COBALT GEOSCIENCES

Cobalt Geosciences, LLC
P.O. Box 82243
Kenmore, Washington 98028

March 5, 2021
Updated February 28, 2022

Berik Hajat
berikhajat@gmail.com

RE: Limited Geotechnical Evaluation
Proposed Residence
3832 NE 155th Street
Lake Forest Park, Washington

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

The purpose of our evaluation was to provide recommendations for foundation design, stormwater management and retaining walls.

Site and Project Description

The site is located at 3832 NE 155th Street in Lake Forest Park, Washington. The site consists of one rectangular shaped parcel (No. 5739602270) with a total area of about 6,000 square feet.

The property was formerly developed with a residence. Currently, there are local gravel driveway areas and a short concrete retaining wall in the south half of the property. The remainder of the property is vegetated with grasses, bushes, and sparse trees. The site slopes downward from west to east at magnitudes of 5 to 20 percent and relief of about 8 feet. There is a 3 to 3.5 feet tall modular block wall near the west property line.

The property is bordered to the north, east, and west by residential properties and to the south by NE 155th Street.

The project includes construction of a new residence and driveway. The residence will utilize local shallow below grade areas and stepped foundations. Stormwater management may include dispersion, detention, or infiltration facilities depending on feasibility.

Area Geology

The Geologic Map of King County indicates that the site is underlain by Pre-Fraser Deposits.

These deposits include mixtures of silt and clay that become stiffer/denser with depth. There is often a variably thick weathered zone of looser materials that can be 5 to 15 feet in places.

Soil & Groundwater Conditions

As part of our evaluation, we excavated one test pit and two hand borings within the property to determine the shallow soil and groundwater conditions, where accessible.

The explorations encountered approximately 1.5 to 3.5 feet of loose to medium dense, silty-fine to medium grained sand trace gravel (Fill). This layer was underlain by medium dense to dense, silty-fine to medium grained sand with gravel (Pre-Fraser Deposits?), which continued to the termination depths of the explorations.

Groundwater was not encountered in the explorations; however, saturated surface soils were locally present.

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.

Landslide Hazard

It is our opinion that the site does not contain steep slope or landslide hazards as defined by the City of Lake Forest Park Municipal Code. There is an older landslide that occurred on a property south of NE 155th Street and southwest of the subject property. The top of the slide is at least 100 feet from the property and the area between the slide and subject property is fully developed with residences and roadways.

The topographic relief of the slide area is about 55 feet and based on the distance from the site, developed conditions in the vicinity, and relatively moderate relief of the old slide, the risk to the subject property is essentially nil. No specific buffers or setbacks are warranted.

Municipal Code Information

Based on the City of Lake Forest Park critical areas map, the site may be within a landslide hazard zone and close to steep slope hazard areas. This designation is likely due to the historic landslide activity that occurred within the gulley/ravine located approximately 100 to 150 feet south of the subject parcel.

The site slopes are less than 15 percent in magnitude except where previously graded through legal grading activities (Class I criteria). The site is not underlain by sand which overlies silt and clay (Class II criteria). The site meets the criteria of Class I hazards, which are considered relatively stable.

The ravine feature with steep slopes would be considered to be "Landslide hazard areas" (from item 2 below), since they have shown movement within the last 10,000 years and are susceptible to stream bank erosion/undercutting that can result in mass wasting of the ravine slope. These areas are also consistent with steep slope areas with magnitudes of 40 percent or more and relief of at least 10 feet. The relevant code definitions are shown below.

J. Landslide Hazard Areas.

1. "Landslide hazard areas" means slopes that are potentially subject to landslides. All landslide hazard areas are classified as:

a. "Class I": a slope that is less than 15 percent and is considered relatively stable;

b. "Class II": a slope that is greater than 15 percent and is underlain by permeable soils that are relatively stable in their natural state but may become unstable if slope configurations or draining conditions are modified;

c. "Class III": a slope that is greater than 15 percent and is underlain by impermeable soils, and may be characterized by springs or seeping groundwater during the wet season.

