March 17, 2026 G-5770-1

Gerald Yuen
4624 E. Mercer Way
Mercer Island, Washington 98040

Subject: Updated Geotechnical Engineering Report
Proposed Modifications to Driveway and Yard Areas
4624 E. Mercer Way
Mercer Island, Washington 98040

Dear Mr. Yuen:

GEO Group Northwest, Inc., is pleased to provide you with this updated geotechnical engineering report for the proposed modifications to driveway and yard areas at your property on Mercer Island, Washington. This report is an update of our previous geotechnical report for the proposed project dated October 31, 2022.

## SITE AND PROJECT DESCRIPTION

### Site Description

The project site (Parcel No. 755870-0020) has the address 4624 E. Mercer Way and is located on the eastern side of Mercer Island, Washington, as illustrated in Plate 1 – Site Location Map. The site is approximately rectangular-shaped, with the major axis oriented approximately east-west, and is 39,303 square feet (0.90 acres) in size. The site has sloping topography that falls generally eastward toward the Lake Washington shoreline.

The site is developed with a single-family residence constructed in 1990, along with an attached garage and exterior decking, and a driveway with both asphalt and concrete surfaced portions. Several low- to medium-height concrete retaining walls and low-height rockeries which

accommodate grade changes are present across the middle and eastern part of the site. A modular block retaining wall approximately 4 feet tall borders a small parking area next to the driveway on the middle to western part of the site. The western perimeter of the site is undeveloped and vegetated with ivy and blackberry vines and trees.

The site is accessed by a private shared access road from East Mercer Way. The site is bounded by developed residential lots to the north and south, by East Mercer Way to the west, and by Lake Washington to the east.

The site topography generally consists of steeply sloped areas on its western portion and southwestern margin, and gently to moderately sloped areas on the remainder of the site, as illustrated in Plate 2 – Pre-Project Site Plan.

**Project Description**

The proposed project includes modifying the existing asphalt-paved driveway on the middle to eastern part of the site and constructing new paver patio areas and staircases and new planting beds to the west of the proposed sport court and south of the driveway. The layout of the proposed modifications is illustrated in Plate 3 – Proposed Project Layout.

Construction of the proposed improvements is anticipated to involve grading of up to approximately 3 or 4 feet of excavation and backfilling. Final grades will be approximately similar in most areas with the exception of terracing between patio and sport court elevations accommodated by retaining walls.

## GEOLOGIC BACKGROUND

The published geologic mapping of the local area (Geologic Map of Mercer Island, Washington, by Troost et al., 2006) indicates that the soils underlying the project site consist predominantly of Quaternary-age pre-Olympia nonglacial deposits, with younger lake deposits along the shoreline at the eastern end. Pre-Olympia nonglacial deposits typically consist of sand, gravel, silt, and organic sediments that were deposited before the last glacial advance of the Puget lobe of the cordilleran ice sheet approximately 15,000 years ago. Lake deposits typically consist of silt with localized sand, peat, and other organic sediments deposited in a subaqueous environment.

## SUBSURFACE INVESTIGATION

### Subsurface Investigation

On September 28, 2022, a geologist from our office visited the subject property to perform a visual reconnaissance of the property and investigate the subsurface soil conditions. Three exploratory borings were excavated with hand operated boring equipment. The approximate locations of each boring are illustrated on the attached Plate 2- Pre-Project Site Plan.

Soils encountered in boring HA-1 consisted of loose light brown silty sand to a depth of approximately 1 foot below ground surface (bgs), underlain by medium stiff to stiff light gray silt with sand to the bottom of the boring at 3 feet bgs.

Soils encountered in boring HA-2 consisted of very loose reddish-brown silty sand to a depth of approximately 2 feet bgs. Loose dark brown silty sand was encountered from depths of approximately 2.0 to 2.2 feet bgs, and was underlain by stiff light gray sandy silt to the bottom of the boring at a depth of approximately 3.5 feet bgs.

Soils encountered in boring HA-3 consisted of a surficial layer of dark brown mulch underlain by loose grayish brown silty sand with gravel to the bottom of the boring at a depth of approximately 2 feet bgs.

No groundwater seepage was encountered in the borings. Soil logs for the borings are provided in Attachment A – USCS Soil Classification and Soil Boring Logs.

We interpret the surficial very loose and loose soils encountered in borings HA-2 and HA-3 as artificial fill soils that were placed during previous construction activity at the site. The stiff to very stiff soils encountered in borings HA-1 and HA-2 are interpreted to be native Pre-Olympia age soils consistent with the published geologic mapping.

## GEOLOGIC HAZARD AREA IDENTIFICATION AND EVALUATION

### Geologic Hazard Area Identification

We reviewed available City of Mercer Island GIS mapping of geologic hazard areas for the local vicinity of the project site. This mapping indicates the project site contains erosion, landslide, and seismic hazard areas and steep slope areas. The mapped extents of the erosion, landslide, and seismic hazard areas include the proposed project area. An excerpt from the GIS mapping is provided in Plate 4 – Geologic Hazard Areas GIS Mapping.

Erosion Hazard Area

The GIS mapping indicates that includes the entire site except for an area along its eastern margin is located within an erosion hazard area. The mapped erosion hazard area extends beyond the site onto properties to the north and south, as well as beyond East Mercer Way to the west.

We referred to the criteria presented in MICC 19.16 to further identify the extent of erosion hazard areas at the site. We reviewed the USDA Natural Resources Conservation Service (NRCS) soils mapping for the project site and immediate vicinity. The NRCS information indicates that soils underlying the proposed project area at the site consist of Kitsap silt loam. Where present on slopes greater than 15 percent inclination, these soils are considered to have severe risk for erosion.

