Drainage Report

9116 SE 58th Street– Raquepau Residence

Mercer Island, WA

Prepared for

Jereme Raquepau
9116 SE 58th Street
Mercer Island, WA 98040

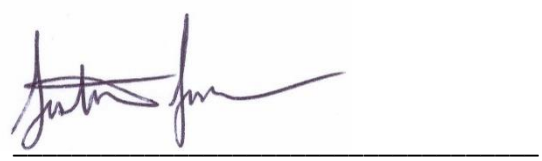
Prepared by

JMJ TEAM
PO Box 2066
Sumner, WA 98390
206.596.2020
Justin Jones, PE

November 1, 2023

PROJECT ENGINEER'S CERTIFICATION

"I hereby state that this Drainage Control Plan for the Raquepau Residence has been prepared by me or under my supervision and meets minimum standard of care and expertise which is usual and customary in this community for professional engineers. I understand that the City of Mercer Island does not and will not assume liability for the sufficiency, suitability, or performance of drainage facilities prepared by me."



Justin Jones, PE

11-01-2023

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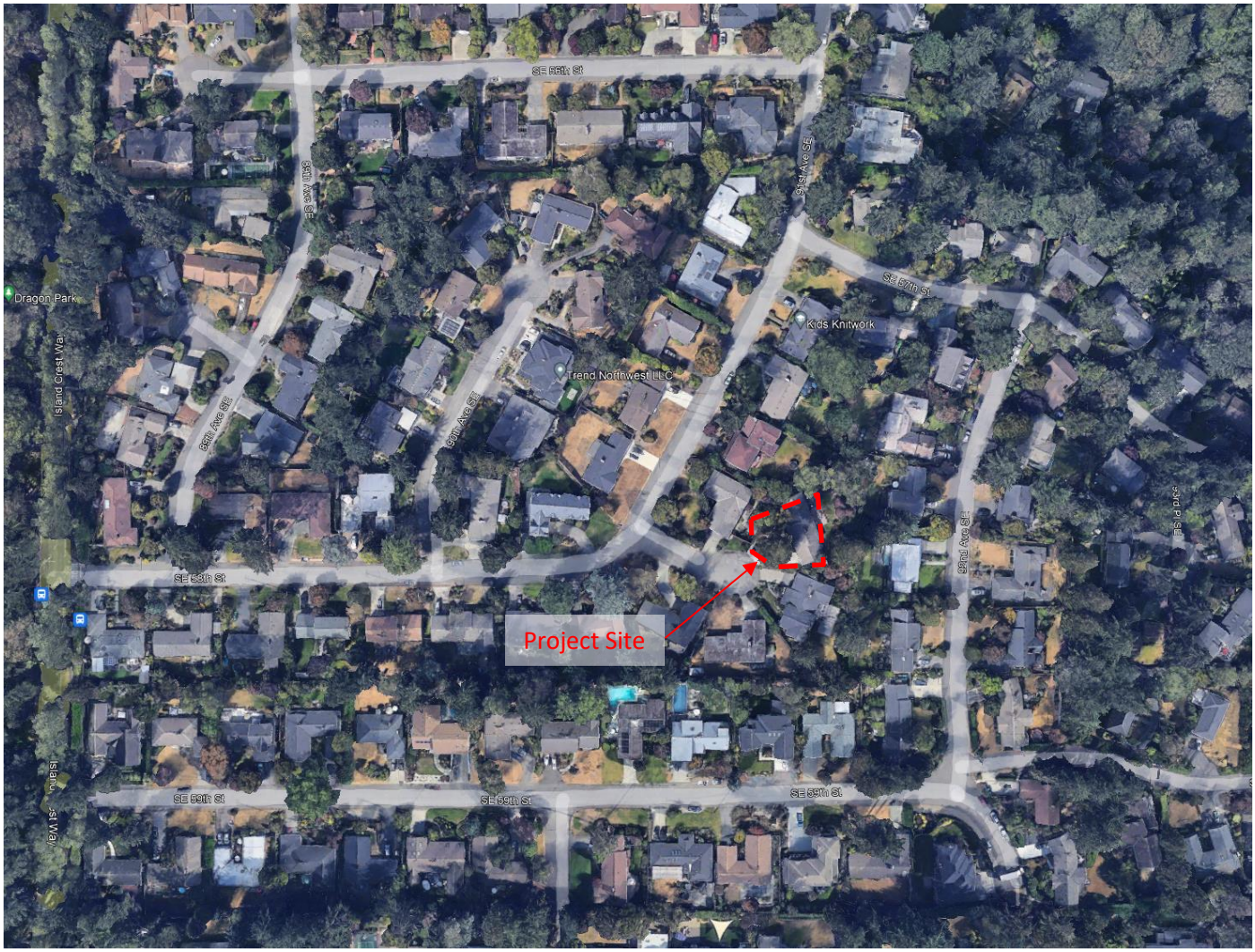
PROJECT OVERVIEW AND MAPS

The Raquepau Residence is located at the dead end of Southeast 58th Street on Mercer Island. The parcel (228700-0120) has a lot size of 0.28 acres and is currently developed as an R-9.6 lot. The surrounding area is comprised of residential buildings. The project includes the construction of building addition, partial roof replacement, expansion of driveway, and the construction of concrete patios and walkway. The stormwater approach is to disperse new and replaced impervious surfaces.



EXISTING CONDITIONS SUMMARY

The Raquepau Residence is a 12,192 SF (0.28 acres) parcel. The home consists of landscaping, concrete pavement, and tree vegetation covering most of the property. The site is fairly flat and has a slight slope towards the south and east side of the property.

The existing storm system consists of downspout dispersion and sheet flow. Runoff from roof disperses onto native soils. Runoff from concrete pavement sheet flows onto native soil or to the existing stormwater system in SE 58th Street.

The existing project site is approximately 43% impervious.

Existing Lot Coverage (12,192 SF Site Area)			
Coverage	**Area (SF)**	**Area (Acres)**	**% of Site**
Roof	2,973	0.07	24%
Concrete Pavement	2,287	0.05	19%
Landscape	6,932	0.16	57%

PROPOSED CONDITIONS SUMMARY

The proposed redevelopment includes addition to the house, driveway expansion, new walkway, new patio, and installation of stormwater conveyance system. The proposed development will result in 4,854 SF (39.8%) of impervious surface within the site, resulting in a net loss of 406 SF of impervious surface.

Proposed Lot Coverage (12,192 SF Site Area)			
Coverage	**Area (SF)**	**Area (Acres)**	**% of Site**
Roof	3,106	0.07	26%
Concrete Pavement	1,493	0.03	12%
Gravel	255	0.01	2%
Landscape	7,338	0.17	60%

Stormwater runoff from the new plus replaced impervious surface will be managed via dispersion system. Project to maintain existing drainage pattern to help runoff disperse away from home.

The project will have 2,687 SF of new and replaced hard surfaces upon project completion, and a total of 6,400 SF of land disturbing activity.

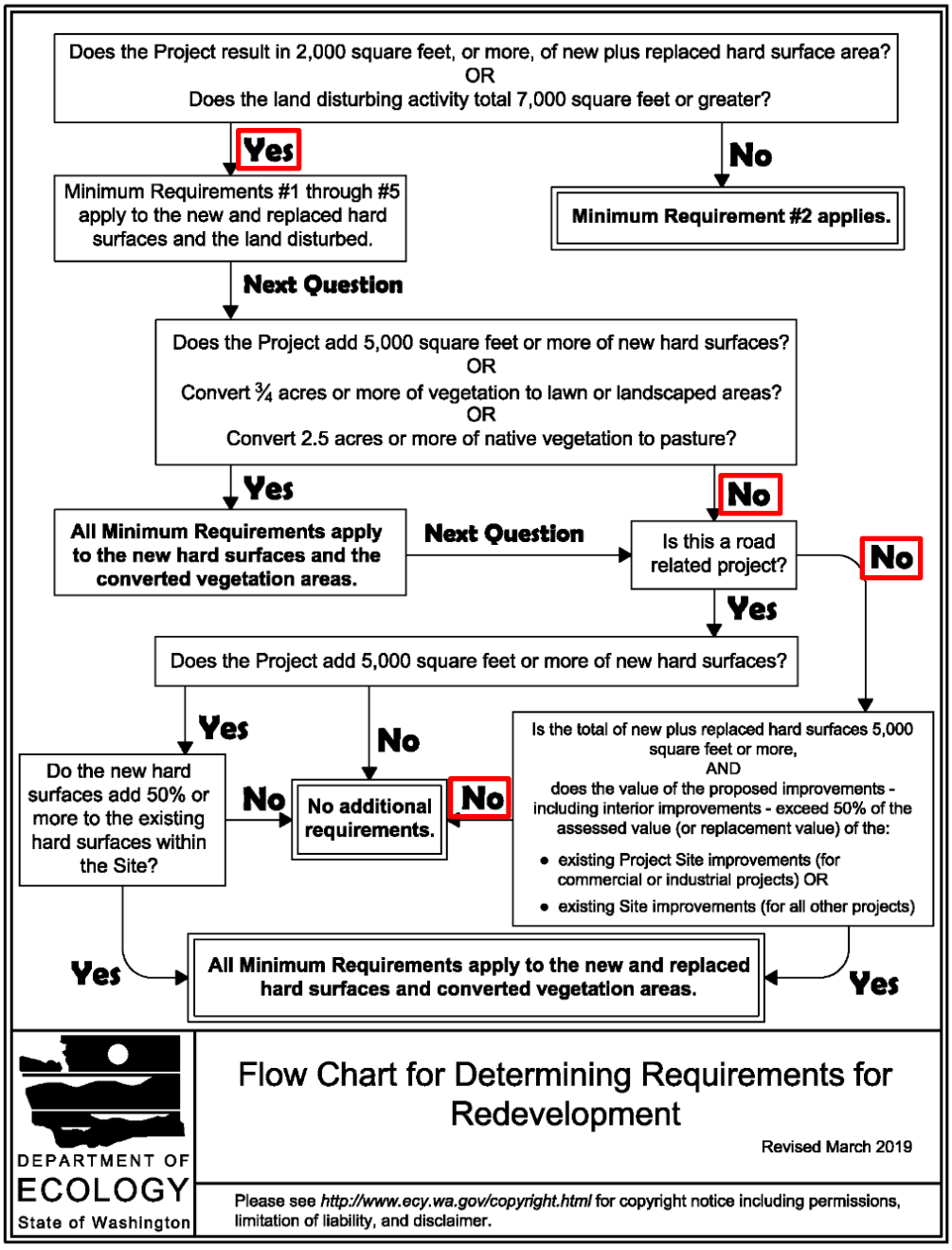
Impervious Calculation	
Coverage	**Area (SF)**
New + Replaced Roof Area	1,728
New + Replaced Concrete Pavement Area	704
New Gravel Area	255
New + Replaced Hard Surface Total	**2,687**

Disturbed Area	**6,400 SF**

SUMMARY OF MINIMUM REQUIREMENTS

The 2019 Stormwater Management Manual for Western Washington describes the minimum requirements for a redevelopment project. Using the flowchart below, Minimum Requirements #1-5 applies to the project site.

