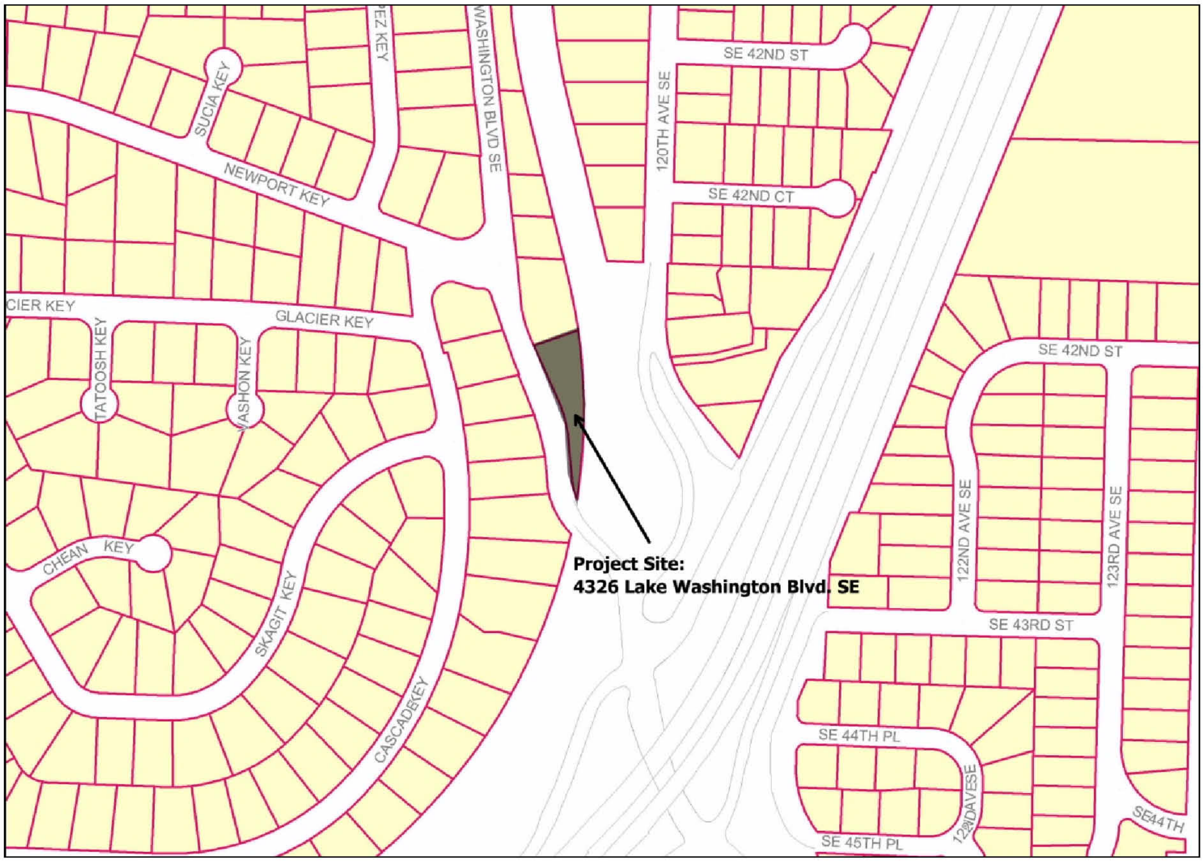
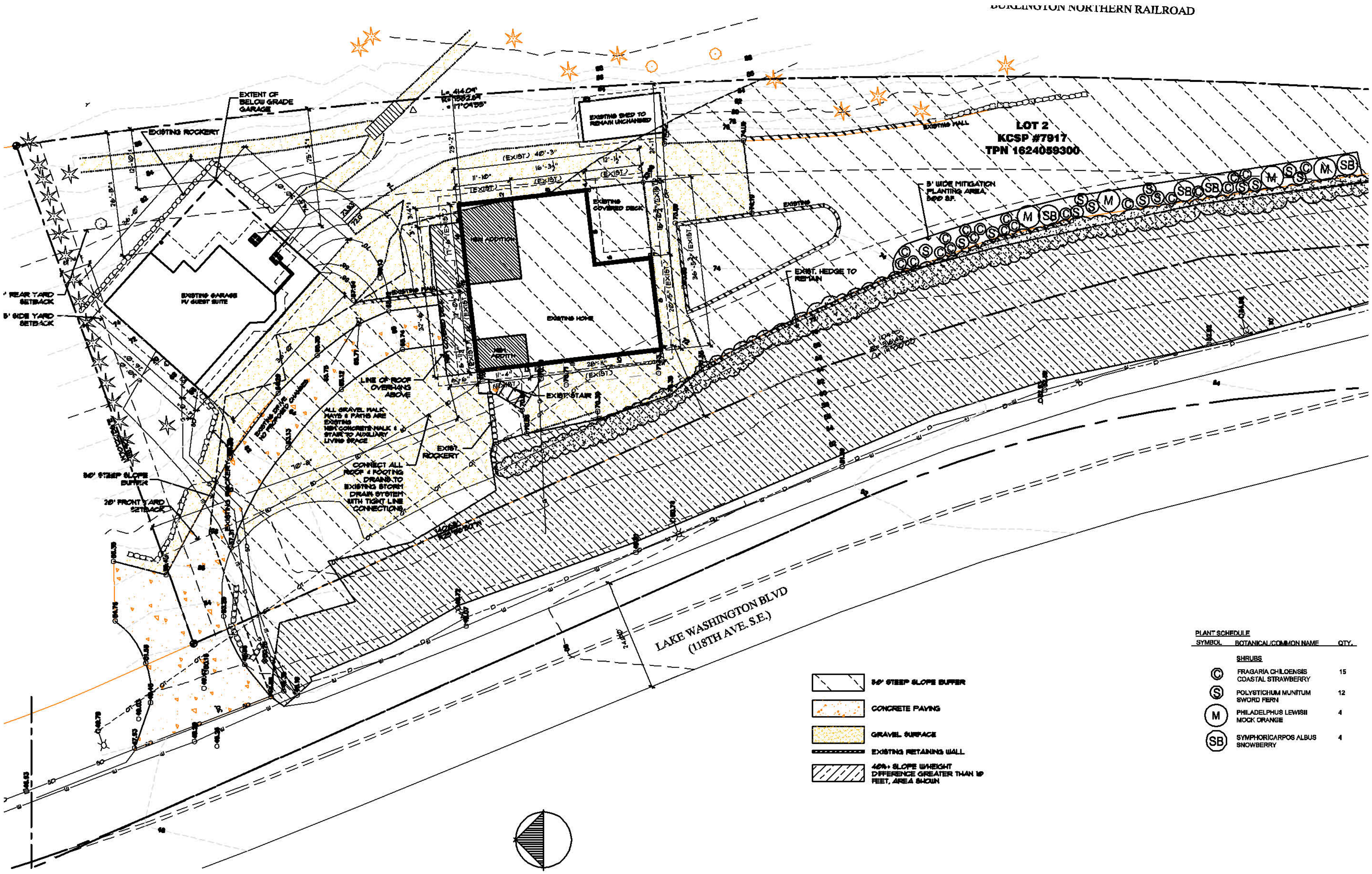
Schaff Slope Buffer Modification Vicinity Map
File Number: 10-109872-LO