2. "Landslide hazard areas" include Class II and Class III if any of the following are present:

a. Any area that has shown movement during the Holocene epoch (from 10,000 years ago to present) or which is underlain by significant waste debris of that epoch; or

b. An area potentially unstable as a result of rapid stream incision, stream bank erosion or undercutting; or

c. Any area located on an alluvial fan or delta potentially subject to inundation by debris flows; or

d. Any area with a slope of 40 percent or greater and with a vertical relief of 10 or more feet except any area composed of consolidated rock.

It is our opinion that the proposed development is within a stable area and will not affect slope stability in the nearby ravine nor will the ravine affect the development. The proposed residence will be situated about 140 feet or more from the top of the gulley/ravine feature. This feature has relief of about 50 to 55 feet and is well outside of the zone of influence to the subject property. The zone of influence could be estimated as equal to the height of the slope, or about 55 feet.

Erosion Hazard

The Natural Resources Conservation Services (NRCS) maps for King County indicate that the site is underlain by Urban land-Alderwood complex (12 to 35 percent slopes). These soils would have a slight to moderate erosion potential in a disturbed state depending on the slope magnitude.

It is our opinion that soil erosion potential at this project site can be reduced through landscaping and surface water runoff control. Typically, erosion of exposed soils will be most noticeable during periods of rainfall and may be controlled by the use of normal temporary erosion control measures, such as silt fences, hay bales, mulching, control ditches and diversion trenches. The typical wet weather season, with regard to site grading, is from October 31st to April 1st. Erosion control measures should be in place before the onset of wet weather.

Seismic Hazard

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 stiff/medium 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 7-10 and 7-16.

Seismic Design Parameters (ASCE 7-10)

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	1.252	0.487	1.0	1.513	0.834	0.491	0.504

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	1.265	0.442	1.2	Null	1.012	Null	0.536

The site class is known to be D based on site specific explorations. It may be feasible or allowed to reduce the value of Fa by 20 percent.

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 low likelihood of liquefaction.

Conclusions and Recommendations

General

The site is underlain by fill which overlies relatively dense Pre-Fraser Deposits. The proposed residence 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.

Infiltration is not feasible based on the soil conditions and type of topography present. We recommend direct connection to City infrastructure. We should be provided with the final plans to verify suitability of the system locations and elevations.

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 large trees where root systems can extend to greater depths, in areas of any existing foundation systems, and in any areas underlain by undocumented fill.

The native soils consist of silty-sand with gravel. Most of the native soils may be used as structural fill provided they achieve compaction requirements and are within 3 percent of the optimum moisture. Some of these soils may only be suitable for use as fill during the summer months, as they will be above the optimum moisture levels in their current state. These soils are variably moisture sensitive and may degrade during periods of wet weather and under equipment traffic. Note that these soils will be well over optimum moisture contents outside of summer months.

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 4 feet or less for foundation and utility placement. Any deeper temporary excavations should be sloped no steeper than 1.5H:1V (Horizontal:Vertical) in loose native soils and fill, 1H:1V in medium dense native soils, and 3/4H:1V in dense to very dense 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.

Stormwater Management Feasibility

The site is underlain by fill along with weathered and unweathered Pre-Fraser Deposits. We encountered dense, very fine grained soils at shallow depths. Infiltration is not feasible due to a shallow restrictive layer and the presence of an overall easterly gradient. If infiltration systems were utilized, runoff would migrate along the dense soil contact and onto the adjacent downslope properties. This flow would likely enter basement and crawlspace areas and could cause numerous water-related issues (mold, soil erosion, settlement).

We recommend direct connection of runoff devices to City infrastructure.

We can provide additional recommendations upon request and once site plans have been developed.

Foundation Design

The proposed residential building may be supported on a shallow spread footing foundation system bearing on undisturbed dense 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.

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 0.40 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.

Concrete Retaining Walls

The following table, titled **Wall Design Criteria**, presents the recommended soil related design parameters for retaining walls with a level backslope. Contact Cobalt if an alternate retaining wall system is used.

