Cobalt Geosciences, LLC
P.O. Box 1792
North Bend, WA 98045

November 13, 2023
Updated February 16, 2024

JayMarc Homes
C/O Darrell Offe
Darrell.offe@comcast.net

RE: Geotechnical Evaluation
Proposed Residence
9619 SE 34th Street
Mercer Island, Washington

In accordance with your authorization, Cobalt Geosciences, LLC has prepared this letter to discuss the results of our geotechnical evaluation at the referenced site.

The purpose of our evaluation was to provide recommendations for foundation design, grading, and earthwork.

Site and Project Description

The site is located at 9619 SE 34th Street in Mercer Island, Washington. The site consists of one nearly rectangular parcel (No. 4139300025) with a total area of 18,720 square feet.

The northern portion of the property is developed with a residence and driveway. The site generally slopes downward from south to north at magnitudes of about 5 to 30 percent and relief of about 16 feet. There are local rockery walls in yard areas where prior cuts were made during the original site development.

The site is vegetated with grasses, bushes, local understory, and variable diameter trees. The site is bordered to the east, west, and south by residences, and to the north by SE 34th Street.

The proposed development includes a new residence and driveway in the central portion of the property.

Site grading may include cuts and fills of 3 feet or less and foundation loads are expected to be light. We should be provided with the final plans to verify that our recommendations remain valid and do not require updating.

Area Geology

The Geologic Map of Mercer Island, indicates that the site is underlain by Vashon Recessional Lacustrine Deposits.

These materials include silt and clay deposited in lake environments during glacial retreat. These materials are normally consolidated and typically soft to medium stiff near the ground surface, becoming stiff and locally very stiff at depth.

Soil & Groundwater Conditions

As part of our evaluation, we advanced two hand borings where accessible. The soils encountered were logged in the field and are described in accordance with the Unified Soil Classification System (USCS).

The hand borings encountered approximately 6 inches of topsoil and vegetation underlain by about 3 to 5 feet of medium stiff, silt trace to with clay (Weathered Recessional Lacustrine Deposits). These soils were underlain by stiff to very stiff, sandy silt trace gravel (Vashon Recessional Lacustrine Deposits) which continued to the termination depths of the hand borings.

Groundwater was not observed or encountered in the explorations. Light volumes of groundwater could be present on or within the silt and clay deposits at variable depths below grade.

We reviewed nearby boring and test pit logs which encountered variable density silt and clay (low to high plasticity) underlain by stiff or firmer silts and fine grained deposits. It appears that this area is underlain consistently by lacustrine silts and clays and not outwash sands, which often have susceptibility to seismic activity.

Water table elevations often fluctuate over time. The groundwater level will depend on a variety of factors that may include seasonal precipitation, irrigation, land use, climatic conditions and soil permeability. Water levels at the time of the field investigation may be different from those encountered during the construction phase of the project. It would be necessary to install a piezometer to determine groundwater depths over a typical year.

City of Mercer Island GIS Mapped Hazards

The City of Mercer Island GIS maps indicate that the site contains seismic hazards and potential landslide hazard areas. This designation is likely due to the mapped Vashon Recessional Outwash in the area. These deposits can include sands which can have susceptibility to liquefaction as well as some potential for landslide activity depending on topographic conditions.

It is our opinion that the seismic hazard risks are low due to the very fine-grained nature of the near surface soils. Mitigation for these hazards is not warranted. The risk of landslide activity is also very low at this time due to a lack of steeper topography and the current conditions (well developed area with streets and residences). There are no steep slope areas within at least 100 feet of the site.

Environmentally Critical Area Assessment

As part of our report preparation, we assessed the site for potential critical areas utilizing the City of Mercer Island geologic hazard map available on-line. As noted above, there is minimal to no risk associated with the mapped hazards. Discussion of code information is as follows:

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

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

The subject site is described as possessing a seismic hazard and potential slide hazards.

Low magnitude slopes within and near the site appear to be associated with past legal grading activities, where slopes in the overall neighborhood were flattened and terraced into lots and buildable areas. The area has low magnitude slopes overall.