The proposed project area has inclinations ranging between approximately 7 to 30 percent grade, with much of the area being greater than 15 percent in grade. Therefore, the proposed project area is confirmed to include erosion hazard areas.

During our visual reconnaissance, we did not observe evidence of soil erosion on the project site. In our opinion, the existing landscaping and pavement conditions on the middle and western part of the project site (including the proposed project area) provide effective mitigation of the risk for soil erosion.

Landslide Hazard Area

According to Mercer Island GIS mapping, the project site and adjacent properties are mapped as being located entirely within a designated landslide hazard area. The mapping indicates no documented landslides have occurred on the project site, but two landslide events are documented for adjacent properties to the southwest (4630 E. Mercer Way) and the northwest (4600 E. Mercer Way). The GIS information for these landslides appears to indicate they were small in extent and did not extend onto the project site.

During our visual reconnaissance of the project site, we did not observe evidence of slope instability. Soils found in the borings completed for our investigation consisted of native, medium dense or dense, silty deposits consistent with the Pre-Olympia deposits noted in the published geologic mapping. No mass wasting or landslide deposits were found in the borings.

Seismic Hazard Area

According to the GIS mapping, the project site and adjacent properties are mapped as being entirely within a designated seismic hazard area. Per the MICC, seismic hazard areas are those areas considered to have a severe risk of damage from earthquake induced ground shaking, slope failure, settlement, soil liquefaction, or surface faulting.

According to the U.S. Geological Survey Active Faults Database, the project site is located within the Seattle Fault Zone. The Seattle Fault Zone has an area having a north-south width of several miles and extending eastward from Bainbridge Island, across Seattle and Mercer Island, and through Issaquah. No fault traces are mapped on the site, and the closest known or suspected fault trace is located approximately 1.25 miles north of the site.

During our visual reconnaissance of the project site, we did not observe evidence of previous ground shaking effects, slope failure, or soil surface faulting, or soil settlement or liquefaction on the site. Soils found in the borings completed for our investigation were unsaturated and consisted of medium dense or dense, silty deposits consistent with the Pre-Olympia deposits noted in the published geologic mapping. Based on the findings from our reconnaissance and soil investigation, we conclude that the location of the proposed project at the site is not subject to severe risk of damage as a result of earthquake-induced seismicity.

Steep Slope Area

The GIS mapping indicates that steep slope areas are present in the northwestern southwestern and central-southern parts of the project site. These slopes have inclinations ranging between approximately 40 to 55 percent grade and heights ranging between approximately 30 to 50 feet. Portions of these steep slope areas extend onto the north and south adjacent properties.

We referred to the criteria presented in MICC 19.16 and information from a recent topographic survey of the project site to further identify the extent of steep slope areas at the site (i.e., slopes having inclinations of 40 percent or greater and heights of at least 30 feet). The topographic information presented in Plate 2 – Pre-Project Site Plan, indicates that no areas meeting these criteria are present within the proposed project area but are present further west on the project site and adjacent property.

During our visual reconnaissance of the project site, we observed that these slope areas were undisturbed and well vegetated with shrubbery and medium to large trees. We did not observe evidence of recent soil movement or springs or water seepage.

**Evaluation of the Impact of the Proposed Project to Geologic Hazards**

In our opinion, the potential risk of adverse impacts will be effectively mitigated by the proposed measures to reduce impacts to the most critical parts of the geologic hazard areas and other areas through 1) avoidance of disturbance to the steep slope area, 2) the use of retaining walls to accommodate grade transitions, and 3) re-stabilization of disturbed areas at the end of construction as proposed in the project landscaping and vegetation plan. The application of appropriate construction methods and Best Management Practices (BMPs) during the project will also minimize impacts to the site, including geologic hazard areas, and adjacent property during construction. Specific comments related to the identified geologic hazard areas and steep slope areas are presented below.

Landslide Hazard

Soil conditions at the proposed project area were found to consist of unsaturated, medium dense to dense soils; and no indications of soil or slope instability were found. Also, grading work for the proposed project will involve relatively shallow amounts of grading at locations which are well away from steeply sloped areas. Therefore, it is our opinion that the project area is stable in

its existing condition and that the proposed project will not increase the risk slope instability on the project site or on adjacent properties.

Erosion Hazard

The potential for soil erosion at the project site can be mitigated through temporary and permanent erosion control measures and control of surface water runoff. Our recommendations for appropriate construction BMPs and erosion control are provided in the conclusions and recommendations section of this report.

Seismic Hazard

Based on the results of our subsurface investigation, it is our opinion that the risk for soil liquefaction resulting from seismic events is minimal for the project site. Soils encountered during our subsurface investigation consisted of unsaturated silts and fine-grained sands, which, in our opinion, are not susceptible to liquefaction.

Statement of Risk

In summary and reference to MICC 19.07.160.B3, we conclude that the proposed project has been designed such that the risk to the project site and adjacent properties is mitigated such that the site is determined to be safe.

## CONCLUSIONS AND RECOMMENDATIONS

### Site Preparation and General Earthwork

At the start of construction, the areas to be modified should be stripped and cleared of pavements, structures, topsoil, organics, and debris, where present. These materials should be hauled off site or used for landscaping if appropriate; they should not be used as structural fill.

Erosion Control

During demolition and clearing, temporary erosion and sedimentation controls (TESCs) should be installed to prevent the flow of sediment-laden runoff from the site and to minimize the potential for on-site soil erosion. Temporary erosion and sedimentation controls, such as silt

fences, should be installed down-gradient of areas disturbed during construction activity to prevent sediment-laden surface runoff from being discharged off the project site. The temporary erosion and sediment controls should be maintained during the progress of the project until the ground disturbance activities have been completed and the disturbed areas have been re-stabilized. We recommend the post-construction re-stabilization measures include mulching and re-vegetation of disturbed soils.

