CITY OF MERCER ISLAND

COMMUNITY PLANNING & DEVELOPMENT
9611 SE 36TH STREET | MERCER ISLAND, WA 98040
PHONE: 206.275.7605 | www.mercerisland.gov

DECISION

CRITICAL AREA REVIEW 2 CAO23-021

Applicant Owner: Design Build Homes, LLC
c/o Todd Sherman
11400 SE 8th Street
Bellevue, WA 98008
Phone: (206) 909-8187
Email: todd@luxurydbh.com

Engineer/Surveyor: D. R. STRONG Consulting Engineers Inc.
c/o Jeffery Eisenhaur, E.I.T.
620 7th Avenue
Kirkland, WA 98033
Phone: (425) 827-3063
Email: jeffrey.eisenhaur@drstrong.com

Site Address: 4719 86th Avenue SE, Mercer Island WA 98040
Identified by King County Assessor tax parcel number: 7598100420

Zone: R-9.6

Staff Contact: Ryan Harriman, EMPA, AICP, Planning Manager
Phone: (206) 275-7717
Email: ryan.harriman@mercerisland.gov

Project Documents: https://mieplan.mercergov.org/public/SUB23-004

Key Project Dates:

Date of Application:	September 14, 2023
Determined to Be Complete:	September 20, 2023

Notice of Application

Bulletin Notice:	September 25, 2023
Date Mailed:	September 25, 2023
Date Posted on the Subject Property:	September 25, 2023
Comment Period Ended:	5:00 PM on October 25, 2023
Decision Date:	December 4, 2023

Notice of Decision

Bulletin Notice:	December 4, 2023
Date Mailed:	December 4, 2023
Date Posted on the Subject Property:	December 4, 2023
Appeal Period Ended:	5:00 PM on December 18, 2023

Terms Used in this Staff Report

Term:	Refers to, unless otherwise specified:
Applicant	Todd Sherman / Design Build Homes, LLC
Proposed development	Critical area review 2 for a two lot short subdivision
Subject property	4719 86th Avenue SE, Mercer Island WA 98040 King County Assessor tax parcel number: 7598100420
City	City of Mercer Island
MICC	Mercer Island City Code
Code Official	Community Planning and Development Director City of Mercer Island or a duly authorized designee

Exhibits:

1. Development Application, dated September 14, 2023;
2. Letter of completeness, dated September 20, 2023;
3. Notice of Application, dated September 25, 2023;
4. Project Narrative;
5. Site plan prepared by DR Strong Consulting Engineers, dated August 11, 2023;
6. Geotechnical Consultation - Preliminary Slope Assessment, Earth Solutions NW, LLC, dated June 25, 2021;
7. Geotechnical Engineering Study, Earth Solutions NW, LLC, dated February 1, 2022;
8. Critical Area Consultation, Earth Solutions NW, LLC, dated September 13, 2023;
9. Geotech peer review memo, dated September 27, 2023;
10. CAO23-021 – First Review Letter;
11. CAO23-021 – First Review Response Letter;
12. Critical Area Consultation, Earth Solutions NW, LLC, revised November 17, 2023;
13. Response to Comments and Geotechnical Update, Earth Solutions NW, LLC, October 12, 2023;
14. Geotech peer review memo, dated November 28, 2023;
15. Email chain between Ryan Harriman, Planning Manager, and the City's third-party geotechnical engineer, Michele Lorilla, P.E. dated November 28, 2023, and
16. Notice of Decision.

INTRODUCTION:

I. Project Description

The applicant proposes to short subdivide the subject property into two (2) lots. A critical area review 2 (CAR2) application was submitted separately from the preliminary short subdivision application, SUB23-004. A CAR2 is required because the proposed development location is within a mapped geologically hazardous area, specifically a seismic and potential slide hazard area.

II. Site Description and Context

The subject property is located within the R-9.6 Zone and is developed with an existing single-family residence (SFR). The subject property is adjacent to 86th Avenue SE to the east and surrounded by single-family homes to the north, south, and west. The subject property contains mapped seismic and potential slide hazard areas.

FINDINGS OF FACT & CONCLUSIONS OF LAW:

III. Application Procedure

1. The application **(Exhibit 1)** for a CAR2 was received by the City of Mercer Island September 14, 2023. The application was determined to be complete **(Exhibit 2)** on September 20, 2023.

2. According to MICC 19.15.030, Table A, a CAR2 is a Type III land use review. Type III land use reviews require notice of application (discussed below). A notice of decision is issued once the project review is approved by the code official, followed by an appeal period.

3. A notice of application (NOA) was issued on September 25, 2023, and the public comment period ran from September 25, 2023, through October 25, 2023. The NOA was mailed to neighboring property owners within 300 feet (ft) of the subject property, the NOA was posted on the subject property, and posted in the City's weekly permit bulletin **(Exhibit 3)**. No public comments were received.

IV. SEPA Review:

1. The proposed development is exempt from SEPA review pursuant to WAC 197-11-800(6)(d).

V. Consistently with the Critical Areas Code:

1. A development proposal or activity within a critical area is required to address the mitigation sequencing measures in MICC 19.07.100.

   Staff Finding: Pursuant to the Critical Area Consultation, dated September 12, 2023 and revised on November 17, 2023 **(Exhibit 12)**, Earth Solutions NW LLC (ESNW) determined that there are no slope-related geologic hazards located on the subject property. This determination was based on the subsurface data collected during the geotechnical engineering fieldwork, the geotechnical engineering review of the topographic survey for the subject property, and geologic hazard map. ESNW provided an analysis of the mitigation sequencing and recommends foundation elements for the residential structure be seated in the firm native material, anticipated to be encountered at depths below two feet; and maintain a ten-foot linear setback from edge-of-footing to the face of slope. This may require a deviation from the code mandated setback and buffer, yet act to minimize additional surcharge/loading on the remnant sloped region of the subject property to the south of the subject project area.

   ESNW insists that Best Management Practices (BMP) for erosion control will need to be employed during and after site development. This includes site grading to minimize erosion and soil mobilization, temporary erosion control measures during construction, and permanent vegetation to protect sloped areas from the effects of erosive forces.

   Pursuant to the Geotech peer review memo, dated November 28, 2023 **(Exhibit 14)**, the proposed development is consistent with MICC 19.07.100. The Critical Area Consultation, Earth Solutions NW, LLC, revised November 17, 2023 **(Exhibit 12)** meets the requirements of MICC 19.07.100 and MICC 19.07.160 provided that the recommendations presented in Response to Comments and Geotechnical Update, Earth Solutions NW, LLC, October 12, 2023 **(Exhibit 13)**, are incorporated into the proposed stormwater drainage system design.

   Staff Finding: In an email between Ryan Harriman, Planning Manager, and the City's third-party geotechnical engineer, Michele Lorilla, P.E. dated November 28, 2023 **(Exhibit 15)**, the City's third-

party geotechnical engineer indicated the following when asked about ESNW's opinion that the subject property doesn't contain geologically hazardous areas and our maps are outdated:

> *I generally agree with them that the site does not contain geologically hazardous areas based on the soil conditions encountered. As for outdated maps, the development to the south installed a series of soil nail walls that would serve to stabilize the slope, but I do not think that we are updating all the maps based on site developments, so I would not say that they are outdated. The geology and slope steepness can indicate a landslide prone area – and I believe that was what triggered the hazard classification in the first place. It just so happened that the landslide prone designation encroached on a small portion of the site in question. The site has a seismic hazard designation and I am not sure how that designation was established for this site, but I also think that a seismic hazard is not present due to the soil conditions encountered.*

In an email from the City's third-party geotechnical engineer, Michele Lorilla, P.E. dated November 28, 2023 **(Exhibit 15)**, Ryan Harriman, Planning Manager asked the following question: "*Are you of the opinion that the proposed development is minor in nature and will not increase the risk of landslide, erosion, or harm from seismic activity, or that the development site does not meet the definition of a geologically hazardous area?*" Michele Lorilla, P.E., responded with the following statement: "*My opinion is that the site does not meet the definition of a geologically hazardous area based on the soil conditions encountered at the site.*"

2. MICC 19.07.110 lists requirements for a critical area study. A critical area study is required when a development proposal will result in an alteration to one or more critical area buffers or when required to determine the potential impact to a critical area. The critical area study may be waived or modified if the applicant demonstrates that the development proposal will not have an impact on the critical area or its buffer in a manner contrary to the purposes and requirements of this chapter.

   Staff Finding: The Applicant submitted the following reviews/studies as part of the application for CAO23-021:
   - Geotechnical Consultation - Preliminary Slope Assessment, Earth Solutions NW, LLC, dated June 25, 2021 **(Exhibit 6)**;
   - Geotechnical Engineering Study, Earth Solutions NW, LLC, dated February 1, 2022 **(Exhibit 7)**;
   - Critical Area Consultation, Earth Solutions NW, LLC, dated September 13, 2023 **(Exhibit 8)**; and
   - Critical Area Consultation, Earth Solutions NW, LLC, revised November 17, 2023 **(Exhibit 12).**

   The reviews/studies submitted with this application meet the requirements of MICC 19.07.110.

3. MICC 19.07.160 lists standards for development on sites containing geologically hazardous areas.
   A. Geologically hazardous areas are lands that are susceptible to erosion, landslides, seismic events, or other factors as identified by WAC 365-190-120. These areas may not be suited for development activities because they may pose a threat to public health and safety. Areas susceptible to one or more of the following types of hazards shall be designated as geologically hazardous areas: landslide hazard areas, seismic hazard areas, and erosion hazard areas.

   Staff Finding: The proposed development is located within a geological hazardous areas, specifically landslide and seismic hazard areas, pursuant to the City's GIS mapping. A Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 was submitted **(Exhibit 12**) with the CAR2 application. According to ESNW, based on the presence of glacial till throughout the sloped

region which presents a very stable geologic condition as it relates to slope stability. Furthermore, based on the homogeny of the soil throughout the profile of the sloped region (based on observations of the site and site to the south) there is no interbedding of sands and gravels, and the slope has been extremely diminished in overall relief resulting from grading on the adjacent property. It is ESNW's opinion that a landslide hazard may not exist following the re-grading of the sloped area based on the soil type and density and vertical relief and inclination of the remaining slope.

Staff Finding: Pursuant to the Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12)**, glacial till is present throughout the subsurface of the site and within the sloped area to the south of the project area. No groundwater seepage was observed during past site exploration or within the exposed slope on the neighboring property to the south of the subject site. ESNW is of the opinion that there is no liquefaction hazard on the subject site and slope to the south based on the presence of glacial till and lack of a nearsurface groundwater table.

B. Alteration within geologically hazardous areas or associated buffers is required to meet the standards in this section, unless the scope of work is exempt pursuant to section 19.07.120, exemptions, or a critical area review 1 approval has been obtained pursuant to section 19.07.090(A).
    1. When an alteration within a landslide hazard area, seismic hazard area or buffer associated with those hazards is proposed, the applicant must submit a critical area study concluding that the proposal can effectively mitigate risks of the hazard. The study shall recommend appropriate design and development measures to mitigate such hazards. The code official may waive the requirement for a critical area study and the requirements of subsections (B)(2) and (B)(3) of this section when he or she determines that the proposed development is minor in nature and will not increase the risk of landslide, erosion, or harm from seismic activity, or that the development site does not meet the definition of a geologically hazardous area.

Staff Finding: Pursuant to the Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12),** ESNW indicates they are of the opinion that there is no geologically hazardous areas on the subject property, and based on the alterations of the slopes located directly to the south of the subject site, the applicant requested the city waive the requirements in subsections (B)(2) and (B)(3) of this section.

The Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12),** was reviewed and approved by the City of Mercer Island's third-party geotechnical reviewer Michele Lorilla, PE **(Exhibit 14)**, subject to the following condition:

Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12),** meets the requirements of MICC 19.07.100 and MICC 19.07.160 provided that the recommendations presented in Earth Solutions NW, LLC 's letter dated October 12, 2023 **(Exhibit 13)**, are incorporated into the proposed stormwater drainage system design.

Staff Finding: Both ESNW and the City's third-party geotechnical review engineer, Michele Lorilla, P.E., are of the opinion that the subject property does not meet the definition of a geologically hazardous area based on the soil conditions encountered at the site **(Exhibits 12 & 15)**.

2. Alteration of landslide hazard areas and seismic hazard areas and associated buffers may occur if the critical area study documents find that the proposed alteration:

a. Will not adversely impact other critical areas;
b. Will not adversely impact the subject property or adjacent properties;
c. Will mitigate impacts to the geologically hazardous area consistent with best available science to the maximum extent reasonably possible such that the site is determined to be safe; and
d. Includes the landscaping of all disturbed areas outside of building footprints and installation of hardscape prior to final inspection.

Staff Finding: Pursuant to MICC 19.07.160(B)(1) the code official may waive the requirement for a critical area study and the requirements of subsections (B)(2) and (B)(3) of this section (MICC 19.07.160) when he or she determines that the proposed development is minor in nature and will not increase the risk of landslide, erosion, or harm from seismic activity, or that the development site does not meet the definition of a geologically hazardous area.

Staff Finding: Both ESNW and the City's third-party geotechnical review engineer, Michele Lorilla, P.E., are of the opinion that the subject property does not meet the definition of a geologically hazardous area based on the soil conditions encountered at the site **(Exhibits 12 & 15)**. MICC 19.07.160(B)(2) is waived by the code official.

3. Alteration of landslide hazard areas, seismic hazard areas and associated buffers may occur if the conditions listed in subsection (B)(2) of this section are satisfied and the geotechnical professional provides a statement of risk matching one of the following:
   a. An evaluation of site-specific subsurface conditions demonstrates that the proposed development is not located in a landslide hazard area or seismic hazard area;
   b. The landslide hazard area or seismic hazard area will be modified or the development has been designed so that the risk to the site and adjacent property is eliminated or mitigated such that the site is determined to be safe;
   c. Construction practices are proposed for the alteration that would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties; or
   d. The development is so minor as not to pose a threat to the public health, safety and welfare.

Staff Finding: Pursuant to MICC 19.07.160(B)(1) the code official may waive the requirement for a critical area study and the requirements of subsections (B)(2) and (B)(3) of this section (MICC 19.07.160) when he or she determines that the proposed development is minor in nature and will not increase the risk of landslide, erosion, or harm from seismic activity, or that the development site does not meet the definition of a geologically hazardous area.

Staff Finding: Both ESNW and the City's third-party geotechnical review engineer, Michele Lorilla, P.E., are of the opinion that the subject property does not meet the definition of a geologically hazardous area based on the soil conditions encountered at the site **(Exhibits 12 & 15)**. MICC 19.07.160(B)(3) is waived by the code official.

C. Development is allowed within landslide hazard areas and associated buffers, when the following standards are met:
   1. A critical area study shall be required for any alteration of a landslide hazard area or associated buffer;

2. Buffers shall be applied as follows. When more than one condition applies to a site, the largest buffer shall be applied:
    a. Buffer widths shall be equal to the height of a steep slope, but not more than 75 feet, and applied to the top and toe of slopes;
    b. Shallow landslide hazard areas shall have minimum 25-foot buffers applied in all directions; and
    c. Deep-seated landslide hazard areas shall have 75-foot buffers applied in all directions.

Staff Finding: Pursuant to the Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12),** ESNW is of the opinion that there are no critical areas present on the subject property in the form of erosion hazards, landslide hazard, or seismic hazard. ESNW bases this opinion on the fact that glacial till is present across the site and surrounding area, lack of a significant slope following excavation for the neighboring residence to the south, and the lack of a groundwater table. We have recommended a ten-foot horizontal foundation setback from the face of any slope on the site or surrounding the site. ESNW is of the opinion that other buffers would be unnecessary.

Staff Finding: The Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12),** was reviewed and approved by the City of Mercer Island's third-party geotechnical reviewer Michele Lorilla, PE **(Exhibit 14)**, subject to the following condition:

The Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12),** meets the requirements of MICC 19.07.100 and MICC 19.07.160 provided that the recommendations presented in Earth Solutions NW, LLC 's letter dated October 12, 2023 **(Exhibit 13)**, are incorporated into the proposed stormwater drainage system design.

Staff Finding: Both ESNW and the City's third-party geotechnical review engineer, Michele Lorilla, P.E., are of the opinion that the subject property does not meet the definition of a geologically hazardous area based on the soil conditions encountered at the site. The prescribed setbacks as provided in the Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12)**, shall be applicable.

D. When development is proposed within a seismic hazard area:
    1. A critical area study shall be required and shall include an evaluation by a qualified professional for seismic engineering and design, a determination of the magnitude of seismic settling that could occur during a seismic event, and a demonstration that the risk associated with the proposed alteration is within acceptable limits or that appropriate construction methods are provided to mitigate the risk of seismic settlement such that there will be no significant impact to life, health, safety, and property.

Staff Finding: Pursuant to the Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12),** ESNW is of the opinion that seismic hazards do not exist on the subject site based on the lack of a nearsurface groundwater table, presence of glacial till, and lack of and liquefiable soil types.

Staff Finding: Both ESNW and the City's third-party geotechnical review engineer, Michele Lorilla, P.E., are of the opinion that the subject property does not meet the definition of a geologically hazardous area based on the soil conditions encountered at the site (**Exhibits 12 & 15)**.

2. Seismic hazard areas shall be identified by a qualified professional who references and interprets information in the U.S. Geological Survey Active Faults Database, performs on-site evaluations, or applies other techniques according to best available science.

Staff Finding: Pursuant to the Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12),** ESNW reviewed the USGS fault maps for Mercer Island. The nearest mapped fault is located approximately a half-mile to the south of the subject property.

Staff Finding: Both ESNW and the City's third-party geotechnical review engineer, Michele Lorilla, P.E., are of the opinion that the subject property does not meet the definition of a geologically hazardous area based on the soil conditions encountered at the site **(Exhibits 12 & 15)**.

3. When development is proposed on a site with an active fault, the follow provisions shall apply:
   a. A 50-foot minimum buffer shall be applied from latest Quaternary, Holocene, or historical fault rupture traces as identified by the United States Geological Survey or Washington Geological Survey map databases or by site investigations by licensed geologic professionals with specialized knowledge of fault trenching studies; or
   b. Mitigation sequencing shall be incorporated into the development proposal as recommended based on geotechnical analysis by a qualified professional to prevent increased risk of harm to life and/or property.

Staff Finding: Pursuant to the Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023 **(Exhibit 12),** ESNW reviewed the USGS fault maps for Mercer Island. The nearest mapped fault is located approximately a half-mile to the south of the subject property.

Staff Finding: Both ESNW and the City's third-party geotechnical review engineer, Michele Lorilla, P.E., are of the opinion that the subject property does not meet the definition of a geologically hazardous area based on the soil conditions encountered at the site **(Exhibits 12 & 15)**.

CONCLUSIONS:

1. Both ESNW and the City's third-party geotechnical review engineer, Michele Lorilla, P.E., are of the opinion that the subject property does not meet the definition of a geologically hazardous area based on the soil conditions encountered at the site **(Exhibits 12 & 15)**.

2. Based on the information provided in Exhibit 12 and Exhibit 15, it appears that the subject property likely does not contain geologically hazardous areas.

3. The applicant should provide mapping data to the City to revise the GIS Mapping for the subject property.

CONDITIONS OF APPROVAL:

1. The proposed development shall be in substantial conformance with **Exhibit 5** and all applicable development standards contained within Chapter 19.07 Mercer Island City Code (MICC).

2. The applicant is responsible for documenting any required changes in the project proposal due to conditions imposed by any applicable local, state and federal government agencies.

3. The applicant shall ensure that the recommendations contained within the Critical Area Consultation, Earth Solutions NW, LLC, dated September 13, 2023, and revised on November 17, 2023 **(Exhibit 12)** are incorporated into the proposed development of the subject property.

4. The applicant shall ensure that all of the recommendations presented in Earth Solutions NW, LLC's letter dated October 12, 2023 **(Exhibit 13)**, are incorporated into the proposed stormwater drainage system design.

5. Best Management Practices (BMP) for erosion control shall be employed during and after the development of the subject property. This includes site grading to minimize erosion and soil mobilization, temporary erosion control measures during construction, and permanent vegetation to protect sloped areas from the effects of erosive forces.

6. Construction or substantial progress toward construction of a development for which a permit has been granted must be undertaken within three years after the approval of the permit or the permit shall terminate. The code official shall determine if substantial progress has been made.

7. To eliminate the geologically hazardous areas on the subject property, the applicant may provide mapping data to the City.

DEVELOPMENT REGULATION COMPLIANCE – DISCLOSURE:

1. The applicant is responsible for obtaining any required permits or approvals from the appropriate Local, State, and Federal Agencies.

2. All required permits must be obtained prior to the commencement of construction.

DECISION:

Based upon the above noted Findings of Fact and Conclusions of Law, Critical Area Review 2 application CAO23-021, is hereby **APPROVED AS CONDITIONED**. This decision is final, unless appealed in writing consistent with adopted appeal procedures, MICC 19.15.130, and all other applicable appeal regulations.

Approved this 4th day of December 2023.

Ryan Harriman

Ryan Harriman, EMPA, AICP
Planning Manager
Community Planning & Development
City of Mercer Island

If you desire to file an appeal, you must submit the appropriate form, available from the department of Community Planning and Development, and file it with the City Clerk within fourteen (14) days from the date after the notice of decision is made available to the public and applicant pursuant to MICC 19.15.130. Upon receipt of a timely complete appeal application and appeal fee, an appeal hearing will be scheduled. To reverse, modify or remand this decision, the appeal hearing body must find that there has been substantial error, the proceedings were materially affected by irregularities in procedure, the decision was unsupported by material

and substantial evidence in view of the entire record, or the decision is in conflict with the city's applicable decision criteria.

Please note that the City will provide notice of this decision to the King County Department of Assessment, as required by State Law (RCW 36.70B.130). Pursuant to RCW 84.41.030(1), affected property owners may request a change in valuation for property tax purposes notwithstanding any program of revaluation by contacting the King County Department of Assessment at (206) 296-7300.

CITY OF MERCER ISLAND

COMMUNITY PLANNING & DEVELOPMENT

9611 SE 36TH STREET | MERCER ISLAND, WA 98040
PHONE: 206.275.7605 | www.mercerisland.gov

CITY USE ONLY		
PROJECT#	RECEIPT #	**FEE**
Date Received:		
Received By:		

DEVELOPMENT APPLICATION

STREET ADDRESS/LOCATION	ZONE
4719 86th Avenue SE	R-9.6
COUNTY ASSESSOR PARCEL #'S	**PARCEL SIZE (SQ. FT.)**
7598100420	28,644

PROPERTY OWNER *(required)*	ADDRESS *(required)*	CELL/OFFICE *(required)*
Design Built Homes	11400 SE 8th St Bellevue, WA 98004	206-909-8187 E-MAIL *(required)* todd@luxurydbh.com
PROJECT CONTACT NAME	ADDRESS	CELL/OFFICE
Todd Sherman	11400 SE 8th St Bellevue, WA 98004	206-909-8187 E-MAIL todd@luxurydbh.com
TENANT NAME	ADDRESS	CELL PHONE E-MAIL

DECLARATION: I HEREBY STATE THAT I AM THE OWNER OF THE SUBJECT PROPERTY OR I HAVE BEEN AUTHORIZED BY THE OWNER(S) OF THE SUBJECT PROPERTY TO REPRESENT THIS APPLICATION, AND THAT THE INFORMATION FURNISHED BY ME IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

SIGNATURE

9/14/23
DATE

PROPOSED APPLICATION(S) AND CLEAR DESCRIPTION OF PROPOSAL (PLEASE USE ADDITIONAL PAPER IF NEEDED):
The proposed projects is for the Critical Area Review for the Lorenzini Short Plat. This project is subdividing the existing parcel into two lots.