Seismic hazards are likely present due to the presence of Vashon Recessional Outwash which when coarse grained and lacking silt, can have potential for liquefaction.

A topographic and boundary survey;

We have provided a site plan with topographic information in Figure 2.

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

This report can be relied upon for design of the proposed single-family residence in our professional opinion. The report was authored with site-specific information obtained through subsurface explorations and site reconnaissance.

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

Cobalt representatives were on-site in November 2023 to obtain subsurface data through excavation and observation of hand-auger borings surrounding the existing residential structure. We also reviewed the geologic maps for the region (Geologic Map of Mercer Island), and the NRCS Soil Survey.

A scale map of the development proposal site;

We have provided a site plan in Figure 2.

Photographic records of the site before the proposed alteration occurs;

We have included photographs with this report.

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

We have analyzed the proposed site development from a slope stability hazard standpoint and with respect to mapped seismic hazards. The new residence will not increase instability on and around the subject site as there are no planned alterations for the landslide hazard areas. Additionally, the distance from slope hazard areas/slopes on the subject site will remain similar to what is currently present and will not result in any alteration in the stability characteristics of the slopes on and off-site. Seismic hazards are very low and do not require mitigation.

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

In our opinion, provided best management practices (BMPs) are utilized during and after construction for stormwater management and erosion control measures, there will be no impacts to the critical areas on the site.

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

We have evaluated the slopes on the subject site and based on our observations, the slopes are stable in their current condition and configuration. The primary basis for this opinion is the lack of indications of prior instability, and the fact that there are no planned alterations for the slopes dictated as possessing an erosion and landslide hazard.

There will be no net-gain in surcharge conditions on the subject slopes. Seismic hazard risks are currently very low and will not be affected by the development.

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

We have evaluated the currently available plan, and there will be no change in the sedimentation or erosion risks on adjacent sites given BMPs are employed during and after construction.

The mapped landslide and seismic hazards will not be affected by the development as these risks are very low and grading will be minimal. No mitigation is required.

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

We can provide this letter upon request and once the project is complete.

Statement of Risk

Per Section 19.07.160B3 of the Mercer Island City Code, development within geologic hazard areas require that a Geotechnical Engineer licensed within the State of Washington provide a statement of risk with supporting documentation indicating that one of the following conditions can be met:

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

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

c. Development practices are proposed for the alteration that would render the development as safe as if it were not located in a geologic hazard area; or

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

The project meets the criteria of b from above. The site is underlain by very fine grained soils which have a low risk of liquefaction. Risks of landslide hazards are very low to nil.

This proposed development can be completed without adversely affecting geologic hazards near or within the site.

Seismic Parameters

The overall subsurface profile corresponds to a Site Class *D* as defined by Table 1613.5.2 of the International Building Code (IBC). A Site Class *D* applies to an overall profile consisting of medium dense to very dense soils within the upper 100 feet.

We referenced the U.S. Geological Survey (USGS) Earthquake Hazards Program Website to obtain values for S_S, S_1, F_a, and F_v. The USGS website includes the most updated published data on seismic conditions. The following tables provide seismic parameters from the USGS web site with referenced parameters from ASCE 7-16.

Seismic Design Parameters (ASCE 7-16)

Site Class	Spectral Acceleration at 0.2 sec. (g)	Spectral Acceleration at 1.0 sec. (g)	Site Coefficients		Design Spectral Response Parameters		Design PGA
			F_a	F_v	S_{DS}	S_{D1}	
D	1.394	0.485	1.0	Null	0.929	Null	0.597

Additional seismic considerations include liquefaction potential and amplification of ground motions by soft/loose soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. The site has a relatively low likelihood of liquefaction. For items listed as "Null" see Section 11.4.8 of the ASCE.

Conclusions and Recommendations

General

The site is underlain by soils consistent with Vashon Recessional Lacustrine deposits. These soils become relatively dense/stiff below a weathered zone. The proposed residential structure may be supported on a shallow foundation system bearing on medium dense or firmer native soils or on structural fill placed on the native soils.

