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GEOTECHNICAL ENGINEERING STUDY
TROMBLEY SHORT PLAT
13224 – 191ST AVENUE SOUTHEAST
MONROE, WASHINGTON

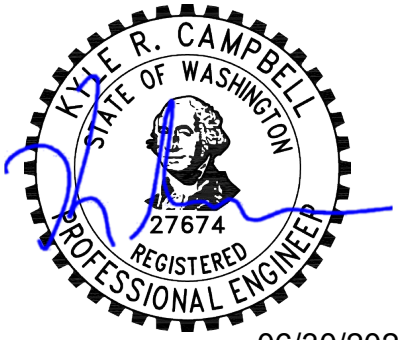
ES-10296

PREPARED FOR

REID DEVELOPMENT GROUP, LLC

June 30, 2025

Stephen H. Avril
Project Manager



06/30/2025

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

GEOTECHNICAL ENGINEERING STUDY
TROMBLEY SHORT PLAT
13224 – 191ST AVENUE SOUTHEAST
MONROE, WASHINGTON

ES-10296

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

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EARTH SOLUTIONS NW

Geotechnical Engineering ■ Earthwork Observation & Testing
Environmental Services ■ CESCL & Stormwater Services

esnw.com info@esnw.com

June 30, 2025
ES-10296

Reid Development Group, LLC
PO Box 1930
Woodinville, Washington 98072

Attention: Michael Reid

Greetings:

Earth Solutions NW, LLC (ESNW) is pleased to present this geotechnical engineering study per our scope of services outlined in the proposal dated December 6, 2024. This study is meant to support the proposed residential construction at the subject address. Based on the results of our investigation, the proposed project is feasible from a geotechnical standpoint. The site is underlain by glacial till deposits based on our subsurface exploration (May 21, 2025).

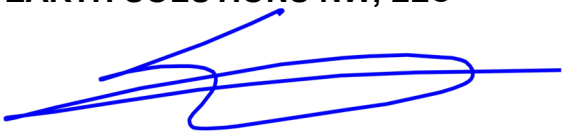
The site will be graded to create building pads following demolition of the existing structures on the site. After completing earthwork activities in accordance with recommendations in this report, the proposed structures can be supported on conventional spread and continuous foundations bearing on undisturbed, competent native soil, re-compacted existing fill, or new structural fill. If structural building pads are disturbed during wet weather, remediation measures such as cement treatment or overexcavation and replacement with rock may be necessary in some areas.

From a geotechnical standpoint, infiltration on the subject site should be considered infeasible based on the in-situ infiltration testing ESNW performed during the site exploration. The cemented nature of glacial till precludes full-infiltration.

Pertinent geotechnical recommendations are provided in this study. We appreciate the opportunity to be of service to you on this project. If you have any questions regarding the content of this geotechnical engineering study, please call.

Sincerely,

EARTH SOLUTIONS NW, LLC



Stephen H. Avril
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GEOTECHNICAL ENGINEERING STUDY
TROMBLEY SHORT PLAT
13224 – 191ST AVENUE SOUTHEAST
MONROE, WASHINGTON

ES-10296

INTRODUCTION

General

This geotechnical engineering study (study) was prepared for the proposed residential development on the west side of 191st Avenue Southeast, north of the intersection with 134th Street Southeast in Monroe, Washington. The site is comprised of a single tax parcel (parcel number 28063600101200). The purpose of this study was to develop geotechnical recommendations for the project. The following tasks were completed as part of our scope of services for this project:

- Logging, and sampling of a series of test pits to characterize soil and groundwater conditions.
- In-situ infiltration testing.
- Laboratory testing of soil samples collected at the test locations.
- Engineering analyses and recommendations for the proposed development.
- Preparation of this report.

Project Description

The proposed project consists of re-development of the existing parcel (parcel number 28063600101200) with construction of a series of single-family residences following the demolition of the existing structures on the subject site who's location is not demonstrated on the subsurface location plan ESNW is providing due to the site survey which ESNW was provided by the client, where no structures were shown. Infiltration is being investigated to aid in stormwater management, and ESNW has provided a preliminary infiltration opinion based on observation of a small-scale Pilot Infiltration Test (PIT) on the subject site.

Based on our experience with similar projects and site grades we anticipate cuts and fills of up to ten to 15 feet or less will be necessary to achieve the proposed finish grade elevations following the demolition of the existing buildings, based on the sloped nature of the site. More extensive earthwork operations will likely be required to install site utilities and construct the stormwater facilities. Block retaining walls and rockeries can be utilized to facilitate grade changes where necessary. ESNW can provide retaining wall and rockery designs upon request.

Based on our experience with similar projects, the proposed residential structures are anticipated to be two to three stories in height and constructed utilizing relatively lightly loaded wood framing supported on conventional foundations. Perimeter footing loads are anticipated be 1 to 2 kips per linear foot, isolated footing loads will be less than 20 kips, and we anticipate slab-on-grade loading of 150 pounds per square foot (psf).

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

SITE CONDITIONS

Surface

The subject site is located on the west side of 191st Avenue Southeast, north of the intersection with 134th Street Southeast in Monroe, Washington. The site is comprised of a single tax parcel (parcel number 28063600101200). The parcel is currently developed with a single-family residence and outbuildings. The remainder of the site is comprised of an agricultural field, and is moderately sloped with 40 feet of elevation change in across the site.

Subsurface

An ESNW representative observed, logged, and sampled eight test pits on May 21, 2025. The test locations were within accessible site locations using an excavator and operator contracted by ESNW. The subsurface exploration was completed to evaluate soil conditions, classify site soils, perform an infiltration investigation and characterize groundwater conditions within the proposed development area.

The maximum exploration depth was nine feet below the existing ground surface (bgs), and terminated within native soil depositional environments.

The approximate locations of the explorations are depicted on Plate 2 (Subsurface Exploration Plan). Please refer to the logs provided in Appendix A for a more detailed description of subsurface conditions. Representative soil samples collected at the exploration locations were analyzed in general accordance with both Unified Soil Classification System (USCS) and United States Department of Agriculture (USDA) methods and procedures. Laboratory test results are provided in Appendix B.

Topsoil

Topsoil was observed at the test locations in depths ranging between 6 to 16 inches below the surface. Topsoil is characterized by its dark brown color, the presence of fine organic material, and small root intrusions, and is not suitable for use as structural fill material.

Fill

Fill was not encountered at the test locations during the site exploration. However, existing fill may be encountered within the current parking areas, and surrounding road and existing building alignments.

Native Soil

Underlying the topsoil, native soils encountered at the test locations were observed to be medium dense grading to dense silty sand with gravel (Unified Soil Classification, SM) and poorly graded sand with silt (SP-SM) observed to the limits of excavation. These soils are consistent with the typical makeup of the mapped geological deposits. Density was observed to increase with depth. In general, the native soil was generally encountered in a moist condition during the time of exploration.

Geologic Setting

Geologic mapping identifies Younger glacial till deposits (Qvt) mapped for the area. These deposits are typified by silty sand (SM) and sandy silt (ML) soils.

The referenced Web Soil Survey (WSS) identifies Tokul gravelly medial loam (0 to 8 percent slopes) as the primary unit underlying the subject site. Tokul gravelly medial loam series of soils are described as glacial till deposits. Based on our field observations, the site soils are comprised of glacial till deposits.