ATTACH RESPONSE TO DECISION CRITERIA IF APPLICABLE

CHECK TYPE OF LAND USE APPROVAL REQUESTED:

CRITICAL AREAS
- ☐ Critical Area Review 1
- ☑ Critical Area Review 2

DESIGN REVIEW
- ☐ Design Review – Signs
- ☐ Design Review – Code Official
- ☐ Design Commission Study Session
- ☐ Design Commission Review – Exterior Alteration
- ☐ Design Commission Review – Major New Construction

DEVIATIONS
- ☐ Deviations to Antenna Standards – Code Official
- ☐ Deviations to Antenna Standards – Design Commission
- ☐ Public Agency Exception
- ☐ Reasonable Use Exception
- ☐ Variance
- ☐ Seasonal Development Limitation Waiver – Wet Season Construction Approval

ENVIRONMENTAL REVIEW (SEPA)
- ☐ SEPA Review
- ☐ Environmental Impact Statement

LEGISLATIVE
- ☐ Code Amendment
- ☐ Comprehensive Plan Docket Application
- ☐ Comprehensive Plan Application (If Docketed)
- ☐ Rezone

OTHER LAND USE
- ☐ Accessory Dwelling Unit
- ☐ Code Interpretation Request
- ☐ Conditional Use (CUP)
- ☐ Noise Exception Type I - IV
- ☐ Other Permit/Services Not Listed

SHORELINE MANAGEMENT
- ☐ Shoreline Exemption
- ☐ Shoreline Substantial Development Permit
- ☐ Shoreline Variance
- ☐ Shoreline Conditional Use Permit
- ☐ Shoreline Permit Revision

SUBDIVISION
- ☐ Short Plat- Preliminary
- ☐ Short Plat- Alteration
- ☐ Short Plat- Final Plat
- ☐ Long Plat- Preliminary
- ☐ Long Plat- Alteration
- ☐ Long Plat- Final Plat
- ☐ Lot Line Revision

WIRELESS COMMUNICATION FACILITIES
- ☐ New Wireless Communication Facility
- ☐ Wireless Communications Facilities- 6409 Exemption
- ☐ Small Cell Deployment
- ☐ Height Variance

September 20, 2023

Design Built Homes
c/o Todd Sherman
11400 SE 8th St
Mercer Island, WA 98040
Via: Email

RE: **CAO23-021** SUB1 Letter of Completeness; 4719 86th Ave SE, Mercer Island, WA 98040

Mr. Sherman,

The City of Mercer Island received the above referenced Critical Area Review 2 (CAR2) application, associated with SUB23-004, for the property located at 4719 86th Ave SE, Mercer Island, WA 98040 (King County parcel no. 759810-0420) on September 14, 2023. The City has assigned file number CAO23-021 to the CAR2 application. Following review of the application, City staff has determined that the application is **complete** for the purpose of review and has established a vesting date of September 14, 2023.

Formal review of the application will now begin in compliance with Title 19 of the Mercer Island City Code (MICC). As review progresses, additional documentation will most likely be requested.

Pursuant to MICC 19.15.110(B), if the applicant fails to provide the required information within 60 days from the date of any request for information, the application shall lapse, and become null and void.

Please do not hesitate to contact me at 206-275-7717 or via e-mail at ryan.harriman@mercerisland.gov if you have any questions.

Best regards,

Ryan Harriman

Ryan Harriman, EMPA, AICP – Planning Manager
City of Mercer Island
Community Planning and Development

COMMUNITY PLANNING & DEVELOPMENT
9611 SE 36TH STREET | MERCER ISLAND, WA 98040
PHONE: 206.275.7605 | www.mercerisland.gov

PUBLIC NOTICE OF APPLICATION

NOTICE IS HEREBY GIVEN for the application described below:

File Nos.:	CAO23-021
Permit Type:	Type III
Description of Request:	A critical areas review 2 application associated with SUB23-004, a proposal to subdivide the parent parcel into two (2) lots.
Applicant/ Owner:	Todd Sherman / Design Built Homes
Location of Property:	4719 86th Ave SE, Mercer Island, WA 98040 King County Tax Parcel No. 7598100420
SEPA Compliance:	The proposed development is exempt from SEPA review pursuant to WAC 197-11-800(6)(d).
Project Documents:	https://mieplan.mercergov.org/public/CAO23-021

Written Comments: This may be the only opportunity to comment on the environmental impacts of the proposal. Written comments on this proposal may be submitted to the City of Mercer Island either by email or by mail to the City of Mercer Island, 9611 SE 36th Street, Mercer Island, WA 98040-3732. Anyone may comment on the application, receive notice, and request a copy of the decision once made. Only those persons who submit written comments or participate at the public hearing (if a hearing is required) will be parties of record; and only parties of record will have the right to appeal.

Public Hearing:	Pursuant to Mercer Island City Code (MICC) MICC 19.15.030 Table A and B a public hearing is not required for Type I-III permits.
Applicable Development Regulations	Applications for a critical areas review 2 approval are required to be processed as a Type III land use reviews pursuant to MICC 19.15.030. Processing requirements for Type III land use reviews are further detailed in MICC 19.15.030. Subdivision and platting standards are located in Chapter 19.08 MICC.
Other Associated Permits:	SUB23-004 https://mieplan.mercergov.org/public/SUB23-004
Environmental Documents:	Copies of all studies and / or environmental documents are available through the above project documents link.

Application Process Information:

Date of Application:	September 14, 2023
Determined to Be Complete:	September 20, 2023
Bulletin Notice:	September 25, 2023
Date Mailed:	September 25, 2023
Date Posted on Site:	September 25, 2023
Comment Period Ends:	5:00PM on October 25, 2023

Project Contact: Ryan Harriman, EMPA, AICP – Planning Manager
Ryan.harriman@mercerisland.gov | (206) 275-7717

D. R. STRONG
CONSULTING ENGINEERS

September 15, 2023

Project No. 21071

CIT OF MERCER ISLAN
PRO ECT NARRATIVE
SHORT S IVISION PRELIMINAR APPROVAL FOR LOREN INI SP

The project is a proposed single-family residential development of 0.657 acres, known as Tax Parcel 7598100420 into **2 sin le- a il residential l ts**. The project is located at 4719 86th Avenue SE in the City of Mercer Island, Washington. All existing improvements will be demolished or removed during plat construction.

Pr ect C ntact In r ati n:

Developer: **esi n ilt H es**
11400 SE 8th St, S ite 41
ellev e, WA 98004
206 909-8187

Engineer/Surveyor: **. R. STRONG C ns ltin En ineers**
620 7th Aven e
ir land, Washin t n 98033
42 827-3063
Maher A. di, P.E.

Land se Per its Re ired:

-Preliminary Plat Approval
-Final Plat Approval
-Environmental Review
-Grading Permit
-Building Permit
-Construction Permit

nin and ensit :

The property and adjacent properties are zoned SR-9.6.

C rrent se Site and e istin i r ve ents:

The parcel is currently developed with one single-family residence. The remainder of the Site is lawn, landscaping and scattered trees. All existing improvements shall be removed.

P tential Critical Areas:

A steep slope area exists to the southwest of the parcels; see attached geotechnical memo.

620 7th Ave.
Kirkland, WA 98033-5565
Phone: (425) 827-3063
Fax: (425) 827-2423
Toll Free: (800) 962-1402

S il T e and raina e C nditi ns:

Per the King County Soil Survey, onsite soil consists of AmC, Arents, Alderwood material, with 6-15% slopes, KpB Kitsap silt loam, 2-8% slopes and KpD Kitsap silt loam, 15-30% slopes. The Site drains primarily to the west and southwest and leaves the Site via sheet flow.

Pr sed se Pr ert :

The Project is proposing to subdivide the existing parcel zoned SR-9.6 (.613 ac. total) into 2 single-family residential lots, per the City of Mercer Island's subdivision process. Both proposed lots meet the geometric requirements of the zoning code.

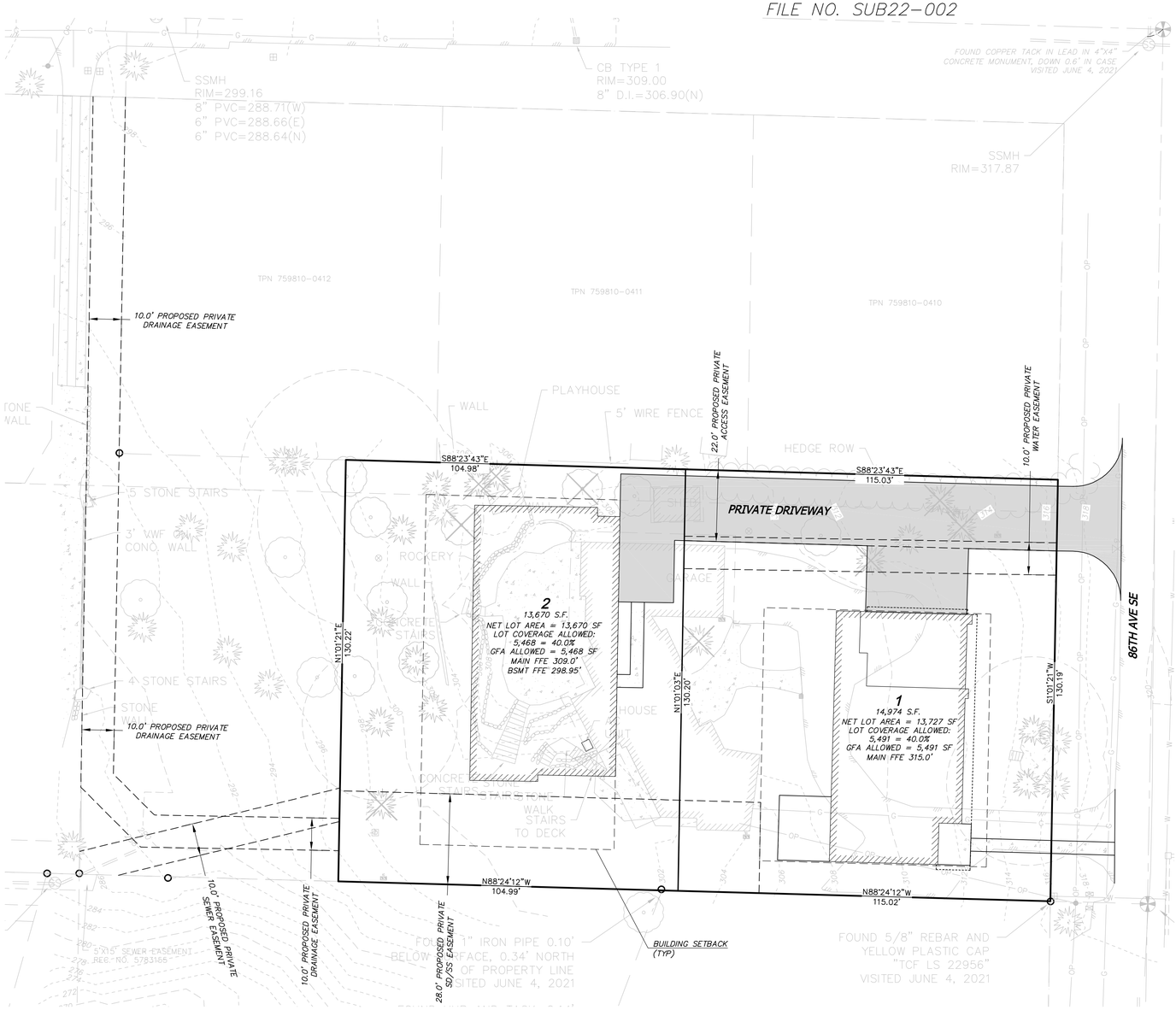
Access, Tra ic, and Circ lati n:

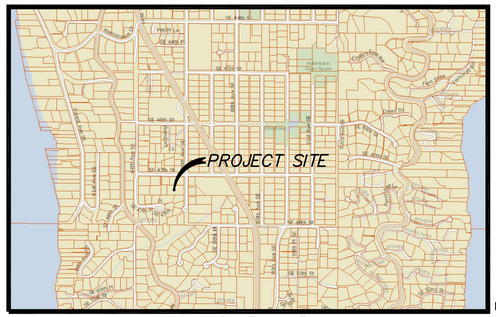
Both lots will access directly from 86th Avenue.

SW 1/4 SECTION 18, TOWNSHIP 24 N, RANGE 5 E, W.M.

LORENZINI SP

FILE NO. SUB22-002





VICINITY MAP:
SCALE: 1"=1,000'

PROJECT CONTACTS:

PROPERTY OWNER/APPLICANT.....TODD SHERMAN
.....DESIGN BUILT HOMES
.....11400 SE 8TH STREET, SUITE 415
.....BELLEVUE, WA 98004
.....(206) 909-8187
.....TODD@LUXURYDBH.COM

CIVIL ENGINEER.....D.R. STRONG CONSULTING ENGINEERS, INC.
.....620 7TH AVENUE
.....KIRKLAND, WASHINGTON 98033
.....(425) 827-3063
.....CONTACT: MAHER A. JOUDI, P.E.
.....MAHER.JOUDI@DRSTRONG.COM

SURVEYOR.....D.R. STRONG CONSULTING ENGINEERS, INC.
.....620 7TH AVENUE
.....KIRKLAND, WASHINGTON 98033
.....(425) 827-3063
.....CONTACT: JAMES G. REICHHOFF, P.L.S.
.....JAMES.REICHHOFF@DRSTRONG.COM

SHEET INDEX:

C1 1 OF 6 TITLE SHEET
C2 2 OF 6 SITE PLAN
C3 3 OF 6 TREE PLAN
C4 4 OF 6 CONCEPTUAL GRADING & UTILITY PLAN

PROJECT DESCRIPTION:

SITE ADDRESS:.....4719 86TH AVENUE SE
TAX PARCEL NUMBER:.....7598100420
NUMBER OF LOTS:.....2
ZONING:.....R-9.6
SITE AREA:.....28,644 S.F. (0.658 ACRES)
GROSS PROJECT AREA:.....24,938 S.F. (0.572 ACRES)
PROPOSED GROSS FLOOR AREA:.....TBD
PROPOSED ONSITE IMPERVIOUS AREA:.....11,029 S.F. (38.5%)
PROPOSED PERVIOUS AREA:.....17,615 S.F. (61.5%)
EXISTING LOT COVERAGE:.....9,079 S.F. (31.7%)
PROPOSED LOT COVERAGE:.....10,826 S.F. (37.8%)
PROPOSED BUILDING HEIGHT:.....TBD
NUMBER OF PARKING SPACES:.....4 MIN.

DEVELOPMENT TABLES

LOT	GROSS LOT AREA (SF)	MAX GFA 40% (SF)	NET LOT AREA (SF)	MAX. LOT COVERAGE (40%) (SF)	MAX. HARDSCAPE (9%) (SF)
1	14,974	5,491	13,727	5,491	1,348
2	13,670	5,468	13,670	5,468	1,230

PROPERTY AREAS	AREA (SF)	AREA (AC)
PROPERTY	28,644	0.658

	NET LOT AREA (SF)	LOT WIDTH (FT)	LOT DEPTH (FT)
ZONE MINIMUM REQUIREMENT	9,600	75.00	80.00
LOT 1	13,727	115.03	130.20
LOT 2	13,670	104.99	130.22

LEGAL DESCRIPTION:

PARCEL A: (TAX PARCEL NO. 759810-0420-03)

THE EAST 220 FEET OF LOT 1, BLOCK 13, VITUS SCHMID'S EAST SEATTLE ACRE TRACTS, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 7 OF PLATS, PAGE 76, RECORDS OF KING COUNTY, WASHINGTON;

EXCEPT THE NORTH 110 FEET OF SAID LOT 1.

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON.

PARCEL B: (TAX PARCEL NO. 759810-0421-02)

LOTS 1 AND 2, BLOCK 13, VITUS SCHMID'S EAST SEATTLE ACRE TRACTS, AS PER PLAT RECORDED IN VOLUME 7 OF PLATS, PAGE 76, RECORDS OF KING COUNTY, WASHINGTON;

EXCEPT THE EAST 220 FEET OF SAID LOTS 1 AND 2;

AND EXCEPT THE NORTH 110 FEET OF THE WEST 70 FEET OF THE EAST 290 FEET OF SAID LOT 1.

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON.

VERTICAL DATUM:

NAVD 88

TITLE RESTRICTIONS:

PARCEL A AND B:

1. THESE PARCELS (SITE) ARE SUBJECT TO COVENANTS, CONDITIONS, RESTRICTIONS, RECITALS, RESERVATIONS, EASEMENTS, EASEMENT PROVISIONS, DEDICATIONS, BUILDING SETBACK LINES, NOTES, STATEMENTS, AND OTHER MATTERS, IF ANY, BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, INCLUDING BUT NOT LIMITED TO THOSE BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, OR SOURCE OF INCOME, AS SET FORTH IN APPLICABLE STATE OR FEDERAL LAWS, EXCEPT TO THE EXTENT THAT SAID COVENANT OR RESTRICTION IS PERMITTED BY APPLICABLE LAW, AS SET FORTH ON THE PLAT OF VITUS SCHMID'S EAST SEATTLE ACRE TRACTS, AS RECORDED UNDER RECORDING NUMBER 78513.

2. THESE PARCELS (SITE) ARE SUBJECT TO COVENANTS, CONDITIONS AND RESTRICTIONS BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, INCLUDING BUT NOT LIMITED TO THOSE BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, SOURCE OF INCOME, GENDER, GENDER IDENTITY, GENDER EXPRESSION, MEDICAL CONDITION, OR GENETIC INFORMATION, AS SET FORTH IN APPLICABLE STATE OR FEDERAL SAWS, EXCEPT TO THE EXTENT THAT SAID COVENANT OR RESTRICTION IS PERMITTED BY APPLICABLE LAW, AS SET FORTH IN DOCUMENT RECORDED MAY 16, 1972 UNDER RECORDING NUMBER 7205160582.

3. THESE PARCELS (SITE) ARE SUBJECT TO CITY, COUNTY, OR LOCAL IMPROVEMENT DISTRICT ASSESSMENTS, IF ANY.

BENCHMARK:

FOUND COPPER TACK IN LEAD IN 4"X4" CONCRETE MONUMENT, DOWN 0.6' IN CASE, AT THE INTERSECTION OF 86TH AVENUE SE AND SE 47TH STREET. GNSS OBSERVATION OF MONUMENT PRODUCED THE ELEVATION OF 317.158'.

REFERENCES:

1. (P) PLAT OF VITUS SCHMID'S EAST SEATTLE ACRE TRACTS, VOLUME 7 OF PLATS, PAGE 76
2. (P2) PLAT OF HILL HIGH ESTATES, VOLUME 68 OF PLATS, PAGE 28
3. (P3) PLAT OF DANIEL'S ADDITION, VOLUME 72 OF PLATS, PAGE 60
4. RECORD OF SURVEY, AFN 202012039000015
5. RECORD OF SURVEY, AFN 201802289000009
6. RECORD OF SURVEY, AFN 9006149020
7. RECORD OF SURVEY, AFN 200503219000011
8. RECORD OF SURVEY, AFN 200802089000017

FIRE MARSHAL NOTE:

ALL BUILDING PERMITS ARE SUBJECT TO MEETING CURRENT FIRE CODE REQUIREMENTS AT THE TIME OF A COMPLETE SUBMITTAL, INCLUDING FIRE APPARATUS ACCESS AS OUTLINED IN ADOPTED CODE SECTIONS OF THE INTERNATIONAL FIRE CODE APPENDIX D. FIRE PLAN REVIEWS WILL BE CONDUCTED AT THE TIME OF BUILDING PERMIT SUBMITTAL AND MAY REQUIRE ADDITIONAL FIRE PROTECTION SYSTEMS AND/OR ADDITIONAL FIRE PREVENTION MEASURES FOR BUILDING APPROVAL.

BASIS OF BEARINGS:

NORTH 01°01'21" EAST BETWEEN THE MONUMENTS FOUND AT THE INTERSECTION OF 86TH AVENUE SE AND SE 47TH STREET, AND IN THE CENTERLINE OF 86TH AVENUE SE AND CUL-DE-SAC, AS SHOWN ON THE PLAT OF HILL HIGH ESTATES, VOLUME 68 OF PLATS, PAGE 28

NORTH
GRAPHIC SCALE
0 10 20 40
1 INCH = 20 FT.

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D.R. STRONG CONSULTING ENGINEERS
ENGINEERS PLANNERS SURVEYORS
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O 425.827.3063 F 425.827.2423

LORENZINI SP
TITLE SHEET
4719 86TH AVENUE SE
MERCER ISLAND, WASHINGTON
PARCEL NO. 7598100420

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BELLEVUE, WASHINGTON 98004
206-909-8187

MAHER A. JOUDI — 49232 — REGISTERED PROFESSIONAL ENGINEER — 08-11-23

DATE	REVISION	APR
12.09.22	REVS. PER AGENCY COMMENTS	MAJ
07.18.23	REVS. PER AGENCY COMMENTS	MAJ
08.11.23	REVISED ARBORIST REPORT	MAJ

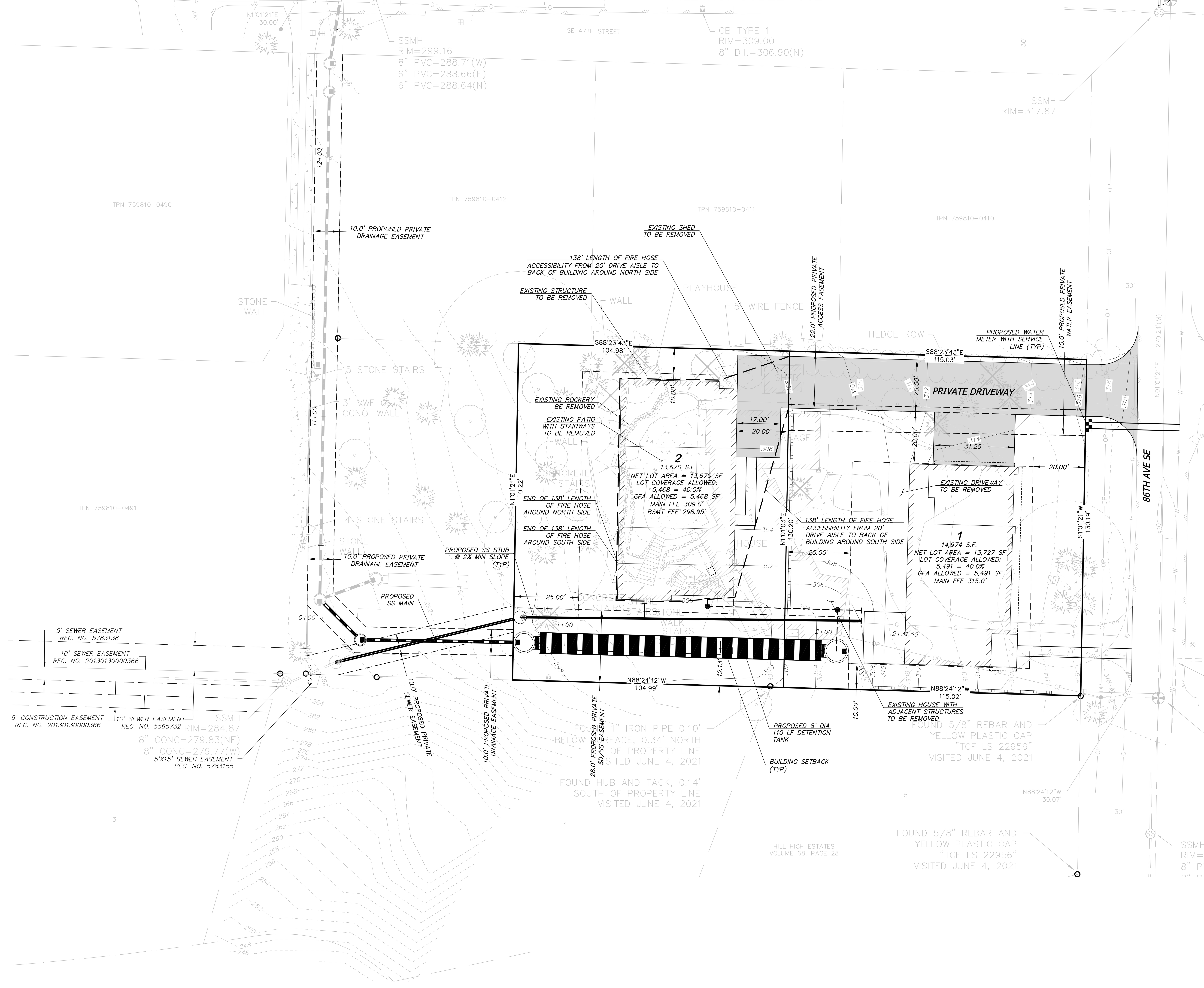
DRAFTED BY: JSE
DESIGNED BY: JSE
PROJECT ENGINEER: MAJ
DATE: 12.20.21
PROJECT NO.: 21071

DRAWING: C1
SHEET: 1 OF 4

SW 1/4 SECTION 18, TOWNSHIP 24 N, RANGE 5 E, W.M.