Concentrated surface water should not be allowed to flow over exposed slopes or into excavations. Water also should not be allowed to stand in any area where concrete slabs, or pavements are to be constructed. Loose or soft exposed soil surfaces should be sealed at night by compacting the surface to reduce the potential for moisture infiltration into the soils. During wet weather, exposed slopes and stockpiled soils should be covered with plastic sheeting to minimize erosion, and surface water should be directed toward temporary settlement or collection points for treatment and discharge, as appropriate for the site conditions.

Excavations and Slopes

Temporary excavation slopes should not exceed the limits specified in local, state, and national government safety regulations, unless otherwise approved on site by the geotechnical engineer. We recommend temporary cuts greater than four feet in height should be sloped at an inclination no steeper than 1H:1V (Horizontal: Vertical). Temporary excavations in very dense soils can be sloped to approximately 0.5H:1V or steeper if observed and approved on site by the geotechnical engineer. Permanent slopes should be inclined no steeper than 2.5H:1V. Permanent slopes that are to be maintained or mowed should be sloped at 3H:1V, or less.

Based on the findings from our subsurface investigation, water seepage is not anticipated for excavations shallower than approximately 3.5 feet bgs at the property. If water seepage or other adverse conditions are encountered, the geotechnical engineer should observe and evaluate these conditions, and temporary cuts in these soils may need to be made at shallower inclinations when recommended by the geotechnical engineer.

Subgrade Preparation

Soils in areas to receive structural fill or concrete slabs should be prepared to a firm, unyielding condition. The prepared subgrade should be observed and approved by the geotechnical engineer. Any detected soft spots or disturbed areas should be compacted or excavated and replaced with compacted structural fill or crushed rock as directed by the geotechnical engineer.

Structural Fill

All fill material used to achieve design site elevations below retaining walls or driveways should meet the requirements for structural fill. During wet weather conditions, material to be used as structural fill should have the following specifications:

1. Be free draining, granular material containing no more than five (5) percent fines (silts and clay-size particles passing a No. 200 mesh sieve);
2. Be free of organic material and other deleterious substances, such as construction debris and garbage;
3. Have a maximum particle size of three (3) inches in diameter.

All fill material should be placed at or slightly above the optimum moisture content. The optimum moisture content is the water content in soil that enables the soil to be compacted to the greatest dry density for a given compaction effort.

Based upon our subsurface investigation, some of the sites near surface soils consisted of silty soils which are not recommended for use as structural fill due to their fine-grained gradation and anticipated moisture content, both of which will retard compaction efforts. If structural fills are required to achieve design site elevations, then we recommend the use of an imported granular fill material which may provide more uniformity and be easier to compact to the required structural fill specifications, especially during periods of wet weather.

Structural fill underneath driveways, should be compacted to at least ninety (90) percent of the material's maximum dry density, as determined by ASTM Test Designation D-1557-91 (Modified Proctor). Structural fill placed within twelve (12) inches of finish grade underneath driveways should be compacted to at least ninety-five (95) percent of the material's maximum dry density.

Structural fill material should be spread and compacted in lifts that are ten (10) inches or less in thickness in an uncompacted state. The compacted fill material should be field tested by using ASTM Designations D2922 and D3017, Nuclear probe method, to verify that the required degree of compaction has been achieved.

We recommend that GEO Group Northwest, Inc. be retained to evaluate the suitability of structural fill material and to monitor the compaction of structural fill material during construction for quality assurance of the earthwork.

**Conventional Concrete Retaining Walls**

Conventional concrete retaining walls which are free to rotate on top (unrestrained) are considered capable of yielding and should be designed using an active earth pressure. Concrete retaining walls which are restrained horizontally at the top (such as basement walls) are considered unyielding and should be designed using an at-rest earth pressure. We recommend conventional concrete retaining walls be supported consistent with the foundation recommendations presented above in this report. Our recommended soil engineering parameters for fully-drained retaining wall design are as follows:

Active Earth Pressure

- 35 pcf, equivalent fluid pressure, for level ground behind the wall;

At-Rest Earth Pressure

- 45 pcf, equivalent fluid pressure, for level ground behind the wall;

- Seismic Surcharge
  8H psf, where applicable, for level ground behind the wall;

Passive Earth Pressure

- 350 pcf, equivalent fluid pressure, for undisturbed, dense native soil or structural fill;

Base Friction

- 0.35 for competent, native soil or structural fill

A factor of safety of 2.0 is incorporated into the above-recommended passive pressure and base friction values.

Surcharge loads imposed on the wall due to nearby structures, driveways or traffic, upward sloping ground, or other conditions that could impose loads against the wall, should be added to the active and at-rest earth pressures stated above.

To prevent the buildup of hydrostatic pressure behind the wall, we recommend that a zone of free-draining material at least 12 inches wide should be placed against the back of the wall. This material should extend downward to the drainage pipe. A layer of non-woven geotextile filter fabric should separate the free-draining backfill material from the adjacent soils or fills. These recommendations are schematically illustrated in Plate 5 – Typical Concrete Retaining Wall Drainage Detail.

The top 12 inches of the backfill behind the wall can consist of topsoil if desired. This material can be separated from the underlying drainage material with a layer of geotextile fabric, if desired. Alternatively, the surface can be sealed with asphalt or concrete paving. Nearby final grades should be sloped to drain away from the wall, or other measures (such as strip or ribbon drains) should be used to intercept surface water that flows toward the wall.