SITE PLAN

SCALE: 1" = 10'-0"

50' STEEP SLOPE BUFFER

CONCRETE PAVING

GRAVEL SURFACE

EXISTING RETAINING WALL

40%+ SLOPE W/HEIGHT DIFFERENCE GREATER THAN 10 FEET, AREA SHOWN

PLANT SCHEDULE

SYMBOL	BOTANICAL/COMMON NAME	QTY.
	SHRUBS	
C	FRAGARIA CHILOENSIS COASTAL STRAWBERRY	15
S	POLYSTICHUM MUNITUM SWORD FERN	12
M	PHILADELPHUS LEWISII MOCK ORANGE	4
SB	SYMPHORICARPOS ALBUS SNOWBERRY	4

STEVEN DONA
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REGISTERED ARCHITECT
STEVEN P. DONA
STATE OF WASHINGTON

PROJECT NAME

SCHAFF RESIDENCE

BELLEVUE, WA

DRAWING TITLE

MITIGATION PLANTING PLAN

DATE 8-4-2009

DRAWN BY LT

CHECKED BY S.D.

FILE: 2818 site

REVISIONS

A1.2

S T E V E N

DONA

ARCHITECTURE & PLANNING

Received
APR 1 0 2010
Permit Processing

Critical Areas Report

History: The original home was constructed on 1912 along the shores of Lake Washington. The home was moved to the current site, just East of Lake Washington Blvd. SW, when the Newport Shores housing area was developed. The property has steep slopes both to the West and East. The area to the West of the home slopes down to Lake Washington Blvd. SW. The area toward the East is a berm that was created when the railroad tracks were laid decades ago. No slope instability is evident on any of the site. This proposal would provide for an infill of the existing foundation footprint as shown in the accompanying site plan. This proposed infill is parallel to the edge of the critical area on both sides. (Making a "T- shaped" foundation square in plan) In addition we are proposing a covered entry deck on the North side of the existing home. The entry deck construction utilizes pier pad and column support to minimize ground disturbance to an absolute minimum.

All proposed expansion to the existing foundation is on flat terrain over areas that are currently impervious. This proposal will not negatively impact the surrounding steep slopes in any way.

This proposed footprint additions would require reduction of the steep slope buffers as defined by the Critical Areas regulations. All combined, these areas will be 498 square feet.

Performance Standards: note to reviewer: standards in italic, proposal in bold typeface.

> *A. Structures and improvements shall minimize alterations to the natural contour of the slope, and foundations shall be tiered where possible to conform to existing topography;*

The proposed design does not alter the existing topography in any way.

> *B. Structures and improvements shall be located to preserve the most critical portion of the site and it's natural landforms and vegetation;*

The proposed design does not remove any vegetation, all areas for new construction are currently impervious and flat.

> *C. The proposed development shall not result in greater risk or a need for increased buffers on neighboring properties;*

Per the enclosed soils report, the proposed project does not increase risk of increasing instability to the surrounding critical areas. No neighboring properties

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are affected by this proposal because of existing topography. The top of the property is bordered by an abandoned railway and bottom Lake Washington Blvd.

D. the use of retaining walls that allow the maintenance of existing natural slope area is preferred over graded artificial slopes where graded slopes would result in increased disturbance as compared to use of retaining wall;

No new retaining walls are proposed with this project. The existing retaining wall on site will remain untouched by this development. (this represents the minimum possible disturbance to the site)

E. Development shall be designed to minimize impervious surfaces within the critical area and critical area buffer;

The proposed development will not increase impervious area period. All development is concentrated on top of existing gravel parking area or exterior stone stairway. The proposed entry deck utilizes pier pad and column construction to minimize site distrubance.

F. Where change in grade outside the building footprint is necessary, the retention system should be stepped and regrading should be designed to minimize topographic modification. On slopes in excess of 40 percent, grading for yard area may be disallowed where inconsistent with this criteria;

As per A. above, no grade changes are proposed period.

G. Building foundation walls shall be utilized as retaining walls rather than rockeries or retaining structures built separately and away from the building wherever feasible. Freestanding retaining devices are only permitted when they cannot be designed as structural elements of the building foundation;

As per D. above, no new retaining walls are proposed with this development. Existing retaining structures will remain as they represent the minimum possible disturbance to the site (and least risk).

H. On slopes in excess of 40 percent, use of pole-type construction which conforms to the existing topography is required where feasible. If pole-type construction is not technically feasible, the structure must be tiered to conform to the existing topography and to minimize topographic modification;

No construction is proposed in any areas of 40% grade so this performance standard is not applicable. (All areas of proposed construction are nearly flat)

I. On slopes in excess of 40 percent, piled deck support structures are required where technically feasible for parking or garages over fill-based construction types;

Not applicable to this application. (Existing garage is outside the critical area buffers)

J. Areas of new permanent disturbance and all areas of temporary disturbance shall be mitigated and or restored pursuant to a mitigation and restoration plan meeting the requirements of LUC 20.25H.210.

See attached Mitigation Plan.

LUC Section 20.25H.210 Mitigation and Restoration:

See attached Mitigation plan.

20.25H.250.B Minimum Critical Areas Report Requirements:

As per the enclosed Geotechnical report, this proposal does not negatively impact the critical area buffers in any way. Buffer effectiveness will be improved by utilization of gutter and downspout drainage collection. This water will tight lined to the existing approved discharge site near the site entrance location. (See enclosed Mitigation plan for specific location) All site disturbance is proposed in areas that are currently flat and impervious. The buffer area does not primarily drain down the steep slope area (it drains to the North and not to the West down the steep slope) So the buffer area does not actually significantly contribute to the stability of the steep slope.

20.30P.140 Critical Areas Land Use Permit Decision Criteria:

i. The proposal obtains all other permits required by the Land Use Code;
Building permit application has already been applied for. Permit will not be issued without this approval.

ii. The proposal utilizes the best available construction, design and development techniques which result in the least impact to the critical area and buffer;
As per the narrative above, this proposal does not negatively impact the critical area, while the mitigation improves stability of the steep slopes.

iii. The proposal incorporates the performance standards of LUC 20.25
Please see performance standards response on page 1-2 or this document.

iv. The proposal is served by adequate public facilities, including streets, fire protection and utilities;
The property is currently served by all the above public facilities.

v. The proposal includes a mitigation or restoration plan consistent with LUC 20.25H.210;
Please see the attached mitigation plan (again).

vi. The proposal complies with other applicable requirements of the Land Use Code.
This item is repetitive, see i. above.

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April 5, 2010

JN 09310

Craig Schaff
4326 Lake Washington Boulevard Southeast
Bellevue, Washington 98006

Subject: ***Geotechnical Engineering Report***
Proposed Additions and New Deck
Schaff Residence
4326 Lake Washington Boulevard Southeast
Bellevue, Washington
Bellevue File No. 09-124957-DC

Dear Mr. Schaff:

via email

This geotechnical engineering report is intended to be submitted to the City of Bellevue with the Critical Areas Report being prepared for your project.