LORENZINI SP

FILE NO. SUB22-002



LEGEND:

- FOUND SECTION CORNER AS NOTED
- FOUND MONUMENT AS NOTED
- FOUND CORNER MONUMENT AS NOTED
- MAIL BOX
- POWER METER
- POWER POLE
- WATER METER
- ROCKERY
- STORM DRAIN CATCH BASIN
- SANITARY SEWER MANHOLE
- GAS VALVE
- GAS METER
- VBF VERTICAL BOARD FENCE
- DECIDUOUS TREE
- EVERGREEN TREE
- SANITARY SEWER LINE
- STORM LINE
- OP OVERHEAD POWER
- W UNDERGROUND WATER
- G UNDERGROUND GAS
- EDGE OF PAVEMENT
- X FENCE
- CONCRETE

PROJECT NOTES:

NUMBER OF LOTS:............ 2

LOT 1 AVERAGE SLOPE:............7.5%

LOT 2 AVERAGE SLOPE:............8.5%

PROPOSED STRUCTURE AREA:............TBD

PROPOSED ONSITE IMPERVIOUS AREA:............11,029 S.F. (38.5%)

PROPOSED PERVIOUS AREA:............17,615 S.F. (61.5%)

EXISTING LOT COVERAGE:............9,079 S.F. (31.7%)

PROPOSED LOT COVERAGE:............10,826 S.F. (37.8%)

PROPOSED BUILDING HEIGHT:............TBD

AVERAGE BUILDING ELEVATION:............ TBD

EXISTING LANDSCAPING:............17,614 FT. (61.5%)

PROPOSED LANDSCAPING:............17,615 S.F. (61.5%)

NUMBER OF PARKING SPACES:............4 MIN.

LEGAL DESCRIPTION:

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NORTH

GRAPHIC SCALE

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1 INCH = 20 FT.

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DRS
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LORENZINI SP

SITE PLAN

4719 86TH AVENUE SE
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DRAWING: C2
SHEET: 2 OF 4

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LORENZINI SP

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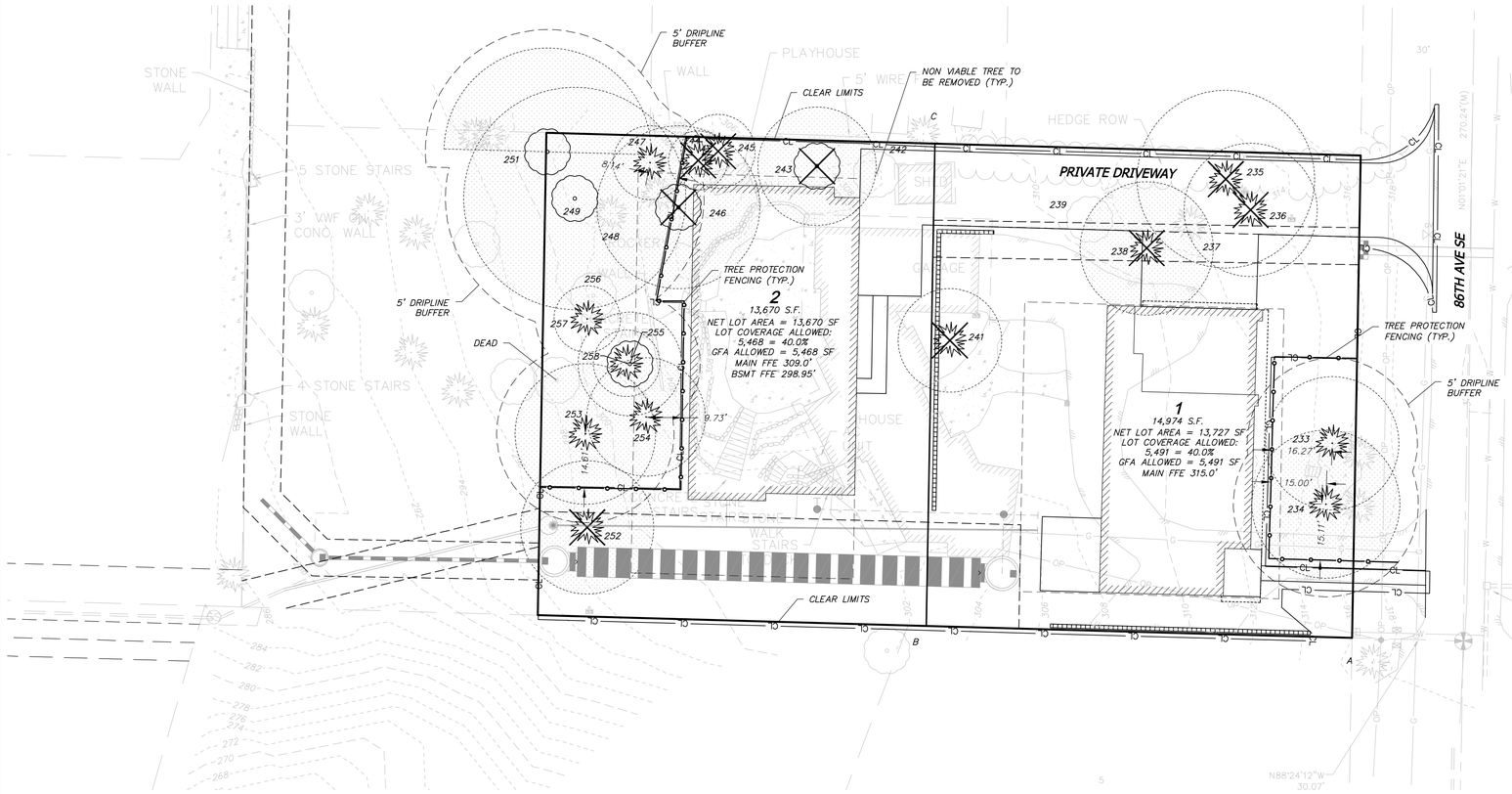

TREE RETENTION CALCULATION

TOTAL ONSITE TREES:	24
TOTAL VIABLE ONSITE TREES:	19
TOTAL NUMBER OF EXCEPTIONAL TREES:	11
REQUIRED TREE CREDITS: 30% X 24 TREES:	8
PROPOSED VIABLE TREES RETAINED:	10/52.6%

OFFSITE TREE

123 24 DRIPLINE OF VIABLE TREE

123 24 DRIPLINE OF EXCEPTIONAL, VIABLE TREE

123 24 NON VIABLE TREE TO BE REMOVED

123 24 VIABLE TREE TO BE REMOVED

CLEARING LIMIT NOTE

CLEARING LIMITS AND TREE PROTECTION FENCING ALONG WEST SIDE OF LOT 2 ARE TO BE COINCIDENTAL. SPACE SHOWN FOR CLARITY OF LINETYPES ONLY.

TREE RETENTION NOTE

ANY CONSTRUCTION WITHIN THE DRIPLINE OF A TREE TO BE RETAINED WILL REQUIRE AN AIR EXCAVATION ANALYSIS TO DETERMINE THAT THE TREE WILL NOT BE DAMAGED DURING CONSTRUCTION.

TREE REPLACEMENT TABLE

DIAMETER OF REMOVED TREE (MEASURES 4.5 FEET ABOVE GROUND)	TREE REPLACEMENT RATIO	NUMBER OF TREES PROPOSED FOR REMOVAL	NUMBER OF TREES REQUIRED FOR REPLACEMENT BASED ON SIZE/TYPE
LESS THAN 10-INCHES AND NON-VIABLE TREES	1	0	0
10-INCHES UP TO 24-INCHES	2	3	6
GREATER THAN 24-INCHES UP TO 36-INCHES	3	2	6
GREATER THAN 36-INCHES AND ANY EXCEPTIONAL TREE	6	4	24
	TOTAL REQUIRED TREE REPLACEMENT:		36 REQUIRED

#	Tree Tag #	Species ID	DBH (in)	Adj. DBH (in)	Drip-line radius (ft)	Wind-firm	OK in Grove	Health	Defects/Comments	Proposed Action: Ret. Viable	Remove Non-viable	Remove Construct	CRZ/TPZ/LOD Radius in feet N	W	E	S	Exceptional tree DBH > 24"	Value	Healthy Trees	Retained trees	Replacement
1	233	Douglas fir	21	21	18			OK	Typical of species	1			18	16	18	18	N	1	1	1	
2	**234**	**Douglas fir**	**28**	**28**	**20**			**OK**	**Self-corrected lean towards west, dead wood, broken branches, dead twigs, typical of species**	**1**			**20**	**15**	**20**	**15**	**Y**	**1**	**1**	**1**	
3	235	Douglas fir	22	22	24			OK	Debris over crown, previous top loss, coning, dead wood, broken branches, typical of species			1	24	24	24	24	N	1	1		2
4	236	Douglas fir	19	19	18			OK	Previous ivy @ root crown up to 50', typical of species, asymmetric canopy towards north			1	18	18	18	18	N	1	1		2
5	237	Douglas fir	19	19	16			Fair	Self-corrected lean towards north, serpentine trunk, co-dominant leaders with included bark x2 @ 30' towards north, strong leader, reaction wood, horizontal crack @ 25', column of decay @ root crown up to 12' towards west, 3 calloused wounds towards west, free flowing sap			1	16	16	16	16	N	1			
6	**238**	**Douglas fir**	**24**	**24**	**18**		**Y**	**Fair**	**Exposed roots, moss and lichen, previous top loss, dead wood, broken branches, elongated branches**			1	**18**	**18**	**18**	**18**	**Y**	**1**	**1**		3
7	**239**	**Bigleaf maple**	**38**	**38**	**38**			**Fair**	**Calloused wound @ 6' towards south, exposed roots, decay in roots towards north, dead wood, broken branches, grade lowered 3' towards east**		1		**38**	**38**	**38**	**38**	**Y**	**1**			
8	241	Scots pine	13	13	14			OK	Typical of species			1	14	14	14	14	N	1	1		2
9	242	Bigleaf maple	16	16	14			Fair	Vertical crack @ 3' up to 10' towards south, co-dominant leaders with included bark x3 @ 10'		1		14	14	14	14	N	1			
10	**243**	**Bigleaf maple**	**10, 8, 14, 15**	**24**	**16**			**OK**	**Co-dominant leaders with included bark x4 @ root crown, moss and lichen, typical of species**			**1**	**16**	**16**	**16**	**16**	**Y**	**1**	**1**		**3**
11	244	White pine	15	15	8			OK	Serpentine trunk, dead wood, broken branches, typical of species			1	8	8	8	8	N	1	1		6
12	245	White pine	19	19	10			OK	Dead wood, broken branches, a towards east, typical of species			1	10	10	10	10	N	1	1		6
13	**246**	**Bigleaf maple**	**17, 18**	**25**	**22**			**OK**	**Co-dominant leaders with included bark x2 @ 2', asymmetric canopy towards south, typical of species**			**1**	**22**	**22**	**22**	**22**	**Y**	**1**	**1**		6
14	247	White pine	11	11	10			OK	Suppressed canopy, dead wood, broken branches, typical of species	1			10	10	10	10	N	1	1	1	
15	248	Douglas fir	19	19	18			Fair	Epicormic branch formation @ 25' towards south, previous top loss, elongated branches, serpentine trunk, asymmetric canopy towards south		1		18	18	18	18	N	1			
16	**249**	**Bigleaf maple**	**16, 44**	**47**	**30**		**Y**	**Fair**	**Co-dominant leaders with included bark x2 @ 4', exposed roots, calloused wound, dead wood, broken branches, asymmetric canopy towards north**	**1**			**30**	**30**	**21**	**30**	**Y**	**1**	**1**	**1**	
17	**251**	**Bigleaf maple**	**26**	**26**	**28 north only**			**OK**	**Asymmetric canopy towards north, typical of species, dead wood, moss and lichen**	**1**			**28**	**28**	**28**	**28**	**Y**	**1**	**1**	**1**	
18	**252**	**Douglas fir**	**28**	**28**	**18**		**Y**	**Fair**	**Self-corrected lean towards south, fill over crown, abnormal bark, popping bark, previous top loss, elongated branches, typical of species, dead wood, broken branches**			**1**	**18**	**18**	**18**	**18**	**Y**	**1**	**1**		6
19	**253**	**Douglas fir**	**36**	**36**	**19**			**OK**	**Dead wood, broken branches, previous top loss, carpenter ants bark only**	**1**			**19**	**19**	**7**	**19**	**Y**	**1**	**1**	**1**	
20	**254**	**Douglas fir**	**36, 28**	**45.5**	**16**			**OK**	**Co-dominant leaders with included bark x2 @ 1', previous top loss @ 50', strong laterals, dead wood, broken branches, abnormal bark, popping bark, woodpecker activity**	**1**			**16**	**16**	**16**	**16**	**Y**	**1**	**1**	**1**	
21	255	Douglas fir	16	16	14		Y	Fair	Abnormal bark, shedding bark, popping bark, topped @ 50', strong lateral, low live crown ratio <10%	1			14	14	14	14	N	1	1	1	
22	**256**	**Bigleaf maple**	**36, 24**	**43.5**	**26**			**Poor**	**Co-dominant leaders with included bark x2 @ 1', dead scaffolds, dead wood, cavity @ 3' towards north**		**1**		**26**	**26**	**26**	**26**	**Y**	**1**			
23	257	Incense cedar	8, 9	12	9			OK	Co-dominant leaders with included bark x2 @ 3', typical of species	1			9	9	9	9	N	1	1	1	
24	258	Incense cedar	18	18	9			OK	Typical of species	1			9	9	9	9	N	1	1	1	
										24	10	5	9					24	19	10	36

NORTH

GRAPHIC SCALE
0 10 20 40
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TREE PLAN
4719 86TH AVENUE SE
MERCER ISLAND, WASHINGTON
PARCEL NO. 7598100420

TODD SHERMAN
DESIGN BUILT HOMES
11400 SE 8TH STREET, SUITE 415
BELLEVUE, WASHINGTON 98004
206-909-8187

MAJER A. JOUDEH 46232 REGISTERED PROFESSIONAL ENGINEER 08-09-23

DATE	REVISION	APR
12.09.22	REVS. PER AGENCY COMMENTS	MAJ
07.18.23	REVS. PER AGENCY COMMENTS	MAJ
08.09.23	REVISED ARBORIST REPORT	MAJ

DRAFTED BY: JSE
DESIGNED BY: JSE
PROJECT ENGINEER: MAJ
DATE: 12.20.21
PROJECT NO.: 21071

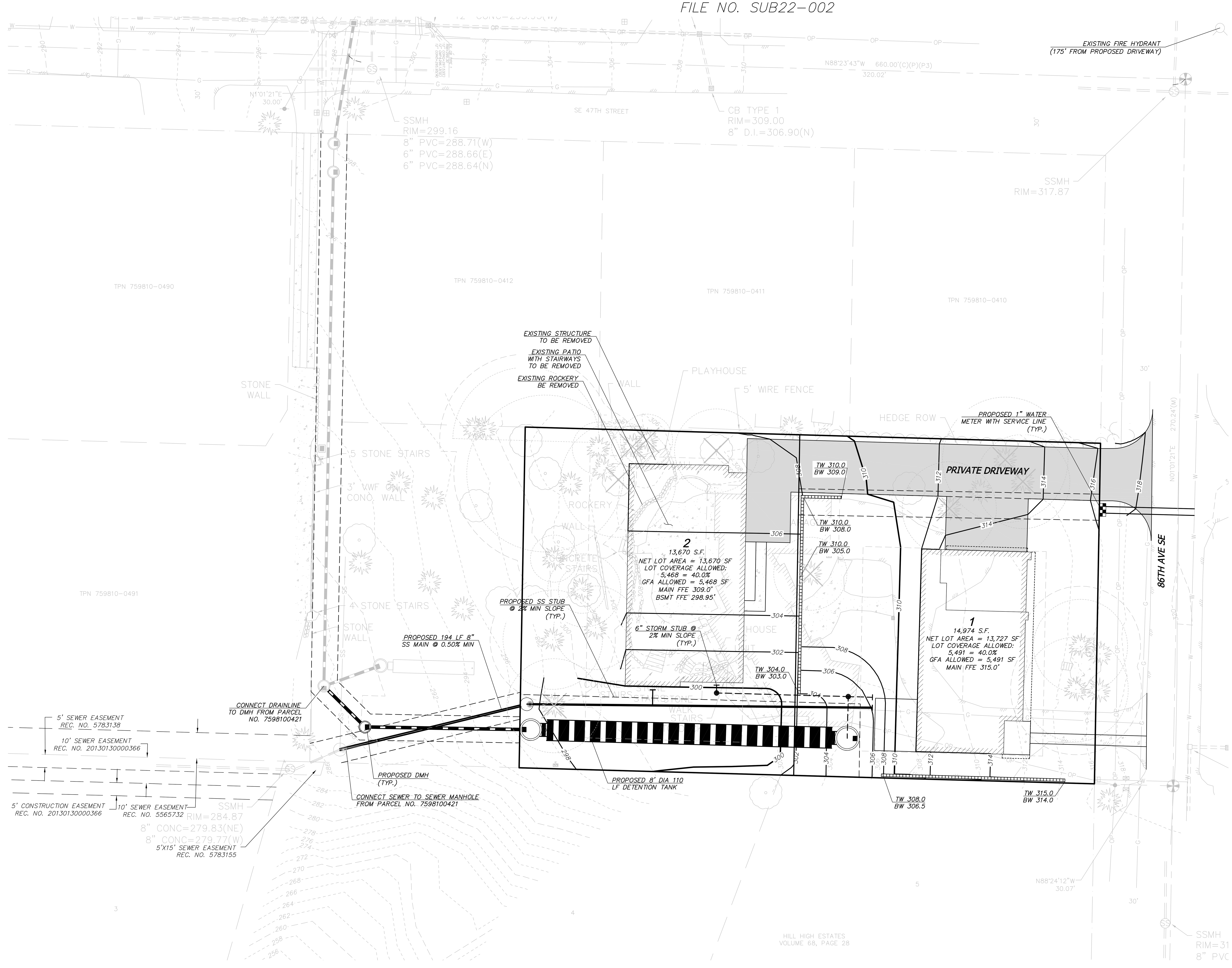
DRAWING: C3
SHEET: 3 OF 4

CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN (SWPPP)
A CONSTRUCTION STORMWATER POLLUTION PREVENTION PLAN WILL BE PREPARED AT FINAL ENGINEERING EACH OF THE 13 CONSTRUCTION SWPPP ELEMENTS ARE TO BE CONSIDERED RESPECTIVELY.

SW 1/4 SECTION 18, TOWNSHIP 24 N, RANGE 5 E, W.M.

LORENZINI SP

FILE NO. SUB22-002



LEGEND:

- FOUND SECTION CORNER AS NOTED
- FOUND MONUMENT AS NOTED
- FOUND CORNER MONUMENT AS NOTED
- MAIL BOX
- POWER METER
- POWER POLE
- WATER METER
- ROCKERY
- STORM DRAIN CATCH BASIN
- SANITARY SEWER MANHOLE
- GAS VALVE
- GAS METER
- VBF VERTICAL BOARD FENCE
- DECIDUOUS TREE
- EVERGREEN TREE
- SANITARY SEWER LINE
- STORM LINE
- OP OVERHEAD POWER
- W UNDERGROUND WATER
- G UNDERGROUND GAS
- EDGE OF PAVEMENT
- X FENCE
- CONCRETE

SITE VOLUME CALCULATIONS

CUT VOLUME (CU. YDS.)	FILL VOLUME (CU. YDS.)	NET VOLUME (CU. YDS.)
535	766	231 FILL

"ALL VOLUMES ARE APPROXIMATE AND REPRESENT FINISH GRADE TO EXISTING GRADE AS SHOWN.
THE VOLUMES DO NOT INCLUDE STRIPPING, STRUCTURAL EXCAVATION, EXPANSION FACTOR OR ANY SOIL TYPE RESTRICTIONS".

LEGAL DESCRIPTION:

PARCEL A: (TAX PARCEL NO. 759810-0420-03)

THE EAST 220 FEET OF LOT 1, BLOCK 13, VITUS SCHMID'S EAST SEATTLE ACRE TRACTS, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 7 OF PLATS, PAGE 76, RECORDS OF KING COUNTY, WASHINGTON;

EXCEPT THE NORTH 110 FEET OF SAID LOT 1.

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON.

PARCEL B: (TAX PARCEL NO. 759810-0421-02)

LOTS 1 AND 2, BLOCK 13, VITUS SCHMID'S EAST SEATTLE ACRE TRACTS, AS PER PLAT RECORDED IN VOLUME 7 OF PLATS, PAGE 76, RECORDS OF KING COUNTY, WASHINGTON;

EXCEPT THE EAST 220 FEET OF SAID LOTS 1 AND 2;

AND EXCEPT THE NORTH 110 FEET OF THE WEST 70 FEET OF THE EAST 290 FEET OF SAID LOT 1.

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON.

VERTICAL DATUM:

NAVD 88

BENCHMARK:

FOUND COPPER TACK IN LEAD IN 4"X4" CONCRETE MONUMENT, DOWN 0.6' IN CASE, AT THE INTERSECTION OF 86TH AVENUE SE AND SE 47TH STREET. GNSS OBSERVATION OF MONUMENT PRODUCED THE ELEVATION OF 317.158'.

FIRE MARSHAL NOTE:

ALL BUILDING PERMITS ARE SUBJECT TO MEETING CURRENT FIRE CODE REQUIREMENTS AT THE TIME OF A COMPLETE SUBMITTAL, INCLUDING FIRE APPARATUS ACCESS AS OUTLINED IN ADOPTED CODE SECTIONS OF THE INTERNATIONAL FIRE CODE APPENDIX D. FIRE PLAN REVIEWS WILL BE CONDUCTED AT THE TIME OF BUILDING PERMIT SUBMITTAL AND MAY REQUIRE ADDITIONAL FIRE PROTECTION SYSTEMS AND/OR ADDITIONAL FIRE PREVENTION MEASURES FOR BUILDING APPROVAL.

BASIS OF BEARINGS:

NORTH 01°01'21" EAST BETWEEN THE MONUMENTS FOUND AT THE INTERSECTION OF 86TH AVENUE SE AND SE 47TH STREET, AND IN THE CENTERLINE OF 86TH AVENUE SE AND CUL-DE-SAC, AS SHOWN ON THE PLAT OF HILL HIGH ESTATES, VOLUME 68 OF PLATS, PAGE 28

NORTH

GRAPHIC SCALE
0 10 20 40
1 INCH = 20 FT.