Figure I-3.2: Flow Chart for Determining Requirements for Redevelopment



MINIMUM REQUIREMENT 1: PREPARATION OF STORMWATER SITE PLANS

Stormwater Site Plan drawings have been prepared per the City of Mercer Island development codes and the 2019 DOE Manual, see Appendix A.

MINIMUM REQUIREMENT 2: CONSTRUCTION STORMWATER POLLUTION PREVENTION

Temporary Erosion and Sediment Control Plans and a Construction Stormwater Pollution Prevention Plan have been prepared per the City of Mercer Island development codes and the 2019 DOE Manual and submitted with the civil permit. Construction Stormwater Pollution Prevention measures may include storm drain inlet protection; construction entrance; silt fence and a sediment trap.

MINIMUM REQUIREMENT 3: SOURCE CONTROL OF POLLUTION

Source control BMPs will be implemented to minimize stormwater contamination and help comply with the Department of Ecology Stormwater Management Manual for Western Washington. BMP's for the project may include:

- *Inspect and clean treatment BMPs, conveyance systems, and catch basins as needed, and determine necessary O & M Improvements.*
- *Clean catch basins when the depth of deposits reaches 60-percent of the sump depth as measured from the bottom of basin to the invert of the lowest pipe into or out of the basin.*
- *Clean woody debris in a catch basin as frequently as needed to ensure proper operation of the catch basin.*

MINIMUM REQUIREMENT 4: PRESERVATION OF NATURAL DRAINAGE SYSTEMS AND OUTFALLS

Natural drainage for the site surface flows away from the home and towards SE 58th Street and towards the southeast side of the site and infiltrates into native soil. Excess runoff that does not infiltrate into the native soil overland flows toward SE 58th Street and is captured by the City's drainage system located on SE 58th Street and 91st Ave. The project proposes to maintain natural drainage patterns and discharge at natural location.

MINIMUM REQUIREMENT 5: ONSITE STORMWATER MANAGEMENT

Using the City of Mercer Island Tip Sheet for Small Project Stormwater Requirement; project that triggers minimum requirement 1-5 is required to implement List #1 or the LID performance standards. See tip sheet below.

CITY OF MERCER ISLAND

TIP SHEET: SMALL PROJECT STORMWATER REQUIREMENTS

Which BMPs should be evaluated?

Projects that trigger Minimum Requirements #1-5 are required to implement List #1 (see below) or the LID performance standard (refer to the Stormwater Manual adopted in Section 15.09.050 of the City's municipal code).

List #1

For each category, select the first feasible item on the list:

Lawn and landscaped areas

- Post-construction soil quality and depth

Roofs

1. Full dispersion or downspout full infiltration systems
2. Rain gardens or bioretention
3. Downspout dispersion systems
4. Perforated stub-out connections
5. On-site detention

Other hard surfaces

1. Full dispersion
2. Permeable pavement, rain gardens, or bioretention
3. Sheet flow dispersion or concentrated flow dispersion
4. On-site detention

List #2

Projects that trigger the full set of Minimum Requirements #1-9 are required to implement List #2 or the LID performance standard in accordance with the Stormwater Manual adopted in Section 15.09.050 of the City's municipal code.

On-site detention is added to the feasibility evaluation for List #2 (similar to List #1 above) if all of the other on-site stormwater management BMPs are determined to be infeasible for Roofs and Other hard surfaces.

Bioretention during installation

Permeable pavement installation

Established bioretention facility

The Raquepau Residence project chooses to implement the list approach to determine feasible stormwater BMP. Each stormwater BMP described in List #1 (above) for each surface type was evaluated to determine appropriate stormwater BMP.

- Roofs:

    - Full Dispersion: Full dispersion is feasible if a site maintains 65% of its area in a native vegetated condition. The Raquepau Residence project does not maintain 65% of the site in a native condition and thus full dispersion was deemed infeasible for roof stormwater management.

    - Rain Garden or Bioretention: Rain Garden or Bioretention is feasible if the Rain Garden or Bioretention if site meets infiltration suitability. The site does not allow for infiltration per the Geotechnical Report, see Appendix B.

    - Downspout Dispersion: Downspout dispersion was evaluated for feasibility for the site. Dispersion was deemed feasible. Proposed roof areas will be routed to the dispersion trench and disperse 100% of roof runoff on-site into native soils. The dispersion trench with notched board has been designed based on the following criteria:

        - Roof downspouts and roof leaders will direct storm runoff through PVC pipes along the outside perimeter of the building.

        - The roof leaders will connect to Type 1 Solid Lid Catch Basins prior to dispersing.

        - A notched board dispersion trench is required since greater than 700 SF is being sent to the dispersion system.

        - Per the 2019 Stormwater Management Manual, the total trench length must not exceed 50 feet and must provide at least 10 ft of trench length for every 700 SF of roof area. The proposed roof area to be conveyed to the dispersion trench is approximately 1,727 SF. Therefore, the trench will need to be at least 25' in length.

        - A 25-foot-wide vegetated buffer will be used to disperse runoff from the trench.

- Other Hard Surfaces:

    - Full Dispersion: Full dispersion is feasible if a site maintains 65% of its area in a native vegetated condition. The Raquepau Residence project does not maintain 65% of the site in a native condition and thus full dispersion was deemed infeasible for hard surface stormwater management.

    - Permeable Pavement: Permeable Pavements were evaluated for the Raquepau Residence site and were determined to be infeasible for the project. Per the Geotechnical Report, the infiltration is infeasible on site, see Appendix B.

    - Sheet Flow Dispersion or Concentrated Flow Dispersion: Sheet Flow Dispersion and Concentrated Flow Dispersion were evaluated for the Raquepau Residence site and were determined to be feasible for the project.

      The Raquepau Residence will use sheet flow dispersion to manage the runoff from the new concrete patios in the backyard. Sheet flow dispersion has been designed based on the following criteria:

- A 2-foot-wide gravel transition zone to discourage channeling between the edge of the impervious surface and the downslope vegetation.

- 10-foot-wide vegetated buffer for the runoff to disperse over.

The Raquepau Residence will use concentrated flow dispersion to manage the runoff from the new concrete walkway and concrete driveway. Runoff from walkway and driveway will overland flow into a french drain system and conveyed to the dispersion trench in the backyard. Concentrated flow dispersion has been designed based on the following criteria:

- Per the 2019 Stormwater Management Manual, sizing for hard surface dispersion trench can be calculated the same as for roof downspout dispersion. The proposed other hard surface area to be conveyed to the dispersion trench is approximately 364 SF. The project proposes to convey runoff from the new/replaced roof and other hard surface area to a single dispersion trench. Total impervious area to be sent to the dispersion trench is approximately 2,091 SF. Therefore, the trench will need to be a minimum of 30' in length.

- 25.0' vegetated buffer for dispersion

- Soil Amendment:

  - This project is required to retain and protect undisturbed soil in areas not being developed and, prior to completion of the project, amend all new, replaced, and disturbed topsoil (including construction lay-down areas) with organic matter in accordance with BMP T5.13 of the 2019 Stormwater Management Manual.

APPENDIX A

SECTION 19, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.

RAQUEPAU RESIDENCE
REMODEL

APPLICANT

JEREME RAQUEPAU
9116 SE 58TH STREET
MERCER ISLAND, WA 98040

ARCHITECT

RF ARCHITECTURE
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BONNEY LAKE, WA 98391
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CIVIL ENGINEER

JMJ TEAM
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SUMNER, WA 98390
(206) 596-2020
CONTACT: JUSTIN JONES, PE

SURVEYOR

SITE SURVEYING INC.
21923 NE 11TH STREET
SAMMAMISH, WA 98074
(425) 298-4412
CONTACT: THOMAS WOLDENDROP, PLS

SITE INFORMATION:

SITE ADDRESS:	9116 SE 58TH STREET MERCER ISLAND, WA 98040
TAX PARCEL NUMBER(S):	228700-0120
ZONING:	R-9.6
TOTAL PROJECT AREA:	0.280 ACRES

VERTICAL DATUM & CONTOUR INTERVAL

ELEVATIONS SHOWN ON THIS DRAWING WERE DERIVED FROM GPS OBSERVATION USING THE WSRN.

DATUM – NAVD 88

2.0' CONTOUR INTERVAL– THE EXPECTED VERTICAL ACCURACY IS EQUAL TO ½ THE CONTOUR INTERVAL OR PLUS / MINUS 1.0' FOR THIS PROJECT.