The backfill for conventional concrete retaining walls should be compacted to a relatively dense condition to mitigate the potential for later ground settlement or excessive saturation. Wall backfill that will support structures or slabs should be placed and compacted consistent with the recommendations regarding structural fill in this report. The compacting machinery that is used should be compatible with the wall's capacity to resist the temporary loading effects produced by operation of the machinery. In this respect, the contractor should exercise care if heavy machinery is used for compaction.

**Pavement Support**

The performance of pavement is directly related to the condition of the underlying subgrade, if there is post-construction settlement of the subgrade, it will be reflected up through the pavement. To avoid this situation, pavements should be constructed on subgrade that has been compacted to a firm and unyielding condition. If soft or unstable areas develop in the subgrade, such areas should be over-excavated and replaced with compacted structural fill or crushed rock.

Structural fill placed in pavement areas should be compacted in accordance with the requirement in the structural fill section of this report. For light-traffic loading conditions, the asphalt pavement section for the modified driveway areas can consist of at least 2.5 inches of asphalt-concrete over at least 4 inches of clean crushed rock base.

**Surface Drainage**

Final grades should not allow for the concentrated flow of surface water surface onto slopes steeper than 15 percent grade, as this may lead to soil erosion or rutting. We recommend that storm water drainage from hardscape surfaces, such as pavements, should be managed so that it is directed to an approved stormwater location.

## LIMITATIONS

This report has been prepared for the specific application to this site for the exclusive use of Mr. Gerald Yuen and his authorized representatives. Any use of this report by other parties is solely at that party's own risk. We recommend that this report be included in its entirety in the project contract documents for reference during construction.

Our findings and recommendations stated herein are based on field observations, our experience and judgment. The recommendations are our professional opinion derived 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, and within the budget constraint. No warranty is expressed or implied. In the event that soil conditions not anticipated in this report are encountered during site development, GEO Group Northwest, Inc. should be notified and the above recommendations should be re-evaluated.

## ADDITIONAL SERVICES

GEO Group Northwest recommends that it be retained to perform a review of the final design and specifications of the proposed driveway modifications to verify that our geotechnical recommendations are properly interpreted and incorporated into the design and construction documents and are appropriate for the finalized configuration of the proposed construction.

We also recommend that we be retained to provide geotechnical monitoring and testing services during construction to verify that construction work is completed in compliance with the recommendations in this report and the project plans. As part of these services, will be available

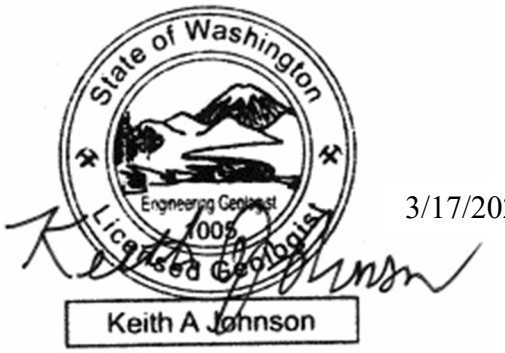
to discuss and recommend design changes, if needed, in the event that unanticipated site conditions are encountered or occur during construction.

**CLOSING**

We appreciate the opportunity to provide you with geotechnical engineering services for this project. If you have any questions, or if we may be of further service, please do not hesitate to contact us.

Sincerely,

**GEO GROUP NORTHWEST, INC.**




3/17/2026


3/17/2026

Keith Johnson, L.E.G.
Project Geologist

William Chang, P.E.
Principal Engineer

Plates and Attachments:

- Plate 1 – Site Location Map
- Plate 2 – Pre-Project Site Plan
- Plate 3 – Proposed Project Layout
- Plate 4 – Geologic Hazard Areas GIS Mapping
- Plate 5 – Typical Concrete Retaining Wall Drainage Detail
- Attachment A – USCS Soil Classification and Soil Boring Logs