Call 2 Working Days Before You Dig
811
Utilities Underground Location Center
(ID,MT,ND,OR,WA)

R:\2021\0\21071\3\Drawings\Plots\PP\04-3FG21071.dwg 8/11/2023 12:11:10 PM

DRS
D.R. STRONG CONSULTING ENGINEERS
ENGINEERS PLANNERS SURVEYORS
620 - 7th AVENUE KIRKLAND, WA 98033
O 425.827.3063 F 425.827.2423

LORENZINI SP
CONCEPTUAL GRADING & UTILITY PLAN
4719 86TH AVENUE SE
MERCER ISLAND, WASHINGTON
PARCEL NO. 7598100420

TODD SHERMAN DESIGN BUILT HOMES
11400 SE 8TH STREET, SUITE 415
BELLEVUE, WASHINGTON 98004
206-909-8187

MAHER A. JOUDI — STATE OF WASHINGTON — 45232 REGISTERED PROFESSIONAL ENGINEER — 08-11-23

DATE	REVISION	APR
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DRAFTED BY: JSE
DESIGNED BY: JSE
PROJECT ENGINEER: MAJ
DATE: 12.20.21
PROJECT NO.: 21071

DRAWING: C4
SHEET: 4 OF 4

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

June 25, 2021
ES-8009

Design Built Homes
11400 Southeast 8th Street, Suite 415
Bellevue, Washington 98004

Attention: Mr. Todd Sherman

Subject: Geotechnical Consultation
Preliminary Slope Assessment
Lorenzini Short Plat
4719 – 86th Avenue Southeast
Mercer Island, Washington

Dear Mr. Sherman:

Earth Solutions NW, LLC (ESNW) has prepared this letter for the proposed residential development located at 4719 – 86th Avenue Southeast in Mercer Island, Washington. The purpose of this letter was to provide an opinion regarding slope stability, and geotechnical recommendations for slope setbacks based on observation of several shallow test pits excavated with hand tools, review of the geologic maps for the area, and review of LiDAR imagery for the area.

Project Description

The subject site is located on the west side of 86th Avenue Southeast, south of the intersection with Southeast 47th Street in Mercer Island, Washington. The site is currently developed with a single-family residential structure, driveway, and general landscape areas. The site sits atop a slope which descends towards the south and neighboring properties. The slope is inclined at 35 percent, based on our review of the available topographic survey for the site. The site is surrounded by developed parcels occupied by residences, and associated improvements.

Re-development plans include removal of the existing structure, and construction of two single-family residences and associated improvements.

Surface Conditions

Native trees are present on and around the slope, and the slope is heavily vegetated with underbrush and blackberries. During our site visit a representative of ESNW observed the areas on and around the top-of-slope. No signs of instability in the form of highly pistol-butted tree trunks, surface seeps, slide scarps, or down-sets were observed within accessible portions of the upper slope.

We reviewed the LiDAR imagery for the slope and site, and observed no signs of past or present instability in the form of crescent-shaped morphology in the slope, downsets, or hummocks. However, fidelity of the LiDAR is limited and somewhat difficult to ascertain as to the presence of past small-scale landslides and scarp formation.

Geologic Setting

The referenced geologic map resource identifies Vashon subglacial till (Qvt) deposits across the site and surrounding areas. The referenced SCS soil survey identifies Arents Alderwood series soils (AmC) across the majority of the site, with Kitsap silt loam 2 to 8 percent slopes (KpB) mapped for the west side of the site, and Kitsap silt loam 15 to 30 percent slopes (KpD) mapped for the area to the south of the existing residence. Arents Alderwood series soils are typified by glacial till, whereas Kitsap series soils are typified by lacustrine depositional environments.

The soil conditions observed at the test pit locations, excavated around the top-of-slope, are generally consistent with glacial till deposits. In our opinion, the site lies in an area underlain by glacial till based on our review and limited subsurface exploration.

Subsurface

We reviewed test pit logs by others as part of the preparation of this report. The test pits were located to the southwest of the subject site, and were described as being excavated within glacial till soil as reviewed on the DNR geology portal which is available on-line.

The soil conditions at the test locations ESNW excavated using hand tools to a depth of two feet were observed to be silty sand (Unified Soil Classification, SM) and sandy silt (ML). The soil density was observed to transition from medium dense to dense at depths of about one and one-half feet.

Groundwater

Groundwater seepage was not observed in the test pits that were excavated June 23, 2021.

Geological Hazard Areas

A slope meeting the criteria for a landslide hazard area is present off the southern and western sides of the property. The slope descends from the site elevation towards the south and southwest.

The City of Mercer Island landslide hazard map describes slopes inclined at 15 percent and higher for the slope under concern. Based on our review of the available topographic survey, the slope is inclined at about 35 percent starting at elevation 290 and descending to elevation 244. Additionally, the map identifies a scarp to the southwest of the subject site, located above the roadway located at the toe-of-slope offsite.

We observed no signs of instability during our site visit in June of 2021. Indicators of slope instability are described above in the Surface Conditions section of this letter.

Recommendations

Based on our review of the city code (19.07.160) in relation to geologically hazardous areas, we have determined (based on our limited site exploration and analysis) that landslide hazards areas are not present on the site based on the inclination of the slope, and the presumed subsurface conditions at-depth within the slope regions on the subject site. Meaning that we do not anticipate a permeable soil type underlain by a less permeable soil type.

In our opinion, a 10-foot separation should be maintained between the face-of-slope and edge-of-foundation.

It is our understanding, and the client's, that a more in-depth analysis may be required to determine the global stability characteristics within the slopes on/around the subject site, as this report is cursory in nature and intended for feasibility reasons. ESNW can provide a more thorough slope stability study upon request.

Limitations

The recommendations and conclusions provided in this geotechnical engineering study are professional opinions consistent with the level of care and skill that is typical of other members in the profession currently practicing under similar conditions in this area. A warranty is not expressed or implied. Variations in the soil and groundwater conditions encountered at the test sites may exist, and may not become evident until construction. ESNW should reevaluate the conclusions in this letter if variations are encountered.

We trust this geotechnical assessment meets your current needs. If you have any questions, or if additional information is required, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC

06/25/2021

Stephen H. Avril
Senior Project Geologist

Kyle R. Campbell, P.E.
Principal Engineer

Earth Solutions NW LLC

Geotechnical Engineering
Construction Observation/Testing
Environmental Services

GEOTECHNICAL ENGINEERING STUDY
LORENZINI SHORT PLAT
4719 – 86TH AVENUE SOUTHEAST AND
84XX SOUTHEAST 47TH STREET
MERCER ISLAND, WASHINGTON

ES-8009.01

15365 N.E. 90th Street, Suite 100 Redmond, WA 98052
(425) 449-4704 Fax (425) 449-4711
www.earthsolutionsnw.com

PREPARED FOR

DESIGN BUILT HOMES, LLC

February 1, 2022

Stephen H. Avril
Project Manager

02/01/2022

Kyle R. Campbell, P.E.
Principal Engineer

GEOTECHNICAL ENGINEERING STUDY
LORENZINI SHORT PLAT
4719 – 86TH AVENUE SOUTHEAST AND
84XX SOUTHEAST 47TH STREET
MERCER ISLAND, WASHINGTON

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Earth Solutions NW, LLC
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Phone: 425-449-4704 | Fax: 425-449-4711
www.earthsolutionsnw.com

Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will not be adequate to develop geotechnical design recommendations for the project.

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not read selective elements only. *Read and refer to the report in full.*

You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*

responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are not final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for information purposes only.* To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures.* If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration*** by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org

February 1, 2022
ES-8009.01

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

Design Built Homes, LLC
11400 Southeast 8th Street, Suite 415
Bellevue, Washington 98004

Attention: Mr. Todd Sherman

Dear Mr. Sherman:

Earth Solutions NW, LLC (ESNW) is pleased to present this report titled "Geotechnical Engineering Study, Lorenzini Short Plat, 4719 – 86th Avenue Southeast and 84XX Southeast 47th Street, Mercer Island, Washington".

The native soil underlying the site consists of glacial till based on our observation of the subsurface conditions. In our opinion, the proposed residence can be supported on conventional continuous and spread footing foundations bearing on competent native soils, competent existing fill, or new structural fill. We anticipate suitable bearing soils will be encountered at depths of approximately two feet below existing grades. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of the soils to the specifications of structural fill, or overexcavation and replacement with a suitable structural fill material will be necessary.

Groundwater seepage was not observed during our fieldwork (December 22, 2021). However, the client should anticipate groundwater seepage on the site at the contact with the unweathered glacial till. The maximum depth-of-exploration was seven and one-half feet below the existing surface elevations.

We performed infiltration testing at the request of the design team. We observed no infiltration during the testing procedure. We recommend full infiltration not be pursued on the subject site as a result. Limited infiltration measures can be considered, such as permeable pavement. Where permeable pavement is to be utilized, an overflow capacity should be designed into the system.

Recommendations for foundation design, site preparation, drainage, and other pertinent recommendations are provided in this study. We appreciate the opportunity to be of service to you on this project. If you have questions regarding the content of this geotechnical engineering study, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC

Stephen H. Avril
Project Manager

Table of Contents

ES-8009.01

	PAGE
INTRODUCTION	1
General	1
Project Description	1
SITE CONDITIONS	2
Surface	2
Subsurface	2
Topsoil	2
Fill	2
Native Soil	3
Geologic Setting	3
Groundwater	3
ENVIRONMENTALLY CRITICAL AREA ASSESSMENT	3
DISCUSSION AND RECOMMENDATIONS	4
General	4
Site Preparation and Earthwork	4
In-situ Soils	6
Imported Soils	6
Structural Fill	6
Foundations	6
Seismic Design Considerations	7
Slab-On-Grade Floors	8
Retaining Walls	8
Drainage	9
Infiltration Evaluation	9
Excavations and Slopes	9
Utility Support and Trench Backfill	10
LIMITATIONS	10
Additional Services	10

Table of Contents

Cont'd

ES-8009.01

GRAPHICS

Plate 1	**Vicinity Map**
Plate 2	**Test Pit Location Plan**
Plate 3	**Retaining Wall Drainage Detail**
Plate 4	**Footing Drain Detail**

APPENDICES

Appendix A	**Subsurface Exploration** **Test Pit Logs**
Appendix B	**Laboratory Test Results**

GEOTECHNICAL ENGINEERING STUDY
LORENZINI SHORT PLAT
4719 – 86TH AVENUE SOUTHEAST AND
84XX SOUTHEAST 47TH STREET
MERCER ISLAND, WASHINGTON

ES-8009.01

INTRODUCTION

General

The subject site is located on the west side of 86th Avenue Southeast, south of the intersection with Southeast 47th Street in Mercer Island, Washington. The site is currently developed with a single-family residential structure, driveway, and general landscape areas. Site development plans include the construction of three single-family residences and associated improvements following demolition of the existing structure.

The purpose of this study was to explore subsurface conditions across the site and develop geotechnical recommendations for the proposed development. Our scope of services for completing this geotechnical engineering study included the following:

- Site exploration consisting of test pits advanced within four locations on the property;
- Laboratory testing of soil samples obtained during subsurface exploration;
- Engineering analyses of data gathered during site exploration, and;
- Preparation of this report.

The following documents/maps were reviewed as part of our report preparation:

- Geologic Map of Washington, Northwest Quadrant, Dragovich, Logan, et al, 2002, and;
- Washington USDA Soil Conservation Survey (SCS).

Project Description

Final site design was not complete at the time of report production; however, we understand the properties will be redeveloped with three new single-family residences and associated improvements.

Given the topographic change of about 25 feet across the site, grading activities will likely involve cuts and fills up to about ten feet to establish the final design grades.

Building construction is anticipated to consist of relatively lightly loaded wood framing and slab-on-grade floors. Perimeter foundation loading is expected to range from approximately one to two kips per foot. Slab-on-grade loading is expected to be on the order of 150 pounds per square foot (psf).

If the above design assumptions are incorrect or change, ESNW should be contacted to review the recommendations in this report. ESNW should review the final design to confirm that the geotechnical recommendations included in this report have been incorporated into the project plans.

SITE CONDITIONS

Surface

The subject site is located on the west side of 86th Avenue Southeast, south of the intersection with Southeast 47th Street in Mercer Island, Washington. The site is comprised of a single tax parcel, and was occupied by a single-family residence at the time of report production.

The existing site topography is sloped in nature, descending from east to west, with topographic relief on the order of 25 feet across the entirety of the site. Taken overall, slope inclinations across the entirety of the site are on the order of 10 percent, with the steepest section in the western portion of the site inclined at approximately 14 percent.

Subsurface

ESNW representatives observed, logged and sampled four test pits, associated with this report. The test pits were advanced using an excavator and operator contracted by the client. The approximate location of the test pits is depicted on the Test Pit Location Plan (Plate 2). Please refer to the soil logs provided in Appendix A for a more detailed description of the subsurface conditions. Test pit TP-4 was terminated at a shallow depth due to the presence of an irrigation pipe within the test pit.

Topsoil

Topsoil was encountered at the test locations on the order off six to 14 inches in thickness. Where topsoil is encountered during site grading activities, it is not suitable for use as structural fill nor should it be mixed with material to be used as structural fill. Topsoil or otherwise unsuitable material can be used in landscaping areas if desired.

Fill

Fill soil was not encountered at the test locations during our fieldwork. Fill soil may likely be encountered surrounding the existing buildings, roads, and utility alignments, and will have to be evaluated during construction for use as structural fill.

Native Soil

Underlying the topsoil at the test locations, native soils consisting of silty sand (Unified Soil Classification, SM) were encountered. The native soils were generally observed in a medium dense grading to very dense condition. These soil types were observed extending to the maximum exploration depth of seven and one-half feet below existing grades.

Geologic Setting

The referenced geologic map resource identifies glacial till (Qvt) deposits. The referenced SCS soil survey describes Alderwood gravelly sandy loam (AgC) 8 to 15 percent slope series soils for the majority of the site; and Kitsap silt loam (KpB) 2 to 8 percent slope series soils for the western portion of the site. Alderwood series of soil is typified by loamy glacial drift over glaciomarine deposits. Whereas Kitsap series soils are typically comprised of lacustrine depositional environments. The majority of the native soil observed at the test locations are consistent with glacial till which is a component of glacial drift.

Groundwater

Groundwater seepage was not observed during the fieldwork (December 2021). Seepage can be present on sites underlain by glacial till and will typically be in a perched condition atop the unweathered till. Seepage should be expected within excavations at this site; particularly during the winter, spring, and early summer months. Groundwater seepage rates and elevations fluctuate depending on many factors, including precipitation duration and intensity, the time of year, and soil conditions. In general, groundwater flow rates are higher during the wetter, winter months. However, the groundwater table was not observed on the subject site.

ENVIRONMENTALLY CRITICAL AREA ASSESSMENT

As part of our report preparation, we assessed the site for potential critical areas utilizing the Mercer Island online GIS resources (critical areas maps). The subject site is not described as possessing geologic hazard areas with the exception of a historic scarp and a seismic hazard delineated for portions of the site.

The existing site topography is sloped in nature, descending from east to west, with topographic relief on the order of 25 feet across the entirety of the site. Taken overall, slope inclinations across the entirety of the site are on the order of 10 percent, with the steepest section in the western portion of the site inclined at approximately 14 percent.

The historic scarp is located on the subject site according to our review of the online GIS website provided by the City of Mercer Island. The scarp is shown bisecting the current residence, and is semi-circle in shape with the limits of the scarp described for the west side of the current residence and on the southern neighboring property. We observed no surficial signs that the scarp was active during our visual site reconnaissance.

With respect to the seismic hazard, liquefaction is a phenomenon where saturated or loose soil suddenly loses internal strength and behaves as a fluid. This behavior is in response to increased pore water pressures resulting from an earthquake or another intense ground shaking. In our opinion, site susceptibility to liquefaction may be considered negligible. The absence of a shallow groundwater table and the relative density of the native glacial till soil are the primary bases for this opinion.

DISCUSSION AND RECOMMENDATIONS

General

In our opinion, construction of the proposed structure is feasible from a geotechnical standpoint. The proposed buildings can be supported on conventional continuous and spread footing foundations bearing on competent native soils, competent existing fill, or new structural fill. Native soil capable of supporting residential foundations will be encountered at a depth of approximately two feet below existing grade in most areas. Slab-on-grade floors should be supported on competent native soil or structural fill. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of the soils to the specifications of structural fill, or overexcavation and replacement with a suitable structural fill material will be necessary. Recommendations for foundation design, site preparation, drainage, and other pertinent geotechnical recommendations are provided in the following sections of this study.

This study has been prepared for the exclusive use of Design Built Homes, LLC and their representatives. No warranty, expressed or implied, is made. This study has been prepared in a manner consistent with the level of care and skill ordinarily exercised by other members of the profession currently practicing under similar conditions in this area.

Site Preparation and Earthwork

Site preparation activities will involve demolition of the existing structures, site clearing and stripping, and implementation of temporary erosion control measures. The primary geotechnical considerations associated with site preparation activities include erosion control installation, building pad subgrade preparation, retaining wall construction, underground utility installations, and preparation of pavement subgrade areas.

Temporary construction entrances and drive lanes, consisting of at least six inches of quarry spalls (potentially placed over geotextile) can be considered in order to minimize off-site soil tracking and to provide a stable access entrance surface. Erosion control measures should consist of silt fencing placed along the down gradient side of the site. Soil stockpiles should be covered or otherwise protected to reduce soil erosion. Temporary sedimentation ponds or other approaches for controlling surface water runoff should be in place prior to beginning earthwork activities.

Where encountered, topsoil and organic-rich soil is not suitable for foundation support, nor is it suitable for use as structural fill. Topsoil or organic-rich soil can be used in non-structural areas if desired. Over-stripping of the site, however, should be avoided. A representative of ESNW should observe the initial stripping operations, to provide recommendations for stripping depths based on the soil conditions exposed during stripping.

Structural fill soils placed throughout foundation, slab, and pavement areas should be placed over a firm base. Loose or otherwise unsuitable areas of native soil exposed at subgrade elevations should be compacted to structural fill requirements or overexcavated and replaced with a suitable structural fill material. Where structural fill soils are used to construct foundation subgrade areas, the soil should be compacted to the requirements of structural fill described in the following section. Foundation subgrade areas should be protected from disturbance, construction traffic, and excessive moisture. Where instability develops below structural fill areas, use of a woven geotextile below the structural fill areas may be required. A representative of ESNW should observe structural fill placement in foundation, slab, and pavement areas.

The process of removing existing structures may produce voids where foundations and basements were present. Complete restoration of voids caused by the removal of existing structure must be executed as part of overall subgrade and building pad preparation activities, unless the excavation for the new building will be lower than existing basements (where present). The following guidelines for preparing building subgrade areas should be incorporated into the final design:

- Removal of the existing stem walls to an elevation where a four-foot vertical separation between the bottom of new foundations is maintained, and demolition of the slab present in the existing basement, or;

- Complete removal of all foundation elements, stem walls, footing drains, sewer and storm drainage pipes, etc. within the footprint of the existing structure.

- Where voids and related demolition disturbances extend below planned subgrade elevations, restoration of these areas should be completed. Structural fill should be used to restore voids or unstable areas resulting from the removal of existing structural improvements.

- Where pipes for stormwater and sanitary sewer are encountered, they should be plugged and abandoned.

- Recompact, or overexcavate and replace, areas of existing fill, if present, exposed at building subgrade elevations. ESNW should confirm subgrade conditions and the required level of recompaction, or overexcavation and replacement, during site preparation activities. Overexcavations should extend into competent native soils, and structural fill should be used to restore subgrades areas.

- ESNW should confirm the overall suitability of prepared subgrade areas following site preparation activities.

In-situ Soils

The soils encountered at the test sites have a moderate sensitivity to moisture and were generally in a moist condition at the time of the exploration (December 2021). In this respect, the in-situ soils may not be suitable for use as structural fill if the soil moisture content is more than about 3 percent above the optimum level at the time of construction. In general, soils encountered during the site excavations that are excessively over the optimum moisture content will require moisture conditioning prior to placement and compaction. Conversely, soils that are below the optimum moisture content will require moisture conditioning through the addition of water prior to use as structural fill. If the in-situ soils are determined to not be suitable for use as structural fill, then use of a suitable imported soil may be necessary. In our opinion, a contingency should be included in the project budget for exporting unsuitable soil and importing structural fill; or moisture conditioning recommendations can be provided upon request based on field observations during the construction phase of on-site work.

Imported Soils

Imported soil intended for use as structural fill should consist of a well graded granular soil with a moisture content that is at or near the optimum level. During wet weather conditions, imported soil intended for use as structural fill should consist of a well graded granular soil with a fines content of 5 percent or less defined as the percent passing the #200 sieve, based on the minus three-quarter inch fraction.

Structural Fill

Structural fill is defined as compacted soil placed in foundation, slab-on-grade, and roadway areas. Fills placed to construct permanent slopes and throughout retaining wall and utility trench backfill areas are also considered structural fill. Soils placed in structural areas should be placed in loose lifts of 12 inches or less and compacted to a relative compaction of 95 percent, based on the laboratory maximum dry density as determined by the Modified Proctor Method (ASTM D-1557). Additionally, more stringent compaction specifications may be required for utility trench backfill zones, depending on the responsible utility district or jurisdiction.

Foundations

Based on the results of our study, the proposed residential structures can be supported on conventional spread and continuous footings bearing on competent native soils, competent existing fill or new structural fill. Based on the soil conditions encountered at the test sites, competent native soils suitable for support of foundations should be encountered at depths of approximately two feet below existing grades. Where loose or unsuitable soil conditions are exposed at foundation subgrade elevations, compaction of the soils to the specifications of structural fill, or overexcavation and replacement with structural fill, may be necessary.

Provided foundations will be supported as described above, the following parameters can be used for design of new foundations:

- Allowable soil bearing capacity 2,500 psf
- Passive earth pressure 300 pcf (equivalent fluid)
- Coefficient of friction 0.40

A one-third increase in the allowable soil bearing capacity can be assumed for short-term wind and seismic loading conditions. The above passive pressure and friction values include a factor-of-safety of 1.5. With structural loading as expected, total settlement in the range of one inch and differential settlement of about one-half inch is anticipated. The majority of the settlements should occur during construction, as dead loads are applied.

Seismic Design Considerations

The 2018 International Building Code (2018 IBC) recognizes the most recent edition of the Minimum Design Loads for Buildings and Other Structures manual (ASCE 7-16) for seismic design, specifically with respect to earthquake loads. Based on the soil conditions encountered at the test pit locations, the parameters and values provided below are recommended for seismic design per the 2018 IBC.

Parameter	Value
Site Class	D*
Mapped short period spectral response acceleration, S_S (*g*)	1.438
Mapped 1-second period spectral response acceleration, S_1 (*g*)	0.499
Short period site coefficient, F_a	1.000
Long period site coefficient, F_v	1.800
Adjusted short period spectral response acceleration, S_{MS} (*g*)	1.438
Adjusted 1-second period spectral response acceleration, S_{M1} (*g*)	0.898
Design short period spectral response acceleration, S_{DS} (*g*)	0.959
Design 1-second period spectral response acceleration, S_{D1} (*g*)	0.599

* *Assumes very dense soil conditions, encountered to a maximum depth of 7.5 feet bgs during the December 2021 field exploration, remain very dense to at least 100 feet bgs. Based on our experience with the project geologic setting (glacial till) across the Puget Sound region, soil conditions are likely consistent with this assumption.*

Further discussion between the project structural engineer, the project owner (or their representative), and ESNW may be prudent to determine the possible impacts to the structural design due to increased earthquake load requirements under the 2018 IBC. ESNW can provide additional consulting services to aid with design efforts, including supplementary geotechnical and geophysical investigation, upon request.