Groundwater

Perched groundwater was observed at four of the test locations during the May 2025 subsurface exploration. The seepage was exposed at depths between two to six feet and flow amounts were characterized as light to moderate. Zones of perched groundwater seepage are expected to develop within the soil substratum depending on the time of year and may be encountered during general earthwork activities. Groundwater seepage rates and elevations fluctuate depending on many factors, including precipitation duration and intensity, the time of year, and soil conditions. Groundwater seepage flow rates are typically higher during the winter, spring, and early summer months.

GEOLOGIC HAZARD AREAS EVALUATION

A review of the City of Monroe (COM) information was completed to evaluate whether geologically hazardous areas are present within the subject site. The city provides the following description of a landslide hazard:

a. Areas of historic failure, such as:

i. Those areas delineated by the U.S. Department of Agriculture's Natural Resources Conservation Service as having a "severe" limitation for building site development; or

ii. Areas designated as quaternary slumps, earthflows, mudflows, lahars, or landslides on maps published by the U.S. Geological Survey or Department of Natural Resources;

b. Areas with all three of the following characteristics:

i. Slopes steeper than fifteen percent; and

ii. Hillsides intersecting geologic contacts with a relatively permeable sediment overlaying a relatively impermeable sediment or bedrock; and

iii. Springs or groundwater seepage;

c. Areas that have shown movement during the Holocene epoch (from ten thousand years ago to the present) or that are underlain or covered by mass wastage debris of that epoch;

d. Slopes that are parallel or subparallel to planes of weakness (such as bedding planes, joint systems, and faults) in subsurface materials;

e. Slopes having a gradient steeper than eighty percent subject to rock fall during seismic shaking;

f. Areas potentially unstable because of rapid stream incision, stream bank erosion, and undercutting by wave action;

g. Areas located in a canyon or on an active alluvial fan, presently or potentially subject to inundation by debris flows or catastrophic flooding; and

h. Any area with a slope of forty percent or steeper and with a vertical relief of ten or more feet except areas composed of consolidated rock. A slope delineated by establishing its toe and top and measured by averaging the inclination over at least ten feet of vertical relief.

The COM defines erosion hazards as:

1. Erosion Hazard Areas. Erosion hazard areas are at least those areas identified by the U.S. Department of Agriculture's Natural Resources Conservation Service as having "severe" or "very severe" rill and inter-rill erosion hazard.

Based on ESNW review of the soil conditions on the site, surface conditions, and topography; there are no geologic critical areas on the subject site.

DISCUSSION AND RECOMMENDATIONS

General

Based on the results of our investigation, construction of the proposed residential re-development is feasible from a geotechnical standpoint. The primary geotechnical considerations associated with the proposed development include site grading and grade changes, stormwater control, and the suitability of using on-site soils as structural fill.

After completing earthwork activities in accordance with recommendations in this report, the proposed residential structures can be supported on conventional spread and continuous foundations bearing on undisturbed, competent native soil, re-compacted native soil, re-compacted existing fill or new structural fill. If structural building pads are disturbed during wet weather, remediation measures such as cement treatment or overexcavation and replacement with rock may be necessary in some areas.

From a geotechnical standpoint, infiltration on the subject site should be considered infeasible based on the presence of the glacial till on the subject site and the results of the PIT testing.

Site Preparation and Earthwork

Initial site preparation activities will consist of demolition, installing temporary erosion control measures, establishing grading limits, and site clearing and stripping activities. Subsequent earthwork activities will involve mass site grading and installation of infrastructure and stormwater management improvements.

Temporary Erosion Control

The following temporary erosion and sediment control (TESC) BMPs are offered:

- Temporary construction entrances and drive lanes, consisting of at least six inches of quarry spalls, should be considered to both minimize off-site soil tracking and provide a stable access entrance surface. Placing geotextile fabric underneath the quarry spalls will provide greater stability, if needed.

- Silt fencing should be placed around the construction site perimeter.

- When not in use, soil stockpiles should be covered or otherwise protected.

- Temporary measures for controlling surface water runoff, such as interceptor trenches, sumps, or swales, should be installed prior to beginning earthwork activities.

- Dry soils disturbed during construction should be wetted to minimize dust and airborne soil erosion.

- When appropriate, permanent planting or hydroseeding will help to stabilize on-site soil.

Additional TESC BMPs, as specified by the project civil engineer and indicated on the plans, should be incorporated into construction activities. TESC BMPs may be modified during construction as site conditions require and as approved by the site erosion control lead.

Stripping

Topsoil will likely be encountered within the upper six to eighteen inches on the subject site. Topsoil is not suitable for load bearing and should be removed where encountered within building footprints and other structural areas to be developed. Topsoil is not suitable for use as structural fill material, but may be considered for placement in landscape zones of the site. Particularly where water quality treatment is required by the city. Root intrusions generally extend below the topsoil into the upper weathered soil. The organic-rich topsoil should be stripped and segregated into a stockpile for later use on site or to haul off site. The material remaining immediately below the topsoil may have some root zones and will likely be variable in composition, density, and/or moisture content. The material exposed after initial topsoil stripping will likely be suitable for direct structural support as is but will need to be evaluated during construction for load-bearing capacities as it is exposed. ESNW should observe initial stripping activities to provide recommendations regarding stripping depths and material suitability.

Excavations and Slopes

Excavation activities on site are likely to expose medium dense to dense native soil. Based on the soil conditions observed at the test locations, the following maximum allowable temporary slope inclinations may be used. The weathered soil should be considered Type B, and the unweathered till should be considered Type A. The applicable Federal Occupation Safety and Health Administration and Washington Industrial Safety and Health Act soil classifications are also provided:

- Areas exposing groundwater seepage or fill — 1.5H:1V (Type C)
- Loose soil — 1.5H:1V (Type C)
- Medium dense soil (weathered till) — 1H:1V (Type B)
- Dense soil (unweathered till) — 0.75H:1V (Type A)

Permanent slopes should be planted with vegetation to both enhance stability and minimize erosion and should maintain a gradient of 2H:1V or flatter. The presence of perched groundwater may cause localized sloughing of temporary slopes. An ESNW representative should be requested to observe temporary and permanent slopes to confirm the slope inclinations are suitable for the exposed soil conditions and to provide additional excavation and slope recommendations, as necessary.

Care must be taken when considering the placement of structures on the site requiring temporary excavations. ESNW recommends excavations not extend into an area where the roadway or other neighboring structures will be creating a surcharge on the excavation walls. The excavations should maintain a minimum 1H:1V (Horizontal:Vertical) setback from the road or any adjacent structures on or off-site. If the recommended temporary slope inclinations cannot be achieved, temporary shoring may be necessary to support excavations.

In-situ and Imported Soil

The on-site soil is moisture sensitive, and successful use of the on-site soil as structural fill will largely be dictated by the moisture content at the time of placement and compaction. Remedial measures may be necessary as part of site grading and earthwork activities. Remedial measures would include aeration or cement modification of the site soils in order to moisture-condition the targeted soils for use as structural fill. If the on-site soil cannot be successfully compacted in its natural moisture or through moisture conditioning, the use of an imported soil may be necessary. In our opinion, a contingency should be provided in the project budget for the export of soil that cannot be successfully compacted as structural fill, particularly if grading activities take place during the wet season. In general, soils with appreciable fines contents (greater than 5 percent) typically degrade rapidly when exposed to rainfall and construction traffic.

Imported soil intended for use as structural fill should consist of a well-graded, granular soil with a moisture content that is at (or slightly above) 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 (where the fines content is defined as the percent passing the Number 200 sieve, based on the minus three-quarter-inch fraction).