1.0 INTRODUCTION

1.1 Overview: Proposed Additions and New Deck
Schaff Residence
4326 Lake Washington Boulevard Southeast
Bellevue, Washington
Bellevue File No. 09-124957-DC

Geotech Consultants, Inc. previously prepared a geotechnical assessment for the project dated January 6, 2010.

1.2 Background: A detached garage is near completion on the northeastern portion of the property under a separate permit. The proposed project related to the existing residence involves a remodel that would include construction of two small additions and a covered deck on the north side of the current structure. The two small additions will be constructed to "fill in" the northeast and northwest corners of the house. The northeastern addition will be two stories constructed over a crawl space, which will avoid the need to excavate fully to the level of the existing basement floor. The northwestern addition will consists of two floors over the basement floor and will cover the area currently occupied by the concrete steps that rise to the front entrance. The covered deck is to extend approximately 8 feet northward from the existing house's footprint. Most of the area to be covered by the deck is already paved parking. At its closest point, the new deck will be 15 feet from the steep slope located on the western side of the site. The only exception to this will be the eastern approximately one-third of the deck, which will be constructed in an area currently covered by bare soil. This portion of the deckwill be adjacent to the planned northeastern addition, and is over 30 feet from the western slope.

1.3 Purpose and Scope of Services: We previously prepared an abbreviated geotechnical assessment for this project dated January 6, 2010. In order to prepare this current report, we have visited the site on two separate occasions to observe the existing conditions and assess the exposed geology, corresponded with the project team multiple times regarding the planned construction, reviewed the February 19, 2010 *Revision Request #1* prepared by the City of Bellevue, and conducted a slope stability analysis.

1.4 Investigations Summary: During our visits to the site we have been able to explore the subsurface conditions by close observation of soil exposures along the eastern property line, in the temporary excavations made for the detached garage, and in the cut slope located to the west of the planned building area. We were able to assess the depth to dense soil conditions near the northwestern, downslope corner of the house by probing. Additional geologic information for the site vicinity was available from a geotechnical study that our firm previously conducted at 4306 – 120th Avenue Southeast, to the east of the site. For that study, we conducted four test pits. The conditions encountered in the on-site and nearby explorations are discussed below in sub-sections **2.3** and **2.4.**

1.5 Report Overview: This report presents geotechnical considerations for foundations, drainage and slope stability related to the proposed new construction.

Attached to the end of the report are a Vicinity Map, Site Plan, Footing Drain Detail and Results of Slope Stability Analyses.

2.0 SITE CONDITIONS

2.1 Location and Surface Conditions: The subject property is located on the east side of Lake Washington Boulevard Northeast, just east of the Newport Shores subdivision. The location of the site is shown on the Vicinity Map attached to the end of this report.

The site is a narrow, triangular-shaped lot, with Lake Washington Boulevard Southeast forming the angled western property line. The property contains the existing residence located in the center of the lot, and a new detached garage situated in the northeast corner of the site. The majority of the property slopes gently to moderately down toward the west. A paved driveway extends up to the garage and house from Lake Washington Boulevard Southeast starting near the northwestern property corner. Along the east edge of the lot is a short slope that rises to the adjacent property, which is old railroad right-of-way. This slope is generally less than 10 feet in height and has been oversteepened by past excavation in conjunction with landscaping and a previous parking space that was located to the east of the house. The area north of the house is covered with asphalt and concrete pavement. Along the west side of the house is a small covered area and landscaping. West of this is a steep slope that declines to the open ditch that runs along the eastern edge of Lake Washington Boulevard Southeast. This slope has a height of 15 to 20 feet and is steeply inclined. The majority of the slope is located within the street right-of-way. The upper two-thirds of the slope has an inclination of approximately 1:1 (Horizontal:Vertical) and is covered with mature underbrush. The lower one-third of the slope is slightly steeper, and appears to have been more recently disturbed, likely in conjunction with maintenance of the ditch and possible utility installation, as there is a fire hydrant at the toe of the slope. This western slope is much steeper than surrounding natural slopes; it is obvious that the slope was created by excavation for Lake Washington Boulevard Southeast and the ditch located alongside it.

There are no indications of instability in the slopes located on both sides of the site.

2.2 Geologic Setting: The west-facing ground on which the site is located is underlain by glacial till, which is a glacially-compressed mixture of gravel, silt and fine-grained sand. The site is mapped to be underlain by this geologic unit on the *Geologic Map of Surficial Deposits in the Seattle Quadrangle* (Yount, et. al, 1993). In undisturbed conditions, glacial till is overlain by one to 2 feet of weathered till and organic topsoil. Glacial till often contains isolated boulders.

Shallow groundwater can be found in the weathered soil perched on top of the unweathered glacial till. This groundwater is typically localized and varies with recent precipitation and the condition of the upgradient land relative to recharge through infiltration.

2.3 Subsurface Soil Conditions: Dense to very dense glacial till is exposed in the previous cuts made to the east of the house and in the excavation for the northeastern detached garage. The uppermost 4 to 5 feet of the steep slope, which is within the site boundaries, appears to consist of fill soil originally placed for yard and landscape areas around the house when the site was developed with the current home. We observed dense glacial till exposed in the lower 5 feet of the cut slope along the ditch to the west of the site.

2.4 Groundwater Conditions: During our site visits, which occurred during the fall of 2009 and winter of 2010, no indications of groundwater seepage were apparent on the slopes along the east and west sides of the site. The potential for upgradient recharge of shallow groundwater is very limited at this property, due to the topography of the old railroad right-of-way upslope to the east of the site.

2.5 Subsurface Contamination: Not Applicable to this project.

3.0 DISCUSSION AND CONCLUSIONS

3.1 Slope Stability: The glacial till soils that underlie the site, and which will support the planned construction are not susceptible to instability during static or seismic loading conditions. We conducted a slope stability analysis of the western slope using the WinStabl program. Based on the results of this analysis, the safety factor against a failure extending into the dense glacial till is in excess of 2.0 for static and 1.5 for seismic conditions. A copy of the topographic and geologic cross-section, and the critical failure surfaces for the static and seismic analyses are attached to this report.

3.2 Seismic Considerations: In accordance with Table 1613.5.2 of the 2006 International Building Code (IBC), the site soil profile within 100 feet of the ground surface is best represented by Site Class Type C (Very Dense Soil). The glacially-compressed soils that will support the foundations are not susceptible to seismic liquefaction. As noted in the USGS website, the mapped spectral acceleration value for a 0.2 second (S_s) and 1.0 second period (S_1) equals 1.44g and 0.49g, respectively. Seismic stability of the glacially-compressed soils is discussed in subsection **3.1** above.

3.3 Site Work: The only site work anticipated for this project involves excavation to reach adequate bearing soil, installation of subsurface drainage along the perimeter walls of the additions, and a small amount of backfilling of these walls. Recommendations for subsurface drainage and surface grading adjacent to the new foundation walls are presented in following sub-sections. We expect that the area between the existing house and the steep western slope will remain undisturbed. Appropriate temporary erosion control measures, as discussed below, will need to be implemented to prevent off-site impacts.