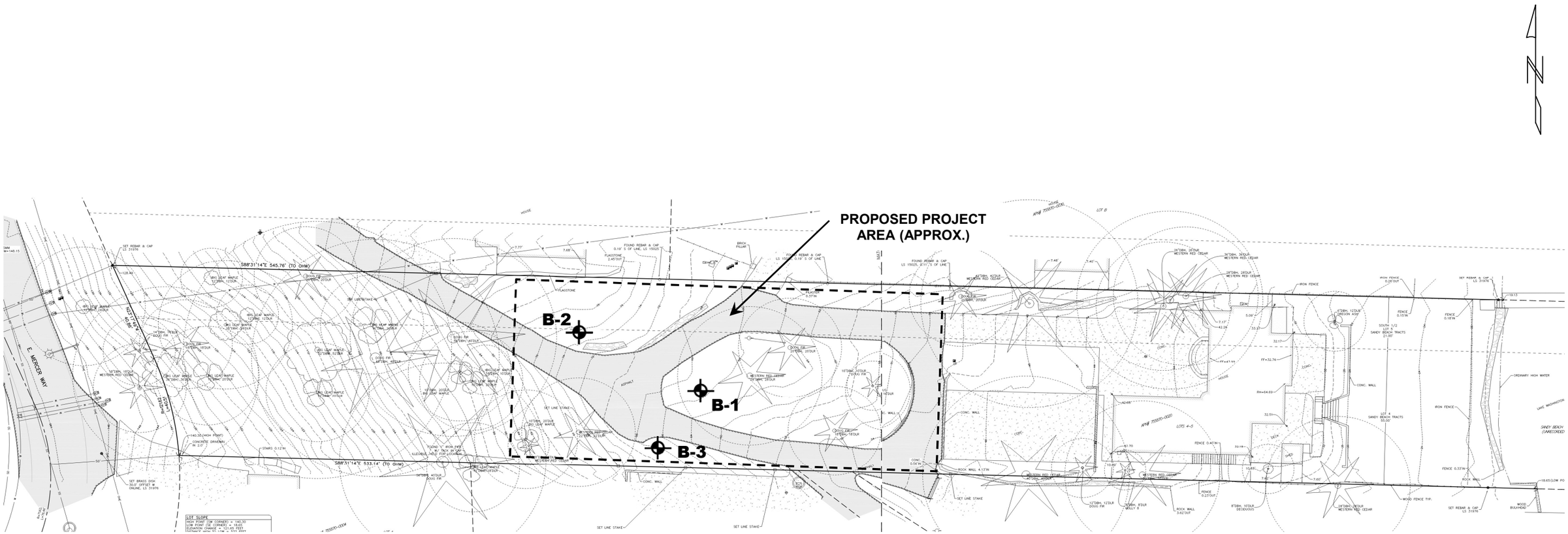

Source: King County iMap, 2022.

GEO Group Northwest, Inc.
Geotechnical Engineers, Geologists, & Environmental Scientists

# SITE LOCATION MAP

**YUEN PROPERTY**
**4624 E. MERCER WAY**
**MERCER ISLAND, WASHINGTON**

| SCALE | DATE | MADE | CHKD | JOB NO. | PLATE |
|---|---|---|---|---|---|
| NONE | 3/17/2026 | AH/KJ | WC | G-5770-1 | 1 |




## LEGEND

**B-1** — EXPLORATORY SOIL BORING LOCATION (APPROXIMATE)

0 40 80

**SCALE: 1 INCH = 40 FEET**

Source: Topographic and Boundary Survey by Plog Engineering, dated 06/08/2022.

**Group Northwest, Inc.**
Geotechnical Engineers, Geologists, & Environmental Scientists

# PRE-PROJECT SITE PLAN

**YUEN PROPERTY**
**4624 E. MERCER WAY**
**MERCER ISLAND, WASHINGTON**

| SCALE | 1" = 40' | DRAWN BY | KJ | CHECKED BY | WC | DATE | 3/17/2026 | PROJECT NO. | G-5770-1 | PLATE | 2 |
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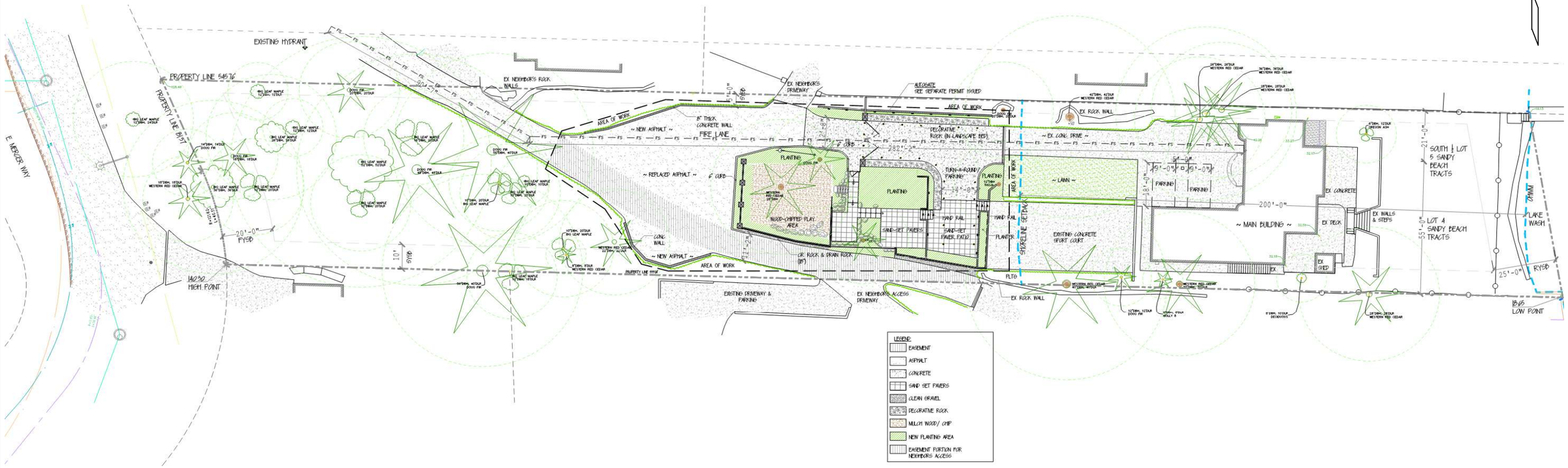