Local overexcavation of loose weathered native soils may be necessary depending on the proposed elevations and locations of the new footings. Please note that fine grained soils are easily disturbed by precipitation and equipment traffic. Work performed during the wet season will likely require additional excavation and soil replacement work.

Per the City of Mercer Island GIS maps, the site is within a Low Impact Development infeasibility area. Widespread infiltration is not feasible due to the soil conditions and anticipated seasonal groundwater conditions. We recommend utilizing direct connection to an approved conveyance.

Site Preparation

Trees, shrubs and other vegetation should be removed prior to stripping of surficial organic-rich soil and fill. Based on observations from the site investigation program, it is anticipated that the stripping depth will be 6 to 18 inches. Deeper excavations will be necessary below larger trees and foundation systems.

The native soils consist of silt with sand and clay. These soils should not be used as structural fill.

Imported structural fill should consist of a sand and gravel mixture with a maximum grain size of 3 inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve). Structural fill should be placed in maximum lift thicknesses of 12 inches and should be compacted to a minimum of 95 percent of the modified proctor maximum dry density, as determined by the ASTM D 1557 test method.

Temporary Excavations

Based on our understanding of the project, we anticipate that the grading could include local cuts on the order of approximately 3 feet or less for foundation and most of the utility placement. Temporary excavations should be sloped no steeper than 1.5H:1V (Horizontal:Vertical) in loose native soils and fill and 1H:1V in medium dense/stiff native soils. If an excavation is subject to heavy vibration or surcharge loads, we recommend that the excavations be sloped no steeper than 2H:1V, where room permits.

Temporary cuts should be in accordance with the Washington Administrative Code (WAC) Part N, Excavation, Trenching, and Shoring. Temporary slopes should be visually inspected daily by a qualified person during construction activities and the inspections should be documented in daily reports. The contractor is responsible for maintaining the stability of the temporary cut slopes and reducing slope erosion during construction.

Temporary cut slopes should be covered with visqueen to help reduce erosion during wet weather, and the slopes should be closely monitored until the permanent retaining systems or slope configurations are complete. Materials should not be stored or equipment operated within 10 feet of the top of any temporary cut slope.

Soil conditions may not be completely known from the geotechnical investigation. In the case of temporary cuts, the existing soil conditions may not be completely revealed until the excavation work exposes the soil. Typically, as excavation work progresses the maximum inclination of temporary slopes will need to be re-evaluated by the geotechnical engineer so that supplemental recommendations can be made. Soil and groundwater conditions can be highly variable. Scheduling for soil work will need to be adjustable, to deal with unanticipated conditions, so that the project can proceed and required deadlines can be met.

If any variations or undesirable conditions are encountered during construction, we should be notified so that supplemental recommendations can be made. If room constraints or groundwater conditions do not permit temporary slopes to be cut to the maximum angles allowed by the WAC, temporary shoring systems may be required. The contractor should be responsible for developing temporary shoring systems, if needed. We recommend that Cobalt Geosciences and the project structural engineer review temporary shoring designs prior to installation, to verify the suitability of the proposed systems.

Foundation Design

The proposed structure may be supported on a shallow spread footing foundation system bearing on undisturbed medium dense/stiff or firmer native soils or on properly compacted structural fill placed on the suitable native soils. Any undocumented fill and/or loose native soils should be removed and replaced with structural fill below foundation elements. Structural fill below footings should consist of clean angular rock 5/8 to 4 inches in size. We should verify soil conditions during foundation excavation work.

For shallow foundation support, we recommend widths of at least 16 and 24 inches, respectively, for continuous wall and isolated column footings supporting the proposed structure. Provided that the footings are supported as recommended above, a net allowable bearing pressure of 2,000 pounds per square foot (psf) may be used for design.

A 1/3 increase in the above value may be used for short duration loads, such as those imposed by wind and seismic events. Structural fill placed on bearing, native subgrade should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Footing excavations should be inspected to verify that the foundations will bear on suitable material.

Exterior footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Interior footings should have a minimum depth of 12 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower.