Liquefaction is a phenomenon where saturated or loose soil suddenly loses internal strength and behaves as a fluid. This behavior is in response to increased pore water pressures resulting from an earthquake or another intense ground shaking. In our opinion, site susceptibility to liquefaction may be considered negligible. The absence of a shallow groundwater table and the dense characteristics of the native soil were the primary bases for this opinion.

Slab-On-Grade Floors

Slab-on-grade floors for the proposed buildings constructed at this site should be supported on a firm and unyielding subgrade. Where feasible, the soil exposed at the slab-on-grade subgrade level can be compacted in place to the specifications of structural fill. Unstable or yielding areas of the subgrade should be recompacted or overexcavated and replaced with suitable structural fill prior to construction of the slab. A capillary break consisting of a minimum of four inches of free draining crushed rock or gravel should be placed below the slab. The free draining material should have a fines content of 5 percent or less (percent passing the #200 sieve, based on the minus three-quarter inch fraction). In areas where slab moisture is undesirable, installation of a vapor barrier below the slab should be considered. If a vapor barrier is to be utilized it should be a material specifically designed for use as a vapor barrier and should be installed in accordance with the manufacturer's specifications.

Retaining Walls

Retaining walls must be designed to resist earth pressures and applicable surcharge loads. The following parameters can be used for retaining wall design:

- Active earth pressure (yielding condition) — 35 pcf (equivalent fluid)
- At-rest earth pressure (restrained condition) — 55 pcf
- Traffic surcharge for passenger vehicles (where applicable) — 70 psf (rectangular distribution)
- Passive earth pressure — 300 pcf (equivalent fluid)
- Coefficient of friction — 0.40
- Seismic surcharge (active condition) — 8H (where H equals retained height)

Additional surcharge loading from adjacent foundations, sloped backfill, or other loads should be included in the retaining wall design. Drainage should be provided behind retaining walls such that hydrostatic pressures do not develop. If drainage is not provided, hydrostatic pressures should be included in the wall design.

Retaining walls should be backfilled with free draining material that extends along the height of the wall, and a distance of at least 18 inches behind the wall. The upper one foot of the wall backfill can consist of a less permeable soil, if desired. A perforated drain pipe should be placed along the base of the wall and connected to an approved discharge location. A typical retaining wall drainage detail is provided on Plate 3.

Drainage

Seepage will likely be encountered in excavations on the site, particularly during winter, spring, and early summer months. Temporary measures to control surface water runoff and groundwater during construction would likely involve interceptor trenches and sumps. ESNW should be consulted during preliminary grading to identify areas of seepage and to provide recommendations to reduce the potential for instability related to seepage effects.

Finish grades must slope away from the building at an inclination of at least 2 percent for a distance of at ten feet or as adjacent building setbacks allow. In addition, surface water should be controlled utilizing best management practices (BMP) during, and after, construction on the subject site.

Footing drains should be installed given the nature of the soils on the site. A typical foundation drain detail for footings not placed directly against shoring is provided as Plate 4.

Infiltration Evaluation

The subject site is underlain by glacial till deposits within the proposed infiltration location, based on our observation of the subsurface conditions. The soil underlying the site consists of dense to very dense glacial till. These soils typically have very low or negligible infiltration capacity.

A Pilot Infiltration Test (PIT) was performed in test pit TP-2 at a depth of four feet below existing grades. No infiltration was observed during the test procedure.

Based on our experience targeted infiltration such as permeable pavement may be feasible on the subject site given a one-foot vertical separation is maintained from the cemented glacial till material present on the site. Additionally, where limited infiltration is employed, overflow should be considered such as underdrains in permeable pavement areas.

Excavations and Slopes

The Federal Occupation Safety and Health Administration (OSHA) and the Washington Industrial Safety and Health Act (WISHA) provide soil classification in terms of temporary slope inclinations. Based on the soil conditions encountered at the test locations, existing fill, loose native soil and any soil where groundwater seepage is exposed, are classified as Type C by OSHA/WISHA. Temporary slopes over four feet in height in Type C soils must be sloped no steeper than 1.5H:1V (Horizontal:Vertical). The presence of perched groundwater may cause caving of the temporary slopes due to hydrostatic pressure. The native silty sand glacial till soils observed are classified as Type A. Temporary slopes over four feet in height in Type A soils must be sloped no steeper than 0.75H:1V. Temporary excavations with inclinations steeper than those described may be acceptable from a geotechnical standpoint. ESNW should be consulted during the design phase to provide recommendations for steeper temporary excavations if necessary. ESNW should observe site excavations to confirm the soil type and allowable slope inclination. If the recommended temporary slope inclination cannot be achieved, temporary shoring may be necessary to support excavations. Additionally, due to the presence of slopes on the subject site, slope surcharging should be taken into consideration when planning open cuts.

Permanent slopes should maintain a gradient of 2H:1V, or flatter, and should be planted with vegetation to enhance stability and to minimize erosion. A representative of ESNW should observe temporary and permanent slopes to confirm the slope inclinations, and to provide additional excavation and slope recommendations, as necessary.

Utility Support and Trench Backfill

In our opinion, the soils anticipated to be exposed in utility excavations should generally be suitable for support of utilities. Organic or highly compressible soils encountered in the trench excavations should not be used for supporting utilities. The on-site soil may not be suitable for use as trench backfill if the soil moisture content is too high at the time of compaction. Utility trench backfill should be placed and compacted to the specifications of structural fill provided in this report, or to the applicable City of Mercer Island specifications. Seepage should be anticipated within utility trench excavations.

LIMITATIONS

The recommendations and conclusions provided in this geotechnical engineering study are professional opinions consistent with the level of care and skill that is typical of other members in the profession currently practicing under similar conditions in this area. A warranty is not expressed or implied. Variations in the soil and groundwater conditions observed at the test locations may exist and may not become evident until construction. ESNW should reevaluate the conclusions in this geotechnical engineering study if variations are encountered.

Additional Services

ESNW should have an opportunity to review the final design with respect to the geotechnical recommendations provided in this report. ESNW should also be retained to provide testing and consultation services during construction.

NORTH

Reference:
King County, Washington
OpenStreetMap.org

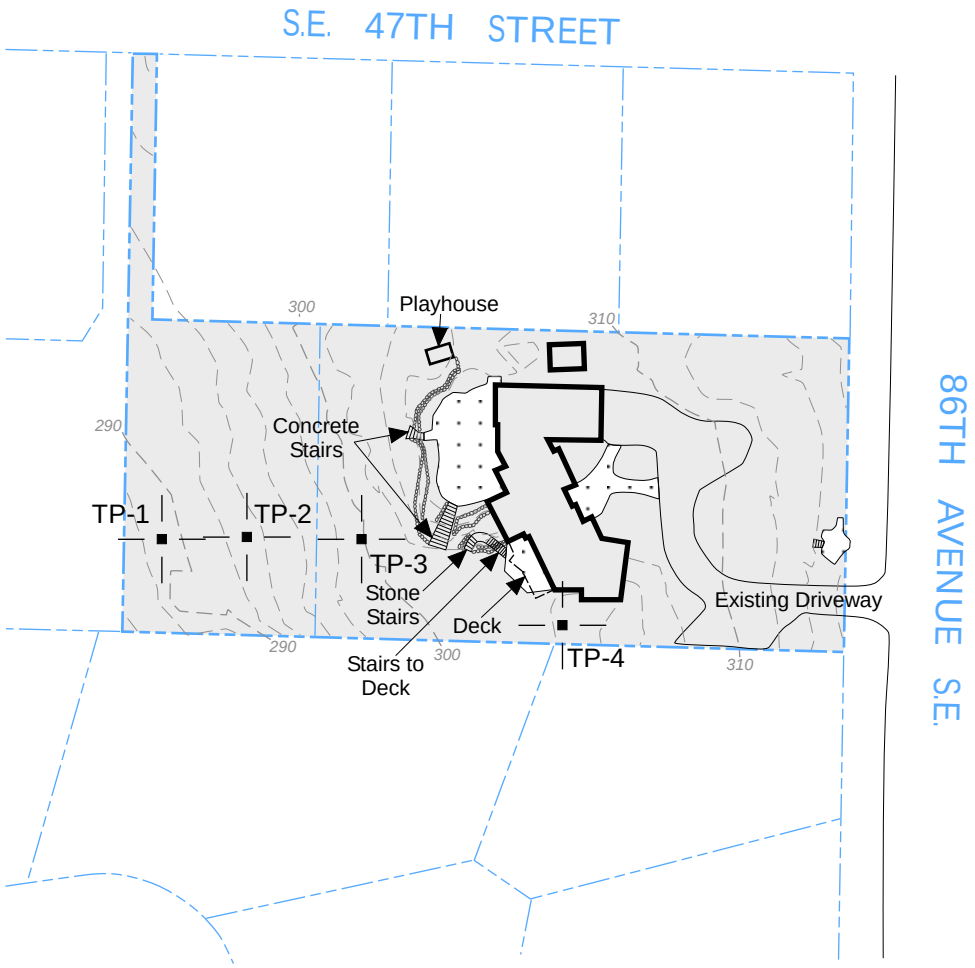
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Vicinity Map
Lorenzini Short Plat
Mercer Island, Washington

Drwn. CAM	Date 01/12/2022	Proj. No. 8009.01
Checked BCS	Date Jan. 2022	Plate 1



LEGEND

TP-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-8009.01, Dec. 2021

Subject Site

Existing Building

Concrete

Rockery

NORTH

1"=80' 0 40 80 160 Scale in Feet

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

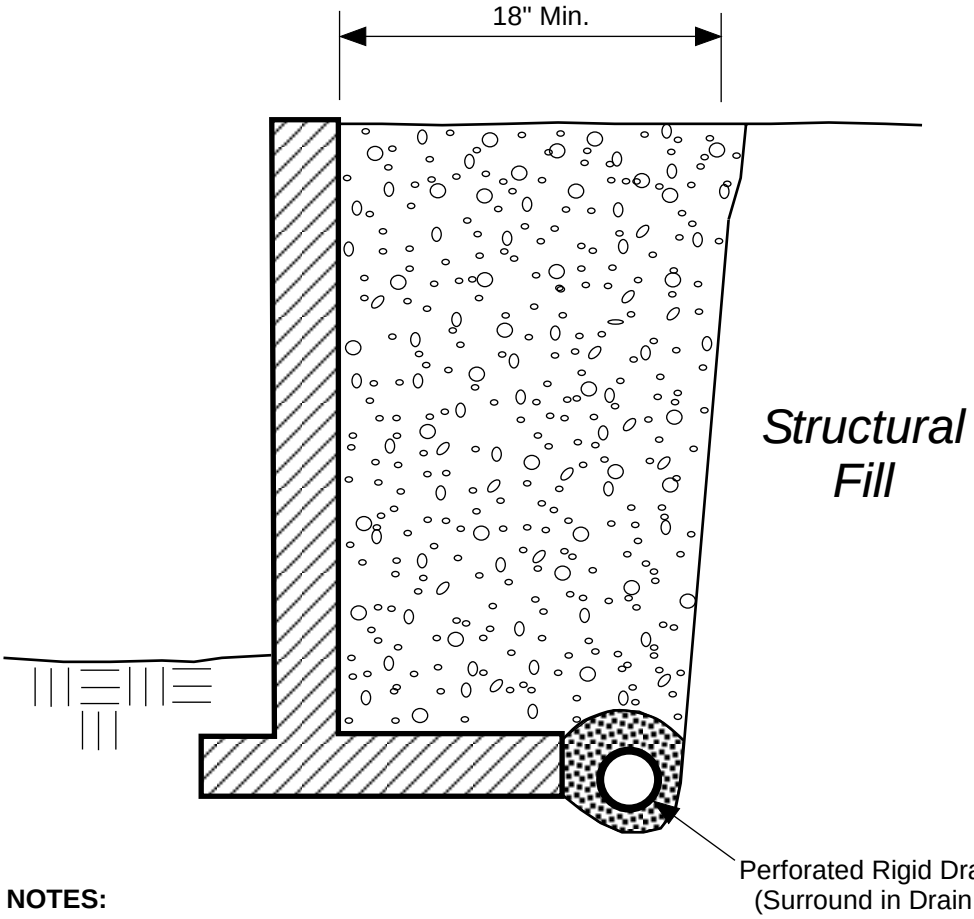
NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Test Pit Location Plan
Lorenzini Short Plat
Mercer Island, Washington

Drwn. CAM	Date 01/12/2022	Proj. No. 8009.01
Checked BCS	Date Jan. 2022	Plate 2



NOTES:

- Free-draining Backfill should consist of soil having less than 5 percent fines. Percent passing No. 4 sieve should be 25 to 75 percent.
- Sheet Drain may be feasible in lieu of Free-draining Backfill, per ESNW recommendations.
- Drain Pipe should consist of perforated, rigid PVC Pipe surrounded with 1-inch Drain Rock.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

Free-draining Structural Backfill

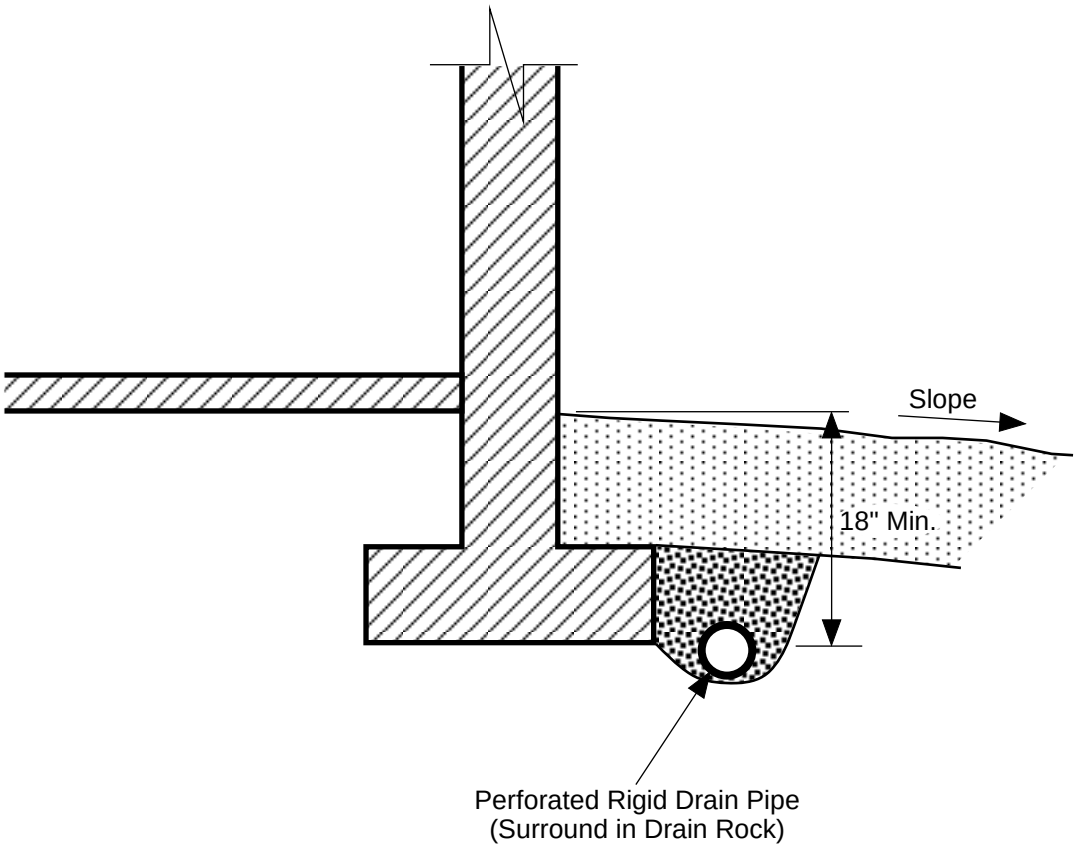
1-inch Drain Rock

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Retaining Wall Drainage Detail
Lorenzini Short Plat
Mercer Island, Washington

Drwn. CAM	Date 01/12/2022	Proj. No. 8009.01
Checked BCS	Date Jan. 2022	Plate 3



NOTES:

- Do NOT tie roof downspouts to Footing Drain.
- Surface Seal to consist of 12" of less permeable, suitable soil. Slope away from building.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

Surface Seal: native soil or other low-permeability material.

1-inch Drain Rock

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Footing Drain Detail
Lorenzini Short Plat
Mercer Island, Washington

Drwn. CAM	Date 01/12/2022	Proj. No. 8009.01
Checked BCS	Date Jan. 2022	Plate 4

Appendix A

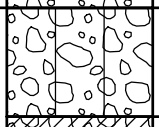
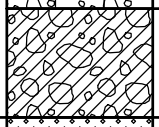
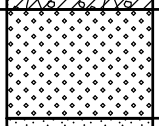
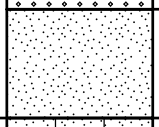
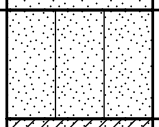
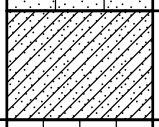
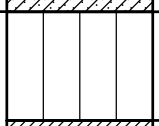
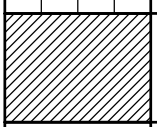
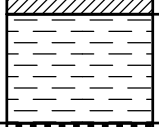
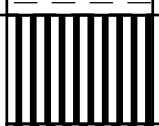
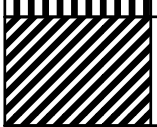
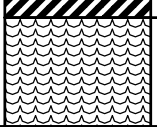
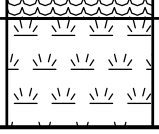
Subsurface Exploration
Test Pit Logs

ES-8009.01

The subsurface conditions at the site were explored by excavating a total of four test pits across accessible portions of the property. The subsurface explorations were completed in December of 2021. The approximate test locations are illustrated on Plate 2 of this report. Logs of the test pits are provided in this Appendix. The test pits were excavated to a maximum depth of seven and one-half feet below existing grades.

Earth Solutions NW LLC

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS
			GRAPH	LETTER	
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-1

PROJECT NUMBER ES-8009.01 **PROJECT NAME** Lorenzini Short Plat

DATE STARTED 12/22/21 **COMPLETED** 12/22/21 **GROUND ELEVATION** 289 ft

EXCAVATION CONTRACTOR Client Provided **LATITUDE** 47.56128 **LONGITUDE** -122.22549

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY BCS **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION**

NOTES Depth of Topsoil & Sod 10"-12": lawn grass

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0			TPSL		Dark brown TOPSOIL	
					1.0	288.0
		MC = 16.6%	SM		Brown silty SAND, medium dense, moist to wet -becomes gray -sparse gravel -moderate iron oxide staining	
5		MC = 13.3%			-becomes very dense, weakly cemented	
		MC = 16.3% Fines = 35.6%			7.5 [USDA Classification: slightly gravelly sandy LOAM]	281.5
					Test pit terminated at 7.5 feet below existing grade. No groundwater encountered during excavation. No caving observed.	

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-2

PROJECT NUMBER ES-8009.01 **PROJECT NAME** Lorenzini Short Plat

DATE STARTED 12/22/21 **COMPLETED** 12/22/21 **GROUND ELEVATION** 293 ft

EXCAVATION CONTRACTOR Client Provided **LATITUDE** 47.56129 **LONGITUDE** -122.22542

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY BCS **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION**

NOTES Depth of Topsoil & Sod ~14": lawn grass

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0			TPSL		Dark brown TOPSOIL
					1.2 291.8
		MC = 17.6%	SM		Brown silty SAND, medium dense to dense, moist to wet
					-becomes gray
					-becomes very dense, light to moderate iron oxide staining, weak cementation
		MC = 14.2% Fines = 35.5%			-infiltration test at 4' [USDA Classification: gravelly sandy LOAM]
5					
		MC = 10.0%			
		MC = 10.9%			7.0 286.0
					Test pit terminated at 7.0 feet below existing grade. No groundwater encountered during excavation. No caving observed.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-3

PROJECT NUMBER ES-8009.01 **PROJECT NAME** Lorenzini Short Plat

DATE STARTED 12/22/21 **COMPLETED** 12/22/21 **GROUND ELEVATION** 300 ft

EXCAVATION CONTRACTOR Client Provided **LATITUDE** 47.56127 **LONGITUDE** -122.22519

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY BCS **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION**

NOTES Depth of Topsoil & Sod 6"-8": lawn grass

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0			TPSL		Dark brown TOPSOIL -large 4" diameter tree roots	299.2
		MC = 16.8% Fines = 33.7%			0.8 Brown silty SAND with gravel, medium dense, moist to wet [USDA Classification: gravelly fine sandy LOAM]	
					-becomes gray dense	
			SM			
		MC = 11.7%			-becomes very dense, weakly cemented	
5						
		MC = 12.7%			6.0	294.0

Test pit terminated at 6.0 feet below existing grade. No groundwater encountered during excavation. No caving observed.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-4

PROJECT NUMBER ES-8009.01 **PROJECT NAME** Lorenzini Short Plat

DATE STARTED 12/22/21 **COMPLETED** 12/22/21 **GROUND ELEVATION** 302 ft

EXCAVATION CONTRACTOR Client Provided **LATITUDE** 47.56118 **LONGITUDE** -122.2249

EXCAVATION METHOD **GROUND WATER LEVEL:**

LOGGED BY BCS **CHECKED BY** SHA ▽ **AT TIME OF EXCAVATION**

NOTES Depth of Topsoil & Sod 12": lawn grass

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0						
			TPSL		Dark brown TOPSOIL	
				1.0		301.0
			SM		Gray silty SAND, very dense, moist to wet	
		MC = 14.1%		1.5	-moderate to heavy iron oxide staining, weakly cemented	300.5
					Test pit terminated at 1.5 feet below existing grade. No groundwater encountered during excavation. No caving observed.	