Wall Design Criteria	
"At-rest" Conditions (Lateral Earth Pressure – EFD+)	55 pcf (Equivalent Fluid Density)
"Active" Conditions (Lateral Earth Pressure – EFD+)	35 pcf (Equivalent Fluid Density)
Seismic Increase for "At-rest" Conditions (Lateral Earth Pressure)	21H* (Uniform Distribution) 1 in 2,500 year event
Seismic Increase for "At-rest" Conditions (Lateral Earth Pressure)	14H* (Uniform Distribution) 1 in 500 year event
Seismic Increase for "Active" Conditions (Lateral Earth Pressure)	7H* (Uniform Distribution)
Passive Earth Pressure on Low Side of Wall (Allowable, includes F.S. = 1.5)	Neglect upper 2 feet, then 250 pcf EFD+
Soil-Footing Coefficient of Sliding Friction (Allowable; includes F.S. = 1.5)	0.40

*H is the height of the wall; Increase based on one in 500 year seismic event (10 percent probability of being exceeded in 50 years),
+EFD – Equivalent Fluid Density

The stated lateral earth pressures do not include the effects of hydrostatic pressure generated by water accumulation behind the retaining walls. Uniform horizontal lateral active and at-rest pressures on the retaining walls from vertical surcharges behind the wall may be calculated using active and at-rest lateral earth pressure coefficients of 0.3 and 0.5, respectively. A soil unit weight of 125 pcf may be used to calculate vertical earth surcharges.

To reduce the potential for the buildup of water pressure against the walls, continuous footing drains (with cleanouts) should be provided at the bases of the walls. The footing drains should consist of a minimum 4-inch diameter perforated pipe, sloped to drain, with perforations placed down and enveloped by a minimum 6 inches of pea gravel in all directions.

The backfill adjacent to and extending a lateral distance behind the walls at least 2 feet should consist of free-draining granular material. All free draining backfill should contain less than 3 percent fines (passing the U.S. Standard No. 200 Sieve) based upon the fraction passing the U.S. Standard No. 4 Sieve with at least 30 percent of the material being retained on the U.S. Standard No. 4 Sieve. The primary purpose of the free-draining material is the reduction of hydrostatic pressure. Some potential for the moisture to contact the back face of the wall may exist, even with treatment, which may require that more extensive waterproofing be specified for walls, which require interior moisture sensitive finishes.

We recommend that the backfill be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. In place density tests should be performed to verify adequate compaction. Soil compactors place transient surcharges on the backfill. Consequently, only light hand operated equipment is recommended within 3 feet of walls so that excessive stress is not imposed on the walls.

Slab-on-Grade

We recommend that the upper 18 inches of the native soils within slab areas be re-compacted to at least 95 percent of the modified proctor (ASTM D1557 Test Method). Any soft fill should be removed and replaced with structural fill. Any fill should be removed and replaced with structural fill.

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 210 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).

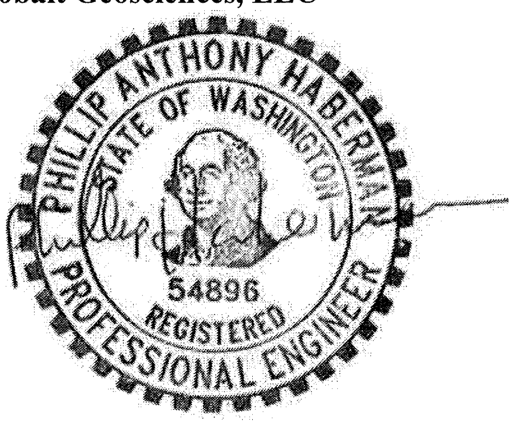
- All site work should be completed and stabilized as quickly as possible.
- Additional perimeter erosion and sediment control features may be required to reduce the possibility of sediment entering the surface water. This may include additional silt fences, silt fences with a higher Apparent Opening 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.