Cement Modified Soil (CMS)

The on-site soil intended to be used within roadway subgrades and building pad subgrades are primarily comprised of silty sand soil. The soil is considered moisture sensitive when above optimum moisture levels. The following percentages of cement modification are recommended for placement and compaction of structural fill, where allowed by COM on the site:

- General Earthwork 3 Percent to 5 Percent

Note that the percentage of cement needed will vary depending on the moisture content of the soil. The above percentages of soil-cement shall be based on the unit weight (approximately 125 pcf) of the soil to be modified.

For general earthwork applications, a backhoe or excavator can be used to mix the soil-cement prior to placement and compaction. The cement must be thoroughly mixed with the soil. Modified soil used as structural fill shall be placed and compacted to a minimum of 95 percent of the soil maximum dry density determined in accordance with Modified Proctor (ASTM D1557). For in-place slab subgrade fill that became wet and unstable during recent precipitation events, a roto-tiller and plate compacter can be utilized to mix the slab subgrade soil with cement to a depth of at least 12 to 18 inches.

ESNW representatives should be on-site during soil amendment and related earthwork activities to provide compaction testing following the soil modification. Care should be taken to maintain containment of cement stockpiles during the soil modification. All modified surfaces must be thoroughly compacted and “sealed” at the end of each day. Plastic sheeting placed over modified areas can be considered to further protect grades from precipitation. Following a 48-hour curing period, ESNW should confirm general acceptability of cement modified structural fill areas. Pavement areas or areas subject to construction traffic should be proof-rolled with a loaded dump truck or similar vehicle. Areas of subgrade identified by the proof-roll to be unstable should be re-treated with cement. Supplemental recommendations for achieving the appropriate level of soil amendment and compaction may be provided by ESNW, as necessary.

Structural Fill

Structural fill is defined as compacted soil placed in foundation, slab-on-grade, roadway, permanent slope, retaining wall, and utility trench backfill areas. Structural fill placed and compacted during site grading activities should meet the following specifications and guidelines:

- Structural fill material — Granular soil*
- Moisture content — At or slightly above optimum**
- Relative compaction*** — 95 percent (Modified Proctor)
- Loose lift thickness (maximum) — 12 inches

* *Existing soil is not suitable for use as structural fill unless at (or slightly above) the optimum moisture content at the time of placement and compaction.*
** *Soil shall not be placed dry of optimum and should be evaluated by ESNW during construction.*
*** *Relative compaction of 90 percent can be considered for mass grading activities and should be evaluated by ESNW during construction.*

With respect to underground utility installations and backfill, local jurisdictions may dictate the soil type(s) and compaction requirements. Areas of otherwise unsuitable material and debris should be removed from structural areas and replaced with structural fill.

Foundations

After completing earthwork activities in accordance with recommendations in this report, the proposed structures can be supported on conventional spread and continuous foundations bearing on undisturbed, competent native soil, re-compacted native soil, re-compacted existing fill or new structural fill. Where fill soil is encountered in foundation excavations, it must be evaluated by ESNW prior to placement of forms or re-bar. Based on the soil condition observed at the exploration locations, soils capable of providing the design bearing capacity are generally anticipated to be encountered two feet below existing grades at most locations. If structural building pads are prepared during wet weather, remediation measures such as cement treatment (as approved by COM) or overexcavation and replacement with rock may be necessary in some areas. If proposed structures will incorporate heavier loads than those stated in the *Project Description* section of this report, revised foundation support recommendations may be necessary.

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

- Allowable soil bearing capacity — 2,500 psf
- Passive earth pressure — 300 pcf
- Coefficient of friction — 0.40

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

Seismic Design

The 2021 International Building Code (2021 IBC) recognizes ASCE 7-16 (formally known as the Minimum Design Loads and Associated Criteria for Buildings and Other Structures manual) 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 2021 IBC.

Parameter	**Value**
Site Class	C*
Mapped short period spectral response acceleration, S_S (*g*)	1.14
Mapped 1-second period spectral response acceleration, S_1 (*g*)	0.40
Short period site coefficient, F_a	1.20
Long period site coefficient, F_v	1.50
Adjusted short period spectral response acceleration, S_{MS} (*g*)	1.37
Adjusted 1-second period spectral response acceleration, S_{M1} (*g*)	0.60
Design short period spectral response acceleration, S_{DS} (*g*)	0.91
Design 1-second period spectral response acceleration, S_{D1} (*g*)	0.40

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

Liquefaction

Liquefaction is a phenomenon that can occur within a soil profile as a result of an intense ground shaking or loading condition. Most commonly, liquefaction is caused by ground shaking during an earthquake. Sand or silt soil profiles that are loose, cohesionless, and present below the groundwater table are most susceptible to liquefaction. During the ground shaking, the soil contracts, and porewater pressure increases. The increased porewater pressure occurs quickly and without sufficient time to dissipate, resulting in water flowing upward to the ground surface and a liquefied soil condition. Soil in a liquefied condition possesses very little shear strength in comparison to the drained condition, which can result in a loss of foundation support for structures.

Based on the soil conditions underlying the site, the risk of liquefication on the subject site is negligible. The relative density of the soil underlying the site is the primary basis for this opinion.

Slab-on-Grade Floors

Slab-on-grade floors for the proposed structures should be supported on firm and unyielding subgrades. Unstable or yielding subgrade areas should be recompacted or overexcavated and replaced with suitable structural fill prior to slab construction.

A capillary break consisting of a minimum of four inches of free-draining crushed rock or gravel should be placed below each slab. The free-draining material should have a fines content of 5 percent or less (percent passing the Number 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 per manufacturer specifications.

Retaining Walls

Retaining walls must be designed to resist earth pressures and applicable surcharge loads. Retaining wall subgrade must be prepared in the same fashion as is recommended within the “Foundations” section of this report. The following parameters may be used for design:

- Active earth pressure (unrestrained condition) — 35 pcf (equivalent fluid)
- At-rest earth pressure (restrained condition) — 55 pcf
- Traffic surcharge* (passenger vehicles) — 70 psf (rectangular distribution)
- Passive earth pressure — 300 pcf (equivalent fluid)
- Coefficient of friction — 0.40
- Seismic surcharge — 8H psf**
- Allowable soil bearing capacity — 2,500 psf

* *Where applicable.*
** *Where H equals the retained height (in feet).*

The above passive earth pressure and coefficient of friction values include a safety factor of 1.5 and are based on a level backfill condition and level grade at the wall toe. Revised design values will be necessary if sloping grades are to be used above or below retaining walls. Additional surcharge loading from adjacent foundations, sloped backfill, or other relevant loads should be included in the retaining wall design.

Retaining walls should be backfilled with free-draining material that extends along with the height of the wall and a distance of at least 18 inches behind the wall. The upper 12 inches of the wall backfill may consist of less permeable soil if desired. A sheet drain may be considered instead of free-draining backfill. A perforated drainpipe 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. If drainage is not provided, hydrostatic pressures should be included in the wall design.

Drainage

Perched seepage should be anticipated within site excavations. Temporary measures to control surface water runoff and groundwater seepage during construction will be critical to minimizing the potential for on-site soils to degrade. ESNW should be consulted during preliminary grading to identify areas effected by groundwater and provide recommendations to reduce the potential for water-related instability.

Finish grades must be designed to direct surface drain water away from structures and slopes. Water must not be allowed to pond adjacent to structures or slopes. Grades adjacent to buildings should be sloped away from the buildings at a gradient of either at least 2 percent for a horizontal distance of 10 feet or the maximum allowed by adjacent structures. In our opinion, foundation drains should be installed along building perimeter footings. A typical foundation drain detail is provided on Plate 4. If footing drains are omitted, there is a higher potential for moisture issues for slabs-on-grade or crawl space areas.