SURVEY DATE: JANUARY 13TH, 2023

BASIS OF BEARINGS

RECORD OF SURVEY BY TERRANE, RECORDED IN VOLUME 390 OF SURVEYS, PAGE 163, UNDER RECORDING NO. 20180830900020, RECORDS OF KING COUNTY, WASHINGTON.

LEGAL DESCRIPTION

LOT 12 OF EL DORADO ESTATES, AS PER PLAT RECORDED IN VOLUME 62 OF PLATS, PAGE 7, RECORDS OF KING COUNTY AUDITOR;

SITUATE IN THE CITY OF MERCER ISLAND, COUNTY OF KING, STATE OF WASHINGTON

SERVICE PROVIDERS:

WATER:	CITY OF MERCER ISLAND
SEWER:	CITY OF MERCER ISLAND
POWER:	PUGET SOUND ENERGY
GAS:	PUGET SOUND ENERGY

VICINITY MAP

9116 SE 58th Street Mercer Island , WA 98040

SHEET INDEX

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2	C-02	Existing Site Plan
3	C-03	Demolition & TESC Plan
4	C-04	Site & Grading Plan
5	C-05	Storm Plan
6	C-06	Details

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1-800-424-5555
UTILITIES UNDERGROUND LOCATION CENTER

Owner/Developer:

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9116 SE 58th Street
Mercer Island, WA 98040

Architect:

RF Architecture
Richard Flake
7421 214th Avenue E
Bonneylake, WA 98391
(253) 359-4039

Engineer:

JMJ Team
905 Main Street, Suite #200
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(206) 596-2020

Project:

Raquepau Residence

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Mercer Island, WA 98040

ONE INCH AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

Civil Permit

JUSTIN M. JONES
STATE OF WASHINGTON
41829
REGISTERED
PROFESSIONAL ENGINEER

11/1/2023

REV	DATE	DESCRIPTION
1	11-1-23	Revised per City Comments

SHEET TITLE:

Cover Sheet

PROJ.NO: 1565-008
DATE: November 1, 2023
DRAWN BY: MO
DESIGN BY: JJ
SHEET NUMBER:

C-01

DWG:

1 OF 6

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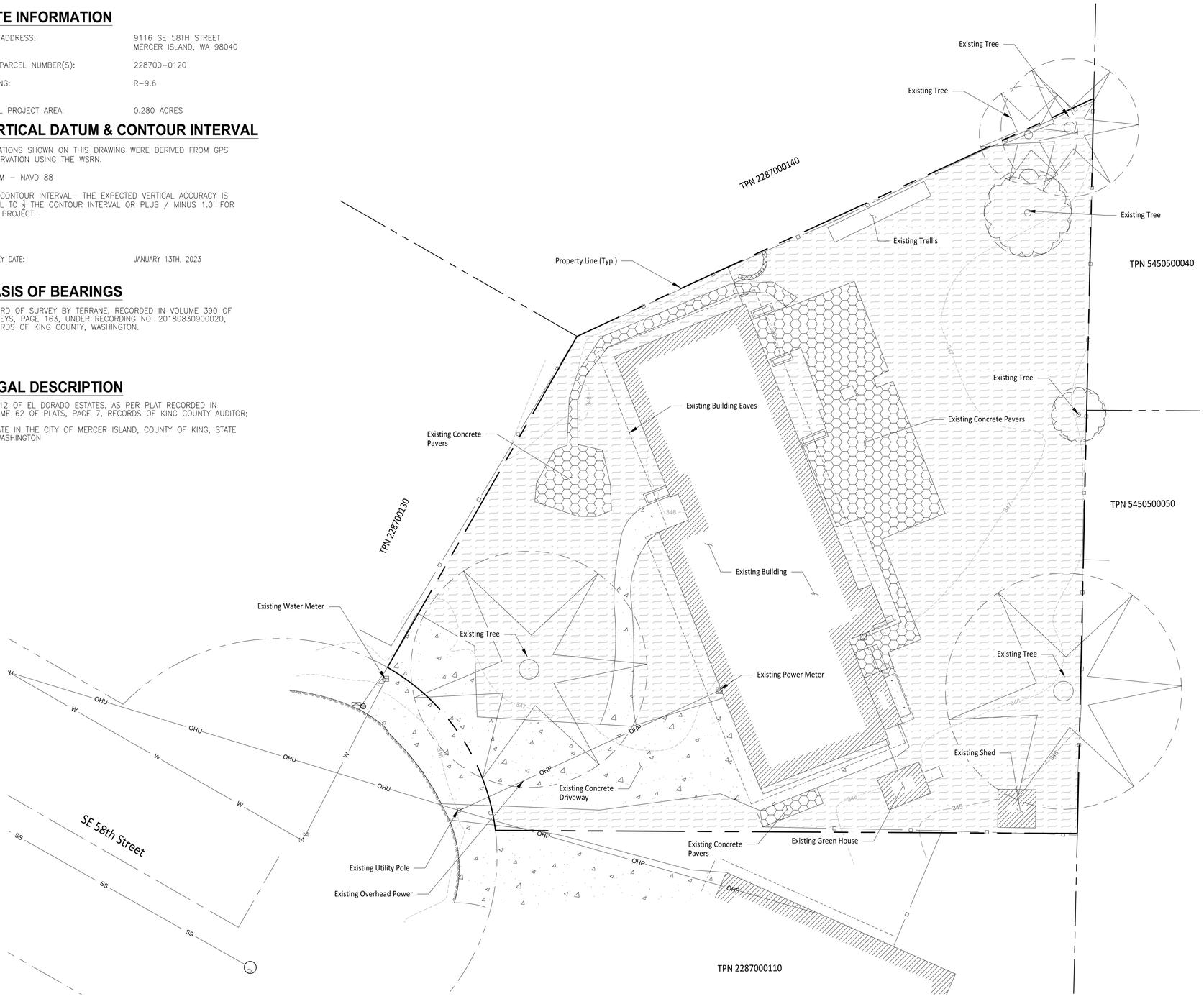

LEGEND

- Found Monument In Case
- Found Rebar As Described
- Found Nail As Described
- Set Mag Nail As Described
- Set $\frac{5}{8}$" X 24" Iron Rod W/1" Yellow Plastic Cap
- Power Meter
- Gas Meter
- Guy Wire
- Utility Pole
- Yard Drain
- Sanitary Sewer Manhole
- Water Valve
- Fire Hydrant
- Water Meter
- SS — Approximate Location Sanitary Sewer Line
- W — Approximate Location Underground Water Line
- OHP — Overhead Power
- OHU — Overhead Utilities
- Wood Fence
- Mailbox
- Concrete Surface
- Concrete Pavers
- CE Cedar
- DF Douglas Fir
- DS Deciduous
- * Indicates Multi-Trunk

EXISTING LOT COVERAGE

- Site Area: 12,192 SF (0.28 AC)
- Total Impervious Coverage: 5,260 SF (43.1%)
  - Roof: 2,973 SF
  - Concrete Pavement: 2,287 SF
- Total Pervious Coverage: 6,932 SF (56.9%)

0 10 20 FEET
1" = 10'

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1	11-1-23	Revised per City Comments

SHEET TITLE:
Existing Site Plan

PROJ. NO: 1565-008
DATE: November 1, 2023
DRAWN BY: MO
DESIGN BY: JJ
SHEET NUMBER: C-02
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TREE PROTECTION NOTES

- Tree Protection Fence (TPF) to be 6 feet High Chainlink, wire mesh, or similar open rigid material (no plywood).
- TPF must be installed prior to demolition or ground disturbance.
- TPF to be kept in place for the duration of construction.
- No soil disturbance or activity allowed within fenced area; material storage/stockpiling, parking, excavation, dumping, or washing.
- If roots greater than 2 inches is found outside of fencing, protect by hand excavation.
- Air excavation and arborist direction on-site for demo of infrastructure within saved trees dripline during construction.

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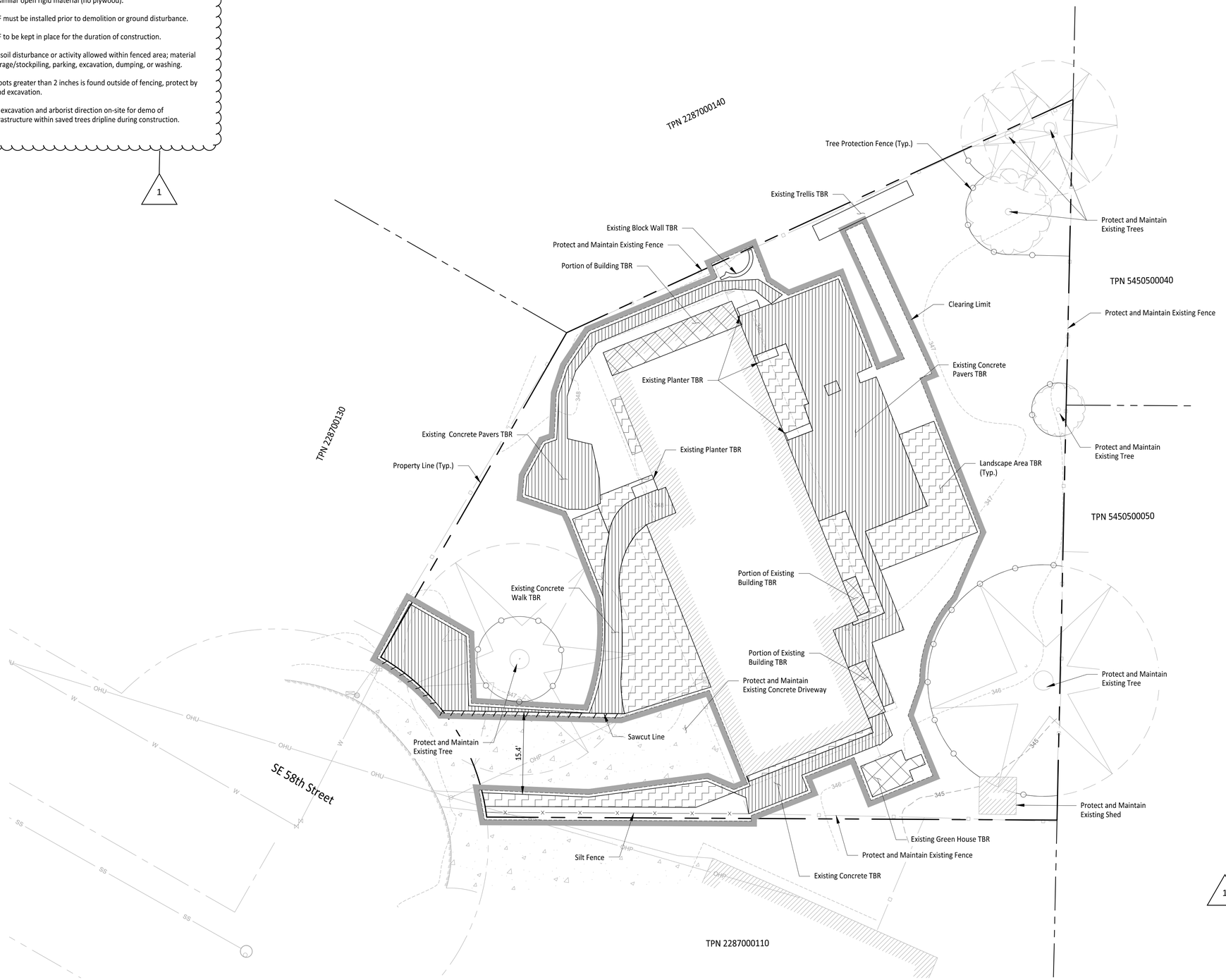