3.4 Retaining Structures: The only retaining walls anticipated for the new construction are the foundation walls for the northeastern addition. No stand-alone walls are expected.

3.5 Rockeries: New rockeries are not anticipated for the project.

3.6 Foundation Support: Conventional foundations can be used to support the additions and the new covered deck. All footings must be excavated down to dense, native soil.

4.0 RECOMMENDATIONS

4.1 Site Grading and Earthwork: The amount of grading, including filling, expected for this project is negligible. All building and pavement areas should be stripped of surface vegetation, topsoil, organic soil, and other deleterious material. The stripped or removed materials should not be mixed with any materials to be used as structural fill, but they could be used in non-structural areas, such as landscape beds.

Structural fill is defined as any fill placed under foundations or slabs, or behind permanent foundation walls. All structural fill should be placed in horizontal lifts with a moisture content at, or near, the optimum moisture content. The optimum moisture content is that moisture content that results in the greatest compacted dry density. The moisture content of fill is very important and must be closely controlled during the filling and compaction process.

If grading activities take place during wet weather, or when the silty, on-site soil is wet, site preparation costs may be higher because of delays due to rain and the potential need to import granular fill. The on-site soil is generally silty and therefore moisture sensitive. Grading operations will be difficult during wet weather, or when the moisture content of this soil exceeds the optimum moisture content.

The moisture content of the silty, on-site soil must be at, or near, the optimum moisture content, as the soil cannot be consistently compacted to the required density when the moisture content is significantly greater than optimum. The moisture content of the on-site soil was generally above the estimated optimum moisture content at the time of our explorations. The on-site silty sand underlying the topsoil could be used as structural fill, if grading operations are conducted during hot, dry weather, when drying the wetter soil by aeration is possible. During excessively dry weather, however, it may be necessary to add water to achieve the optimum moisture content.

Structural fill that will be placed in wet weather should consist of a coarse, granular soil with a silt or clay content of no more than 5 percent. The percentage of particles passing the No. 200 sieve should be measured from that portion of soil passing the three-quarter-inch sieve.

4.2 Temporary Shoring and Retaining Walls: Temporary excavation shoring will not be needed for this project. We expect that temporary sloped cuts for the foundation excavations will be possible in the dense soils without the use of shoring.

Permanent foundation walls taller than approximately 2 feet that are backfilled on only one side should be designed to resist the lateral earth pressures imposed by the soil they retain.

The following recommended parameters are for walls that restrain level backfill:

PARAMETER	Value
Active Earth Pressure *	40 pcf
Passive Earth Pressure	300 pcf
Coefficient of Friction	0.45
Soil Unit Weight	130 pcf

Where: (i) pcf is pounds per cubic foot, and (ii) active and passive earth pressures are computed using the equivalent fluid pressures.

*** For a restrained wall that cannot deflect at least 0.002 times its height, a uniform lateral pressure equal to 10 psf times the height of the wall should be added to the above active equivalent fluid pressure.**

The values given above are to be used to design only permanent foundation and retaining walls that are to be backfilled, such as conventional walls constructed of reinforced concrete or masonry. It is not appropriate to use the above earth pressures and soil unit weight to back-calculate soil strength parameters for design of other types of retaining walls, such as soldier pile, reinforced earth, modular or soil nail walls. We can assist with design of these types of walls, if desired. The passive pressure given is appropriate for the depth of level structural fill placed in front of a retaining or foundation wall only. The values for friction and passive resistance are ultimate values and do not include a safety factor. We recommend a safety factor of at least 1.5 for overturning and sliding, when using the above values to design the walls. Restrained wall soil parameters should be utilized for a distance of 1.5 times the wall height from corners or bends in the walls. This is intended to reduce the amount of cracking that can occur where a wall is restrained by a corner.

The design values given above do not include the effects of any hydrostatic pressures behind the walls and assume that no surcharges, such as those caused by slopes, vehicles, or adjacent foundations will be exerted on the walls. If these conditions exist, those pressures should be added to the above lateral soil pressures. Where sloping backfill is desired behind the walls, we will need to be given the wall dimensions and the slope of the backfill in order to provide the appropriate design earth pressures. Heavy construction equipment should not be operated behind retaining and foundation walls within a distance equal to the height of a wall, unless the walls are designed for the additional lateral pressures resulting from the equipment.

Wall Pressures Due to Seismic Forces

The surcharge wall loads that could be imposed by the design earthquake can be modeled by adding a uniform lateral pressure to the above-recommended active pressure. The recommended surcharge pressure is 7**H** pounds per square foot (psf), where **H** is the design retention height of the wall. Using this increased pressure, the safety factor against sliding and overturning can be reduced to 1.2 for the seismic analysis.

Retaining Wall Backfill and Waterproofing

Backfill placed behind retaining or foundation walls should be coarse, free-draining structural fill containing no organics. This backfill should contain no more than 5 percent silt or clay particles and have no gravel greater than 4 inches in diameter. The percentage of particles passing the No. 4 sieve should be between 25 and 70 percent. The on-site soils are silty, and are not free-draining. If these soils are dry enough to be adequately compacted, and are used as wall backfill, a minimum 12-inch width of free-draining gravel should be placed against the backfilled retaining walls. This would allow rapid downward movement of water to the footing drain system.

The purpose of these backfill requirements is to ensure that the design criteria for a retaining wall are not exceeded because of a build-up of hydrostatic pressure behind the wall. The top 12 to 18 inches of the backfill should consist of a compacted, relatively impermeable soil or topsoil, or the surface should be paved. The ground surface must also slope away from backfilled walls to reduce the potential for surface water to percolate into the backfill.

It is critical that the wall backfill be placed in lifts and be properly compacted, in order for the above-recommended design earth pressures to be appropriate. The wall design criteria assume that the backfill will be well-compacted in lifts no thicker than 12 inches. The compaction of backfill near the walls should be accomplished with hand-operated equipment to prevent the walls from being overloaded by the higher soil forces that occur during compaction.

The above recommendations are not intended to waterproof below-grade walls, or to prevent the formation of mold, mildew or fungi in interior spaces. Over time, the performance of subsurface drainage systems can degrade, subsurface groundwater flow patterns can change, and utilities can break or develop leaks. Therefore, waterproofing should be provided where future seepage through the walls is not acceptable. This typically includes limiting cold-joints and wall penetrations, and using bentonite panels or membranes on the outside of the walls. There are a variety of different waterproofing materials and systems, which should be installed by an experienced contractor familiar with the anticipated construction and subsurface conditions. Applying a thin coat of asphalt emulsion to the outside face of a wall is not considered waterproofing, and will only help to reduce moisture generated from water vapor or capillary action from seeping through the concrete. As with any project, adequate ventilation of basement and crawl space areas is important to prevent a build up of water vapor that is commonly transmitted through concrete walls from the surrounding soil, even when seepage is not present. This is appropriate even when waterproofing is applied to the outside of foundation and retaining walls. We recommend that you contact a specialty consultant if detailed recommendations or specifications related to waterproofing design, or minimizing the potential for infestations of mold and mildew are desired.