If construction will incorporate crawl spaces rather than slab-on-grade, a crawl space drain system can be used in lieu of perimeter footing drains. The crawl space drain must provide positive drainage to an appropriate outlet.

Preliminary Infiltration Evaluation

As indicated in the *Subsurface* section of this report, the native soil encountered during our fieldwork was primarily characterized as glacial till deposits. In our opinion, infiltration potential within the dense to very dense glacial till deposits is negligible. The near-surface, loose to medium dense soil horizon (weathered till) may possess a limited infiltration capacity. However, following site stripping and mass earthwork activities, this horizon will likely be altered or removed to the extent that would render it unsuitable for infiltration purposes.

Per our scope of services, infiltration testing was included in the fieldwork. The testing was completed at a depth of approximately four feet at TP-1. Measured PIT rates were minimal, with little to no change over the course of the drop period. The very low hydrologic capacity is attributed to both the presence of the relatively high in-situ fines content and cemented condition of the native soil.

From a geotechnical standpoint, full stormwater infiltration on the subject site should be considered infeasible on the subject site due to the presence of glacial till.

Preliminary Pavement Sections

The performance of site pavements is largely related to the condition of the underlying subgrade. To ensure adequate pavement performance, the subgrade should be in a firm and unyielding condition when subjected to proof rolling with a loaded dump truck. Structural fill in pavement areas should be compacted to the specifications previously detailed in this report. Soft, wet, or otherwise unsuitable subgrade areas may still exist after base grading activities. Areas containing unsuitable or yielding subgrade conditions will require remedial measures, such as overexcavation and/or placement of thicker crushed rock or structural fill sections, prior to pavement.

We anticipate new pavement sections will be subjected primarily to passenger vehicle traffic. For lightly loaded pavement areas subjected primarily to passenger vehicles, the following preliminary pavement sections may be considered:

- A minimum of two inches of hot-mix asphalt (HMA) placed over four inches of crushed rock base (CRB).

- A minimum of two inches of HMA placed over three inches of asphalt-treated base (ATB).

The HMA, ATB, and CRB materials should conform to WSDOT and/or the City of Monroe specifications. All soil base material should be compacted to a relative compaction of 95 percent, based on the laboratory maximum dry density as determined by ASTM D1557. Final pavement design recommendations, including recommendations for heavy traffic areas, access roads, and frontage improvement areas, can be provided once final traffic loading has been determined. Road standards utilized by the county may supersede the recommendations provided in this report.

If an inverted crown will be used for roadway surfaces, drainage measures should be included in the design to drain water in the subgrade adjacent to catch basins. Such measures can consist of finger drains extending from the catch basins.

Utility Support and Trench Backfill

In our opinion, the on-site native soil will generally be suitable for support of utilities where groundwater does not affect trench-bottoms. However, existing fill may be unsuitable in its current condition, if encountered. Remedial measures may be necessary in some areas to provide support for utilities, such as overexcavation and replacement with structural fill or placement of geotextile fabric. Groundwater may be encountered within utility excavations, and caving of trench walls may occur where groundwater or unsuitable fill are encountered. Depending on the time of year, depth-of-excavation, and conditions encountered, dewatering or temporary trench shoring may be necessary during utility excavation and installation.

The on-site soil may not be suitable for use as structural backfill throughout utility trench excavations unless the soil is at (or slightly above) the optimum moisture content at the time of placement and compaction. Moisture conditioning of the soil may be necessary at some locations prior to use as structural fill. Each section of the utility lines must be adequately supported in the bedding material. Utility trench backfill should be placed and compacted to the structural fill specifications previously detailed in this report or to the applicable specifications of the presiding jurisdiction.

LIMITATIONS

This study has been prepared for the exclusive use of Reid Development Group, LLC., and their representatives. The recommendations and conclusions provided in this 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. No warranty, express or implied, is made. Variations in the subsurface conditions observed at the test locations may exist and may not become evident until construction. ESNW should reevaluate the conclusions provided in this study if variations are encountered.

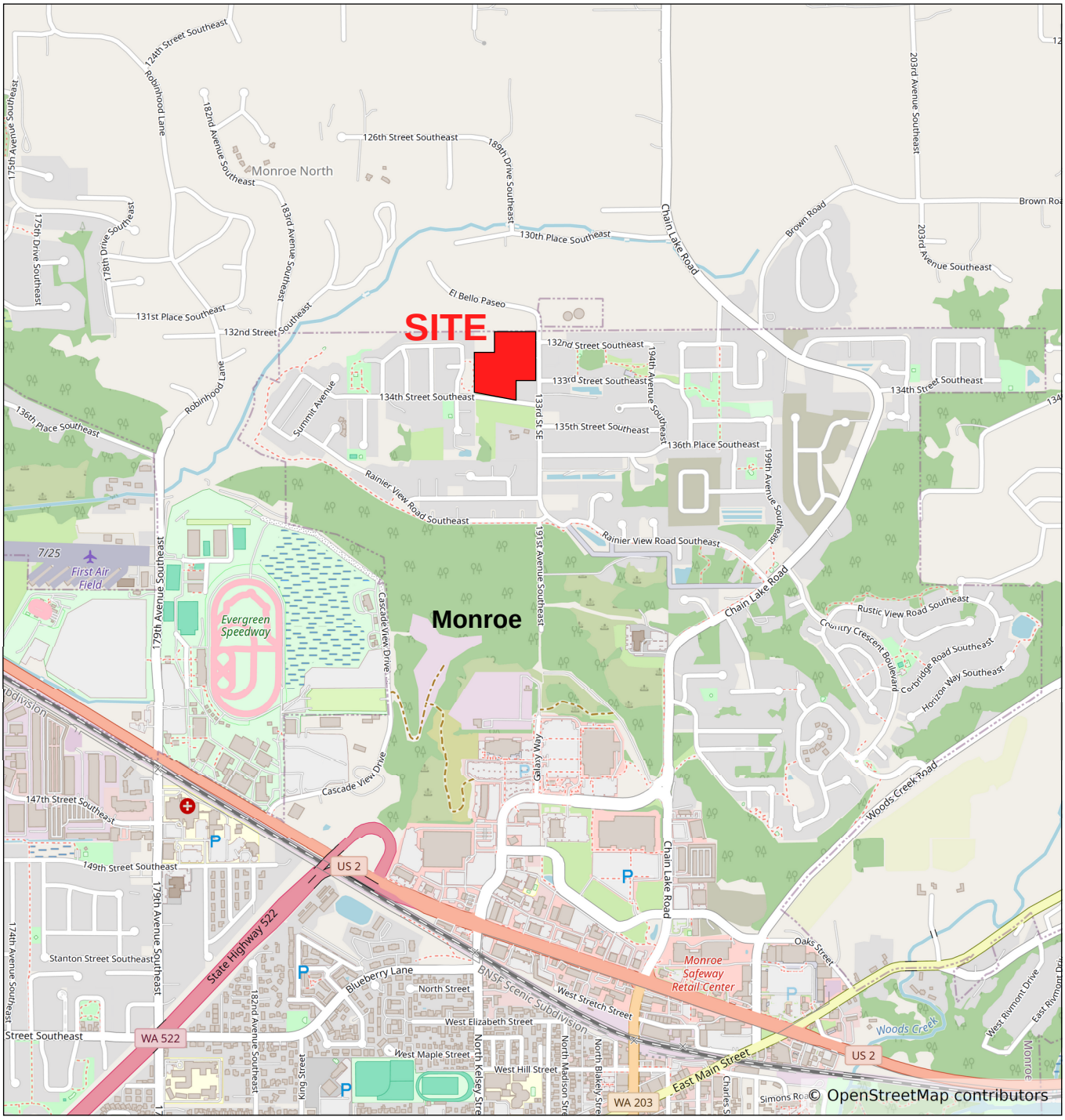
Additional Services

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.