LEGEND

	Existing Building to be Removed
	Existing Concrete to be Removed
	Landscaping to be Removed
	Sawcut Existing Concrete
CLR. LIMIT	Clearing Limit
X	Silt Fence
O	Tree Protection Fence
TBR	To Be Removed

TESC NOTES

- Contractor to install temporary erosion and sediment control measures as necessary to ensure stormwater leaving the site is free of settleable solids.
- Roads shall be cleaned thoroughly as needed to protect stormwater infrastructure and downstream water resources. Sediment shall be removed from roads by shoveling or pickup sweeping and be transported to a controlled sediment disposal area.
- Install Silt Fence as necessary per DOE BMP C233.
- Install straw bale barriers, wattles and other TESC measures as necessary.
- Exposed soils shall be watered as necessary to prevent dust from leaving the site.
- Contractor to mark clearing limits with lath and flagging.
- Concrete handling and equipment washing in accordance with DOE BMP C151.

SOIL AMENDMENT NOTES

The lawn and landscape areas are required to provide Post-Construction Soil Quality and Depth in accordance with BMP T5.13.

- POST-CONSTRUCTION SOIL MANAGEMENT

1. Retain & Protect Native Vegetation and Soil
   1.1. Identify Areas of the site that will not be disturbed construction. Fence areas to prevent impacts during construction.
2. Loosen Compacted Subsoil
   2.1. In Areas Compacted by Construction Traffic Scarify the top 4-inches of subsoil. Use a Cat-mounted Ripper, tractor-mounted disc, or tiller to mix the first lift of topsoil into the subsoil. Use the equipment listed to scarify soils to a depth of 12-inches before tilling in at least 8-inches of compost.
3. Restore Soils that are Disturbed During Construction
   3.1. Stockpile and reuse existing topsoil (amend if needed to meet 5% organic matter content for turf areas; 10% organic matter content for planting beds).
4. Add Mulch to Planting Beds
   4.1. Spread mulch (coarse bark or wood chips) in the spring or fall (after planting) to control weeds, reduce the need for irrigation and prevent erosion). Apply 1 to 2 inches of mulch on planting beds and around shallow-rooted annuals. Apply 2 to 4 inches of mulch around trees and woody perennials, but make sure to keep mulch 2-3 inches away from tree trunks.
5. Protect Restored Soils from Erosion anad Re-Compaction
   5.1. Prevent runoff from roads or open slopes onto amended soil areas. Compost blankets are an approved erosion control Best Management Practice (BMP) that can be used during construction and then tilled into existing soil at the end of the construction process prior to planting. Once soils have been amended, vehicle traffic should be prohibited to prevent recompilation from occurring.

DEMOLITION NOTES

- Landscaping to be Cleared & Grubbed: 1,055 SF
- Existing Concrete Pavement to be Removed: 1,675 SF
- Existing Building to be Removed: 235 SF
- Disturbed Area: 6,400 SF

1

0 10 20 FEET
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TESC & Demo Plan

PROJ. NO: 1565-008
DATE: November 1, 2023
DRAWN BY: MO
DESIGN BY: JJ

SHEET NUMBER:
C-03

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3 OF 6

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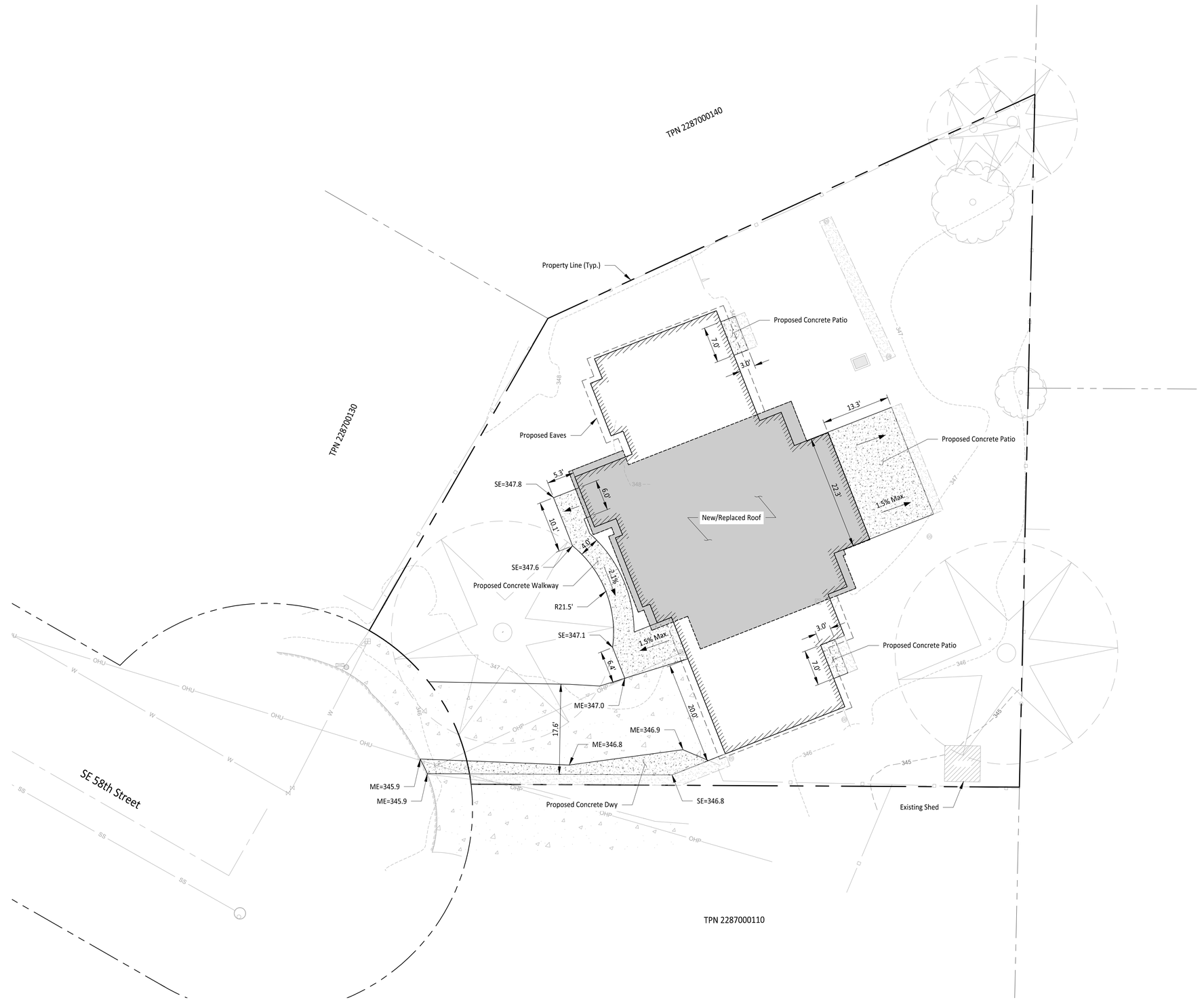

LEGEND

	Existing Concrete
	Proposed Concrete
	Proposed Gravel
	New/Replaced Roof Area
	Proposed Bldg. Extents
	Proposed Eaves
SE	Spot Elevation
ME	Match Existing Grade

PROPOSED LOT COVERAGE

- Site Area: 12,192 SF (0.28 AC)
- Total Impervious Coverage: 4,854 SF (39.8%)
  - Existing Remain: 2,167 SF
    - Roof: 1,378 SF
    - Concrete Pavement: 789 SF
  - New/Replaced: 2,687 SF
    - Roof: 1,728 SF
    - Concrete Pavement: 704 SF
    - Gravel: 255 SF
- Total Pervious Coverage: 7,338 SF (60.2%)
- Net Impervious: - 406 SF

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1

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SHEET TITLE:

Site & Grading Plan

PROJ. NO: 1565-008
DATE: November 1, 2023
DRAWN BY: MO
DESIGN BY: JJ
SHEET NUMBER: C-04
DWG. 4 OF 6

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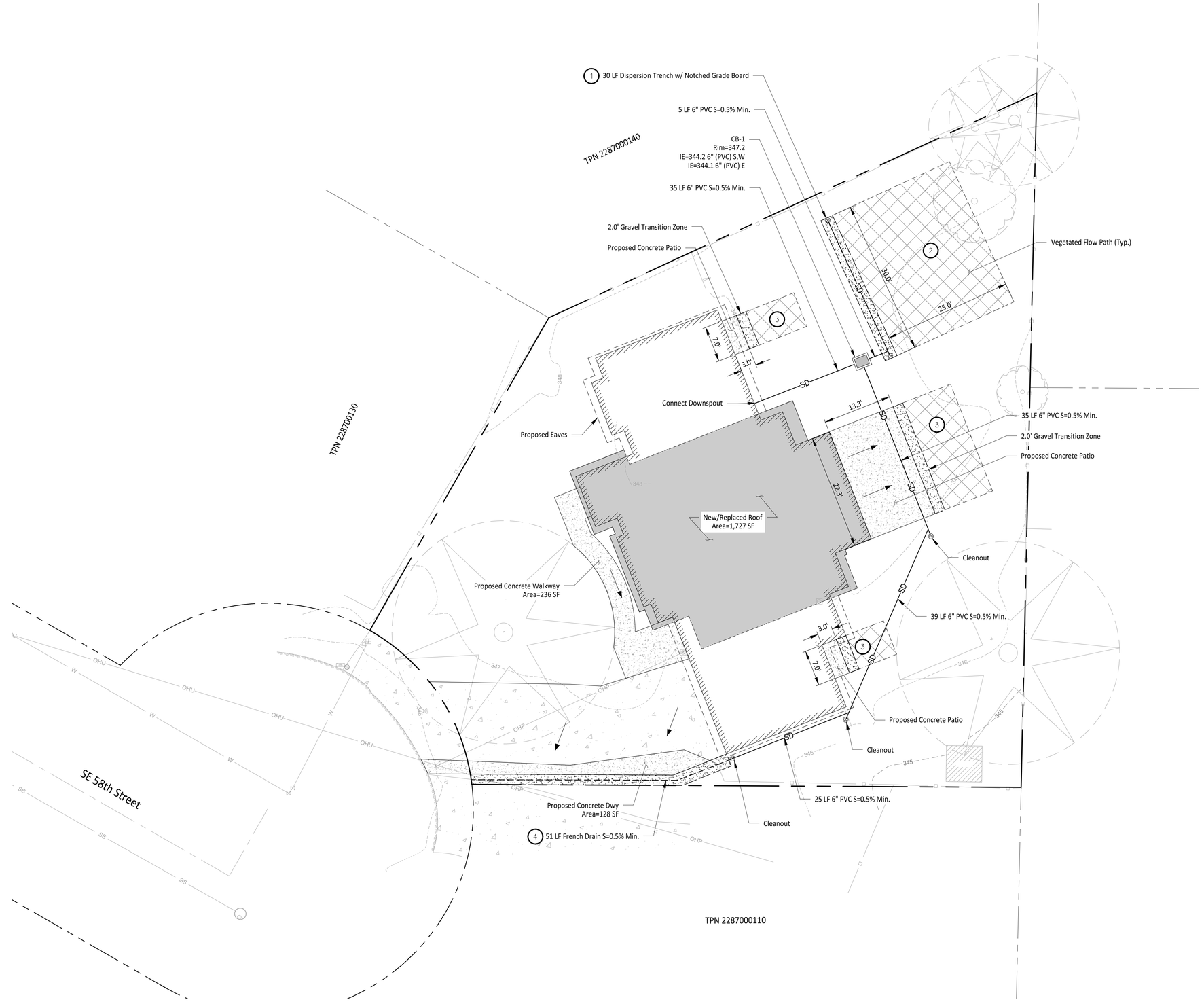

LEGEND

- Existing Concrete
- Proposed Concrete
- Proposed Gravel
- New/Replaced Roof Area
- Vegetated Flow Path
- Proposed Bldg. Extents
- Proposed Eaves
- SD — 6" PVC Storm Line
- Cleanout
- Type 1 Catch Basin, Solid Lid
- Flow Path

CONSTRUCTION NOTES

1. Dispersion Trench to be constructed per DOE Figure V-4.5. See Detail on Sheet C-06.
2. Dispersion Trench Vegetated Flow Path to be a minimum of 25 LF in length.
3. Sheet Flow Vegetated Flow Path to be a minimum of 10 LF in length.
4. Install French Drain per Section B on Sheet C-06.
5. Storm Pipes to be SDR 35 PVC piping.
6. Storm Pipes to maintain a minimum cover of 1.5' from finished grade surface.

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JMJ Team
905 Main Street, Suite #200
Sumner, WA 98390
(206) 596-2020

Project:

Raquepau Residence

9116 Se 58th Street
Mercer Island, WA 98040

ONE INCH AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

Civil Permit

JUSTIN M. JONES
STATE OF WASHINGTON
41829
REGISTERED
PROFESSIONAL ENGINEER
11/1/2023

REV	DATE	DESCRIPTION
1	11-1-23	Revised per City Comments

SHEET TITLE:

Storm Plan

PROJ. NO: 1565-008
DATE: November 1, 2023
DRAWN BY: MO
DESIGN BY: JJ
SHEET NUMBER: C-05
DWG. 5 OF 6

File: 1565008c-STRM.dwg Path: J:\1565 - RF Architecture\008 - Raquepau Residence\CAD\ Plotted by: Powerlss Date: 30-Oct-23 3:46:08pm

BMP C233: Silt Fence

Purpose Use of a silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow. See Figure 4.2.12 for details on silt fence construction.

Conditions of Use Silt fence may be used downslope of all disturbed areas.

- Silt fence shall prevent soil carried by runoff water from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Convey any concentrated flows through the drainage system to a sediment pond.
- Do not construct silt fences in streams or use in V-shaped ditches. Silt fences do not provide an adequate method of silt control for anything deeper than sheet or overland flow.

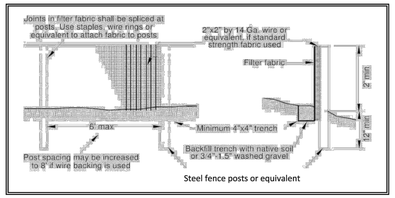


Figure 4.2.12 – Silt Fence

Design and Installation Specifications

- Use in combination with sediment basins or other BMPs.
- Maximum slope steepness (normal (perpendicular) to fence line) 1H:1V.
- Maximum sheet or overland flow path length to the fence of 100 feet.
- Do not allow flows greater than 0.5 cfs.
- The geotextile used shall meet the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in Table 4.2.3):

Table 4.2.3
Geotextile Standards

Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film woven (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec^{-1} minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. Minimum for extra strength fabric. 100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

- Support standard strength fabrics with wire mesh, chicken wire, 2-inch x 2-inch wire, safety fence, or jute mesh to increase the strength of the fabric. Silt fence materials are available that have synthetic mesh backing attached.
- Filter fabric material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0°F. to 120°F.
- One-hundred percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by local regulations.
- Refer to Figure 4.2.12 for standard silt fence details. Include the following standard Notes for silt fence on construction plans and specifications:
  1. The contractor shall install and maintain temporary silt fences at the locations shown in the Plans.
  2. Construct silt fences in areas of clearing, grading, or drainage prior to starting those activities.
  3. The silt fence shall have a 2-feet min. and a 2½-feet max. height above the original ground surface.
  4. The filter fabric shall be sewn together at the point of manufacture to form filter fabric lengths as required. Locate all sewn seams at support posts. Alternatively, two sections of silt fence can be overlapped, provided the Contractor can demonstrate, to the satisfaction of the Engineer, that the overlap is long enough and that the adjacent fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.
  5. Attach the filter fabric on the up-slope side of the posts and secure with staples, wire, or in accordance with the manufacturer's recommendations. Attach the filter fabric to the posts in a manner that reduces the potential for tearing.
  6. Support the filter fabric with wire or plastic mesh, dependent on the properties of the geotextile selected for use. If wire or plastic mesh is used, fasten the mesh securely to the up-slope side of the posts with the filter fabric up-slope of the mesh.
  7. Mesh support, if used, shall consist of steel wire with a maximum mesh spacing of 2-inches, or a prefabricated polymeric mesh. The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs. grab tensile strength. The polymeric mesh must be as resistant to the same level of ultraviolet radiation as the filter fabric it supports.
  8. Bury the bottom of the filter fabric 4-inches min. below the ground surface. Backfill and tamp soil in place over the buried portion of the filter fabric, so that no flow can pass beneath the fence and scouring cannot occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the ground 3-inches min.
  9. Drive or place the fence posts into the ground 18-inches min. A 12–inch min. depth is allowed if topsoil or other soft subgrade soil is not present and 18-inches cannot be reached. Increase fence post min. depths by 6 inches if the fence is located on slopes of 3H:1V or steeper and the slope is perpendicular to the fence. If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.
  10. Use steel or equivalent posts. The spacing of the support posts shall be a maximum of 6-feet. Posts shall consist of either:
      - No. 6 steel rebar or larger.
      - ASTM A 120 steel pipe with a minimum diameter of 1-inch.
      - U, T, L, or C shape steel posts with a minimum weight of 1.35 lbs./ft.
      - Other steel posts having equivalent strength and bending resistance to the post sizes listed above.
  11. Locate silt fences on contour as much as possible, except at the ends of the fence, where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.
  12. If the fence must cross contours, with the exception of the ends of the fence, place gravel check dams perpendicular to the back of the fence to minimize concentrated flow and erosion. The slope of the fence line where contours must be crossed shall not be steeper than 3H:1V.
      - Gravel check dams shall be approximately 1-foot deep at the back of the fence. Gravel check dams shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence.
      - Gravel check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. Gravel check dams shall be located every 10 feet along the fence where the fence must cross contours.
- Refer to Figure 4.2.13 for slicing method details. Silt fence installation using the slicing method specifications:
  1. The base of both end posts must be at least 2- to 4-inches above the top of the filter fabric on the middle posts for ditch checks to drain properly. Use a hand level or string level, if necessary, to mark base points before installation.
  2. Install posts 3- to 4-feet apart in critical retention areas and 6- to 7- feet apart in standard applications.
  3. Install posts 24-inches deep on the downstream side of the silt fence, and as close as possible to the filter fabric, enabling posts to support the filter fabric from upstream water pressure.
  4. Install posts with the nipples facing away from the filter fabric.
  5. Attach the filter fabric to each post with three ties, all spaced within the top 8-inches of the filter fabric. Attach each tie diagonally 45 degrees through the filter fabric, with each puncture at least 1-inch vertically apart. Each tie should be positioned to hang on a post nipple when tightening to prevent sagging.
  6. Wrap approximately 6-inches of fabric around the end posts and secure with 3 ties.
  7. No more than 24-inches of a 36-inch filter fabric is allowed above ground level.