Closure

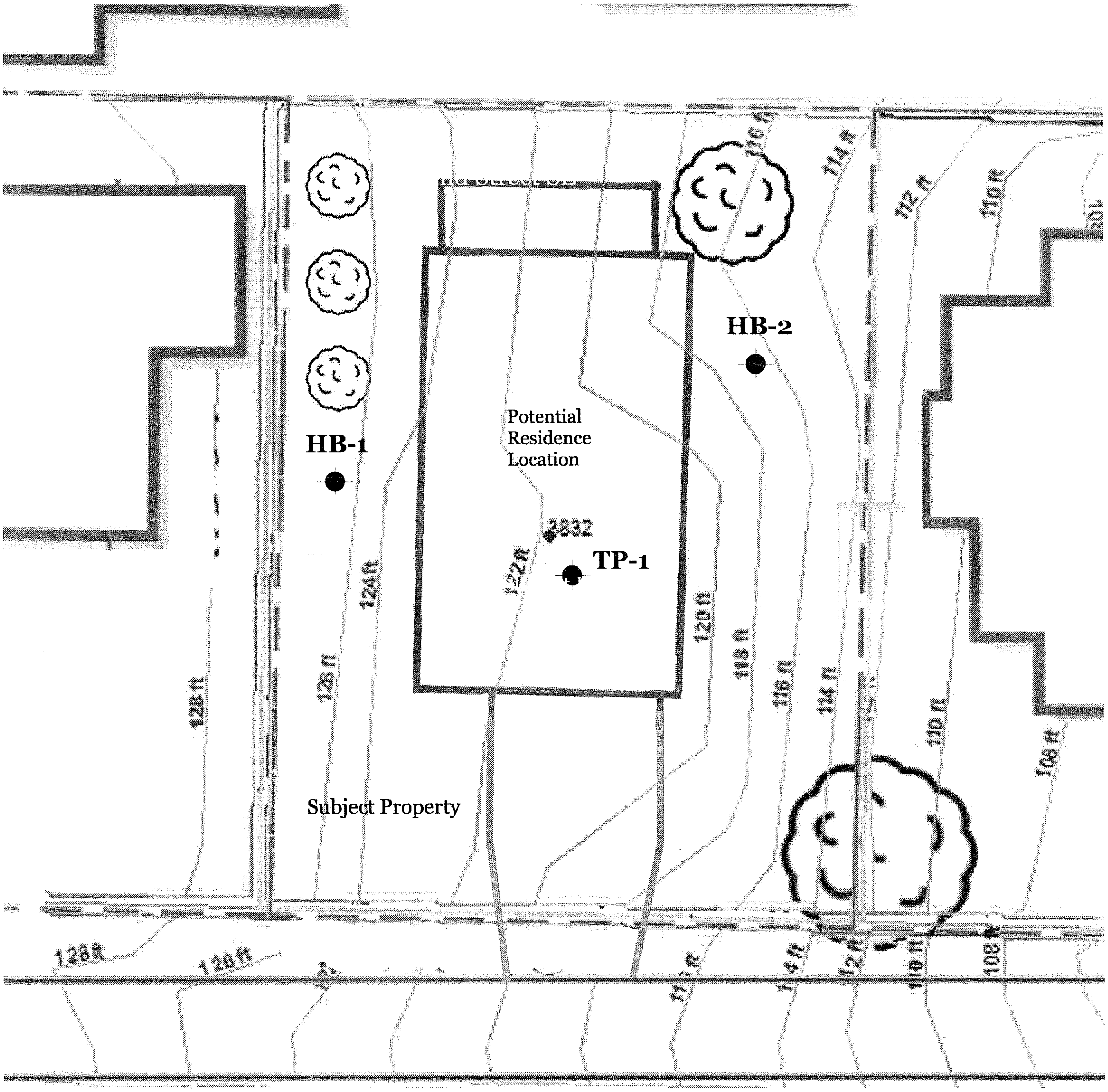
The information presented herein is based upon professional interpretation utilizing standard practices and a degree of conservatism deemed proper for this project. We emphasize that this report is valid for this project as outlined above and for the current site conditions and should not be used for any other site.