REFERENCES

The following documents were reviewed as part of the preparation of this study:

- Boundary and Topographic Survey, provided by Core Design, dated October 23, 2024
- COM municipal code (MMC – Chapter 22.80)
- Conceptual Site Plan, provided by Core Design, dated April 4, 2025
- Geologic map of the Lake Roesiger 7.5-minute quadrangle, Snohomish County, Washington, compiled by Joe D. Dragovich et al., October 2015
- WSS, provided by the USDA Natural Resources Conservation Service



Reference:
Snohomish County, Washington
OpenStreetMap.org

NORTH

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.

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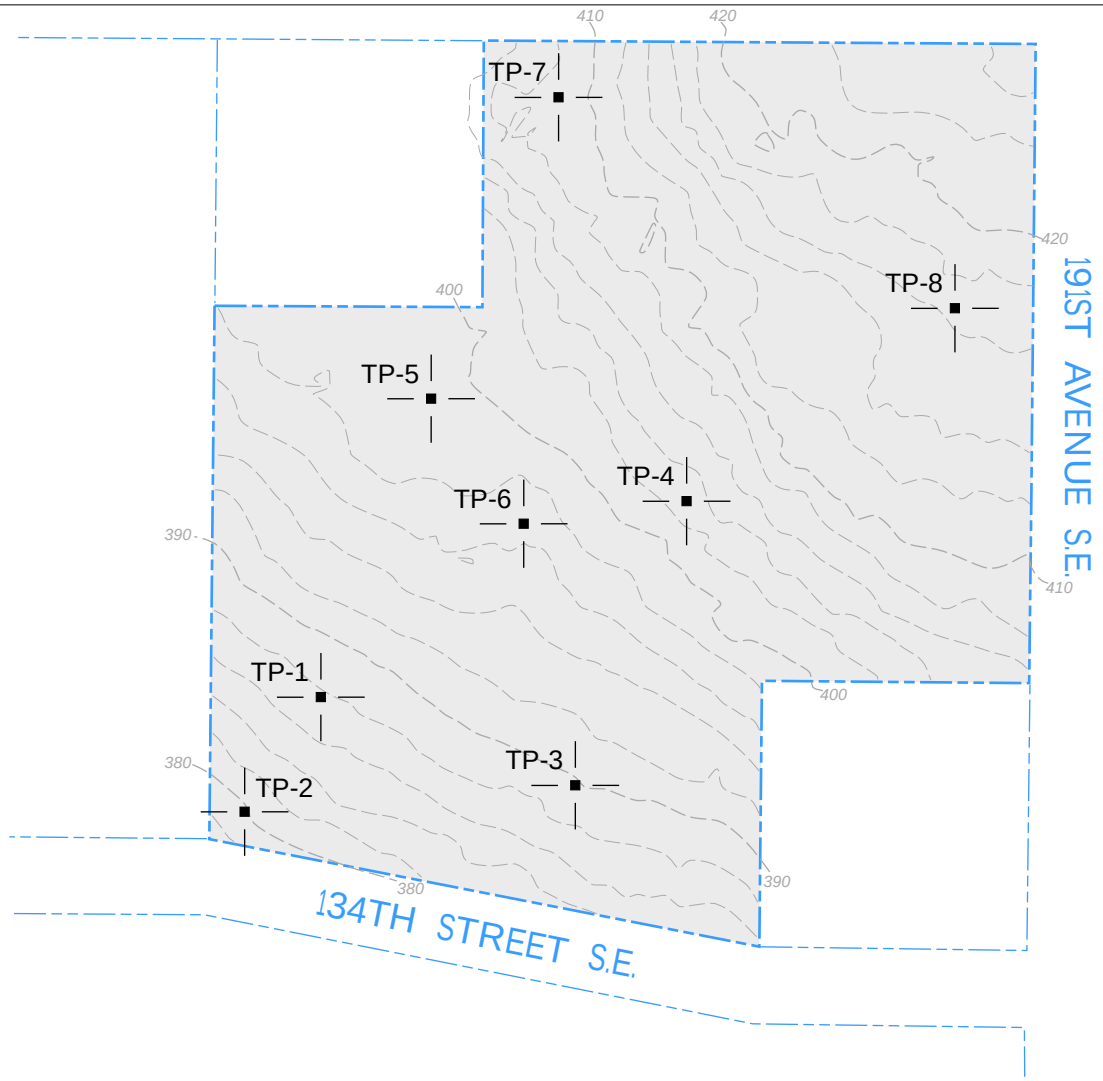
Vicinity Map
Trombley Short Plat
Monroe, Washington

Drawn CAM	Date 06/18/2025	Proj. No. 10296
Checked AZS	Date June 2025	Plate 1



LEGEND

TP-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-10296, May 2025

Subject Site

NORTH

0 75 150 300

1"=150'

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.

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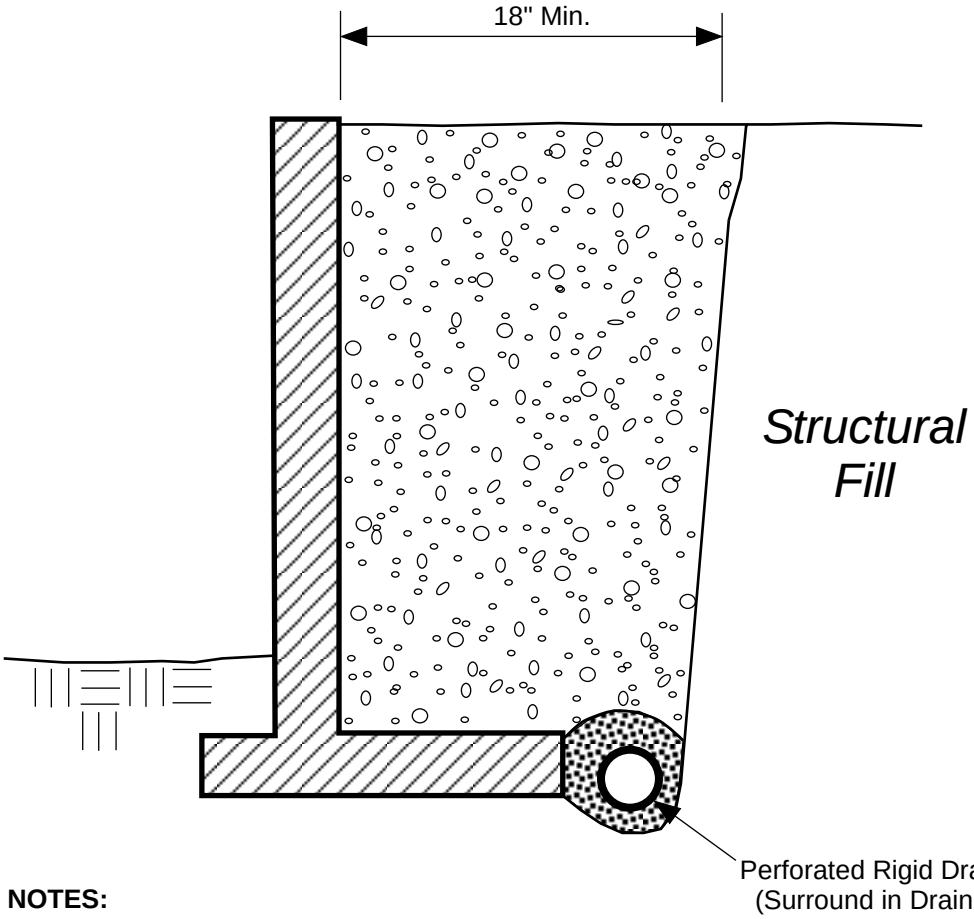
Subsurface Exploration Plan
Trombley Short Plat
Monroe, Washington

Drawn CAM	Date 06/18/2025	Proj. No. 10296
Checked AZS	Date June 2025	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.