If constructed as recommended, the total foundation settlement is not expected to exceed 1 inch. Differential settlement, along a 25-foot exterior wall footing, or between adjoining column footings, should be less than ½ inch. This translates to an angular distortion of 0.002. Most settlement is expected to occur during construction, as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated. All footing excavations should be observed by a qualified geotechnical consultant.

Resistance to lateral footing displacement can be determined using an allowable friction factor of 0.30 acting between the base of foundations and the supporting subgrades. Lateral resistance for footings can also be developed using an allowable equivalent fluid passive pressure of 225 pounds per cubic foot (pcf) acting against the appropriate vertical footing faces (neglect the upper 12 inches below grade in exterior areas). The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance.

Care should be taken to prevent wetting or drying of the bearing materials during construction. Any extremely wet or dry materials, or any loose or disturbed materials at the bottom of the footing excavations, should be removed prior to placing concrete. The potential for wetting or drying of the bearing materials can be reduced by pouring concrete as soon as possible after completing the footing excavation and evaluating the bearing surface by the geotechnical engineer or his representative.

Stormwater Management Feasibility

The site is underlain by very fine-grained lacustrine deposits. Infiltration is not recommended or feasible in these soils, which act as an aquitard. We recommend direct connection of runoff devices to City infrastructure.

Slab-on-Grade

We recommend that the upper 18 inches of the existing native soils within slab areas be re-compacted to at least 95 percent of the modified proctor (ASTM D1557 Test Method).

Often, a vapor barrier is considered below concrete slab areas. However, the usage of a vapor barrier could result in curling of the concrete slab at joints. Floor covers sensitive to moisture typically requires the usage of a vapor barrier. A materials or structural engineer should be consulted regarding the detailing of the vapor barrier below concrete slabs. Exterior slabs typically do not utilize vapor barriers.

The American Concrete Institutes ACI 360R-06 Design of Slabs on Grade and ACI 302.1R-04 Guide for Concrete Floor and Slab Construction are recommended references for vapor barrier selection and floor slab detailing.

Slabs on grade may be designed using a coefficient of subgrade reaction of 180 pounds per cubic inch (pci) assuming the slab-on-grade base course is underlain by structural fill placed and compacted as outlined above. A 4- to 6-inch-thick capillary break layer should be placed over the prepared subgrade. This material should consist of pea gravel or 5/8 inch clean angular rock.

A perimeter drainage system is recommended unless interior slab areas are elevated a minimum of 12 inches above adjacent exterior grades. If installed, a perimeter drainage system should consist of a 4-inch diameter perforated drain pipe surrounded by a minimum 6 inches of drain rock wrapped in a non-woven geosynthetic filter fabric to reduce migration of soil particles into the drainage system. The perimeter drainage system should discharge by gravity flow to a suitable stormwater system.

Exterior grades surrounding buildings should be sloped at a minimum of one percent to facilitate surface water flow away from the building and preferably with a relatively impermeable surface cover immediately adjacent to the building.

Erosion and Sediment Control

Erosion and sediment control (ESC) is used to reduce the transportation of eroded sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be implemented, and these measures should be in general accordance with local regulations. At a minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features for the site:

- Schedule the soil, foundation, utility, and other work requiring excavation or the disturbance of the site soils, to take place during the dry season (generally May through September). However, provided precautions are taken using Best Management Practices (BMP's), grading activities can be completed during the wet season (generally October through April).
- All site work should be completed and stabilized as quickly as possible.
- Additional perimeter erosion and sediment control features may be required to reduce the possibility of sediment entering the surface water. This may include additional silt fences, silt fences with a higher Apparent Opening Size (AOS), construction of a berm, or other filtration systems.
- Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited other filtration methods will need to be incorporated.

Utilities

Utility trenches should be excavated according to accepted engineering practices following OSHA (Occupational Safety and Health Administration) standards, by a contractor experienced in such work. The contractor is responsible for the safety of open trenches. Traffic and vibration adjacent to trench walls should be reduced; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

In general, silty soils were encountered at shallow depths in the explorations at this site. These soils have low cohesion and density and will have a tendency to cave or slough in excavations. Shoring or sloping back trench sidewalls is required within these soils in excavations greater than 4 feet deep.