Appendix B

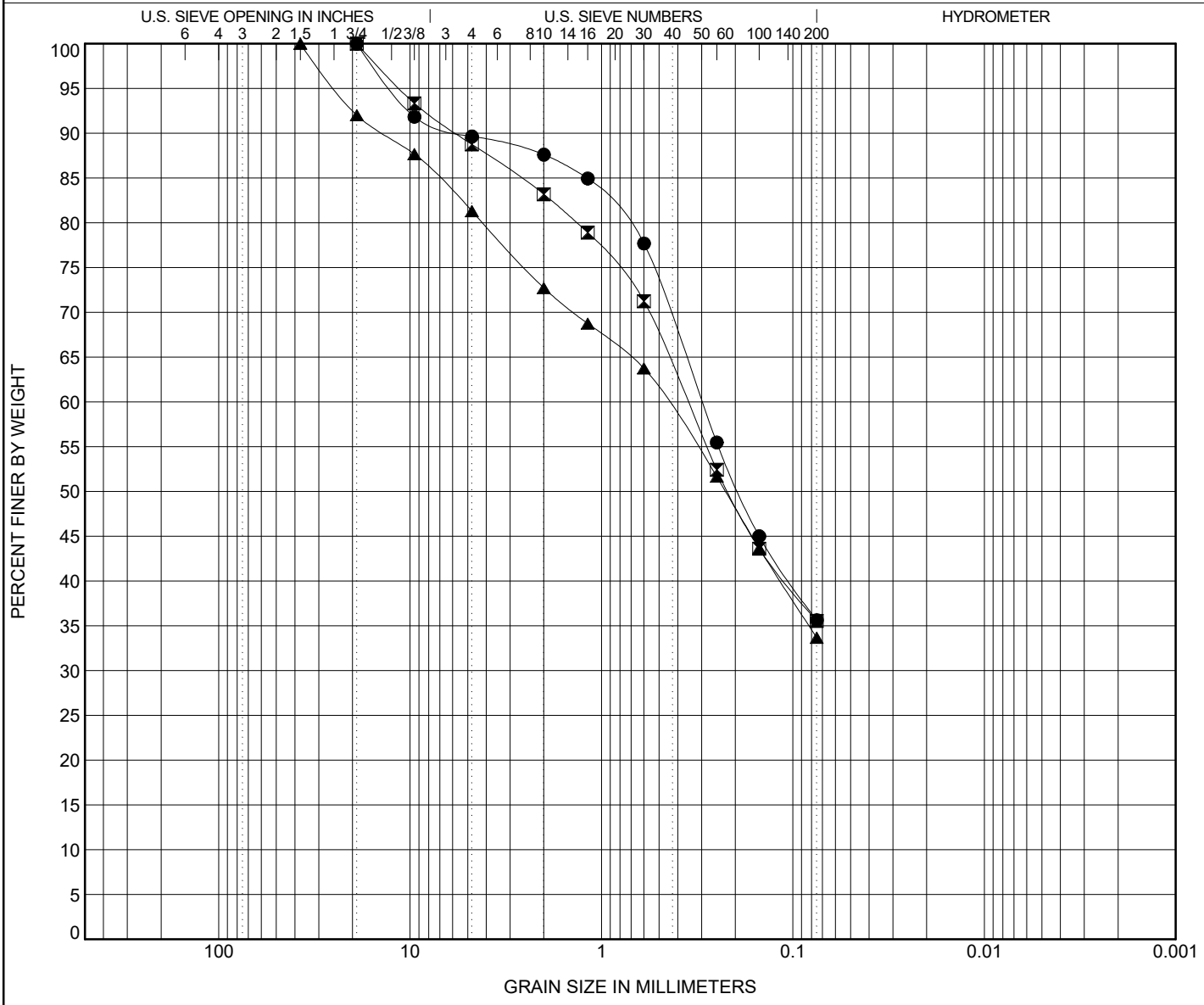
Laboratory Test Results

ES-8009.01

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

GRAIN SIZE DISTRIBUTION

PROJECT NUMBER ES-8009.01 **PROJECT NAME** Lorenzini Short Plat



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	Cc	Cu
●	TP-01	7.50ft.	USDA: Gray Slightly Gravelly Sandy Loam. USCS: SM.		
⧓	TP-02	4.00ft.	USDA: Gray Gravelly Sandy Loam. USCS: SM.		
▲	TP-03	1.00ft.	USDA: Brown Gravelly Fine Sandy Loam. USCS: SM with Gravel.		

Specimen Identification			D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	TP-01	7.5ft.	19	0.299						35.6	
⧓	TP-02	4.0ft.	19	0.355						35.5	
▲	TP-03	1.0ft.	37.5	0.457						33.7	

GRAIN SIZE USDA ES-8009.01 LORENZINI SHORT PLAT.GPJ GINT US LAB.GDT 1/6/22

Report Distribution

ES-8009.01

EMAIL ONLY

Design Built Homes, LLC
11400 Southeast 8th Street, Suite 415
Bellevue, Washington 98004

Attention: Mr. Todd Sherman

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

September 13, 2023
ES-8009.02

Design Built Homes, LLC
11400 Southeast 8th Street, Suite 415
Bellevue, Washington 98004

Attention: Todd Sherman

Subject: Critical Area Consultation
Lorenzini Short Plat
4719 – 86th Avenue Southeast and 84XX Southeast 47th Street
Mercer Island, Washington

Dear Todd:

Per your request, Earth Solutions NW, LLC (ESNW) has provided this critical area consultation for the subject site. This letter includes a critical area report in general accordance with the City of Mercer Island requirements for both a landslide hazard and seismic hazard as described on the mapping provided by the city. Our scope of services for this phase of site work included reviewing the subsurface data gathered during past site exploration, observe the current site conditions and conditions surrounding the site in regards to slopes (performed in August 2023), review of the city code relating to critical areas, and authoring of this report.

The subject site is located on the west side of 86th Avenue Southeast, south of the intersection with Southeast 47th Street in mercer Island, Washington. The site is occupied by a single-family residence and associated improvements at the time of this report production. A slope is located on the south side of the residence which descends towards the south and the neighboring property which is in the process of being re-developed with a new residence. The new residence has been constructed using daylit construction of foundation elements into the subject slope which is designated as a landslide hazard by the City of Mercer Island mapping. The excavation for the neighboring residence has resulted in a condition where most of the slope (with exception of the section of slope which remains above a retaining wall) has been altered and removed. The remaining slope above the new retaining walls on the neighboring property is well-vegetated with plant species typical of the region.

The subject site is mapped as possessing a seismic hazard by the City of Mercer Island on-line critical areas maps. ESNW has provided a critical area report in general accordance with the city requirements per your request using data gathered during past site exploration, and conditions observed within the excavation for the neighboring property re-development.

ESNW has been requested to address The City of Mercer Island municipal code section 19.07.100 in how it relates to the subject project. The client has communicated they desire ESNW perform this reporting without additional subsurface exploration, and rely on past site experience. The code section is cited below (italics) and ESNW has provided a response to the code section following the citation. The critical areas report follows.

19.07.100 - Mitigation sequencing.

Except as otherwise provided in this chapter, an applicant for a development proposal or activity shall implement the following sequential measures, listed below in order of preference, to avoid, minimize, and mitigate impacts to environmentally critical areas and associated buffers. Applicants shall document how each measure has been addressed before considering and incorporating the next measure in the sequence:

A. *Avoiding the impact altogether by not taking a certain action or parts of an action. The applicant shall consider reasonable, affirmative steps and make best efforts to avoid critical area impacts. However, avoidance shall not be construed to mean mandatory withdrawal or denial of the development proposal or activity if the proposal or activity is an allowed, permitted, or conditional use in this title. In determining the extent to which the proposal should be redesigned to avoid the impact, the code official may consider the purpose, effectiveness, engineering feasibility, commercial availability of technology, best management practices, safety and cost of the proposal and identified changes to the proposal. Development proposals should seek to avoid, minimize and mitigate overall impacts based on the functions and values of all of the relevant critical areas and based on the recommendations of a critical area study. If impacts cannot be avoided through redesign, use of a setback deviation pursuant to section 16.06.110(C), or because of site conditions or project requirements, the applicant shall then proceed with the sequence of steps in subsections B through E of this section;*

B. *Minimizing impacts by limiting the degree or magnitude of the action and its implementation, using a setback deviation pursuant to section 19.06.110 (C), using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;*

C. *Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;*

D. *Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;*

E. *Compensating for the impact by replacing, enhancing, or providing substitute resources or environments, and/or;*

F. *Monitoring the impact and taking appropriate corrective measures to maintain the integrity of compensating measures.*

It is our opinion that there are no slope-related geologic hazards located on the subject site. We base this opinion on the subsurface data collected during our fieldwork, our review of the topographic survey for the subject site, and geologic hazard map. The soils appear to be uniform across the entirety of the subject site and throughout the sloped region under concern. There is no evidence of more permeable soil types (such as sand and clean gravel) sited above the glacial till or fine-grained deposits, which would be cause for concern over soil mobilization in the future on and around the subject site.

ESNW recommends foundation elements for the residential structure be seated in the firm native material, anticipated to be encountered at depths below two feet; and maintain a ten-foot linear setback from edge-of-footing to the face of slope. This may require a deviation from the code mandated setback and buffer, yet act to minimize additional surcharge/loading on the remnant-sloped region of the site to the south of the subject project area.

Best Management Practices (BMP) for erosion control will need to be employed during and after site development. This includes site grading to minimize erosion and soil mobilization, temporary erosion control measures during construction, and permanent vegetation to protect sloped areas from the effects of erosive forces.

ESNW has reviewed section 19.07.160 per client request. The code is cited below (italics).

19.07.160 - Geologically hazardous areas.

A. Designation and typing. Geologically hazardous areas are lands that are susceptible to erosion, landslides, seismic events, or other factors as identified by WAC 365-190-120. These areas may not be suited for development activities because they may pose a threat to public health and safety. Areas susceptible to one or more of the following types of hazards shall be designated as geologically hazardous areas: landslide hazard areas, seismic hazard areas, and erosion hazard areas.

Based on the presence of glacial till throughout the sloped region which presents a very stable geologic condition as it relates to slope stability. Furthermore, based on the homogeny of the soil throughout the profile of the sloped region (based on observations of the site and site to the south) there is no interbedding of sands and gravels, and the slope has been extremely diminished in overall relief resulting from grading on the adjacent property. It is ESNW's opinion that a landslide hazard may not exist following the re-grading of the sloped area based on the soil type and density and vertical relief and inclination of the remaining slope.

A seismic hazard is mapped for the subject site. Glacial till is present throughout the subsurface of the site and within the sloped area to the south of the project area. No groundwater seepage was observed during past site exploration or within the exposed slope on the neighboring property to the south of the subject site. In our opinion there is no liquefaction hazard on the subject site and slope to the south based on the presence of glacial till and lack of a near-surface groundwater table.

B. General review requirements. Alteration within geologically hazardous areas or associated buffers is required to meet the standards in this section, unless the scope of work is exempt pursuant to section 19.07.120, exemptions, or a critical area review 1 approval has been obtained pursuant to section 19.07.0909(A).

1. When an alteration within a landslide hazard area, seismic hazard area or buffer associated with those hazards is proposed, the applicant must submit a critical area study concluding that the proposal can effectively mitigate risks of the hazard. The study shall recommend appropriate design and development measures to mitigate such hazards. The code official may waive the requirement for a critical area study and the requirements of subsections (B)(2) and (B)(3) of this section when he or she determines that the proposed development is minor in nature and will not increase the risk of landslide, erosion, or harm from seismic activity, or that the development site does not meet the definition of a geologically hazardous area.

ESNW has provided a critical area study within this document.

2. Alteration of landslide hazard areas and seismic hazard areas and associated buffers may occur if the critical area study documents find that the proposed alteration:

a. Will not adversely impact other critical areas;

b. Will not adversely impact the subject property or adjacent properties;

c. Will mitigate impacts to the geologically hazardous area consistent with best available science to the maximum extent reasonably possible such that the site is determined to be safe, and;

d. Includes the landscaping of all disturbed areas outside of building footprints and installation of hardscape prior to final inspection.

3. Alteration of landslide hazard areas, seismic hazard areas and associated buffers may occur if the conditions listed in subsection (B)(2) of this section are satisfied and the geotechnical professional provides a statement of risk matching one of the following:

a. An evaluation of site-specific subsurface conditions demonstrates that the proposed development is not located in a landslide hazard area or seismic hazard area;

b. The landslide hazard area or seismic hazard area will be modified or the development has been designed so that the risk to the site and adjacent property is eliminated or mitigated such that the site is determined to be safe;

c. Construction practices are proposed for the alteration that would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties, or;

d. The development is so minor as not to pose a threat to the public health, safety and welfare.

In our opinion, there is no geologic hazard present on the site based on the presence of glacial till, limited slope relief, and lack of groundwater on the site or within the sloped region remaining following the grading and wall installation on the adjacent site to the south.

In our opinion, the proposed alteration would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties.

C. Development standards—Landslide hazard areas. Development is allowed within landslide hazard areas and associated buffers, when the following standards are met:

1. A critical area study shall be required for any alteration of a landslide hazard area or associated buffer;

2. Buffers shall be applied as follows. When more than one condition applies to a site, the largest buffer shall be applied:

a. Steep slopes. Buffer widths shall be equal to the height of a steep slope, but not more than 75 feet, and applied to the top and toe of slopes;

b. Shallow landslide hazard areas shall have minimum 25-foot buffers applied in all directions, and;

c. Deep-seated landslide hazard areas shall have 75-foot buffers applied in all directions.

ESNW has provided a critical area study out of a sense of thoroughness within this document. However, it is the opinion of ESNW that there are no critical areas present on the subject site in the form of erosion hazards, landslide hazard, or seismic hazard. ESNW bases this opinion on the fact that glacial till is present across the site and surrounding area, lack of a significant slope following excavation for the neighboring residence to the south, and the lack of a groundwater table. We have recommended a ten-foot horizontal foundation setback from the face of any slope on the site or surrounding the site. In our opinion, any other buffer will be unnecessary.

D. Development standards—Seismic hazard areas. When development is proposed within a seismic hazard area:

1. A critical area study shall be required and shall include an evaluation by a qualified professional for seismic engineering and design, a determination of the magnitude of seismic settling that could occur during a seismic event, and a demonstration that the risk associated with the proposed alteration is within acceptable limits or that appropriate construction methods are provided to mitigate the risk of seismic settlement such that there will be no significant impact to life, health, safety, and property.

2. *Identification of seismic hazard areas. Seismic hazard areas shall be identified by a qualified professional who references and interprets information in the U.S. Geological Survey Active Faults Database, performs on-site evaluations, or applies other techniques according to best available science.*

3. *When development is proposed on a site with an active fault, the follow provisions shall apply:*

    a. *A 50-foot minimum buffer shall be applied from latest Quaternary, Holocene, or historical fault rupture traces as identified by the United States Geological Survey or Washington Geological Survey map databases or by site investigations by licensed geologic professionals with specialized knowledge of fault trenching studies, or;*

    b. *Mitigation sequencing shall be incorporated into the development proposal as recommended based on geotechnical analysis by a qualified professional to prevent increased risk of harm to life and/or property.*

ESNW has provided a critical areas study within this document (see below).

E. Development standards—Erosion hazard areas.

1. *All development proposals shall demonstrate compliance with chapter 15.09, storm water management program.*

2. *No development or activity within an erosion hazard area may create a net increase in geological instability on or off site.*

In our opinion, there is little to no risk of erosion on the subject site based on the presence of glacial till soils across the site and surrounding area. These soils present a cemented condition which results in a very low erosion risk.

F. Development standards—Additional criteria for specific activities.

1. *Trail building within geologically hazardous areas shall be subject to the following:*

    a. *Trail surfaces shall be constructed of pervious materials and may not be wider than five feet, and;*

    b. *Trails shall be located to minimize the need for tree removal.*

2. *Land clearing, grading, filling, and foundation work within: (a) an erosion hazard area, when 2,000 square feet or more of site disturbance is proposed, and/or (b) a landslide hazard area are not permitted between October 1 and April 1.*

    a. *The code official may grant a waiver to this seasonal development limitation if the applicant provides a critical area study for the site concluding that:*

        i. *Geotechnical slope stability concerns, erosion and sedimentation impacts can be effectively controlled on site consistent with adopted storm water standards, and;*

        ii. *The proposed construction work will not subject people or property, including areas off site, to an increased risk of associated impacts.*

    b. *As a condition of the waiver, the code official may require erosion control measures, restoration plans, an indemnification, a release agreement and/or performance bond.*

    c. *If site activities result in erosion impacts or threaten water quality standards, the city may suspend further work on the site and/or require remedial action.*

    d. *Failure to comply with the conditions of an approved waiver shall subject the applicant to code compliance pursuant to chapter 6.10, code compliance, including but not limited to civil penalties and permit suspension.*

It is the opinion of ESNW that the subject site does not meet the criteria for a liquefaction hazard or landslide hazard based on the presence of glacial till soil observed from the surface of the subject site to the base of the subject slope terminating within the excavation for the neighboring property to the south, coupled with the fact that the slopes under concern have been highly modified resulting in limited amounts of remaining slopes above the cast-in-place retaining walls associated with the new residence on the southern neighboring property. Our evaluation of site-specific subsurface conditions demonstrates that the proposed development is not located in a landslide hazard area or seismic hazard area.

Critical Area Report

As part of this report preparation, ESNW assessed the site for potential critical areas utilizing the City of Mercer Island geologic hazard map available on-line. The subject slopes located south of the proposed development envelope, above the neighboring residence under construction are not proposed to be modified beyond what has occurred as part of the neighboring property re-development, which has essentially removed the previously identified steep slopes and replaced them with a series of cast-in-place retaining walls for the new residence.

ESNW has provided an evaluation of the sloped regions and mapped scarps within this critical areas study in addition to an opinion relating to the seismic hazard delineated for the subject site based on previous fieldwork (December 2021) and additional fieldwork which occurred in August of 2023 where ESNW observed the subsurface conditions within the excavation for the adjacent property foundation elements.

ESNW observed no soil mobilization or visible scarps within the areas where scarps are mapped during site visits in 2021 and 2023.

The City of Mercer Island municipal code requires the following for a critical areas study:

1. *Disclosure of the presence of critical areas, including a delineation and type or category of critical area, on the development proposal site and any mapped or identifiable critical areas on or off site within the distance equal to the largest potential required buffer applicable to the development proposal area on the applicant's property;*

The slopes on the south side of the existing residence are described as possessing an erosion hazard (known or suspected), landslide hazard (known or suspected), slopes 15 percent to 39 percent, and scarps within the sloped regions to the south of the residence. Additionally, a seismic hazard is mapped for the subject site and sites to the west and south of the subject property.

Recently, the site to the south of the subject site has been undergoing re-development with a single-family residence which includes a series of cast-in-place retaining walls cut into the subject slope. This grading activity has essentially removed the majority of the sloped region below the subject site, leaving only a small vertical portion of the slope above the retaining walls. A landslide hazard may not exist following the re-grading of the slopes.

2. *A topographic and boundary survey;*

We have provided a site plan which does not includes topographic information for the subject site but not for the entirety of the now-altered slopes on the neighboring properties designated as geologic critical areas.

3. *A statement specifying the accuracy of the report and all assumptions made and relied upon;*

This report can be relied upon for geotechnical analysis of the critical areas as they relate to the proposed single-family residence in our professional opinion. The report was authored with site-specific information gleaned through subsurface and surface explorations in December of 2021 and as site visit in August of 2023.

4. *A description of the methodologies used to conduct the critical area study, including references;*

ESNW representatives were on-site in December of 2021 to obtain subsurface data through excavation and observation of test pits surrounding the existing residential structure. The test pits were advanced to seven and one-half feet maximum depth, and terminated in dense to very dense native glacial till soil. ESNW observed glacial till within the excavation for the neighboring residence under construction located at the toe of the subject slopes in August of 2023. We also reviewed the geologic maps for the region, and the Web Soil Survey.

5. *A scale map of the development proposal site;*

We have provided a site plan. The subject slopes are located on the south and west sides of the existing residence depicted on Plate 2.

6. *Photographic records of the site before the proposed alteration occurs;*

We have provided as an attachment.

7. *An assessment of the probable effects to critical areas and associated buffers, including impacts caused by the development proposal and associated alterations to the subject property and impacts to other properties and any critical areas or buffers located on them resulting from the development of the site and the proposed development;*

We have analyzed the proposed site re-development from a slope stability standpoint. The new residence will not likely increase instability on and around the subject site as there are no planned alterations for the slopes designated as steep, the presence of glacial till extending from the surface to below the toe-of-slope on the neighboring property, and recommendations for foundations to be sited to where a minimum of ten feet laterally is maintained to the face-of-remaining slope. Additionally, ESNW assumes the buffers from the top-of-slope on the subject site will remain similar in many respects which will not result in any alteration in the stability characteristics of the slopes on and off-site.

In regards to the seismic hazard delineated for the site and site to the south, in our opinion a liquefication hazard does not exist on the site. The site and slopes are underlain by glacial till which is shown to demonstrate a very stable condition during seismic events. In our opinion, site susceptibility to liquefaction may be considered negligible. The absence of a shallow groundwater table and the dense to very dense characteristics of the native glacial till soil were the primary bases for this opinion.

The densified cemented qualities of glacial till present a very low erosion hazard from a geological standpoint. In this respect, ESNW opines there is a negligible risk of erosion on the subject site within the unweathered glacial till and slopes located off-site to the south of the existing residence and subsequent building envelope. There is a risk of erosion within the weathered zone of glacial till and topsoil where they are exposed during construction. Best management practices should be utilized for protection of these areas where exposed during and after construction in order to lessen the risk of erosion. Covering exposed soil with plastic sheeting and directing surface water away from exposed soil must be considered for the subject site. Furthermore, stormwater must not be allowed to sheet towards sloped regions. ESNW can consult with the client if desired to provide stormwater management services relating to erosion control upon request.

ESNW representatives observed no soil mobilization or scarps within areas described as possessing scarps in 2021 or 2023.

8. *A description of mitigation sequencing implementation described in section 19.07.100 including steps taken to avoid and minimize critical areas impacts to the greatest extent feasible;*

In our opinion, provided best management practices (BMP) are utilized during and after construction for stormwater management and erosion control measures, there will be no impacts to the critical areas on the site. Erosion control BMP include silt fencing, swales/interceptor trenches to collect and divert stormwater away from slopes, and other common erosion control measures typical of the industry practices.

9. *Detailed studies, as required by this chapter, for individual critical area types in order to ensure critical area protection;*

We have evaluated the slopes on the subject site and based on our observations, the slopes are stable in their current condition and configuration. The primary basis for this opinion is the fact that there are no planned alterations for the slopes dictated as possessing an erosion and landslide hazard, and the underlying site geology. The subject development will be occurring outside of the sloped regions, and the site and slopes are underlain by dense to very dense glacial till which presents a very stable condition. As such there will be no net-gain in surcharge conditions on the subject slopes if the recommended ten-foot foundation setback from face-of-slope is adhered to.

10. *Assessment of potential impacts that may occur on adjacent sites, such as sedimentation or erosion, where applicable, and;*

We have evaluated the currently available plan, and there will be no change in the sedimentation or erosion risks on adjacent sites given BMP are employed during and after construction. This should consist of grading the site such that there is no net increase in the volume of water running towards the south and west sides of the site. This can be achieved through grading and installation of stormwater control features that collect and vector surface water to approved discharge points.

11. *A post-design memorandum prepared by a qualified professional confirming that the proposed improvements comply with the design recommendations.*

ESNW can provide upon request.