4.3 Rockeries: Not Applicable to expected scope of development.

4.4 Reinforced Soil Structures: Not Applicable to expected scope of development.

4.5 Structure and Foundations: All new foundations should bear on dense, native soils. We recommend that continuous and individual spread footings have minimum widths of 12 and 16 inches, respectively. Exterior footings should also be bottomed at least 18 inches below the lowest adjacent finish ground surface for protection against frost and erosion. The local building codes should be reviewed to determine if different footing widths or embedment depths are required. Footing subgrades must be cleaned of loose or disturbed soil prior to pouring concrete. Depending upon site and equipment constraints, this may require removing the disturbed soil by hand.

An allowable bearing pressure of 2,000 pounds per square foot (psf) is appropriate for footings supported on competent native soil. A one-third increase in this design bearing pressure may be used when considering short-term wind or seismic loads. For the above design criteria, it is anticipated that the total post-construction settlement of footings founded on competent native soil will be less than one inch, with differential settlements on the order of one-quarter inch in a distance of 25 feet along a continuous footing with a uniform load.

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

PARAMETER	ULTIMATE VALUE
Coefficient of Friction	0.45
Passive Earth Pressure	300 pcf

Where: (i) pcf is pounds per cubic foot, and (ii) passive earth pressure is computed using the equivalent fluid density.

If the ground in front of a foundation is loose or sloping, the passive earth pressure given above will not be appropriate. We recommend maintaining a safety factor of at least 1.5 for the foundation's resistance to lateral loading, when using the above ultimate values.

4.6 Floors: Where slab-on-grade floors are used, the subgrade soil must be in a firm, non-yielding condition at the time of slab construction or underslab fill placement. Any soft areas encountered should be excavated and replaced with select, imported structural fill.

Even where the exposed soils appear dry, water vapor will tend to naturally migrate upward through the soil to the new constructed space above it. This can affect moisture-sensitive flooring, cause imperfections or damage to the slab, or simply allow excessive water vapor into the space above the slab. All interior slabs-on-grade should be underlain by a capillary break or drainage layer consisting of a minimum 4-inch thickness of gravel or crushed rock that has a fines content (percent passing the No. 200 sieve) of less than 3 percent and a sand content (percent passing the No. 4 sieve) of no more than 10 percent.

As noted by the American Concrete Institute (ACI) in the *Guides for Concrete Floor and Slab Structures*, proper moisture protection is desirable immediately below any on-grade slab that will be covered by tile, wood, carpet, impermeable floor coverings, or any moisture-sensitive equipment or products. ACI also notes that vapor *retarders*, such as 6-mil plastic sheeting, have been used in the past, but are now recommending a minimum 10-mil thickness. A vapor retarder is defined as a material with a permeance of less than 0.3 perms, as determined by

ASTM E 96. It is possible that concrete admixtures may meet this specification, although the manufacturers of the admixtures should be consulted. Where vapor retarders are used under slabs, their edges should overlap by at least 6 inches and be sealed with adhesive tape. The sheeting should extend to the foundation walls for maximum vapor protection. If no potential for vapor passage through the slab is desired, a vapor *barrier* should be used. A vapor barrier, as defined by ACI, is a product with a water transmission rate of 0.01 perms when tested in accordance with ASTM E 96. Reinforced membranes having sealed overlaps can meet this requirement.

4.7 Pavements: Not Applicable to expected scope of development.

4.8 Utilities: Not Applicable to expected scope of development.

4.9 Drainage: Refer to sub-section **4.6** for water and moisture control beneath floor slabs. A vapor retarder/barrier similar to that discussed in sub-section 4.6 should be included in any crawl space area. An outlet drain and a layer of at least 4 inches of free-draining gravel should also be provided below the vapor retarder/barrier in any crawl space area to prevent an accumulation of subsurface water that may bypass the perimeter foundation drains.

Foundation drains should be used where (1) crawl spaces or basements will be below a structure, (2) a slab is below the outside grade, or (3) the outside grade does not slope downward from a building. Drains should also be placed at the base of all earth-retaining walls. These drains should be surrounded by at least 6 inches of 1-inch-minus, washed rock and then wrapped in non-woven, geotextile filter fabric (Mirafi 140N, Supac 4NP, or similar material). At its highest point, a perforated pipe invert should be at least 6 inches below the bottom of a slab floor or the level of a crawl space, and it should be sloped for drainage. All roof and surface water drains must be kept separate from the foundation drain system. A typical drain detail is attached to this report. For the best long-term performance, perforated PVC pipe is recommended for all subsurface drains.

Final site grading in areas adjacent to a foundation wall should slope away at least 2 percent, except where the area is paved. Surface drains should be provided where necessary to prevent ponding of water behind foundation or retaining walls.

4.10 Hazards and Mitigation: The proposed new construction will be located no closer than 15 feet to the crest of the steep western slope. The area that will be disturbed by the northwestern addition and the portion of the new covered deck closest to the western slope is currently covered by asphalt pavement. The footings for the new construction are to bear on dense glacial till. The glacial till soils that underlie the property are relatively incompressible and have a very high internal strength. In order to prevent the project from increasing the landslide potential on the western slope, we recommend the following:

- Leave the steep slope, including its existing vegetated cover, undisturbed.
- Place no new fill in the area between the house and the steep slope. If desired, some of the existing fill could be removed in this area, provided the excavation stops at the face of the steep slope. Soil resulting from excavation should either be used for backfill on the east side of the house, or be hauled off the site.
- Excavate all new footings, including those for the deck down to dense, native soil.

- Avoid discharging concentrated water from impervious areas toward the slope.

The steep slope to the west of the proposed work area appears to have been created by past grading, but it is not excessively tall. Considering the competent nature of the underlying soils that will support the additions and new deck, and the fact that the new construction will not encroach closer to the steep slope than the existing house, we support a modification to Bellevue Land Use Code (LUC) 20.25H.120, which requires a 50-foot buffer from steep slopes. The planned construction of the additions and the northern deck will not adversely affect the stability of the steep slope, nor would future soil movement on the slope affect the new construction, provided the recommendations of this report are followed. The buffer area has already been degraded by past construction and grading for the house, and paving of the driveway and parking areas. The planned construction will not cause additional degradation of the buffer area, nor will it adversely impact stability of the slope. In fact, the planned construction may improve slope stability slightly, as the runoff from the additions and covered deck will be discharged off the site away from the steep slope.

Beyond the above recommended measures, no mitigation, such as planting additional vegetation, is necessary for the project to encroach into the minimum 50-foot buffer area.