Sincerely,

Cobalt Geosciences, LLC

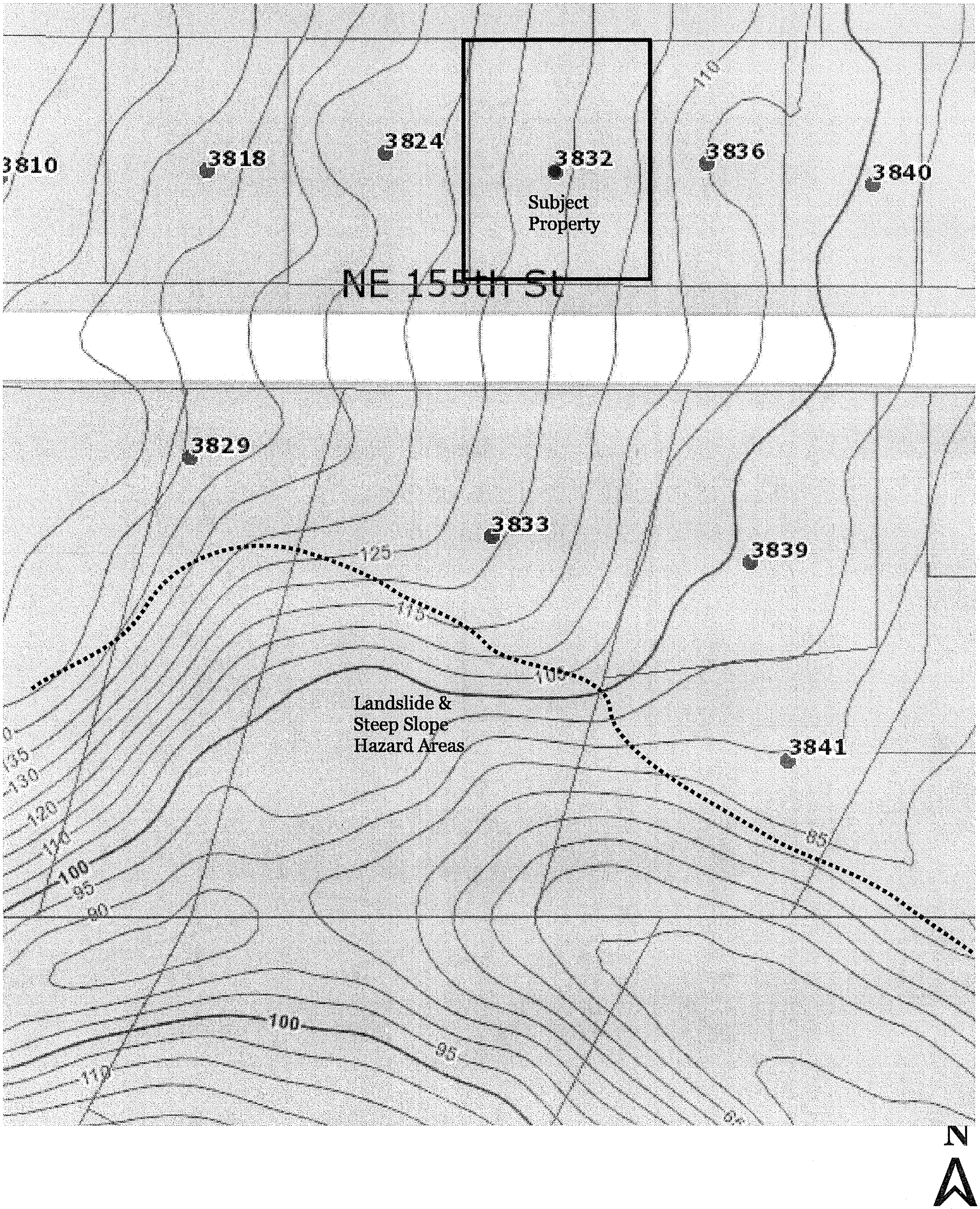


February 28, 2022
Phil Haberman, PE, LG, LEG
Principal



HB-1
TP-1
Approximate Test Pit and Hand Boring Location

COBALT GEOSCIENCES	Proposed Residence 3832 NE 155th Street Lake Forest Park, Washington	**SITE PLAN** **FIGURE 1**	Cobalt Geosciences, LLC P.O. Box 1792 North Bend, WA 98045 (206) 331-1097 www.cobaltgeo.com phil@cobaltgeo.com