We trust this letter meets your current needs. Should you have any questions regarding the content herein, or require additional information, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC

KYLE R. CAMPBELL
STATE OF WASHINGTON
27674
REGISTERED
PROFESSIONAL ENGINEER

09/13/2023

Stephen H. Avril
Project Manager

Kyle R. Campbell, P.E.
Senior Principal Engineer

Attachments: Site Photos
Plate 2 – Test Pit Location Plan

Reference:

- Geotechnical Engineering Study – Lorenzini Short Plat, prepared by ESNW, ES-8009.01, dated February 1, 2022


SE 47th St
SE 47th St
SE 47t
86th Ave SE
86th Ave SE
86th Ave SE
8435
8445
4703
8427
8421
4727
4735
8450
SE 47th Pl
SE 47th Pl
4739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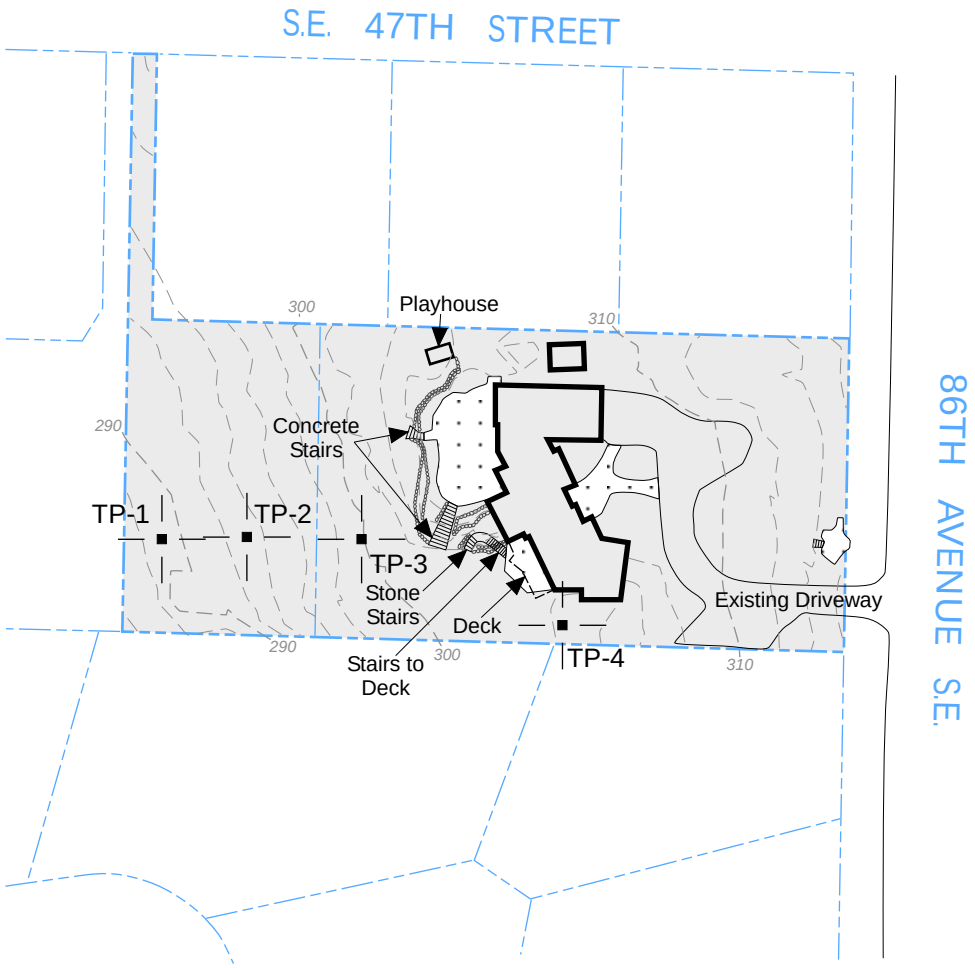

LEGEND

TP-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-8009.01, Dec. 2021

Subject Site

Existing Building

Concrete

Rockery

NORTH

1"=80' 0 40 80 160 Scale in Feet

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Test Pit Location Plan
Lorenzini Short Plat
Mercer Island, Washington

Drwn. CAM	Date 01/12/2022	Proj. No. 8009.01
Checked BCS	Date Jan. 2022	Plate 2

September 27, 2023

Ryan Harriman
Planning Manager
Community Planning and Development (CPD)
City of Mercer Island

Re: 4719 86th Ave SE
Mercer Island, Washington
CAO23-021

This letter provides the geotechnical engineering-related comments for the above-referenced permit.

The Lorenzini short plat documents (SUB 1) were reviewed as part of the Critical Area Review (CAR2).

The proposed location of the stormwater detention tank shown on Sheet C4 should be reviewed by the geotechnical engineer of record. An assessment of both the potential long-term impacts from the detention system on the stability of the slope given its proximity to the edge of the slope, as well as the potential adverse impacts of future slope movements on the performance of the detention system should be provided.

Following review of the plans, assessment of the detention tank location, and recommendations for alternate detention system location, if applicable, a letter should be provided stating whether the current plans conform to the geotechnical engineer's site development recommendations. An updated statement of risk (MICC19.07.160.B.3) from the geotechnical engineer should also be included in the letter.

Sincerely,

Cit Mercer Island - CP

Michele Lorilla, P.E.
Geotechnical Peer Reviewer

November 2, 2023

Design Built Homes
c/o Todd Sherman
11400 SE 8th St
Mercer Island, WA 98040
Via: Email

RE: **CAO23-021** First Review Letter; 4719 86th Ave SE, Mercer Island, WA 98040

Mr. Sherman,

The City of Mercer Island Community Planning and Development Department has completed a review for compliance with the zoning code, Title 19 of the Mercer Island City Code (MICC) for the above Critical Area Review 2 application. The following issues need to be addressed in your resubmission:

Planning:

1. Review and prepare responses to the September 27, 2023, review letter from Michele Lorilla, P.E., Geotechnical Peer Reviewer, see attached.

2. The Critical Area Consultation, Earth Solutions NW, LLC, dated September 13, 2023, needs to be reviewed and possibly modified so each item in MICC 19.07.100 is thoroughly addressed. How is the proposed development consistent with MICC 19.07.100? The applicant shall document how each measure has been addressed before considering and incorporating the next measure in the sequence.

3. The Critical Area Consultation, Earth Solutions NW, LLC, dated September 13, 2023, needs to be reviewed and possibly modified so each item in MICC 19.07.160 is thoroughly addressed. How is the proposed development consistent with the applicable sections of MICC 19.07.160? Earth Solutions NW, LLC provides their opinions throughout the document, but does not provide adequate responses to how the proposed development is consistent with each applicable section of MICC 19.07.160.

The City's processing of the Critical Area Review 2 application, CAO23-021, has been put on hold until these issues are resolved. Pursuant to MICC 19.15.110, all requested information

must be submitted within 60 days or a request for extension requested. The deadline for a complete response or request for extension is January 2, 2024. If a complete response is not received or an extension response has been received prior to that date, the application will expire and be canceled for inactivity. No additional notification regarding this deadline or expiration of the application will be provided.

If you have any questions, please contact me at 206-275-7717 or ryan.harriman@mercerisland.gov.

Best regards,

Ryan Harriman

Ryan Harriman, EMPA, AICP – Planning Manager
City of Mercer Island
Community Planning and Development

September 27, 2023

Ryan Harriman
Planning Manager
Community Planning and Development (CPD)
City of Mercer Island

Re: 4719 86th Ave SE
Mercer Island, Washington
CAO23-021

This letter provides the geotechnical engineering-related comments for the above-referenced permit.

The Lorenzini short plat documents (SUB 1) were reviewed as part of the Critical Area Review (CAR2).

The proposed location of the stormwater detention tank shown on Sheet C4 should be reviewed by the geotechnical engineer of record. An assessment of both the potential long-term impacts from the detention system on the stability of the slope given its proximity to the edge of the slope, as well as the potential adverse impacts of future slope movements on the performance of the detention system should be provided.

Following review of the plans, assessment of the detention tank location, and recommendations for alternate detention system location, if applicable, a letter should be provided stating whether the current plans conform to the geotechnical engineer's site development recommendations. An updated statement of risk (MICC19.07.160.B.3) from the geotechnical engineer should also be included in the letter.

Sincerely,

Cit Mercer Island - CP

Michele Lorilla, P.E.
Geotechnical Peer Reviewer

D. R. STRONG
CONSULTING ENGINEERS

November 20, 2023

Project No. 21071

Ryan Harriman
City of Mercer Island
Community Planning and Development
9611 SE 36th Street
Mercer Island 98040

Re: CAO23-021 First Review Letter; 4719 86th Ave SE, Mercer Island, WA 98040

Dear Mr. Harriman,

This letter is provided as response to comments dated November 2, 2023. Each item has been carefully reviewed and considered and the following is a summary of how each item was addressed.

Planning:

1. Review and prepare responses to the September 27, 2023, review letter from Michele Lorilla, P.E., Geotechnical Peer Reviewer, see attached.

   The review letter from Michele Lorilla, P.E. has been reviewed. The Response to Comments and Geotechnical Update provided by Earth Solutions NW, LLC (the Geotechnical Engineer of record) is provided with this submission, dated October 12, 2023.

2. The Critical Area Consultation, Earth Solutions NW, LLC, dated September 13, 2023, needs to be reviewed and possibly modified so each item in MICC 19.07.100 is thoroughly addressed. How is the proposed development consistent with MICC 19.07.100? The applicant shall document how each measure has been addressed before considering and incorporating the next measure in the sequence.

   The Critical Area Consultation provided by Earth Solutions NW, LLC, dated September 13, 2023, has been reviewed and modified so each item in MICC 19.07.160 is thoroughly addressed. The revised letter is included in this submission with a revision date of November 17, 2023.

3. The Critical Area Consultation, Earth Solutions NW, LLC, dated September 13, 2023, needs to be reviewed and possibly modified so each item in MICC 19.07.160 is thoroughly addressed. How is the proposed development consistent with the applicable sections of MICC 19.07.160? Earth Solutions NW, LLC provides their opinions throughout the document, but does not provide adequate responses to how the proposed development is consistent with each applicable section of MICC 19.07.160.

   The Critical Area Consultation provided by Earth Solutions NW, LLC, dated September 13, 2023, has been reviewed and modified so each item in MICC 19.07.160 is thoroughly addressed. The revised letter is included in this submission with a revision date of November 17, 2023.

620 7th Ave.
Kirkland, WA 98033-5565
Phone: (425) 827-3063
Fax: (425) 827-2423
Toll Free: (800) 962-1402

GEOTECHNICAL PEER REVIEW: MICHELE LORILLA, P.E.

The proposed location of the stormwater detention tank shown on Sheet C4 should be reviewed by the geotechnical engineer of record. An assessment of both the potential long-term impacts from the detention system on the stability of the slope given its proximity to the edge of the slope, as well as the potential adverse impacts of future slope movements on the performance of the detention system should be provided.

Following review of the plans, assessment of the detention tank location, and recommendations for alternate detention system location, if applicable, a letter should be provided stating whether the current plans conform to the geotechnical engineerôs site development recommendations. An updated statement of risk (MICC19.07.160.B.3) from the geotechnical engineer should also be included in the letter.

The review letter from Michele Lorilla, P.E. has been reviewed. The Response to Comments and Geotechnical Update provided by Earth Solutions NW, LLC (the Geotechnical Engineer of record) is provided with this submission, dated October 12, 2023.

If you have any questions, please do not hesitate to contact me.

Sincerely yours,
D. R. STRONG Consulting Engineers

Jeffrey S. Eisenhaur, E.I.T
Sr. Design Engineer

JSE/dle

Enclosure

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Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

September 13, 2023
Updated November 17, 2023
ES-8009.02

Design Built Homes, LLC
11400 Southeast 8th Street, Suite 415
Bellevue, Washington 98004

Attention: Todd Sherman

Subject: Critical Area Consultation
Lorenzini Short Plat
4719 – 86th Avenue Southeast and 84XX Southeast 47th Street
Mercer Island, Washington

Dear Todd:

In accordance with your request, Earth Solutions NW, LLC (ESNW) has prepared this letter further addressing the critical areas following comments issued by the City of Mercer Island representatives requesting additional information regarding the city code Chapters 19.07.100 and 19.07.160.

Per your request, Earth Solutions NW, LLC (ESNW) has provided this critical area consultation for the subject site. This letter includes a critical area report in general accordance with the City of Mercer Island requirements for both a landslide hazard and seismic hazard as described on the mapping provided by the city. Our scope of services for this phase of site work included reviewing the subsurface data gathered during past site exploration, observe the current site conditions and conditions surrounding the site in regards to slopes (performed in August 2023), review of the city code relating to critical areas, and authoring of this report.

The subject site is located on the west side of 86th Avenue Southeast, south of the intersection with Southeast 47th Street in mercer Island, Washington. The site is occupied by a single-family residence and associated improvements at the time of this report production. A slope is located on the south side of the residence which descends towards the south and the neighboring property which is in the process of being re-developed with a new residence. The new residence has been constructed using daylit construction of foundation elements into the subject slope which is designated as a landslide hazard by the City of Mercer Island mapping. The excavation for the neighboring residence has resulted in a condition where most of the slope (with exception of the section of slope which remains above a retaining wall) has been altered and removed. The city mapping for critical areas may be out-of-date in this respect. The remaining slope above the new retaining walls on the neighboring property is well-vegetated with plant species typical of the region. ESNW has replied to MICC 19.07.160 below, asking for the geological hazardous areas requirements to be waived in accordance with this chapter due to the lack of evidence of geologically hazardous areas based on subject site, and neighboring site, conditions following the regrading of the slopes on the neighboring property.

ESNW has provided a critical area report in general accordance with the city requirements per your request using data gathered during past site exploration, and conditions observed within the excavation for the neighboring property re-development.

The code section is cited below (italics) and ESNW has provided a response to the code section following the citation. The critical areas report follows.

19.07.100 - Mitigation sequencing.

Except as otherwise provided in this chapter, an applicant for a development proposal or activity shall implement the following sequential measures, listed below in order of preference, to avoid, minimize, and mitigate impacts to environmentally critical areas and associated buffers. Applicants shall document how each measure has been addressed before considering and incorporating the next measure in the sequence:

A. Avoiding the impact altogether by not taking a certain action or parts of an action. The applicant shall consider reasonable, affirmative steps and make best efforts to avoid critical area impacts. However, avoidance shall not be construed to mean mandatory withdrawal or denial of the development proposal or activity if the proposal or activity is an allowed, permitted, or conditional use in this title. In determining the extent to which the proposal should be redesigned to avoid the impact, the code official may consider the purpose, effectiveness, engineering feasibility, commercial availability of technology, best management practices, safety and cost of the proposal and identified changes to the proposal. Development proposals should seek to avoid, minimize and mitigate overall impacts based on the functions and values of all of the relevant critical areas and based on the recommendations of a critical area study. If impacts cannot be avoided through redesign, use of a setback deviation pursuant to section 16.06.110(C), or because of site conditions or project requirements, the applicant shall then proceed with the sequence of steps in subsections B through E of this section;

Based on consultations with the client, there is no potential for re-design of the site layout due to space constraints. The code mandated slope buffer will render the project infeasible from a civil engineering standpoint.

The site on which the slopes are contained has recently been re-developed and regraded the steep slopes which ascend into the subject site with a series of cast-in-place retaining walls. This action has created a situation where there remains only a remnant of the historic slope below the subject site. The inclination and overall relief of the relic slope may not meet the standard for a landslide hazard.

ESNW is recommending a setback for foundations that will render what remains of the slope as stable provided the retaining walls on the adjacent site associated with recent re-development have been sufficiently engineered to retain the slopes below the subject site.

B. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, using a setback deviation pursuant to section 19.06.110 (C), using appropriate technology, or by taking affirmative steps to avoid or reduce impacts;

The client may wish to apply for a setback deviation as described in this item.

C. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;

In our opinion, there is no planned impact to the environment that would require restoration, rehabilitation, or repair on the adjacent site slopes based on the proposal.

D. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action;

The risk of impact over time in this case will be reduced by the foundation setback from the face-of-slope. This will serve to provide adequate lateral separation where erosion and the risk of landslide have been reduced in comparison with a scenario where the foundations are not set back from the face of slope via deepening as ESNW has recommended. ESNW has also provided recommendations related to the stormwater control features on the site which will reduce the risk of leaks in the system and the potential for an increase in water volumes within the substrate. ESNW recommends regular inspection of the stormwater management systems to ensure leaks are not present.

E. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments, and/or;

By our estimation, this item is not of import when considering geologic hazards such as in this instance. The environment within the sloped regions off the subject site are not to be modified based on the proposed re-development of the subject site. However, care should be taken in regards to how the subject site is graded to ensure there is no net increase in surface and subsurface water volumes directed towards the slopes on the south side of the subject site.

F. Monitoring the impact and taking appropriate corrective measures to maintain the integrity of compensating measures.

As stated above, ESNW recommends regular inspection of the stormwater control measures on the subject site to ensure there is no increase in the volumes of subsurface water within the relic slopes on the neighboring property.

It is our opinion that there are no slope-related geologic hazards located on the subject site. We base this opinion on the subsurface data collected during our fieldwork, our review of the topographic survey for the subject site, and geologic hazard map. The soils appear to be uniform across the entirety of the subject site and throughout the sloped region under concern. There is no evidence of more permeable soil types (such as sand and clean gravel) sited above the glacial till or fine-grained deposits, which would be cause for concern over soil mobilization in the future on and around the subject site.

ESNW recommends foundation elements for the residential structure be seated in the firm native material, anticipated to be encountered at depths below two feet; and maintain a ten-foot linear setback from edge-of-footing to the face of slope. This may require a deviation from the code mandated setback and buffer, yet act to minimize additional surcharge/loading on the remnant-sloped region of the site to the south of the subject project area.

Best Management Practices (BMP) for erosion control will need to be employed during and after site development. This includes site grading to minimize erosion and soil mobilization, temporary erosion control measures during construction, and permanent vegetation to protect sloped areas from the effects of erosive forces.

ESNW has reviewed section 19.07.160 per client request. The code is cited below (italics).

Critical Area Report

As part of this report preparation, ESNW assessed the site for potential critical areas utilizing the City of Mercer Island geologic hazard map available on-line. The subject slopes located south of the proposed development envelope, above the neighboring residence under construction are not proposed to be modified beyond what has occurred as part of the neighboring property re-development, which has essentially removed the previously identified steep slopes and replaced them with a series of cast-in-place retaining walls for the new residence.

ESNW has provided an evaluation of the sloped regions and mapped scarps within this critical areas study in addition to an opinion relating to the seismic hazard delineated for the subject site based on previous fieldwork (December 2021) and additional fieldwork which occurred in August of 2023 where ESNW observed the subsurface conditions within the excavation for the adjacent property foundation elements.

ESNW observed no soil mobilization or visible scarps within the areas where scarps are mapped during site visits in 2021 and 2023.

The city code for a critical area study is cited in italics and ESNW response to the item follows:

19.07.110 - Critical area study.

A. A critical area study shall be required when a development proposal will result in an alteration to one or more critical areas or critical area buffers or when required to determine the potential impact to a critical area.

As previously stated, it is the opinion of ESNW there is no critical area on the subject site. A remnant slope is located off the subject site on the adjacent site where a new residence is being constructed. The new development included excavation into the historic steep slope and installation of a series of cast-in-place retaining walls meant to retain the remainder of the slope. The remaining slope above the retaining walls may not meet the criteria for a landslide hazard or even a steep slope based on inclination and vertical relief. As such, the City of Mercer Island mapping for landslide hazard is out-of-date. However, the client wishes ESNW provide this critical area report out of a sense of thoroughness and transparency with the city.

B. The critical area study shall be in the form of a written report supported by graphic information prepared by a qualified professional using guidance based on the best available science consistent with the standards in WAC Chapter 365-195 and shall contain the following items, as applicable to adequately evaluate the proposal, proposed alterations, and mitigation:

1. Disclosure of the presence of critical areas, including a delineation and type or category of critical area, on the development proposal site and any mapped or identifiable critical areas on or off site within the distance equal to the largest potential required buffer applicable to the development proposal area on the applicant's property;

The slopes on the south side of the existing residence are described by the city mapping as possessing an erosion hazard (known or suspected), landslide hazard (known or suspected), slopes 15 percent to 39 percent, and scarps within the sloped regions to the south of the residence. Additionally, a seismic hazard is mapped for the subject site and sites to the west and south of the subject property.

Recently, the site to the south of the subject site has been undergoing re-development with a single-family residence which includes a series of cast-in-place retaining walls cut into the subject slope. This grading activity has essentially removed the majority of the sloped region below the subject site, leaving only a small vertical portion of the slope above the retaining walls. A landslide hazard may not exist following the re-grading of the slopes.

2. A topographic and boundary survey;

We have provided a site plan which does not includes topographic information for the subject site but not for the entirety of the now-altered slopes on the neighboring properties designated as geologic critical areas.

3. A statement specifying the accuracy of the report and all assumptions made and relied upon;

This report can be relied upon for geotechnical analysis of the critical areas as they relate to the proposed single-family residence in our professional opinion. The report was authored with site-specific information gleaned through subsurface and surface explorations in December of 2021 and as site visit in August of 2023.

4. A description of the methodologies used to conduct the critical area study, including references;

ESNW representatives were on-site in December of 2021 to obtain subsurface data through excavation and observation of test pits surrounding the existing residential structure. The test pits were advanced to seven and one-half feet maximum depth, and terminated in dense to very dense native glacial till soil. ESNW observed glacial till within the excavation for the neighboring residence under construction located at the toe of the subject slopes in August of 2023. We also reviewed the geologic maps for the region, and the Web Soil Survey.

5. *A scale map of the development proposal site;*

We have provided a site plan. The subject slopes are located on the south and west sides of the existing residence depicted on Plate 2.

6. *Photographic records of the site before the proposed alteration occurs;*

We have provided as an attachment.

7. *An assessment of the probable effects to critical areas and associated buffers, including impacts caused by the development proposal and associated alterations to the subject property and impacts to other properties and any critical areas or buffers located on them resulting from the development of the site and the proposed development;*

We have analyzed the proposed site re-development from a slope stability standpoint. The new residence will not likely increase instability on and around the subject site as there are no planned alterations for the slopes designated as steep, the presence of glacial till extending from the surface to below the toe-of-slope on the neighboring property, and recommendations for foundations to be sited to where a minimum of ten feet laterally is maintained to the face-of-remaining slope. Additionally, ESNW assumes the buffers from the top-of-slope on the subject site will remain similar in many respects which will not result in any alteration in the stability characteristics of the slopes on and off-site.

In regards to the seismic hazard delineated for the site and site to the south, in our opinion a liquefication hazard does not exist on the site. The site and slopes are underlain by glacial till which is shown to demonstrate a very stable condition during seismic events. In our opinion, site susceptibility to liquefaction may be considered negligible. The absence of a shallow groundwater table and the dense to very dense characteristics of the native glacial till soil were the primary bases for this opinion.

The densified cemented qualities of glacial till present a very low erosion hazard from a geological standpoint. In this respect, ESNW opines there is a negligible risk of erosion on the subject site within the unweathered glacial till and slopes located off-site to the south of the existing residence and subsequent building envelope. There is a risk of erosion within the weathered zone of glacial till and topsoil where they are exposed during construction. Best management practices should be utilized for protection of these areas where exposed during and after construction in order to lessen the risk of erosion. Covering exposed soil with plastic sheeting and directing surface water away from exposed soil must be considered for the subject site. Furthermore, stormwater must not be allowed to sheet towards sloped regions. ESNW can consult with the client if desired to provide stormwater management services relating to erosion control upon request.

ESNW representatives observed no soil mobilization or scarps within areas described as possessing scarps in 2021 or 2023.

8. *A description of mitigation sequencing implementation described in section 19.07.100 including steps taken to avoid and minimize critical areas impacts to the greatest extent feasible;*

In our opinion, provided best management practices (BMP) are utilized during and after construction for stormwater management and erosion control measures, there will be no impacts to the critical areas on the site. Erosion control BMP include silt fencing, swales/interceptor trenches to collect and divert stormwater away from slopes, and other common erosion control measures typical of the industry practices.

9. *Detailed studies, as required by this chapter, for individual critical area types in order to ensure critical area protection;*

We have evaluated the slopes on the subject site and based on our observations, the slopes are stable in their current condition and configuration. The primary basis for this opinion is the fact that there are no planned alterations for the slopes dictated as possessing an erosion and landslide hazard, and the underlying site geology. The subject development will be occurring outside of the sloped regions, and the site and slopes are underlain by dense to very dense glacial till which presents a very stable condition. As such there will be no net-gain in surcharge conditions on the subject slopes if the recommended ten-foot foundation setback from face-of-slope is adhered to.

10. *Assessment of potential impacts that may occur on adjacent sites, such as sedimentation or erosion, where applicable, and;*

We have evaluated the currently available plan, and there will be no change in the sedimentation or erosion risks on adjacent sites given BMP are employed during and after construction. This should consist of grading the site such that there is no net increase in the volume of water running towards the south and west sides of the site. This can be achieved through grading and installation of stormwater control features that collect and vector surface water to approved discharge points.

11. *A post-design memorandum prepared by a qualified professional confirming that the proposed improvements comply with the design recommendations.*

ESNW can provide upon request.

19.07.160 - Geologically hazardous areas.

A. *Designation and typing. Geologically hazardous areas are lands that are susceptible to erosion, landslides, seismic events, or other factors as identified by WAC 365-190-120. These areas may not be suited for development activities because they may pose a threat to public health and safety. Areas susceptible to one or more of the following types of hazards shall be designated as geologically hazardous areas: landslide hazard areas, seismic hazard areas, and erosion hazard areas.*

Based on the presence of glacial till throughout the sloped region which presents a very stable geologic condition as it relates to slope stability. Furthermore, based on the homogeny of the soil throughout the profile of the sloped region (based on observations of the site and site to the south) there is no interbedding of sands and gravels, and the slope has been extremely diminished in overall relief resulting from grading on the adjacent property. It is ESNW's opinion that a landslide hazard may not exist following the re-grading of the sloped area based on the soil type and density and vertical relief and inclination of the remaining slope.