The 1990 King County *Sensitive Areas Map Folio* shows the steep manmade slope west of the site to be mapped as an erosion hazard area. This is due to the inclination of the slope. The slope is covered with well-established vegetation and does not pose an erosion hazard in its current condition. The proposed project will not disturb the slope, or result in grading close to the slope that could increase the potential for erosion. We expect that only minimal erosion control measures will be needed for this project, due to the very limited amount of ground disturbance expected. It is likely that a silt fence will not be needed, and would not be effective for this project. The foundation excavations should be covered with plastic or crushed rock during wet weather to prevent silty runoff. Any temporary stockpiles should be covered with plastic in wet conditions. Trucks and other equipment should be kept on the existing pavement or gravel-covered areas to prevent tracking soil or mud off the site. Excavations should be backfilled as quickly and possible, and the rough-graded ground surface covered with mulch, straw, plastic or another appropriate erosion control element until permanent landscaping is complete.

LIMITATIONS

The conclusions and recommendations contained in this report are based on site conditions as they existed at the time of our site visit. If the subsurface conditions encountered during construction are significantly different from those anticipated, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. Unanticipated soil conditions are commonly encountered on construction sites. Such unexpected conditions frequently require making additional expenditures to attain a properly constructed project.

This report has been prepared for the exclusive use of Craig Schaff and his representatives for specific application to this project and site. Our recommendations and conclusions are based on the site materials observed and on previous experience with sites that have similar observed conditions. The conclusions and recommendations are professional opinions derived in accordance with current standards of practice within the limited scope of our services. No warranty is expressed or implied.

If you have any questions, or if we may be of further service, please do not hesitate to contact us.

Respectfully submitted,

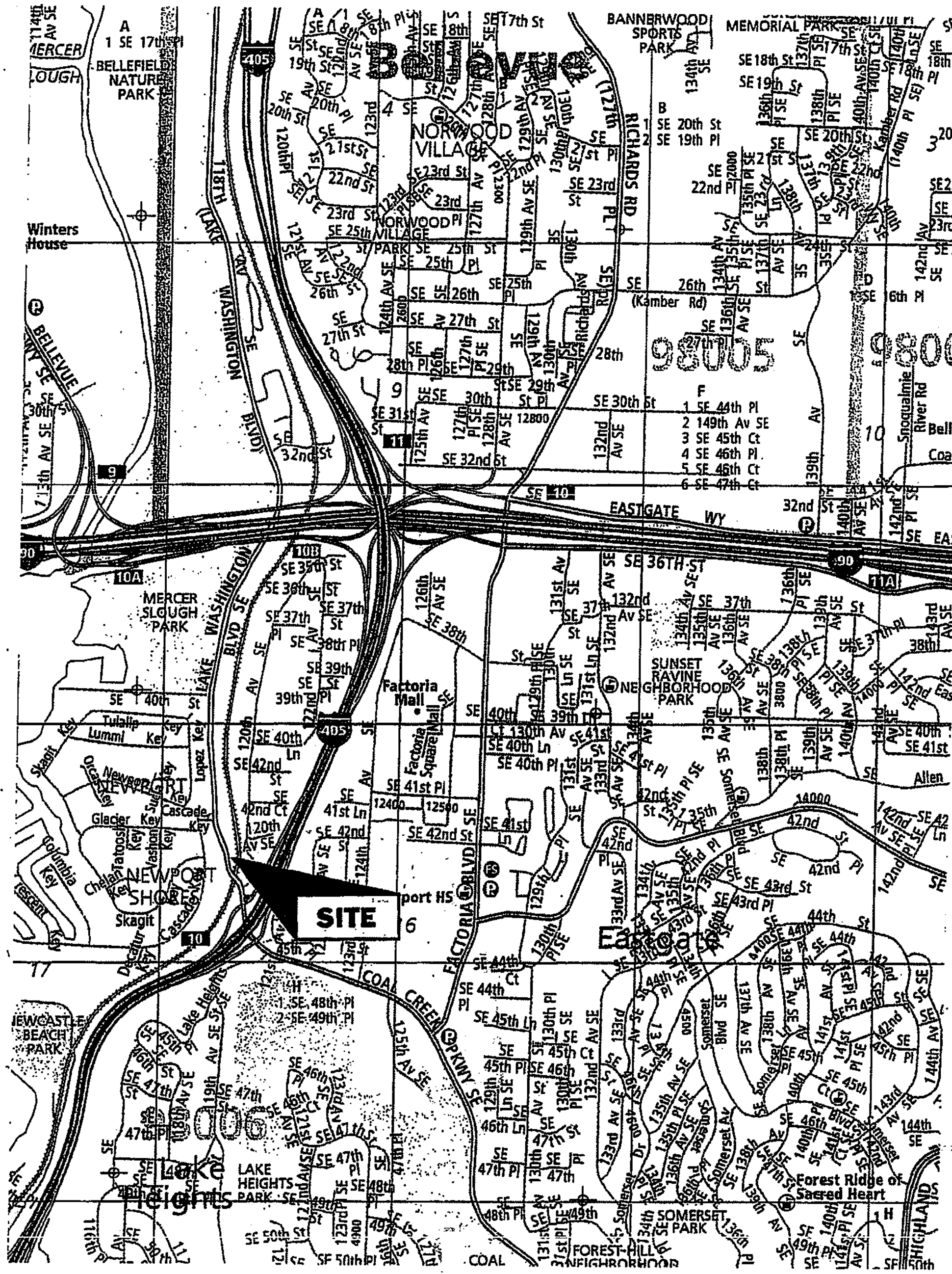
GEOTECH CONSULTANTS, INC.

Marc R. McGinnis, P.E.
Principal

cc: **Greg Jones**
via email
Dona Architecture
via email

Attachments-Vicinity Map, Site Plan, Footing Drain Detail, Slope Stability Analyses