All utility trench backfill should consist of imported structural fill or suitable on site soils. Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. The upper 5 feet of utility trench backfill placed in pavement areas should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Below 5 feet, utility trench backfill in pavement areas should be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. Pipe bedding should be in accordance with the pipe manufacturer's recommendations.

The contractor is responsible for removing all water-sensitive soils from the trenches regardless of the backfill location and compaction requirements. Depending on the depth and location of the proposed utilities, we anticipate the need to re-compact existing fill soils below the utility structures and pipes. The contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction procedures.

CONSTRUCTION FIELD REVIEWS

Cobalt Geosciences should be retained to provide part time field review during construction in order to verify that the soil conditions encountered are consistent with our design assumptions and that the intent of our recommendations is being met. This will require field and engineering review to:

- Monitor and test structural fill placement and soil compaction
- Observe bearing capacity at foundation locations
- Observe slab-on-grade preparation
- Monitor foundation drainage placement
- Observe excavation stability

Geotechnical design services should also be anticipated during the subsequent final design phase to support the structural design and address specific issues arising during this phase. Field and engineering review services will also be required during the construction phase in order to provide a Final Letter for the project.

CLOSURE

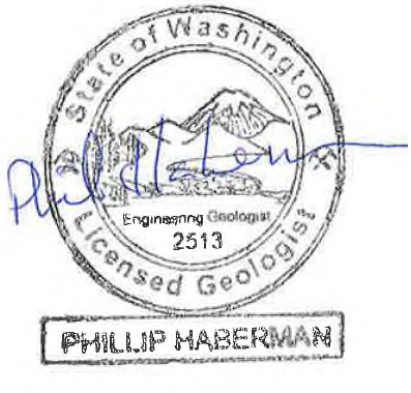
This report was prepared for the exclusive use of JayMarc Homes and their appointed consultants. Any use of this report or the material contained herein by third parties, or for other than the intended purpose, should first be approved in writing by Cobalt Geosciences, LLC.

The recommendations contained in this report are based on assumed continuity of soils with those of our test holes and assumed structural loads. Cobalt Geosciences should be provided with final architectural and civil drawings when they become available in order that we may review our design recommendations and advise of any revisions, if necessary.

Use of this report is subject to the Statement of General Conditions provided in Appendix A. It is the responsibility of JayMarc Homes who is identified as “the Client” within the Statement of General Conditions, and its agents to review the conditions and to notify Cobalt Geosciences should any of these not be satisfied.

Sincerely,

Cobalt Geosciences, LLC



2/16/2024
Phil Haberman, PE, LG, LEG
Principal

Statement of General Conditions

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Cobalt Geosciences and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Cobalt Geosciences present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Cobalt Geosciences is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Cobalt Geosciences at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Cobalt Geosciences must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Cobalt Geosciences will not be responsible to any party for damages incurred as a result of failing to notify Cobalt Geosciences that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Cobalt Geosciences, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Cobalt Geosciences cannot be responsible for site work carried out without being present.