A seismic hazard is mapped for the subject site. Glacial till is present throughout the subsurface of the site and within the sloped area to the south of the project area. No groundwater seepage was observed during past site exploration or within the exposed slope on the neighboring property to the south of the subject site. In our opinion there is no liquefaction hazard on the subject site and slope to the south based on the presence of glacial till and lack of a near-surface groundwater table.

B. General review requirements. Alteration within geologically hazardous areas or associated buffers is required to meet the standards in this section, unless the scope of work is exempt pursuant to section 19.07.120, exemptions, or a critical area review 1 approval has been obtained pursuant to section 19.07.0909(A).

1. When an alteration within a landslide hazard area, seismic hazard area or buffer associated with those hazards is proposed, the applicant must submit a critical area study concluding that the proposal can effectively mitigate risks of the hazard. The study shall recommend appropriate design and development measures to mitigate such hazards. The code official may waive the requirement for a critical area study and the requirements of subsections (B)(2) and (B)(3) of this section when he or she determines that the proposed development is minor in nature and will not increase the risk of landslide, erosion, or harm from seismic activity, or that the development site does not meet the definition of a geologically hazardous area.

As there is no geologically hazardous areas on the subject site in ESNW's opinion, and based on the alterations of the slopes located directly to the south of the subject site, the client wishes to have the city waive the requirements in the listed code sections.

ESNW has provided a critical area study within this document.

2. Alteration of landslide hazard areas and seismic hazard areas and associated buffers may occur if the critical area study documents find that the proposed alteration:

a. Will not adversely impact other critical areas;

It is our opinion the proposal will not impact other critical areas. The recommended foundation setbacks will decrease the risk of soil mobilization on the remnant slopes on the adjacent property.

b. Will not adversely impact the subject property or adjacent properties;

Based on ESNW review of the project plans there will not be an increased risk of adverse impact on the subject property or adjacent properties given our recommendations are adhered to. In particular, the recommendation for the foundation setback from the face-of-slope.

c. Will mitigate impacts to the geologically hazardous area consistent with best available science to the maximum extent reasonably possible such that the site is determined to be safe, and;

To the extent reasonably possible ESNW has provided an opinion stating the risk of impacts to the supposed geologically hazardous area will be mitigated. Meaning that survey of the remainder of the slope on the adjacent site was not feasible based on limitations for access on a property other than the subject property. As such, ESNW recommends the foundation setback mentioned within this document to provide adequate separation from the slope from a surcharging/loading standpoint.

d. Includes the landscaping of all disturbed areas outside of building footprints and installation of hardscape prior to final inspection.

The re-development will include landscaping of disturbed areas following construction on the subject site. ESNW recommends complete installation of landscape and hardscape prior to final inspection; and ESNW can provide a final site observation following this completion.

3. Alteration of landslide hazard areas, seismic hazard areas and associated buffers may occur if the conditions listed in subsection (B)(2) of this section are satisfied and the geotechnical professional provides a statement of risk matching one of the following:

a. An evaluation of site-specific subsurface conditions demonstrates that the proposed development is not located in a landslide hazard area or seismic hazard area;

b. The landslide hazard area or seismic hazard area will be modified or the development has been designed so that the risk to the site and adjacent property is eliminated or mitigated such that the site is determined to be safe;

c. Construction practices are proposed for the alteration that would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties, or;

d. The development is so minor as not to pose a threat to the public health, safety and welfare.

In our opinion, there is no geologic hazard present on the site based on the presence of glacial till, limited slope relief, and lack of groundwater on the site or within the sloped region remaining following the grading and wall installation on the adjacent site to the south.

In our opinion, the proposed alteration would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties.

C. Development standards—Landslide hazard areas. Development is allowed within landslide hazard areas and associated buffers, when the following standards are met:

1. A critical area study shall be required for any alteration of a landslide hazard area or associated buffer;

ESNW has provided a critical area study.

2. Buffers shall be applied as follows. When more than one condition applies to a site, the largest buffer shall be applied:

a. Steep slopes. Buffer widths shall be equal to the height of a steep slope, but not more than 75 feet, and applied to the top and toe of slopes;

b. Shallow landslide hazard areas shall have minimum 25-foot buffers applied in all directions, and;

c. Deep-seated landslide hazard areas shall have 75-foot buffers applied in all directions.

ESNW has provided a critical area study out of a sense of thoroughness within this document. However, it is the opinion of ESNW that there are no critical areas present on the subject site in the form of erosion hazards, landslide hazard, or seismic hazard. ESNW bases this opinion on the fact that glacial till is present across the site and surrounding area, lack of a significant slope following excavation for the neighboring residence to the south, and the lack of a groundwater table. We have recommended a ten-foot horizontal foundation setback from the face of any slope on the site or surrounding the site. In our opinion, any other buffer will be unnecessary.

D. Development standards—Seismic hazard areas. When development is proposed within a seismic hazard area:

1. A critical area study shall be required and shall include an evaluation by a qualified professional for seismic engineering and design, a determination of the magnitude of seismic settling that could occur during a seismic event, and a demonstration that the risk associated with the proposed alteration is within acceptable limits or that appropriate construction methods are provided to mitigate the risk of seismic settlement such that there will be no significant impact to life, health, safety, and property.

In our opinion seismic hazards do not exist on the subject site based on the lack of a near-surface groundwater table, presence of glacial till, and lack of and liquefiable soil types.

2. *Identification of seismic hazard areas. Seismic hazard areas shall be identified by a qualified professional who references and interprets information in the U.S. Geological Survey Active Faults Database, performs on-site evaluations, or applies other techniques according to best available science.*

ESNW has reviewed the USGS fault maps for Mercer Island. The nearest mapped fault is located approximately a half-mile to the south of the subject site.

3. *When development is proposed on a site with an active fault, the follow provisions shall apply:*

    a. *A 50-foot minimum buffer shall be applied from latest Quaternary, Holocene, or historical fault rupture traces as identified by the United States Geological Survey or Washington Geological Survey map databases or by site investigations by licensed geologic professionals with specialized knowledge of fault trenching studies, or;*

    b. *Mitigation sequencing shall be incorporated into the development proposal as recommended based on geotechnical analysis by a qualified professional to prevent increased risk of harm to life and/or property.*

ESNW has reviewed the USGS fault maps for Mercer Island. The nearest mapped fault is located about a half-mile to the south of the subject site.

ESNW has provided a critical areas study within this document (see below).

E. Development standards—Erosion hazard areas.

1. *All development proposals shall demonstrate compliance with chapter 15.09, storm water management program.*

The client and project civil engineer can speak to this item. However, site re-development includes the use of conventional stormwater management as infiltration is not feasible based on the presence of a confining soil (glacial till) and the slopes located to the south of the site. ESNW strongly recommends infiltration not be utilized on the site as an increase in subsurface water volumes increases the risk of soil mobilization.

2. *No development or activity within an erosion hazard area may create a net increase in geological instability on or off site.*

Based on our review of the proposal, there will be no increase in the risk of geological instability on or off the subject site.

F. Development standards—Additional criteria for specific activities.

1. Trail building within geologically hazardous areas shall be subject to the following:

a. Trail surfaces shall be constructed of pervious materials and may not be wider than five feet, and;

b. Trails shall be located to minimize the need for tree removal.

Based on our review of the project plans, trail building is not part of the proposed re-development.

2. Land clearing, grading, filling, and foundation work within: (a) an erosion hazard area, when 2,000 square feet or more of site disturbance is proposed, and/or (b) a landslide hazard area are not permitted between October 1 and April 1.

a. The code official may grant a waiver to this seasonal development limitation if the applicant provides a critical area study for the site concluding that:

i. Geotechnical slope stability concerns, erosion and sedimentation impacts can be effectively controlled on site consistent with adopted storm water standards, and;

ii. The proposed construction work will not subject people or property, including areas off site, to an increased risk of associated impacts.

b. As a condition of the waiver, the code official may require erosion control measures, restoration plans, an indemnification, a release agreement and/or performance bond.

c. If site activities result in erosion impacts or threaten water quality standards, the city may suspend further work on the site and/or require remedial action.

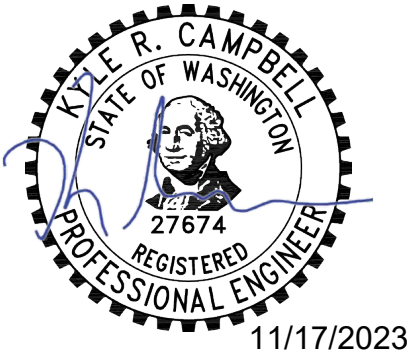
d. Failure to comply with the conditions of an approved waiver shall subject the applicant to code compliance pursuant to chapter 6.10, code compliance, including but not limited to civil penalties and permit suspension.

It is the opinion of ESNW that the subject site does not meet the criteria for a liquefaction hazard or landslide hazard based on the presence of glacial till soil observed from the surface of the subject site to the base of the subject slope terminating within the excavation for the neighboring property to the south, coupled with the fact that the slopes under concern have been highly modified resulting in limited amounts of remaining slopes above the cast-in-place retaining walls associated with the new residence on the southern neighboring property. Our evaluation of site-specific subsurface conditions demonstrates that the proposed development is not located in a landslide hazard area or seismic hazard area.

We trust this letter meets your current needs. Should you have any questions regarding the content herein, or require additional information, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC



11/17/2023

Stephen H. Avril
Project Manager

Kyle R. Campbell, P.E.
Senior Principal Engineer

Attachments: Site Photos
Plate 2 – Test Pit Location Plan

References:

- Geotechnical Engineering Study – Lorenzini Short Plat, prepared by ESNW, ES-8009.01, dated February 1, 2022
- Review Letter – 4719 86th Ave SE, prepared by City of Mercer Island, dated November 2, 2023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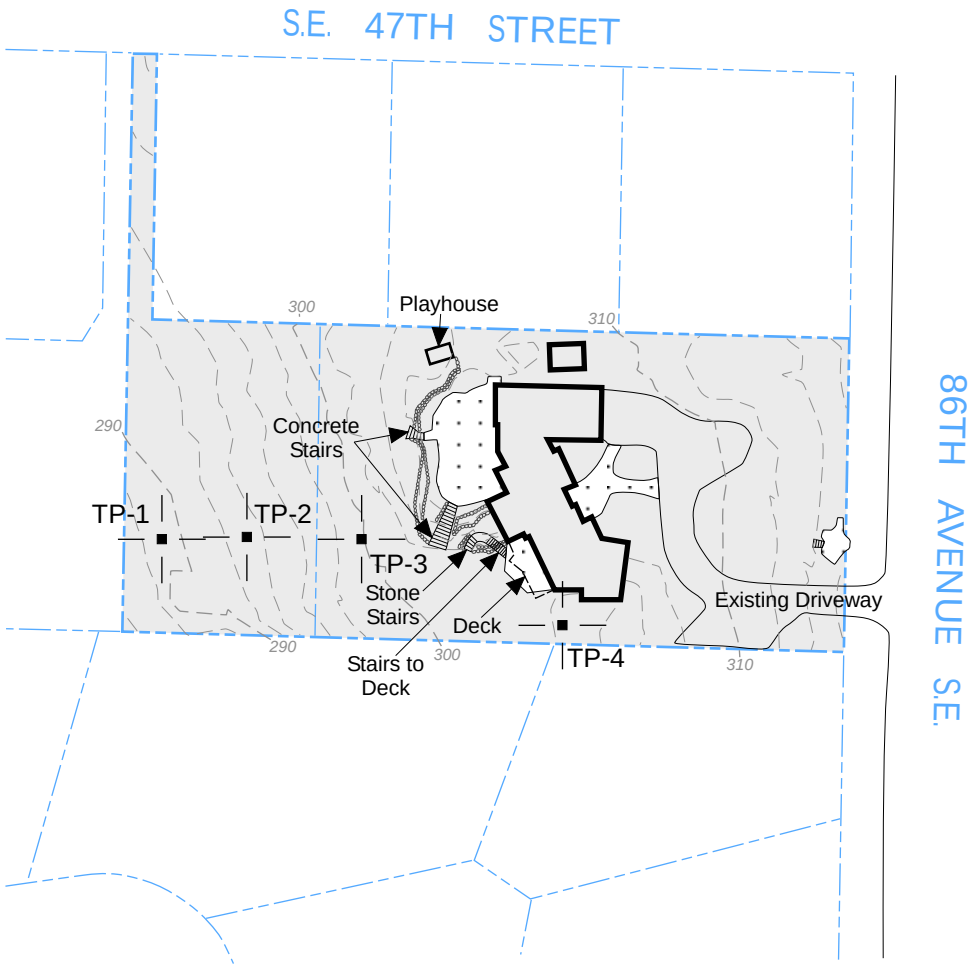

LEGEND

TP-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-8009.01, Dec. 2021

Subject Site

Existing Building

Concrete

Rockery

NORTH

1"=80' 0 40 80 160 Scale in Feet

NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Test Pit Location Plan
Lorenzini Short Plat
Mercer Island, Washington

Drwn. CAM	Date 01/12/2022	Proj. No. 8009.01
Checked BCS	Date Jan. 2022	Plate 2

Earth Solutions NW LLC
Geotechnical Engineering, Construction
Observation/Testing and Environmental Services

October 12, 2023
ES-8009.02

Design Built Homes, LLC
11400 Southeast 8th Street, Suite 415
Bellevue, Washington 98004

Attention: Todd Sherman

Subject: Response to Comments and Geotechnical Update
Lorenzini Short Plat
4719 – 86th Avenue Southeast and 84XX Southeast 47th Street
Mercer Island, Washington

Greetings, Todd:

In accordance with your request, Earth Solutions NW, LLC (ESNW) has prepared this letter providing a response to comments provided by the City of Mercer Island representatives. The comment from the reviewer is cited, and the ESNW response follows.

City of Mercer Island Comment – The proposed location of the stormwater detention tank shown on Sheet C4 should be reviewed by the geotechnical engineer of record. An assessment of both the potential long-term impacts from the detention system on the stability of the slope given its proximity to the edge of the slope, as well as the potential adverse impacts of future slope movements on the performance of the detention system should be provided.

Following review of the plans, assessment of the detention tank location, and recommendations for alternate detention system location, if applicable, a letter should be provided stating whether the current plans conform to the geotechnical engineer's site development recommendations. An updated statement of risk (MICC19.07.160.B.3) from the geotechnical engineer should also be included in the letter.

ESNW Response – ESNW has reviewed the referenced site plans which include the placement of the subject detention tank and piping.

In the opinion of ESNW, the placement of the detention system as shown is feasible from a geotechnical standpoint. ESNW consulted with the project civil engineer regarding alternative locations for the system. Based on the sizing of the detention system, site elevations relating to grading and other utility installations, and trees that are to be retained, the location on the southern side of the site is the only one feasible.

In ESNW's opinion, the tank will reduce the surcharging on the subject slope; as the system (even when filled with water) will be lighter than the soil which is currently in-place within the footprint of the system.

All pipe joints associated with the subject stormwater system must be sealed such that water cannot exit the system. In addition, the system must be designed in such a manner as to capture any water that may leak from the detention system or accumulate within the limits of the excavation after construction. This can be accomplished by installing a subsurface drainage system within the backfill. The drainage system should be constructed as follows:

- The bottom of the excavation must be sloped to a low point on the upslope side of the excavation.

- A non-woven geotextile, such as Mirafi 140N must be placed over the entirety of the excavation.

- A four-inch diameter, perforated must be placed on the geotextile, at the low point of the excavation, with the perforations facing down.

- The entire excavation must be backfilled with ¾ inch clean crushed rock. Alternative sizes of clean crushed rock can be used, but any alternate must be approved by ESNW. The upper one to two feet of the backfill can be native soil or topsoil for landscaping purposes. Non-woven geotextile must be placed over the clean crushed rock prior to placement of the native soil or topsoil.

- The perforated pipe must be extended along the outfall line and be connected to the first downstream storm structure.

The construction of the drainage system should be observed by a representative of ESNW on a near full-time basis.

Erosion control measures must be installed during and immediately following the detention system installation. Permanent erosion control measures should consist of establishment of vegetation such as grass and other ground cover.

In our opinion, the plans conform to ESNW recommendations presented within the referenced documents. Additionally, the proposed alteration/site work would render the development as safe as if it were not located in a geologically hazardous area and do not adversely impact adjacent properties provided the geotechnical recommendations contained within this letter and past documents provided by ESNW are adhered to.

Limitations

The recommendations and conclusions provided in this letter are professional opinions consistent with the level of care and skill that is typical of other members in the profession currently practicing under similar conditions in this area. Our recommendations are based on the information available at the time of this letter preparation. A warranty is not expressed or implied.

We trust this letter meets your current needs. If you have any questions, or if additional information is required, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC

10/12/2023

Stephen H. Avril
Project Manager

Kyle R. Campbell, P.E.
Senior Principal Engineer

References:

- Geotechnical Engineering Study, prepared by ESNW, ES-8009.01, dated February 1, 2022
- Critical Area Consultation, prepared by ESNW, ES-8009.02, dated September 13, 2023
- Site Plan – Lorenzini SP, prepared by D.R. Strong Consulting Engineers, Sheet 1 through 4, dated December 20, 2021

November 28, 2023

Ryan Harriman
Planning Manager
Community Planning and Development (CPD)
City of Mercer Island

Re: 4719 86th Ave SE
Mercer Island, Washington
CAO23-021

This letter provides the geotechnical engineering-related comments for the above-referenced permit.

The SUB 2 supplemental documents in response to the SUB 1 comments were reviewed. No revised drawings were submitted in the SUB 2 package for review.

The SUB 2 information from Earth Solutions NW, LLC meets the requirements of MICC 19.07.100 and MICC 19.07.160 provided that the recommendations presented in Earth Solutions NW, LLC ‘s letter dated October 12, 2023, are incorporated into the proposed stormwater drainage system design.

Sincerely,

Cit Mercer Island - CP

Michele Lorilla, P.E.
Geotechnical Peer Reviewer

Ryan Harriman

From: Michele Lorilla
Sent: Wednesday, November 29, 2023 2:28 PM
To: Ryan Harriman
Subject: RE: CAO23-021

My opinion is that the site does not meet the definition of a geologically hazardous area based on the soil conditions encountered at the site.

Michele Lorilla, P.E.
Geotechnical Peer Reviewer
City of Mercer Island – Community Planning & Development
www.mercerisland.gov

From: Ryan Harriman <ryan.harriman@mercerisland.gov>
Sent: Wednesday, November 29, 2023 1:56 PM
To: Michele Lorilla <michele.lorilla@mercergov.org>
Subject: RE: CAO23-021

Thanks, Michele.

Are you of the opinion that the proposed development is minor in nature and will not increase the risk of landslide, erosion, or harm from seismic activity, or that the development site does not meet the definition of a geologically hazardous area?

Thanks!

Ryan Harriman, EMPA, AICP
Planning Manager
City of Mercer Island – Community Planning & Development
206-275-7717 | www.mercerisland.gov

From: Michele Lorilla <michele.lorilla@mercergov.org>
Sent: Wednesday, November 29, 2023 9:06 AM
To: Ryan Harriman <ryan.harriman@mercerisland.gov>
Subject: RE: CAO23-021

Good morning,

I generally agree with them that the site does not contain geologically hazardous areas based on the soil conditions encountered. As for outdated maps, the development to the south installed a series of soil nail walls that would serve to

stabilize the slope, but I do not think that we are updating all the maps based on site developments, so I would not say that they are outdated. The geology and slope steepness can indicate a landslide prone area – and I believe that was what triggered the hazard classification in the first place. It just so happened that the landslide prone designation encroached on a small portion of the site in question. The site has a seismic hazard designation and I am not sure how that designation was established for this site, but I also think that a seismic hazard is not present due to the soil conditions encountered.

Let me know if that answers your question.

Michele Lorilla, P.E.
Geotechnical Peer Reviewer
City of Mercer Island – Community Planning & Development
www.mercerisland.gov

From: Ryan Harriman <ryan.harriman@mercerisland.gov>
Sent: Tuesday, November 28, 2023 3:36 PM
To: Michele Lorilla <michele.lorilla@mercergov.org>
Subject: CAO23-021

Hi Michelle,

I wanted to get your thoughts on CAO23-021, specifically in regard to the Critical Area Consultation, dated September 13, 2023 and revised on November 17, 2023. ESNW consistently argues that the subject property doesn't contain geologically hazardous areas and our maps are outdated.

In your professional opinion, are they correct?

Thanks!

Ryan Harriman, EMPA, AICP
Planning Manager
City of Mercer Island – Community Planning & Development
206-275-7717 | www.mercerisland.gov

COMMUNITY PLANNING & DEVELOPMENT
9611 SE 36TH STREET | MERCER ISLAND, WA 98040
206.275.7605 | www.mercerisland.gov/cpd

PUBLIC NOTICE OF DECISION

NOTICE IS HEREBY GIVEN that approval has been granted for the application described below:

File No.:	CAO23-021
Permit Type:	Type III
Description of Request:	A request for a critical areas review 2 application, associated with SUB23-004, a proposal to subdivide the parent parcel into two (2) lots.
Applicant/ Owner:	Todd Sherman / Design Built Homes
Location of Property:	4719 86th Ave SE, Mercer Island, WA 98040 King County Tax Parcel No. 7598100420
SEPA Compliance:	SEPA Exempt pursuant to WAC 197-11-800(6)(d).
Applicable Development Regulations:	Pursuant to Mercer Island City Code (MICC) 19.15.030 Table A, applications for Critical Area Type 2 Permits are required to be processed as Type III land use reviews. Processing requirements for Type III land use reviews are further detailed in MICC 19.15.030 Table B.
Other Associated Permits:	SUB23-004 https://mieplan.mercergov.org/public/SUB23-004
Project Documents:	https://mieplan.mercergov.org/public/CAO23-021
Decision:	Approved subject to conditions.

Appeal Rights: *DISCLAIMER: This information is provided as a courtesy. It is the ultimate responsibility of the appellant to comply with all legal requirements for the filing of an appeal.*

Parties of record have the right to appeal certain permit and land use decisions. In some cases, other affected parties also have appeal rights. Depending on the type of decision, the appeal may be heard by a City Hearing Examiner, Commission, Board, or City Council, or outside the City to the State Shoreline Hearings Board, the State Growth Management Hearings Board, or King County Superior Court. For a comprehensive list of actions and the applicable entity who will hear the appeal, see MICC 19.15.030 Table B.

If you desire to file an appeal of a decision that is appealable to the City, you must submit the appropriate form and file it with the City Clerk **within the time stated in the Notice of Decision.** Forms are available from Community Development and Planning. Upon receipt of a timely complete appeal application and appeal fee, an appeal hearing will be scheduled. To reverse, modify or remand a decision, the appeal hearing body must find that there has

been substantial error; the proceedings were materially affected by irregularities in procedure; the decision was unsupported by material and substantial evidence in view of the entire record; or the decision is in conflict with the City's applicable decision criteria.

Application Process Information:	Date of Application:	September 14, 2023
	Determined to Be Complete:	September 20, 2023
	Public Comment Period:	September 25, 2023 through 5:00 PM on October 25, 2023
	Date Notice of Decision Issued:	December 4, 2023
	Appeal Filing Deadline:	5:00 PM on December 19, 2023
Project Contact:	Ryan Harriman, Planning Manager ryan.harriman@mercerisland.gov | (206) 275-7717	