Proposed Residence
3832 NE 155th Street
Lake Forest Park, Washington

AREA MAP FIGURE 2

Cobalt Geosciences, LLC
P.O. Box 1792
North Bend, WA 98045
(206) 331-1097
www.cobaltgeo.com
phil@cobaltgeo.com

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

COBALT GEOSCIENCES

Cobalt Geosciences, LLC
P.O. Box 82243
Kenmore, WA 98028
(206) 331-1097
www.cobaltgeo.com
cobaltgeo@gmail.com

Soil Classification Chart

Figure C1

Test Pit TP-1

Date: FEBRUARY 25, 2021	Depth: 8'	Groundwater: None
Contractor: Jim	Elevation:	Logged By: PH Checked By: SC

Depth (Feet)	Interval	Graphic Log	USCS Symbol	Material Description	Groundwater	Moisture Content (%) Plastic Limit – Liquid Limit / DCP Equivalent N-Value 0 10 20 30 40 50
0				Topsoil/Vegetation		
1–2	■ (2)		SM	Loose to medium dense, silty-fine to fine grained sand with gravel, dark yellowish brown to grayish brown, very moist to moist. (Fill)		
3–7	■ (6–7)		SM	Medium dense to dense, silty-fine to fine grained sand trace gravel, mottled grayish brown, moist. (Pre-Fraser Deposits)		
8				End of Test Pit 8'		
9						
10						

Proposed Residence
3832 NE 155th Street
Lake Forest Park, Washington

Test Pit Logs

COBALT GEOSCIENCES

Cobalt Geosciences, LLC
P.O. Box 82243
Kenmore, WA 98028
(206) 331-1097
www.cobaltgeo.com
cobaltgeo@gmail.com

Hand Boring HB-1

Date: FEBRUARY 25, 2021	Depth: 6'	Groundwater: None
Contractor: Cobalt	Elevation:	Logged By: PH Checked By: SC

Depth (Feet)	Interval	Graphic Log	USCS Symbol	Material Description	Groundwater	Moisture Content (%) Plastic Limit — Liquid Limit / DCP Equivalent N-Value 0 10 20 30 40 50
0				Topsoil/Vegetation		
0–2 (1)	■ (~2)		SM	Loose to medium dense, silty-fine to fine grained sand with gravel, dark yellowish brown to grayish brown, very moist to moist. (Fill)		
2–6 (3, 4, 5)	■ (~5)		SM	Medium dense to dense, silty-fine to fine grained sand trace gravel, mottled grayish brown, moist. (Pre-Fraser Deposits)		
6–10 (7, 8, 9, 10)				End of Hand Boring 6'		

Hand Boring HB-2

Date: FEBRUARY 25, 2021	Depth: 6'	Groundwater: None
Contractor: Cobalt	Elevation:	Logged By: PH Checked By: SC

Depth (Feet)	Interval	Graphic Log	USCS Symbol	Material Description	Groundwater	Moisture Content (%) Plastic Limit — Liquid Limit / DCP Equivalent N-Value 0 10 20 30 40 50
0				Topsoil/Vegetation		
0–4 (1, 2, 3)	■ (~2)		SM	Loose to medium dense, silty-fine to fine grained sand with gravel, dark yellowish brown to grayish brown, very moist to moist. (Fill)		
4–6 (5)	■ (~5)		SM	Medium dense to dense, silty-fine to fine grained sand trace gravel, mottled grayish brown, moist. (Pre-Fraser Deposits)		
6–10 (7, 8, 9, 10)				End of Hand Boring 6'		

Cobalt Geosciences, LLC
P.O. Box 82243
Kenmore, WA 98028
(206) 331-1097
www.cobaltgeo.com
cobaltgeo@gmail.com