0 40 80

**SCALE: 1 INCH = 40 FEET**

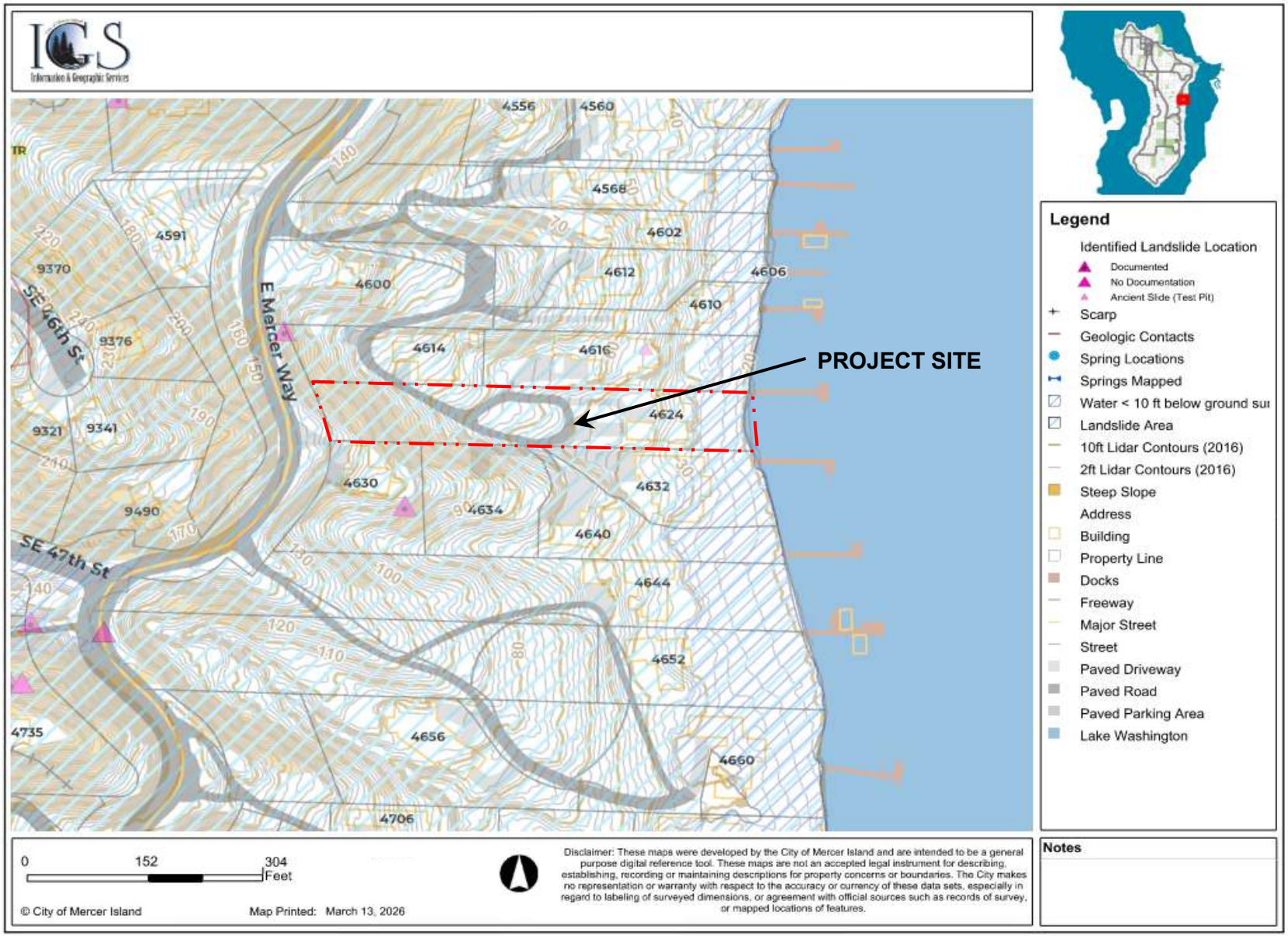
Source: Adapted from Site Plan, by Ragen and Associates, dated 2/23/2026.

**Group Northwest, Inc.**
Geotechnical Engineers, Geologists, & Environmental Scientists

# PROPOSED PROJECT LAYOUT

**YUEN PROPERTY**
**4624 E. MERCER WAY**
**MERCER ISLAND, WASHINGTON**

| SCALE | 1" = 40' | DRAWN BY | KJ | CHECKED BY | WC | DATE | 3/17/2026 | PROJECT NO. | G-5770-1 | PLATE | 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|




Reference: City of Mercer Island.

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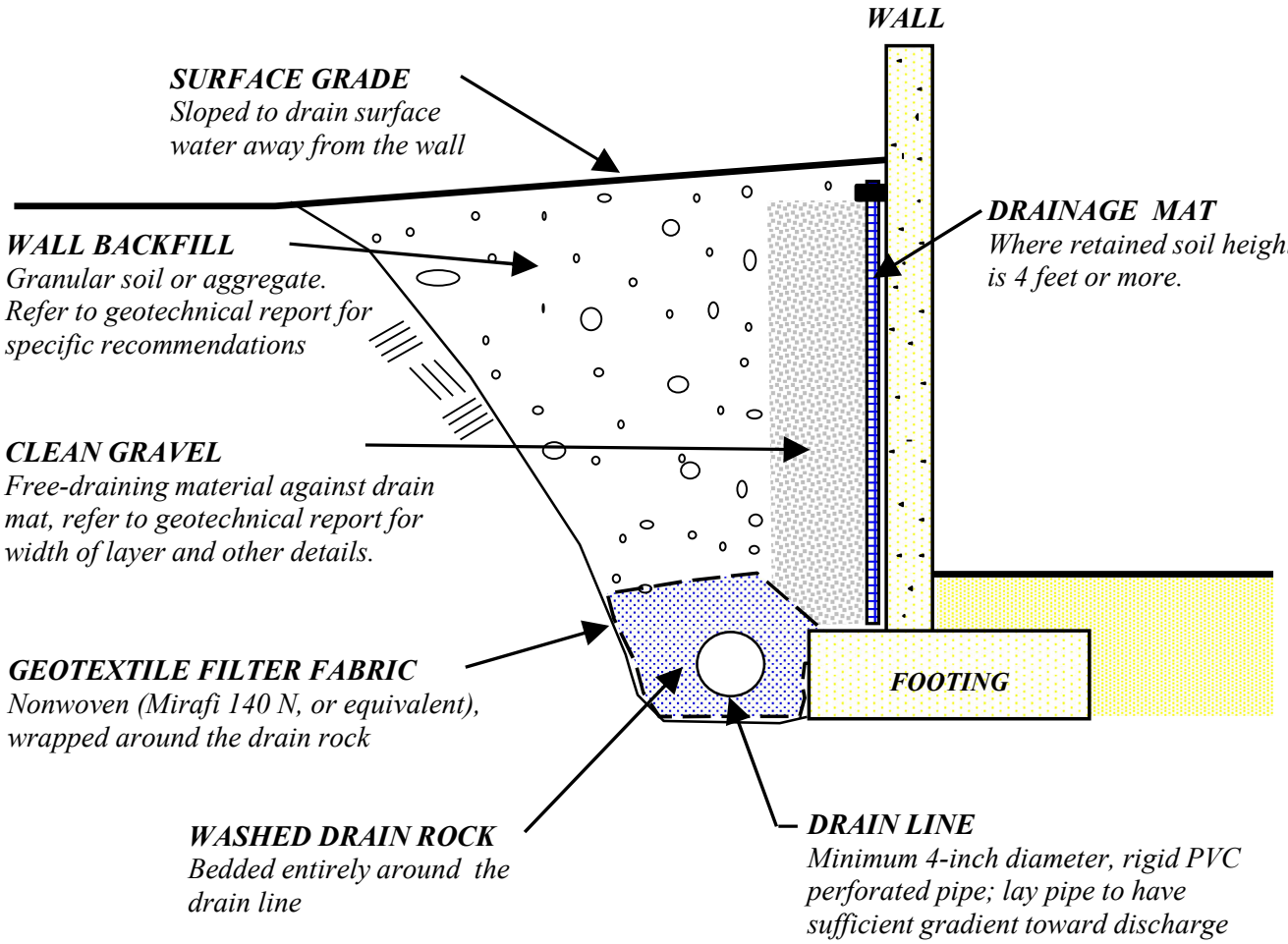
# GEOLOGIC HAZARD AREAS GIS MAPPING