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NOT A CONSTRUCTION DRAWING

LEGEND:

Free-draining Structural Backfill

1-inch Drain Rock

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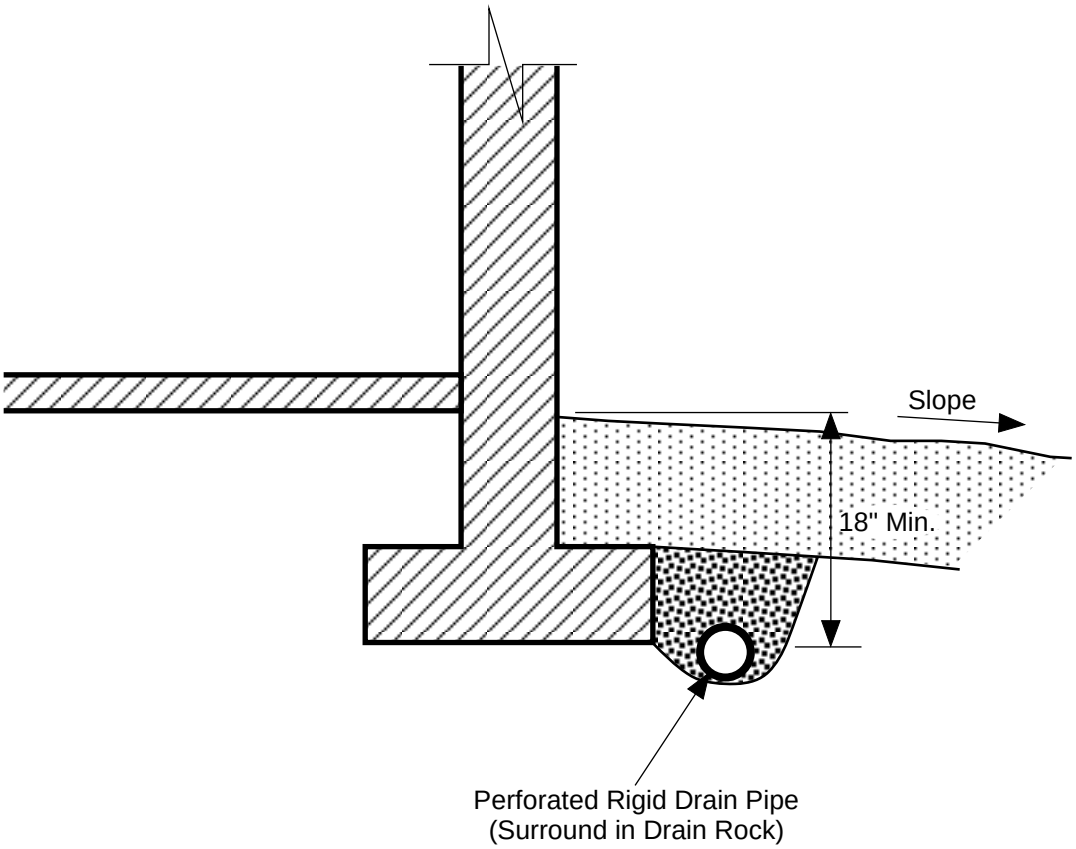
Retaining Wall Drainage Detail
Trombley Short Plat
Monroe, Washington

Drawn CAM	Date 06/18/2025	Proj. No. 10296
Checked AZS	Date June 2025	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

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Footing Drain Detail
Trombley Short Plat
Monroe, Washington

Drawn CAM	Date 06/18/2025	Proj. No. 10296
Checked AZS	Date June 2025	Plate 4

Appendix A

Subsurface Exploration Logs

ES-10296

Subsurface conditions at the subject site were explored in May of 2025. A total of eight test pits were excavated using an excavator and operator contracted by the ESNW. The approximate locations of the explorations are illustrated on Plate 2 of this study. The test logs are provided in this Appendix. The maximum exploration depth was nine feet bgs.

The final logs represent the interpretations of the field logs and the results of laboratory analyses. The stratification lines on the logs represent the approximate boundaries between soil types. In actuality, the transitions may be more gradual.

Coarse-Grained Soils - More Than 50% Retained on No. 4 Sieve	Gravels - More Than 50% of Coarse Fraction Retained on No. 4 Sieve	< 5% Fines	GW	Well-graded gravel with or without sand, little to no fines
			GP	Poorly graded gravel with or without sand, little to no fines
		> 12% Fines	GM	Silty gravel with or without sand
			GC	Clayey gravel with or without sand
	Sands - 50% or More of Coarse Fraction Passes No. 4 Sieve	< 5% Fines	SW	Well-graded sand with or without gravel, little to no fines
			SP	Poorly graded sand with or without gravel, little to no fines
		> 12% Fines	SM	Silty sand with or without gravel
			SC	Clayey sand with or without gravel
Fine-Grained Soils - 50% or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less Than 50		ML	Silt with or without sand or gravel; sandy or gravelly silt
			CL	Clay of low to medium plasticity; lean clay with or without sand or gravel; sandy or gravelly lean clay
			OL	Organic clay or silt of low plasticity
	Silts and Clays Liquid Limit 50 or More		MH	Elastic silt with or without sand or gravel; sandy or gravelly elastic silt
			CH	Clay of high plasticity; fat clay with or without sand or gravel; sandy or gravelly fat clay
			OH	Organic clay or silt of medium to high plasticity
Highly Organic Soils			PT	Peat, muck, and other highly organic soils
Fill			FILL	Made Ground

Moisture Content

Dry - Absence of moisture, dusty, dry to the touch

Damp - Perceptible moisture, likely below optimum MC

Moist - Damp but no visible water, likely at/near optimum MC

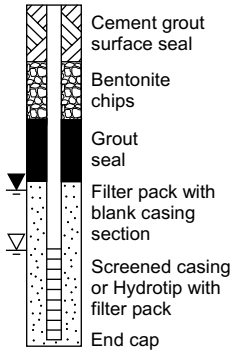
Wet - Water visible but not free draining, likely above optimum MC

Saturated/Water Bearing - Visible free water, typically below groundwater table

Symbols

ATD = At time of drilling

Static water level (date)



Terms Describing Relative Density and Consistency

Coarse-Grained Soils:

Density	SPT blows/foot
Very Loose	< 4
Loose	4 to 9
Medium Dense	10 to 29
Dense	30 to 49
Very Dense	≥ 50

Fine-Grained Soils:

Consistency	SPT blows/foot
Very Soft	< 2
Soft	2 to 3
Medium Stiff	4 to 7
Stiff	8 to 14
Very Stiff	15 to 29
Hard	≥ 30

Test Symbols & Units

Fines = Fines Content (%)

MC = Moisture Content (%)

DD = Dry Density (pcf)

Str = Shear Strength (tsf)

PID = Photoionization Detector (ppm)

OC = Organic Content (%)

CEC = Cation Exchange Capacity (meq/100 g)

LL = Liquid Limit (%)

PL = Plastic Limit (%)

PI = Plasticity Index (%)

Component Definitions

Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

Modifier Definitions

Percentage by Weight (Approx.)	Modifier
< 5	Trace (sand, silt, clay, gravel)
5 to 14	Slightly (sandy, silty, clayey, gravelly)
15 to 29	Sandy, silty, clayey, gravelly
≥ 30	Very (sandy, silty, clayey, gravelly)

Classifications of soils in this geotechnical report and as shown on the exploration logs are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates, and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D2487 and D2488 were used as an identification guide for the Unified Soil Classification System.