MRM: jyb



NORTH

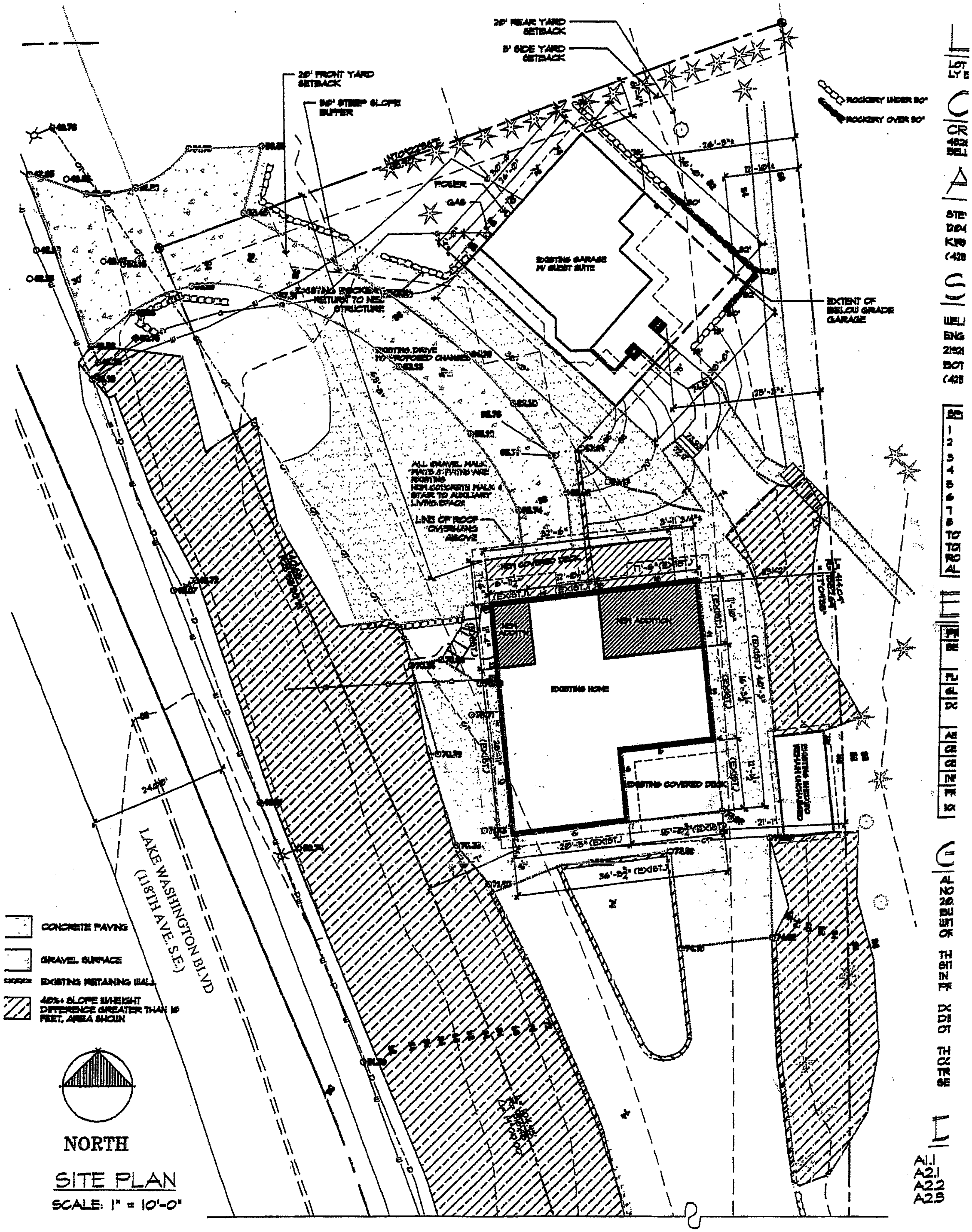
(Source: Thomas Brothers Street Guide and Directory)

GEOTECH
CONSULTANTS, INC.

VICINITY MAP

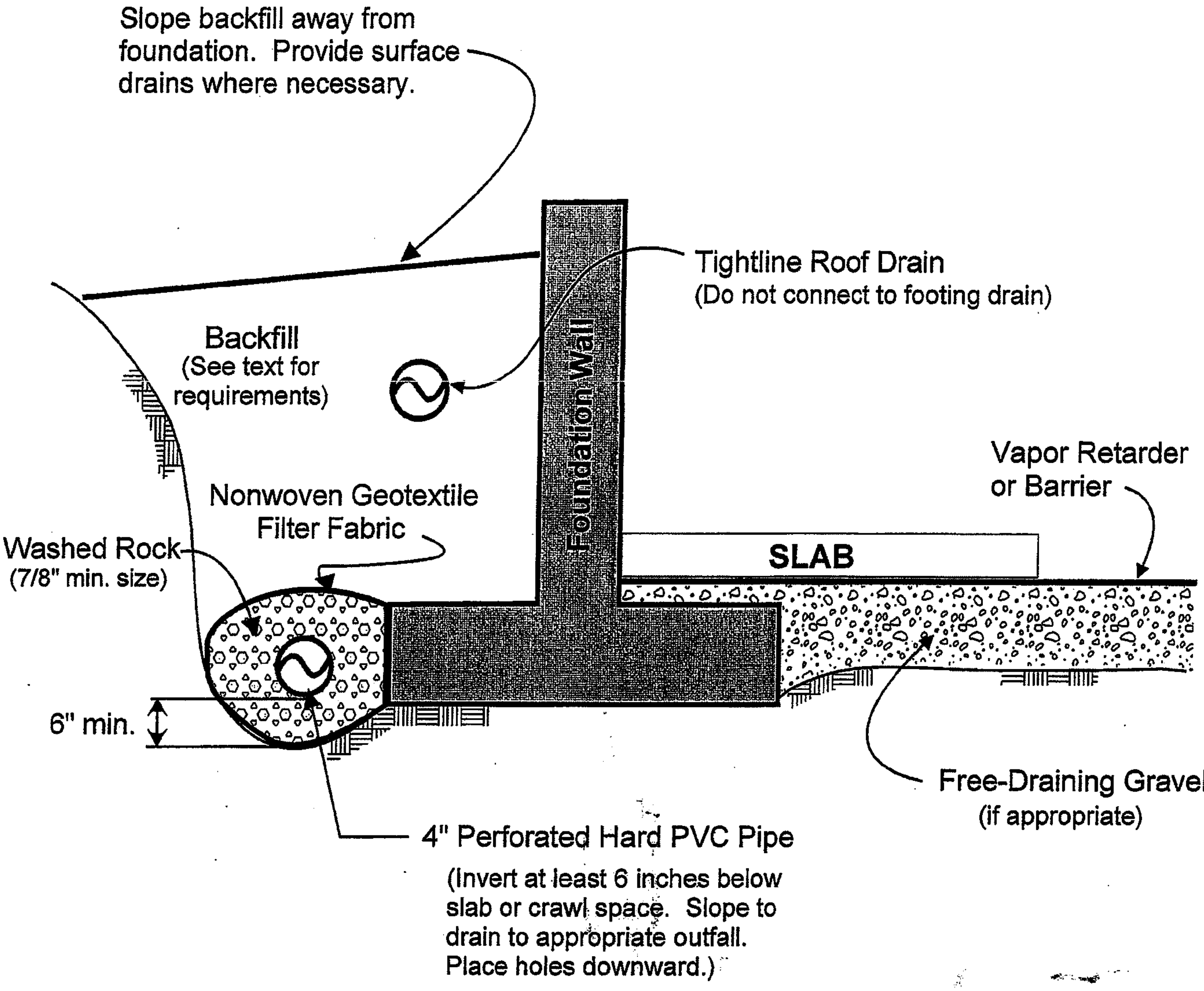
4326 Lk. Wash. Blvd. N.E.
Bellevue, Washington

Job No:	***Date:***		***Plate:***
09310	April 2010	Not To Scale	



SITE PLAN

SCALE: 1" = 10'-0"



NOTES:

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

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

GEOTECH CONSULTANTS, INC.

TYPICAL FOOTING DRAIN

4326 Lk. Wash. Blvd. N.E.
Bellevue, Washington

Job	Date:	Scale:	Plate:
09310	April 2010	Not to Scale	

Profile.out
** PCSTABL6 **

by
Purdue University

modified by
Peter J. Bosscher
University of Wisconsin-Madison

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

PROBLEM DESCRIPTION

BOUNDARY COORDINATES

5 Top Boundaries
6 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	0.00	10.00	10.00	10.00	2
2	10.00	10.00	17.00	15.00	2
3	17.00	15.00	40.00	30.00	1
4	40.00	30.00	55.00	30.00	1
5	55.00	30.00	75.00	30.00	2
6	17.00	15.00	55.00	30.00	2

ISOTROPIC SOIL PARAMETERS

2 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	125.0	135.0	0.0	28.0	0.00	0.0	0
2	140.0	150.0	0.0	45.0	0.00	0.0	0

A Critical Failure Surface Searching Method, Using A Random

Technique For Generating Circular Surfaces, Has Been Specified.