**YUEN PROPERTY**
**4624 E. MERCER WAY**
**MERCER ISLAND, WASHINGTON**

| SCALE: | As Shown | DRAWN: | KJ | CHECKED: | WC | DATE: | 3/17/2026 | PROJECT NO.: | G-5770-1 | PLATE | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|

# CONCRETE RETAINING WALL DRAINAGE




## NOT TO SCALE

**NOTES:**

**1**.) Do not replace rigid PVC pipe with flexible corrugated plastic pipe.

**2**.) Perforated PVC pipe should be tight jointed and laid with perforations oriented downward. The pipe should be gently sloped to provide flow toward the tightline or discharge location.

**3**.) Do not connect other drain lines into the footing drain system.

**4**.) Backfill should meet structural fill specifications if it will support driveways, sidewalks, patios, or other structures. Refer to the report for structural fill recommendations.

**5**.) Surface grade above the backfill can be covered with a layer of relatively less permeable soil or pavement or slab to reduce infiltration of surface water into the backfill and drainage system.


GEO Group Northwest, Inc.
Geotechnical Engineers, Geologists, & Environmental Scientists


**TYPICAL CONCRETE RETAINING WALL DRAINAGE DETAIL**

**YUEN PROPERTY**
**4524 E. MERCER WAY**
**MERCER ISLANDE, WASHINGTON**

| SCALE | DATE | MADE | CHKD | JOB NO. | PLATE |
|---|---|---|---|---|---|
| NONE | 3/17/2026 | KJ | WC | G-5770-1 | 5 |

**ATTACHMENT A**

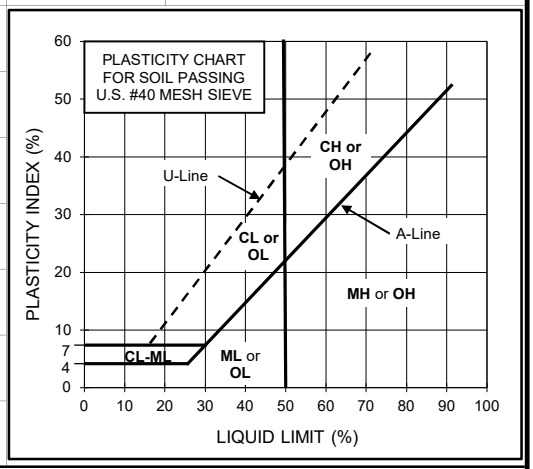
**G-5770-1**

**USCS SOIL CLASSIFICATION AND BORING LOGS**

# SOIL CLASSIFICATION & PENETRATION TEST DATA EXPLANATION

## UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

| MAJOR DIVISION | | | GROUP SYMBOL | TYPICAL DESCRIPTION | LABORATORY CLASSIFICATION CRITERIA | |
|---|---|---|---|---|---|---|
| COARSE-GRAINED SOILS | GRAVELS (More Than Half Coarse Fraction is Larger Than No. 4 Sieve) | CLEAN GRAVELS (little or no fines) | GW | WELL GRADED GRAVELS, GRAVEL-SAND MIXTURE, LITTLE OR NO FINES | CONTENT OF FINES BELOW 5% | Cu = (D60 / D10) greater than 4<br>Cc = $(D30)^2$ / (D10 * D60) between 1 and 3 |
| | | | GP | POORLY GRADED GRAVELS, AND GRAVEL-SAND MIXTURES LITTLE OR NO FINES | | CLEAN GRAVELS NOT MEETING ABOVE REQUIREMENTS |
| | | DIRTY GRAVELS (with some fines) | GM | SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES | CONTENT OF FINES EXCEEDS 12% | GM: ATTERBERG LIMITS BELOW "A" LINE. or P.I. LESS THAN 4 |
| | | | GC | CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES | | GC: ATTERBERG LIMITS ABOVE "A" LINE. or P.I. MORE THAN 7 |
| More Than Half by Weight Larger Than No. 200 Sieve | SANDS (More Than Half Coarse Fraction is Smaller Than No. 4 Sieve) | CLEAN SANDS (little or no fines) | SW | WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES | CONTENT OF FINES BELOW 5% | Cu = (D60 / D10) greater than 6<br>Cc = $(D30)^2$ / (D10 * D60) between 1 and 3 |
| | | | SP | POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES | | CLEAN SANDS NOT MEETING ABOVE REQUIREMENTS |
| | | DIRTY SANDS (with some fines) | SM | SILTY SANDS, SAND-SILT MIXTURES | CONTENT OF FINES EXCEEDS 12% | ATTERBERG LIMITS BELOW "A" LINE with P.I. LESS THAN 4 |
| | | | SC | CLAYEY SANDS, SAND-CLAY MIXTURES | | ATTERBERG LIMITS ABOVE "A" LINE with P.I. MORE THAN 7 |