HB-1 **Approximate Hand Boring Location**

King County imap Image

N

COBALT GEOSCIENCES

Proposed Residence
9619 SE 34th St
Mercer Island, Washington

Site Image

Figure 1

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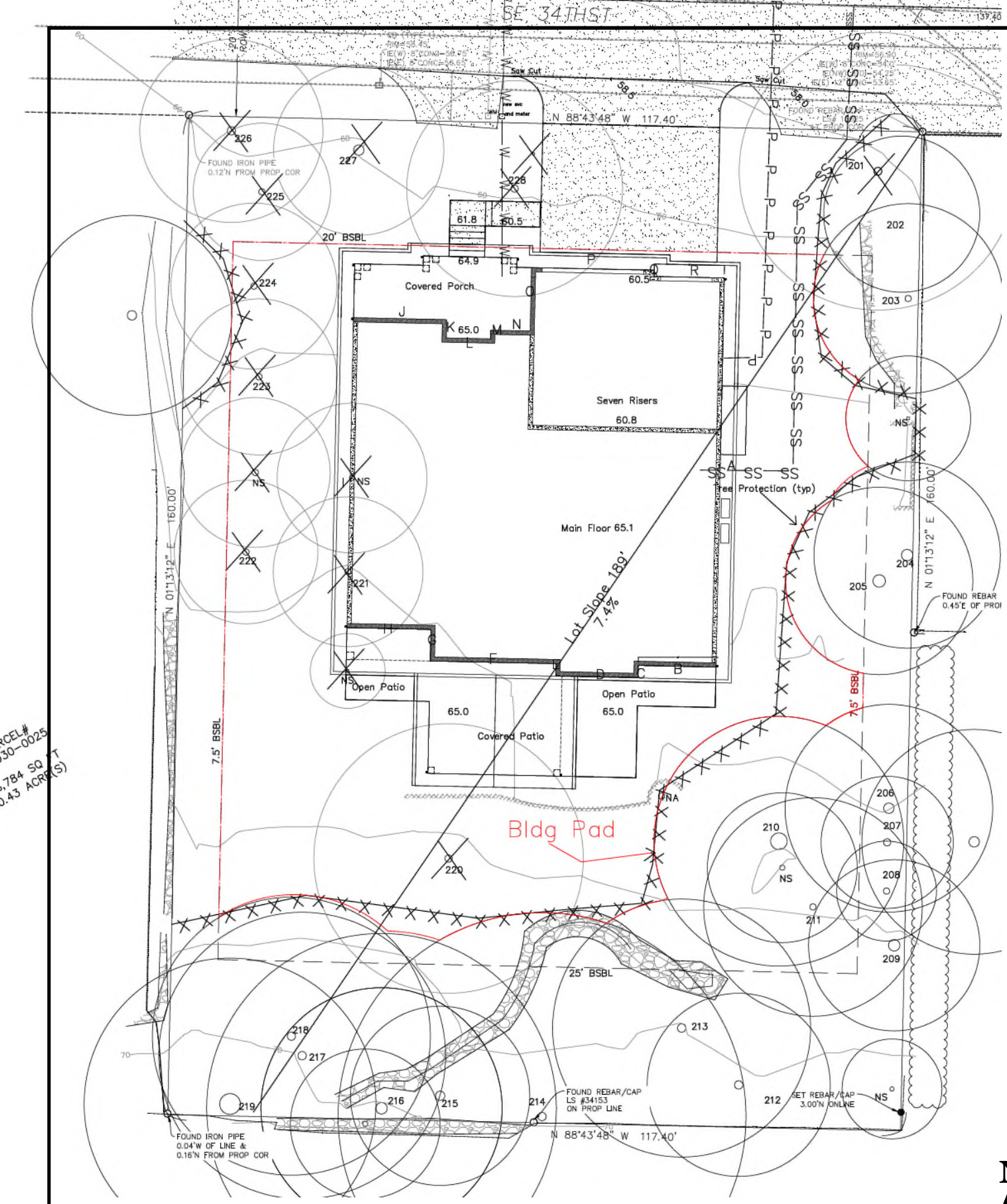
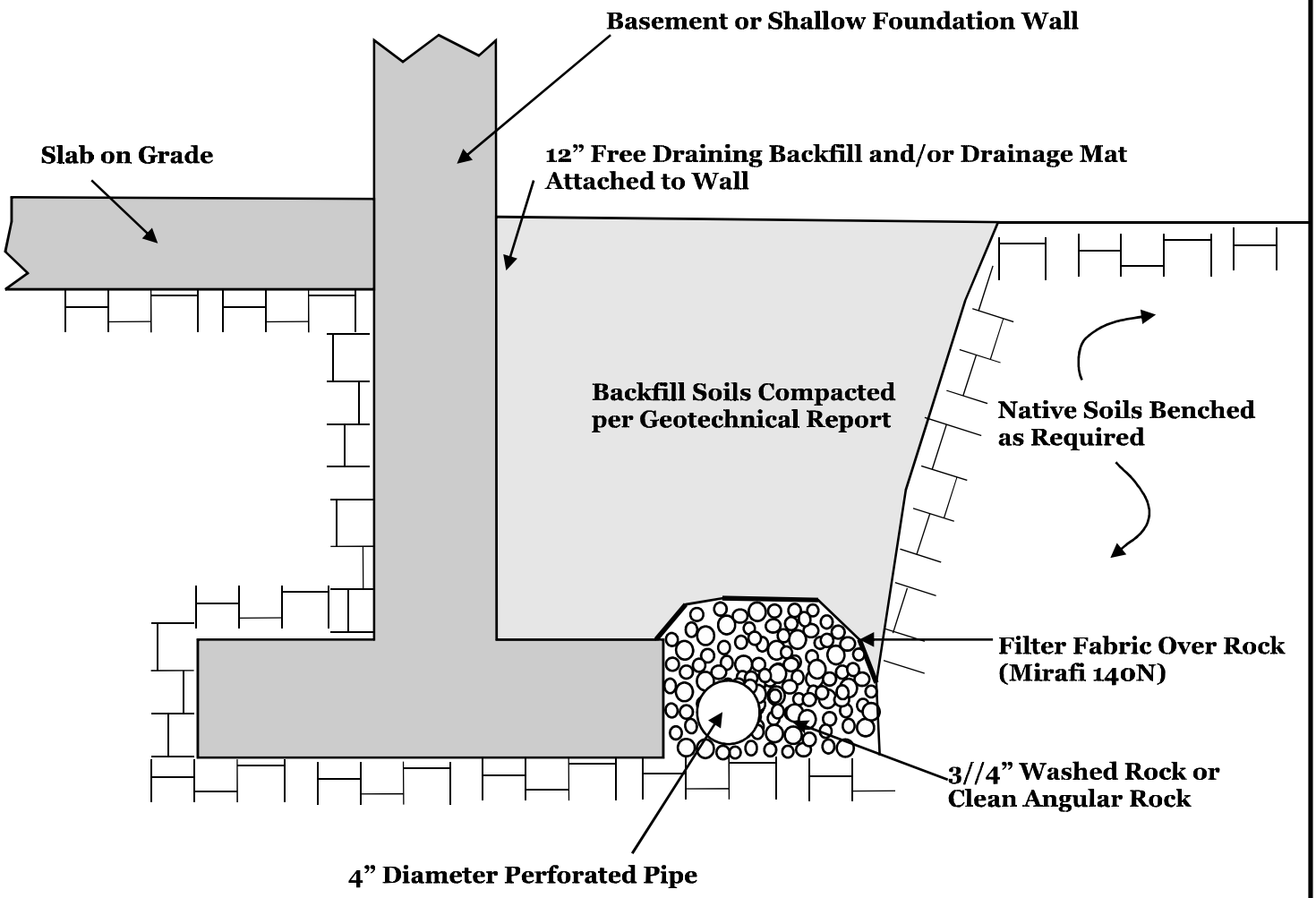