40 Trial Surfaces Have Been Generated.

20 Surfaces Initiate From Each Of 2 Points Equally Spaced
Along The Ground Surface Between X = 10.00 ft.
and X = 20.00 ft.

Each Surface Terminates Between X = 55.00 ft.
and X = 65.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = 10.00 ft.

5.00 ft. Line Segments Define Each Trial Failure Surface.

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 11 Coordinate Points

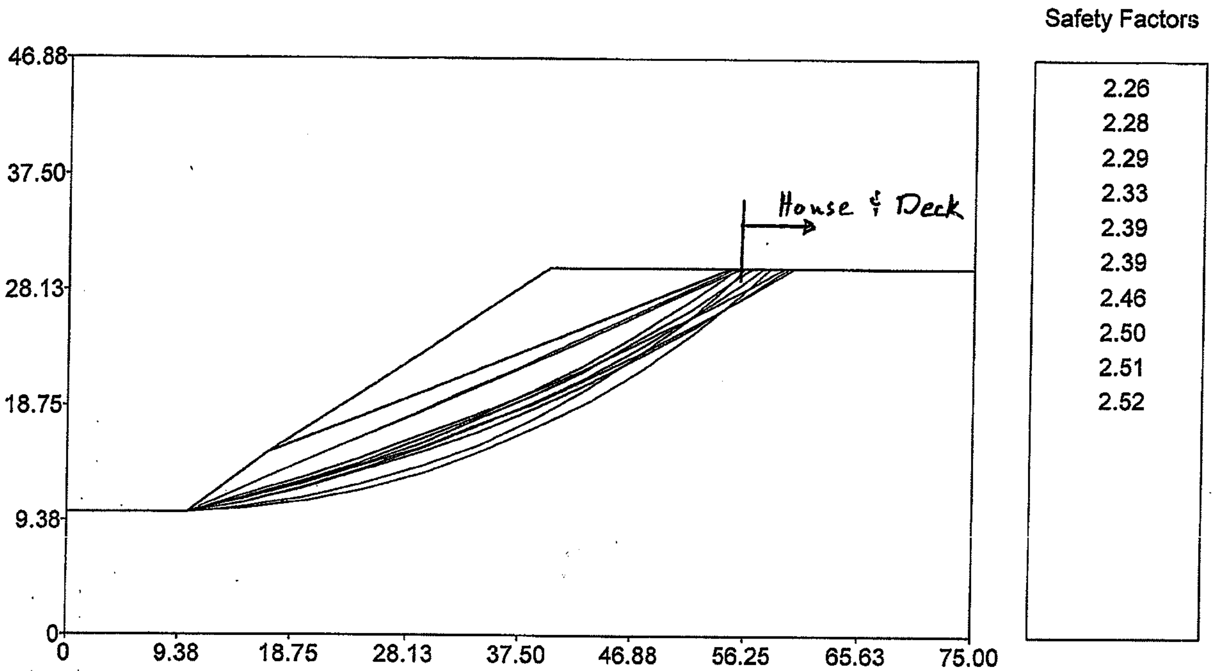
Point No.	X-Surf (ft)	Y-Surf (ft)
1	10.00	10.00
2	14.59	11.99
3	19.18	13.98
4	23.76	15.98
5	28.34	17.98
6	32.91	20.00
7	37.49	22.02
8	42.06	24.05
9	46.62	26.09
10	51.19	28.13
11	55.35	30.00

Circle Center At X = ****** ; Y = 2866.3 and Radius, 3110.9

*** 2.263 ***

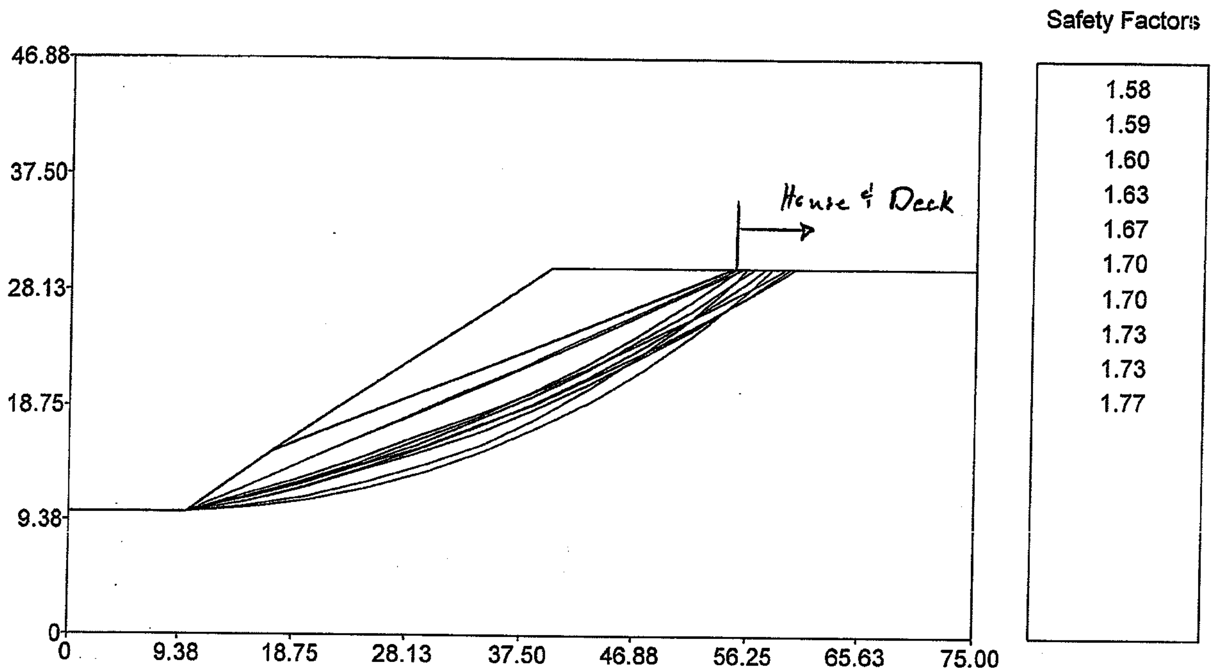
Failure Surface Specified By 12 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)



Safety Factors
2.26
2.28
2.29
2.33
2.39
2.39
2.46
2.50
2.51
2.52
46.88
37.50
28.13
18.75
9.38
0
0
9.38
18.75
28.13
37.50
46.88
56.25
65.63
75.00
House & Deck

Static


Safety Factors
1.58
1.59
1.60
1.63
1.67
1.70
1.70
1.73
1.73
1.77
House & Deck
46.88
37.50
28.13
18.75
9.38
0
0
9.38
18.75
28.13
37.50
46.88
56.25
65.63
75.00

Earthquake