     Compact the soil immediately next to the filter fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four trips. Check and correct the silt fence installation for any deviation before compaction. Use a flat-bladed shovel to tuck fabric deeper into the ground if necessary.

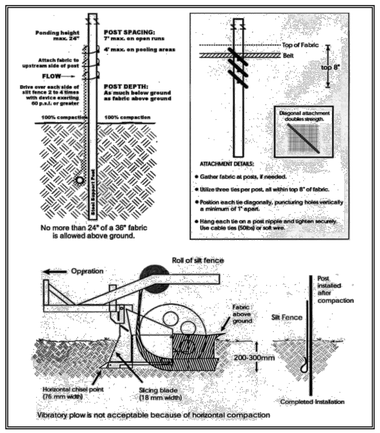
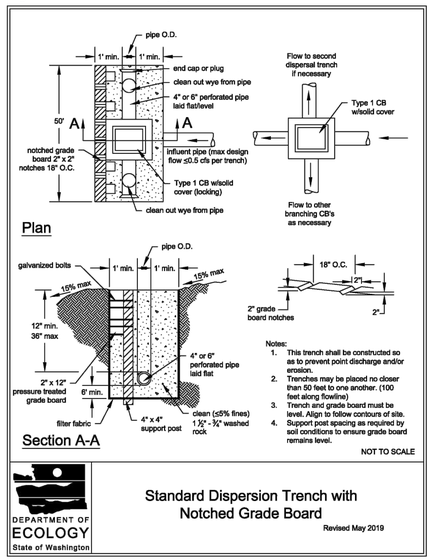


Figure 4.2.13 – Silt Fence Installation by Slicing Method

Maintenance Standards

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment pond.
- Check the uphill side of the fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence or remove the trapped sediment.
- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace filter fabric that has deteriorated due to ultraviolet breakdown.

Figure V-4.5: Standard Dispersion Trench with Notched Grade Board



1

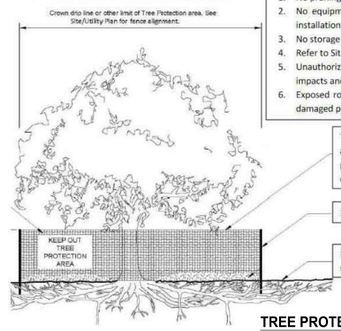
TREE PROTECTION AREA (TPZ)

KEEP OUT!

DO NOT REMOVE OR ADJUST THE APPROVED LOCATION OF THIS TREE PROTECTION AREA

Trees enclosed by this fence are protected and are subject to the conditions of the tree permit. Violation of tree conditions may lead to:

1. Correction Notices or Stop Work Orders until compliance is achieved
2. RE Inspection Fees
3. Arborist reports recommending mitigation



Notes

1. No pruning shall be preformed unless under the direction of an arborist
2. No equipment shall be stored or operated inside the protective fencing including during fence installation and removal
3. No storage of materials shall occur inside the protective fencing
4. Refer to Site/Utility Plan for allowable modifications to the tree protection area.
5. Unauthorized activities in tree protection area may require evaluation by private arborist to identify impacts and mitigation required
6. Exposed roots: For roots > 1" damaged during construction, make a clean straight cut to remove damaged portion and inform City Arborist

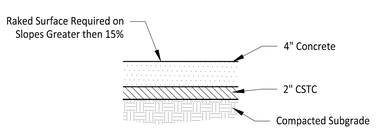
Tree protection fence: 4-6" chain link fence, solidly anchored into the ground, or if authorized High-density polyethylene fencing with 3.5" x 1.5" openings; color orange. Steel posts installed at 8' o.c.

2" x 6" steel posts or approved equal

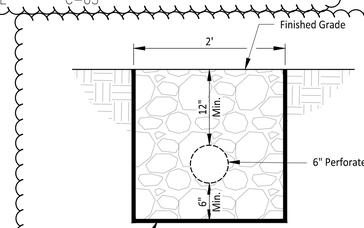
Maintain existing grade with the tree protection fence unless otherwise indication on the plans

TREE PROTECTION FENCING
DETAIL 1
NOT TO SCALE C–03

1



CONCRETE PAVEMENT
SECTION A
1" = 1' C–04



FRENCH DRAIN
SECTION B
1" = 1' C–05

1

CALL TWO BUSINESS DAYS BEFORE YOU DIG
1–800–424–5555
UTILITIES UNDERGROUND LOCATION CENTER

Owner/Developer:

Jereme Raquepau
9116 SE 58th Street
Mercer Island, WA 98040

Architect:

RF Architecture
Richard Flake
7421 214th Avenue E
Bonneylake, WA 98391
(253) 359-4039

Engineer:

JMJ Team
905 Main Street, Suite #200
Sumner, WA 98390
(206) 596-2020

Project:

Raquepau Residence

9116 Se 58th Street
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SHEET TITLE:

Details

PROJ. NO: 1565-008
DATE: November 1, 2023
DRAWN BY: MO
DESIGN BY: JJ

SHEET NUMBER:

C-06

DWG. 6 OF 6

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APPENDIX B

GEOTECH
CONSULTANTS, INC.

2401 10th Ave E
Seattle, Washington 98102
(425) 747-5618

April 25, 2023

JN 23101

Jeremy Raquepau and Angela Gribble
9116 S.E. 58th Street
Mercer Island, Washington 98040
via email: jraquepau@gmail.com & angribble00@gmail.com

Subject: **Geotechnical Report**
Proposed Remodel and Expansion of Existing Residence
9116 S.E. 58th Street
Mercer Island, Washington

Greetings:

This report presents our geotechnical engineering report related to the planned remodel and expansion of your existing home. The scope of our services consisted of assessing the site surface and subsurface conditions, and then developing this summary report.

Plans for the development have been prepared by RF Architecture. Based on these plans, new foundations will be constructed to "bump out" areas of the existing main floor through the central portion of the house. A new second story addition will then be constructed over the central portion of the structure. A deck overlying an outdoor living space will also be created on the east side of the house, in the area of the existing patio. The excavations are expected to be limited in depth to what is necessary to reach suitable bearing soils for the new foundations. No deep below-grade spaces, such as a basement, are anticipated.

The City of Mercer Island GIS indicates that no geologic hazards are mapped on your property on the adjacent lots. There are no steep slopes on, or around, your property.

We visited the subject property on two occasions, the most recent being April 4, 2023. During these site visits, we were able to assess the conditions on and around the property, and to conduct soil explorations in the area of the proposed expansion. The existing house sits centrally on the irregularly-shaped lot. The cul-de-sac for S.E. 58th Street forms the curved western property line. Developed residential lots abut the remaining property lines. The existing residence consists of one story, with a crawl space beneath the main floor. The garage is located on the southern end of the house, with a driveway extending through the south portion of the lot from S.E. 58th Street. A paver patio is located on the eastern side of the house. Grass yard and landscaping cover most of the remainder of the lot, with several mature trees scattered about on the lot. The property is relatively flat, with a slight rise up to the house from S.E. 58th Street, and a slight slope away from the eastern side of the residence. There are no steep slopes on, or near, the site.

There is no history of slope movement in this area. This is confirmed by our review of Mercer Island's GIS, as well as the *Mercer Island Landslide Hazard Assessment* (Troos and Wisher, 2009).

By probing alongside the house in the area of the planned expansion, we were able to determine that the top of the perimeter footing lies 19 to 24 inches below the ground surface. This would result in a bottom-of-footing depth of around 24 to 30 inches.

We are familiar with the native subsurface conditions on the property from review of published geologic maps, explorations that our firm has completed in close proximity to the site, and the conditions exposed in test holes completed around the existing residence in the area of the planned expansion. The locations of these test holes are shown on the attached Site Exploration Plan. Underlying the ground surface, all of the test holes exposed fill soils extending to a depth of 6 to 24 inches. Beneath the fill, native soils consisting of heavily-weathered, gravelly, silty sand were exposed. This heavily-weathered soil was loose to medium-dense and typically extended to a depth of 42 to 45 inches. Below this depth, the explorations encountered dense, gravelly, silty sand that has been glacially-compressed. This dense soil is referred to as glacial till. Geologic maps and our previous experience on nearby projects confirms that glacial till soils are typical for the site vicinity. No groundwater seepage was exposed in the test holes. However, it is relatively common to find at least localized zones of subsurface water perched on top of the impervious glacial till following extended periods of weather.