| FINE-GRAINED SOILS | SILTS (Below A-Line on Plasticity Chart, Negligible Organics) | Liquid Limit < 50% | ML | INORGANIC SILTS, ROCK FLOUR, SANDY SILTS OF SLIGHT PLASTICITY | | |
| | | Liquid Limit > 50% | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS, FINE SANDY OR SILTY SOIL | | |
| | CLAYS (Above A-Line on Plasticity Chart, Negligible Organics) | Liquid Limit < 50% | CL | INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS | | |
| | | Liquid Limit > 50% | CH | INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS | | |
| Less Than Half by Weight Larger Than No. 200 Sieve | ORGANIC SILTS & CLAYS (Below A-Line on Plasticity Chart) | Liquid Limit < 50% | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY | | |
| | | Liquid Limit > 50% | OH | ORGANIC CLAYS OF HIGH PLASTICITY | | |
| HIGHLY ORGANIC SOILS | | | Pt | PEAT AND OTHER HIGHLY ORGANIC SOILS | | |




### SOIL PARTICLE SIZE

| FRACTION | U.S. STANDARD SIEVE | | | |
|---|---|---|---|---|
| | Passing | | Retained | |
| | Sieve | Size (mm) | Sieve | Size (mm) |
| SILT / CLAY | #200 | 0.075 | | |
| SAND | | | | |
| FINE | #40 | 0.425 | #200 | 0.075 |
| MEDIUM | #10 | 2.00 | #40 | 0.425 |
| COARSE | #4 | 4.75 | #10 | 2.00 |
| GRAVEL | | | | |
| FINE | 0.75" | 19 | #4 | 4.75 |
| COARSE | 3" | 76 | 0.75" | 19 |
| COBBLES | 76 mm to 203 mm | | | |
| BOULDERS | > 203 mm | | | |
| ROCK FRAGMENTS | > 76 mm | | | |
| ROCK | >0.76 cubic meter in volume | | | |

### GENERAL GUIDANCE FOR ENGINEERING PROPERTIES OF SOILS BASED ON STANDARD PENETRATION TEST (SPT) DATA

| SANDY SOILS | | | | SILTY & CLAYEY SOILS | | |
|---|---|---|---|---|---|---|
| Blow Counts N | Relative Density, % | Friction Angle, degrees | Description | Blow Counts N | Unconfined Strength Qu, tsf | Description |
| 0 - 4 | 0 -15 | | Very Loose | < 2 | < 0.25 | Very soft |
| 4 - 10 | 15 - 35 | 26 - 30 | Loose | 2 - 4 | 0.25 - 0.50 | Soft |
| 10 - 30 | 35 - 65 | 28 - 35 | Medium Dense | 4 - 8 | 0.50 - 1.00 | Medium Stiff |
| 30 - 50 | 65 - 85 | 35 - 42 | Dense | 8 - 15 | 1.00 - 2.00 | Stiff |
| > 50 | 85 - 100 | 38 - 46 | Very Dense | 15 - 30 | 2.00 - 4.00 | Very Stiff |
| | | | | > 30 | > 4.00 | Hard |


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PLATE A1

# BORING LOG HA-1



Completed By: AH  Date Drilled: 9/28/2022  Surface Elev. Approx. 67 ft

| Depth ft. | Elevation | USCS Code | Description | Sample Loc. | Sample No. | Probing Rod Penet. (in.) | Water Content % | Other Tests/ Comments |
|---|---|---|---|---|---|---|---|---|
| 1 | | SM | - Surficial layer of mulch underlain by light brown to grayish brown SILTY SAND, sand is fine to medium grained, loose, dry; abundant small diameter roots. | | | 6" | | |
| | | ML | - Light gray SILT WITH SAND, sand is fine grained, medium stiff to stiff, dry; trace subrounded gravel is fine to coarse. | | S1 | 2.5" | 7.3 | |
| 2 | | | | | | 1" | | |
| | | ML | - As above, color changes to olive gray. | | | | | |
| 3 | | | | | | <1" | | |
| | | | Total depth = 3.0', Dense material encountered. No groundwater seepage encountered. | | | | | |
| 4 | | | | | | | | |
| 5 | | | | | | | | |

**LEGEND:** ⌶ Sample Location (Approximate)

**GEO Group Northwest, Inc.**
Geotechnical Engineers, Geologists, & Environmental Scientists

# BORING LOG

**PROPOSED DRIVEWAY EXPANSION**
**4624 E MERCER WY**
**MERCER ISLAND, WA 98040**

**JOB NO.** G-5770  **DATE** 10/31/2022  **PLATE** A2