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EXPLORATION LOG KEY

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TEST PIT NUMBER TP-1

PROJECT NUMBER ES-10296 **PROJECT NAME** Trombley Short Plat

DATE STARTED 5/21/25 **COMPLETED** 5/21/25 **GROUND ELEVATION** 388 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.87612 **LONGITUDE** -121.97704

LOGGED BY AZS **CHECKED BY** SHA **GROUND WATER LEVEL:**

NOTES ▽ **AT TIME OF EXCAVATION**

SURFACE CONDITIONS Field grass **AFTER EXCAVATION**

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			TPSL		Dark brown TOPSOIL, roots
0.9					387.1
			SM		Brown silty SAND, loose, moist to wet -probed 10"
2.5					385.5
	GB	MC = 9.9			Gray silty SAND with gravel, dense, moist (Unweathered glacial till) -probed 0.5" -infiltration test at 4'
5.0	GB	MC = 9.4 Fines = 23.2	SM		-moderately cemented [USDA Classification: gravelly sandy LOAM]
7.5					
	GB	MC = 11.3			
9.0					379.0

Test pit terminated at 9.0 feet below existing grade. No groundwater encountered during excavation. No caving observed.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-2

PROJECT NUMBER ES-10296 **PROJECT NAME** Trombley Short Plat

DATE STARTED 5/21/25 **COMPLETED** 5/21/25 **GROUND ELEVATION** 380 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.87591 **LONGITUDE** -121.97730

LOGGED BY AZS **CHECKED BY** SHA **GROUND WATER LEVEL:**

NOTES ▽ **AT TIME OF EXCAVATION**

SURFACE CONDITIONS Field grass **AFTER EXCAVATION**

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0			TPSL		Dark brown TOPSOIL -roots	
					0.8	379.2
					Brown silty SAND, loose, moist to wet	
	GB	MC = 45.8	SM		-probed 8-10"	
2.5					2.5	377.5
					Gray silty SAND with gravel, dense, moist (Unweathered glacial till)	
	GB	MC = 13.0			-probed 0-0.5"	
					-moderate groundwater seepage	
5.0						
			SM		-moderately cemented	
7.5						
	GB	MC = 8.7 Fines = 21.4			8.5	371.5
					[USDA Classification: very gravelly sandy LOAM]	

Test pit terminated at 8.5 feet below existing grade. Groundwater seepage encountered at 4.0 feet during excavation. No caving observed.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-3

PROJECT NUMBER ES-10296 **PROJECT NAME** Trombley Short Plat

DATE STARTED 5/21/25 **COMPLETED** 5/21/25 **GROUND ELEVATION** 388 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.87602 **LONGITUDE** -121.97626

LOGGED BY AZS **CHECKED BY** SHA **GROUND WATER LEVEL:**

NOTES ▽ **AT TIME OF EXCAVATION**

SURFACE CONDITIONS Field grass **AFTER EXCAVATION**

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0			TPSL		Dark brown TOPSOIL, roots -probed 6"	
					1.3	386.7
	GB	MC = 38.3	SM		Brown silty SAND, loose to medium dense, moist to wet	
2.5					3.0	385.0
	GB	MC = 9.5	SM		Gray silty SAND with gravel, dense, moist (Unweathered glacial till) -probed 0.5" -light groundwater seepage -moderately cemented	
5.0					-light groundwater seepage	
7.5						
	GB	MC = 7.1			8.5	379.5

Test pit terminated at 8.5 feet below existing grade. Groundwater seepage encountered at 4.0 and 6.0 feet during excavation. No caving observed.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-4

PROJECT NUMBER ES-10296 **PROJECT NAME** Trombley Short Plat

DATE STARTED 5/21/25 **COMPLETED** 5/21/25 **GROUND ELEVATION** 403 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.87659 **LONGITUDE** -121.97592

LOGGED BY AZS **CHECKED BY** SHA **GROUND WATER LEVEL:**

NOTES ▽ **AT TIME OF EXCAVATION**

SURFACE CONDITIONS Field grass **AFTER EXCAVATION**

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0.0			TPSL		Dark brown TOPSOIL, roots
0.6					402.4
	GB	MC = 31.5	SM		Brown silty SAND, loose, moist to wet
					-probed 4-6"
2.0					401.0
2.5					Gray silty SAND with gravel, dense, moist (Unweathered glacial till)
					-light groundwater seepage at 2'
	GB	MC = 12.8			
					-probed 0-0.5"
			SM		
5.0					-moderately cemented
					-light groundwater seepage
	GB	MC = 9.0			
7.0					396.0

Test pit terminated at 7.0 feet below existing grade. Groundwater seepage encountered at 2.0 and 6.0 feet during excavation. No caving observed.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-5

PROJECT NUMBER ES-10296 **PROJECT NAME** Trombley Short Plat

DATE STARTED 5/21/25 **COMPLETED** 5/21/25 **GROUND ELEVATION** 399 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.87672 **LONGITUDE** -121.97679

LOGGED BY AZS **CHECKED BY** SHA **GROUND WATER LEVEL:**

NOTES ▽ **AT TIME OF EXCAVATION**

SURFACE CONDITIONS Field grass **AFTER EXCAVATION**

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0			TPSL		Dark brown TOPSOIL, roots -probed 2"	
					1.3	397.7
2.5	GB	MC = 49.2 Fines = 49.5	SM		Brown silty SAND, medium dense, moist to wet [USDA Classification: gravelly silt LOAM]	
					3.0	396.0
5.0	GB	MC = 7.7	SM		Gray silty SAND with gravel, dense, moist (Unweathered glacial till) -moderately cemented -probed 0.5"	
	GB	MC = 9.7			7.0	392.0

Test pit terminated at 7.0 feet below existing grade. No groundwater encountered during excavation. No caving observed.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-6

PROJECT NUMBER ES-10296 **PROJECT NAME** Trombley Short Plat

DATE STARTED 5/21/25 **COMPLETED** 5/21/25 **GROUND ELEVATION** 397 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.87654 **LONGITUDE** -121.97648

LOGGED BY AZS **CHECKED BY** SHA **GROUND WATER LEVEL:**

NOTES ▽ **AT TIME OF EXCAVATION**

SURFACE CONDITIONS Field grass **AFTER EXCAVATION**

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0			TPSL		Dark brown TOPSOIL, roots -probed 6-8"	
						395.7
			SM		Brown silty SAND, loose to medium dense, moist to wet	
	GB	MC = 38.9				
2.5						394.5
			SM		Gray silty SAND with gravel, dense, moist (Unweathered glacial till) -moderately cemented, probed 0.5" -light groundwater seepage	
	GB	MC = 11.0				
5.0						
	GB	MC = 7.9				
						390.0

Test pit terminated at 7.0 feet below existing grade. Groundwater seepage encountered at 4.0 feet during excavation. No caving observed.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-7

PROJECT NUMBER ES-10296 **PROJECT NAME** Trombley Short Plat

DATE STARTED 5/21/25 **COMPLETED** 5/21/25 **GROUND ELEVATION** 409 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.87742 **LONGITUDE** -121.97638