CONCLUSIONS AND RECOMMENDATIONS

GENERAL

THIS SECTION CONTAINS A SUMMARY OF OUR STUDY AND FINDINGS FOR THE PURPOSES OF A GENERAL OVERVIEW ONLY. MORE SPECIFIC RECOMMENDATIONS AND CONCLUSIONS ARE CONTAINED IN THE REMAINDER OF THIS REPORT. ANY PARTY RELYING ON THIS REPORT SHOULD READ THE ENTIRE DOCUMENT.

The site and surrounding area are underlain by competent, glacially-compressed native soils. Based on the results of our test holes and probing, it appears that the existing perimeter house foundations were placed on the heavily-weathered soils, at least one foot above the level of the glacial till. The heavily-weathered soils are suitable to support lightly-loaded foundations for an allowable bearing capacity of up to 2,000 pounds per square foot. If additional load is applied to the perimeter footings, they may undergo a slight amount of settlement as the soil compresses under the new loads. We did not assess conditions supporting the isolated footings within the crawl space. However, these footings, which typically support primarily floor loads, we often not excavated as deep as perimeter foundations. It would be prudent to avoid adding any more load to those interior footings, unless the bearing capacity of their supporting soils were first verified.

New footings should all be excavated to bear on the dense glacial till, which will minimize post-construction settlement. This may require excavation below the planned footing subgrade elevations. Where this overexcavation is necessary, it should be filled using imported clean crushed rock (quarry spalls or railroad ballast rock). Where they abut each other, existing and new footings should be connected by doweling, in order to prevent differential movement.

We expect that the floors of the new additions will be framed over a crawl space. It is not necessary to remove the loose soils in crawl space areas.

The onsite soils will not be suitable for reuse as compacted fill, due to their very high silt and moisture contents. Any compacted fill placed in structural areas, or where post-construction settlement is undesirable (patios, porches, stoops, etc.) should consist of imported granular material that can be properly compacted.

The underlying glacially-compressed soils beneath the site are not susceptible to seismic liquefaction.

The site does not meet the City of Mercer Island's criteria for an Erosion Hazard Area. Even so, it is prudent to install appropriate temporary erosion control measures during the site development, in order to avoid adverse erosion impacts to the surrounding properties. The temporary erosion control measures needed during the site development will depend heavily on the weather conditions that are encountered during the site work. One of the most important considerations, particularly during wet weather, is to immediately cover any bare soil areas to prevent accumulated water or runoff from the work area from becoming silty in the first place. A wire-backed silt fence bedded in compost, not native soil or sand, should be erected as close as possible to the planned work area, and the existing vegetation between the silt fence and the top of the steep slope be left in place. Rocked construction access and staging areas should be established wherever trucks will have to drive off of pavement, in order reduce the amount of soil or mud carried off the property by trucks and equipment. Covering the base of the excavation with a layer of clean gravel or rock is also prudent to reduce the amount of mud and silty water generated. Cut slopes and soil stockpiles should be covered with plastic during wet weather. Soil stockpiles should be minimized. Following rough grading, it may be necessary to mulch or hydroseed bare areas that will not be immediately covered with landscaping or an impervious surface.

Even shallow crawl spaces may collect subsurface water perched on top of the dense soil. Providing perimeter footing drains, and well as installing perforated drains in a layer of gravel under the vapor barrier/retarder in the crawl space, would be prudent. A typical footing drain detail is attached.

The glacial till soil is impervious, and seasonal perched groundwater is relatively common in these conditions. On-site infiltration of concentrated runoff from impervious surfaces is infeasible, due to the impervious barrier against downward percolation resulting from the glacial till.

We recommend including this report, in its entirety, in the project contract documents. This report should also be provided to any future property owners so they will be aware of our findings and recommendations.

SEISMIC CONSIDERATIONS

In accordance with the International Building Code (IBC), the site class within 100 feet of the ground surface is best represented by Site Class Type D (Stiff Soil).

The IBC and ASCE 7 require that the potential for liquefaction (soil strength loss) during an earthquake be evaluated for the peak ground acceleration of the Maximum Considered Earthquake (MCE), which has a probability of occurring once in 2,475 years (2 percent probability of occurring in a 50-year period). The dense soils beneath the site are not susceptible to seismic liquefaction under the ground motions of the MCE because of the absence of near-surface groundwater.

CONVENTIONAL FOUNDATIONS

We recommend that continuous and individual spread footings have minimum widths of 12 and 16 inches, respectively. Exterior footings should also be bottomed at least 18 inches below the lowest adjacent finish ground surface for protection against frost and erosion. The local building codes should be reviewed to determine if different footing widths or embedment depths are required.

Footing subgrades must be cleaned of loose or disturbed soil prior to pouring concrete. Depending upon site and equipment constraints, this may require removing the disturbed soil by hand. In wet conditions, the prepared footing subgrades should be protected with several inches of clean crushed rock, in order to prevent softening or disturbance during the placement of forms and rebar.

Depending on the final site grades, overexcavation may be required below the footings to expose competent native soil. Unless lean concrete is used to fill an overexcavated hole, the overexcavation must be at least as wide at the bottom as the sum of the depth of the overexcavation and the footing width. For example, an overexcavation extending 2 feet below the bottom of a 2-foot-wide footing must be at least 4 feet wide at the base of the excavation. If lean concrete is used, the overexcavation need only extend 6 inches beyond the edges of the footing.

An allowable bearing pressure of 2,500 pounds per square foot (psf) is appropriate for new footings supported on competent native soil. A one-third increase in this design bearing pressure can be used when considering short-term wind or seismic loads. For the above design criteria, it is anticipated that the total post-construction settlement of footings founded on competent native soil, or compacted rock structural fill up to 5 feet in thickness will be less than one inch, with differential settlements on the order of one-quarter-inch in a distance of 25 feet along a continuous footing with a uniform load.

Lateral loads due to wind or seismic forces may be resisted by friction between the foundation and the bearing soil, or by passive earth pressure acting on the vertical, embedded portions of the foundation. For the latter condition, the foundation must be either poured directly against relatively level, undisturbed soil or be surrounded by level, well-compacted fill. We recommend using the following ultimate values for the foundation's resistance to lateral loading:

PARAMETER	ULTIMATE VALUE
Coefficient of Friction	0.40
Passive Earth Pressure	300 pcf

Where: pcf is Pounds per Cubic Foot, and Passive Earth Pressure is computed using the Equivalent Fluid Density.

The above ultimate values for passive earth pressure and coefficient of friction do not include a safety factor.

LIMITATIONS

This report has been prepared for the exclusive use of Jeremy Raquepau and Angela Gribble, and their representatives, for specific application to this project and site. Our conclusions and recommendations are professional opinions derived in accordance with our understanding of current local standards of practice, and within the scope of our services. No warranty is expressed or implied. The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design. Our services also do not include assessing or minimizing the potential for biological hazards, such as mold, bacteria, mildew and fungi in either the existing or proposed site development.

ADDITIONAL SERVICES

Geotech Consultants, Inc. should be retained to provide geotechnical consultation, testing, and observation services during construction. This is to confirm that subsurface conditions are consistent with those indicated by our exploration, to evaluate whether earthwork and foundation construction activities comply with the general intent of the recommendations presented in this report, and to provide suggestions for design changes in the event subsurface conditions differ from those anticipated prior to the start of construction. However, our work would not include the supervision or direction of the actual work of the contractor and its employees or agents. Also, job and site safety, and dimensional measurements, will be the responsibility of the contractor.

During the construction phase, we will provide geotechnical observation and testing services when requested by you or your representatives. Please be aware that we can only document site work we actually observe. It is still the responsibility of your contractor or on-site construction team to verify that our recommendations are being followed, whether we are present at the site or not.

We appreciate the opportunity to be of service on this project. Please contact us if you have any questions, or if we can be of further assistance.

Respectfully submitted,

GEOTECH CONSULTANTS, INC.

4/25/2023

Marc R. McGinnis, P.E.
Principal

Attachments: Vicinity Map, Site Exploration Plan, Test Pit Logs, Footing Drain Detail