Provided site plan and topographic map

Approximate Scale 1"=40'

COBALT GEOSCIENCES	Proposed Residence 9619 SE 34th St Mercer Island, Washington	**Site Plan** **Figure 2**	Cobalt Geosciences, LLC P.O. Box 82243 Kenmore, WA 98028 (206) 331-1097 www.cobaltgeo.com cobaltgeo@gmail.com



Not to Scale

COBALT GEOSCIENCES	**Typical Foundation Drain Detail**	**Attachment**	Cobalt Geosciences, LLC PO Box 1792 North Bend, WA 98045 (206) 331-1097 www.cobaltgeo.com phil@cobaltgeo.com

Looking across the property. No steep slopes noted.

Looking at existing structure and vegetation.

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Looking into the property and residence. No steep slopes noted.

Looking into carport of structure.

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Unified Soil Classification System (USCS)

MAJOR DIVISIONS			SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS (more than 50% retained on No. 200 sieve)	Gravels (more than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with Fines (more than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (50% or more of coarse fraction passes the No. 4 sieve)	Clean Sands (less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly graded sand, gravelly sands, little or no fines
		Sands with Fines (more than 12% fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (50% or more passes the No. 200 sieve)	Silts and Clays (liquid limit less than 50)	Inorganic	ML	Inorganic silts of low to medium plasticity, sandy silts, gravelly silts, or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays silty clays, lean clays
		Organic	OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays (liquid limit 50 or more)	Inorganic	MH	Inorganic silts, micaceous or diatomaceous fine sands or silty soils, elastic silt
			CH	Inorganic clays of medium to high plasticity, sandy fat clay, or gravelly fat clay
		Organic	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT	Peat, humus, swamp soils with high organic content (ASTM D4427)

Classification of Soil Constituents

MAJOR constituents compose more than 50 percent, by weight, of the soil. Major constituents are capitalized (i.e., SAND).

Minor constituents compose 12 to 50 percent of the soil and precede the major constituents (i.e., silty SAND). Minor constituents preceded by "slightly" compose 5 to 12 percent of the soil (i.e., slightly silty SAND).

Trace constituents compose 0 to 5 percent of the soil (i.e., slightly silty SAND, trace gravel).

Grain Size Definitions

Description	Sieve Number and/or Size
Fines	<#200 (0.08 mm)
Sand	
-Fine	#200 to #40 (0.08 to 0.4 mm)
-Medium	#40 to #10 (0.4 to 2 mm)
-Coarse	#10 to #4 (2 to 5 mm)
Gravel	
-Fine	#4 to 3/4 inch (5 to 19 mm)
-Coarse	3/4 to 3 inches (19 to 76 mm)
Cobbles	3 to 12 inches (75 to 305 mm)
Boulders	>12 inches (305 mm)

Relative Density (Coarse Grained Soils)

N, SPT, Blows/FT	Relative Density
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium dense
30 - 50	Dense
Over 50	Very dense

Consistency (Fine Grained Soils)

N, SPT, Blows/FT	Relative Consistency
Under 2	Very soft
2 - 4	Soft
4 - 8	Medium stiff
8 - 15	Stiff
15 - 30	Very stiff
Over 30	Hard

Moisture Content Definitions

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

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Soil Classification Chart

Figure C1

Log of Hand Boring HB-1

Date: November 2023	Depth: 6'	Initial Groundwater: None
Contractor:	Elevation:	Sample Type: Grab
Method: Hand Auger	Logged By: KK Checked By: PH	Final Groundwater: N/A

Depth (Feet)	Interval	% Recovery	Blows/6"	Graphic Log	USCS Symbol	Material Description
						Vegetation/Topsoil
1					ML	Medium stiff, silt trace clay, locally mottled yellowish brown to grayish brown, moist. (Possible Fill over Weathered Lacustrine Deposits)
2						
3	■					
4					ML	Stiff, silt trace clay, locally mottled olive brown to grayish brown, moist. (Lacustrine Deposits) Areas of SM-ML
5						
6	■					
						End of Hand Boring 6'
7						
8						
9						
10						

Groundwater

Moisture Content (%)
Plastic Limit — Liquid Limit

SPT N-Value
0 10 20 30 40 50

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Proposed Residence
9619 SE 34th Street
Mercer Island, Washington

Hand Boring Log

Log of Hand Boring HB-2

Date: November 2023	Depth: 6'	Initial Groundwater: None
Contractor:	Elevation:	Sample Type: Grab
Method: Hand Auger	Logged By: KK Checked By: PH	Final Groundwater: N/A

Depth (Feet)	Interval	% Recovery	Blows/6"	Graphic Log	USCS Symbol	Material Description
						Vegetation/Topsoil
1					ML	Medium stiff to stiff, silt trace clay some fine sand, locally mottled yellowish brown to grayish brown, moist to very moist. (Weathered Lacustrine Deposits)
2						
3						
4						
5						
6					ML	Stiff to very stiff, silt trace clay, locally mottled olive brown to grayish brown, moist. (Lacustrine Deposits)
7						End of Hand Boring 6'
8						
9						
10						

Groundwater

Moisture Content (%)
Plastic Limit — Liquid Limit

SPT N-Value
0 10 20 30 40 50

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Hand Boring Log