LOGGED BY AZS **CHECKED BY** SHA **GROUND WATER LEVEL:**

NOTES ▽ **AT TIME OF EXCAVATION**

SURFACE CONDITIONS Blackberries **AFTER EXCAVATION**

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0			TPSL		Dark brown TOPSOIL -probed 2-3"	408.5
	GB	MC = 36.6	SM		Brown silty SAND, medium dense, moist to wet	
2.5						406.5
			SP-SM		Gray poorly graded SAND with silt and gravel, medium dense to dense, moist -probed 1-2"	405.0
	GB	MC = 8.9 Fines = 5.5	SM		Gray silty SAND with gravel, dense to very dense, moist (Unweathered glacial till) [USDA Classification: gravelly coarse SAND]	
5.0						
	GB	MC = 7.4			-moderately cemented	403.5

Test pit terminated at 5.5 feet below existing grade. No groundwater encountered during excavation. No caving observed.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

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TEST PIT NUMBER TP-8

PROJECT NUMBER ES-10296 **PROJECT NAME** Trombley Short Plat

DATE STARTED 5/21/25 **COMPLETED** 5/21/25 **GROUND ELEVATION** 418 ft

EXCAVATION CONTRACTOR NW Excavating **LATITUDE** 47.87700 **LONGITUDE** -121.97504

LOGGED BY AZS **CHECKED BY** SHA **GROUND WATER LEVEL:**

NOTES ▽ **AT TIME OF EXCAVATION**

SURFACE CONDITIONS Field grass **AFTER EXCAVATION**

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0.0			TPSL		Dark brown TOPSOIL, roots -probed 6-8"	
1.0						417.0
	GB	MC = 38.1	SM		Brown silty SAND, loose, moist to wet	
2.5						415.5
	GB	MC = 11.3 Fines = 25.9	SM		Gray silty SAND with gravel, dense, moist (Unweathered glacial till) -probed 0.5" [USDA Classification: gravelly sandy LOAM] -moderately cemented	
5.0						
	GB	MC = 8.8				
7.0						411.0

Test pit terminated at 7.0 feet below existing grade. No groundwater encountered during excavation. No caving observed.

LIMITATIONS: Ground elevation (if listed) is approximate; the test location was not surveyed. Coordinates are approximate and based on the WGS84 datum. Do not rely on this test log as a standalone document. Refer to the text of the geotechnical report for a complete understanding of subsurface conditions.

Appendix B

Laboratory Test Results

ES-10296

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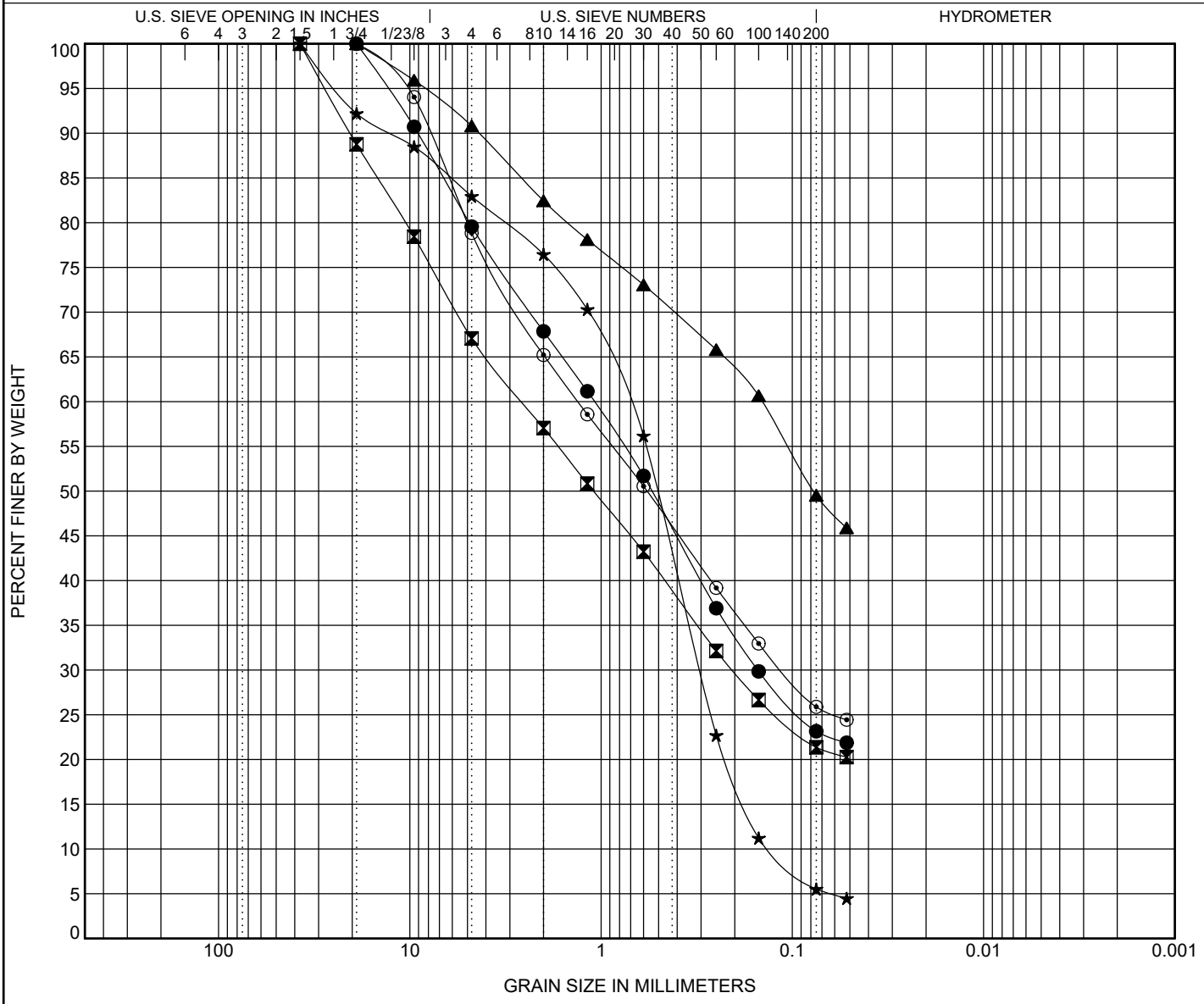
GRAIN SIZE DISTRIBUTION

PROJECT NUMBER ES-10296 **PROJECT NAME** Trombley Short Plat



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	Cc	Cu
●	TP-01	5.00ft.	USDA: Gray Gravelly Sandy Loam. USCS: SM with Gravel.		
⊠	TP-02	8.50ft.	USDA: Gray Very Gravelly Sandy Loam. USCS: SM with Gravel.		
▲	TP-05	2.00ft.	USDA: Brown Gravelly Silt Loam. USCS: SM.		
★	TP-07	4.00ft.	USDA: Gray Gravelly Coarse Sand. USCS: SP-SM with Gravel.	0.98	5.57
⊙	TP-08	3.50ft.	USDA: Gray Gravelly Sandy Loam. USCS: SM with Gravel.		

Specimen Identification			D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	TP-01	5.0ft.	19	1.086	0.152					23.2	
⊠	TP-02	8.5ft.	37.5	2.581	0.205					21.4	
▲	TP-05	2.0ft.	19	0.144						49.5	
★	TP-07	4.0ft.	37.5	0.72	0.303	0.129				5.5	
⊙	TP-08	3.5ft.	19	1.321	0.112					25.9	

GRAIN SIZE USDA ES-10296 TROMBLEY SHORT PLAT.GPJ GINT US LAB.GDT 6/4/25