cc: **RF Architecture** – Richard Flake
via email: richard@rfarchitecture.com

MRM:kg

NORTH

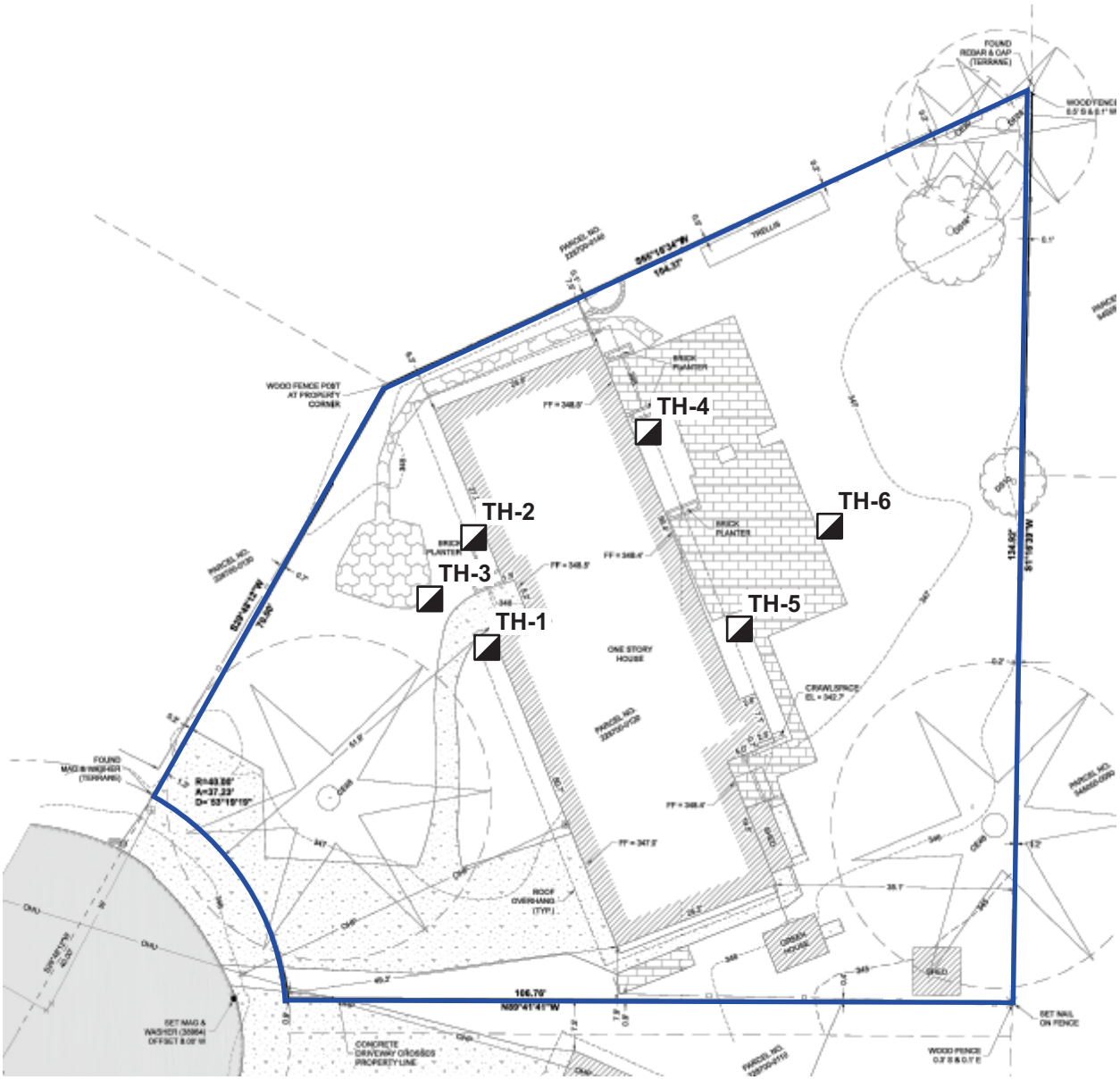
(Source: King County iMap)

GEOTECH
CONSULTANTS, INC.

VICINITY MAP

9116 Southeast 58th Street
Mercer Island, Washington

Job	Date:		Plate:
23101	April 2023		1



Legend:

Test Hole Location

GEOTECH
CONSULTANTS, INC.

SITE EXPLORATION PLAN

9116 Southeast 58th Street
Mercer Island, Washington

Job	Date:		Plate:
23101	April 2023	No Scale	2

TEST HOLE 1

Depth (inches)	Soil Description
0.0 – 24	Landscape bark over dark brown, gravelly, silty SAND, fine-grained, very moist, loose **[FILL]**
24 – 45	Brown mottled orange, slightly gravelly, silty SAND, fine-grained, very moist, loose to medium-dense (heavily weathered)
45	Dense, slightly gravelly, silty SAND, fine-grained, moist, dense

Test Hole was terminated at 45 inches on April 4, 2023.
No groundwater seepage was encountered in the test hole.

TEST HOLE 2

Depth (inches)	Soil Description
0.0 – 12	Landscape bark over dark brown, gravelly, silty SAND, fine-grained, very moist, loose **[FILL]**
12 – 45	Brown mottled orange, slightly gravelly, silty SAND, fine-grained, very-moist, medium-dense (heavily weathered)
45	Dense, slightly gravelly, silty SAND, fine-grained, moist, dense

Test Hole was terminated at 45 inches on April 4, 2023.
No groundwater seepage was encountered in the test hole.

TEST HOLE 3

Depth (inches)	Soil Description
0.0 – 6	Grass over dark brown silty SAND, fine-grained, very moist, loose **[FILL]**
6 – 32	Gray-brown mottled orange, gravelly, silty SAND, fine-grained, moist, medium-dense (weathered) - at 24”, becomes dense with more silt, sand, and rust seams
32 – 40	Gray, very silty SAND, fine-grained, very moist, dense - 36”, becomes gravelly

Test Hole was terminated at 40 inches on April 4, 2023.
No groundwater seepage was encountered in the test hole.

TEST HOLE 4

Depth (inches)	Soil Description
0 – 6	Topsoil over brown slightly silty, slightly gravelly SAND, fine-grained, moist, loose **[FILL]**
6 – 45	Brown mottled orange, slightly gravelly, silty SAND, fine-grained, very moist, medium-dense (heavily weathered)
45	Dense, slightly gravelly, silty SAND, fine-grained, moist, dense

Test Hole was terminated at 45 inches on April 4, 2023.
No groundwater seepage was encountered in the test hole.

TEST HOLE 5

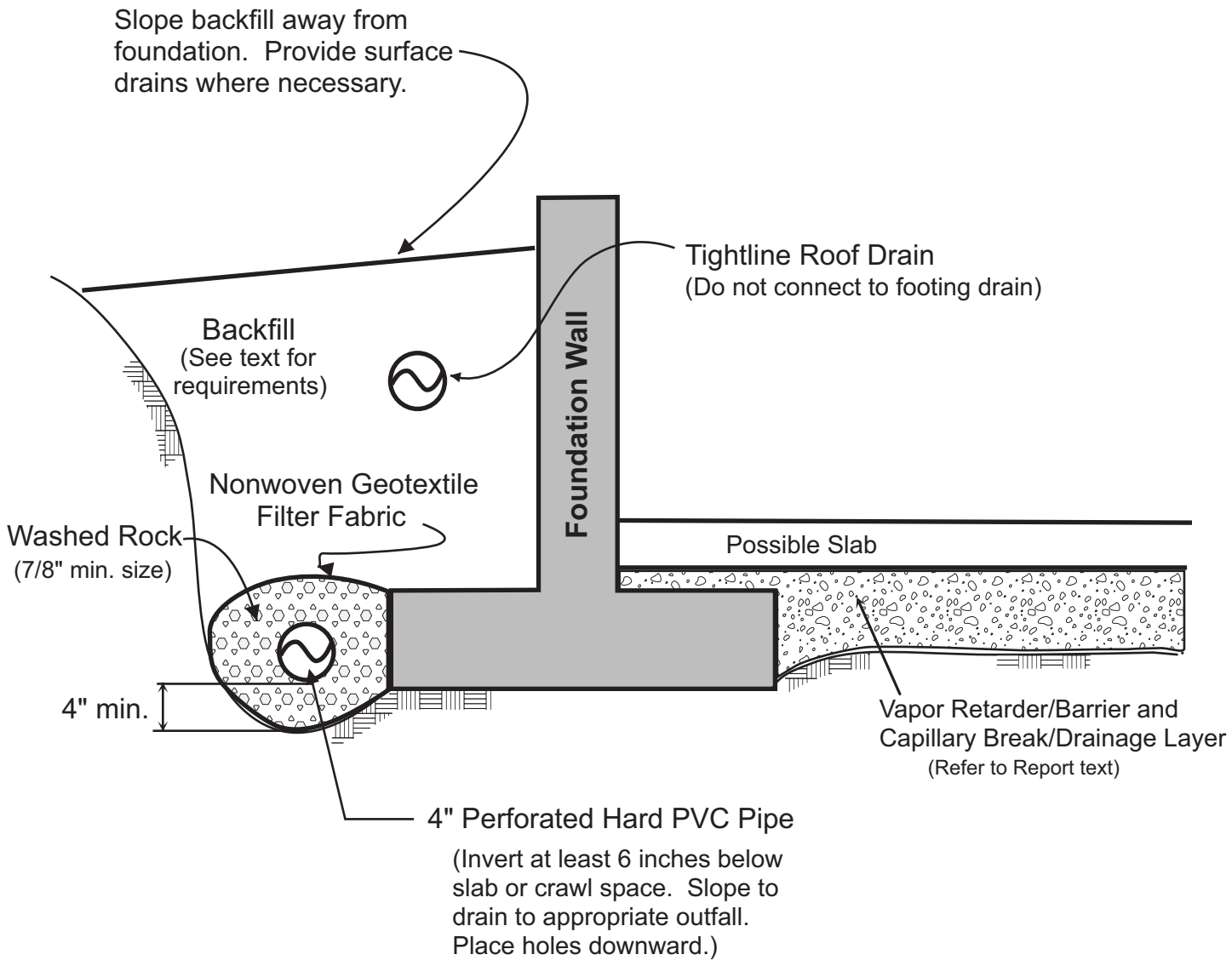
Depth (inches)	Soil Description
0 – 6	Topsoil **[FILL]**
6 – 30	Gray-brown, mottled, silty SAND, fine to medium-grained, very moist, loose
30 - 42	Orange-brown, silty SAND, fine to medium-grained, moist, medium-dense - at 42" becomes dense

Test Hole was terminated at 42 inches on April 4, 2023.
No groundwater seepage was encountered in the test hole.

TEST HOLE 6

Depth (inches)	Soil Description
0.0 – 15	Grass over dark brown slightly silty, slightly gravelly SAND, fine-grained, moist, loose **[FILL]**
15 – 20	Gray, slightly silty SAND, fine-grained, moist, medium-dense **[FILL]**
20 – 26	Dark brown- black, slightly silty SAND, fine-grained, very moist, medium-dense
26 – 45	Orange-brown, slightly silty SAND, fine to medium-grained, very moist, medium-dense
45	Dense, slightly gravelly, silty SAND, fine-grained, moist, dense

Test Hole was terminated at 45 inches on April 4, 2023.
No groundwater seepage was encountered in the test hole.



NOTES:

(1) In crawl spaces, provide an outlet drain to prevent buildup of water that bypasses the perimeter footing drains.

(2) Refer to report text for additional drainage, waterproofing, and slab considerations.

GEOTECH
CONSULTANTS, INC.

FOOTING DRAIN DETAIL

9116 Southeast 58th Street
Mercer Island, Washington

Job	Date:		Plate:
23101	April 2023		5