GEOTECHNICAL ENGINEERING REPORT
SIDHU RESIDENCE
COVINGTON, WASHINGTON
FOR
HSGC GENERAL CONTRACTORS

ROBINSON NOBLE

October 17, 2012

Mr. Sunny Singh
HSGC General Contractors
5313 Highland Drive Southeast
Auburn, Washington 98092

Geotechnical Engineering Report
Sidhu Residence
Covington, Washington
RN File No. 2744-001A

Dear Mr. Singh:

This letter serves as a transmittal for three copies of our report for the Sidhu Residence located at 28625 – 176th Avenue Southeast in Covington. The explorations identified approximately 2 to 6 feet of undocumented fill above the medium dense to very dense undisturbed glacial soils.

We appreciate the opportunity of working with you on this project. If you have any questions regarding this report, please contact us.

Sincerely,

Rick B. Powell, PE
Principal Engineer

BAG:RBP:am

Three Copies Submitted
Six Figures
Appendix A

TABLE OF CONTENTS

INTRODUCTION

This report presents the results of our geotechnical engineering investigation at your proposed single-family residential project in the Covington area of King County, Washington. The site is located at 28625 – 176th Avenue Southeast, as shown on the Vicinity Map in Figure 1.

You have requested that we complete this report to evaluate subsurface conditions and provide recommendations for site development.

PROJECT DESCRIPTION

The development will consist of a new single family residence. A detailed grading plan has not been completed to date, but based on topography we anticipate site grading will include cuts and fills of approximately 10 to 15 feet depending on the siting of the residence.

SCOPE

The purpose of this study is to explore and characterize the subsurface conditions and present recommendations for site development. Specifically, our scope of services as outlined in our Services Agreement, dated June 21, 2012 includes the following:

- Review available geologic maps for the site.
- Explore the subsurface soil and groundwater conditions using hand augers.
- Prepare a geotechnical report containing the results of our subsurface explorations, and our conclusions and recommendations for geotechnical design elements of the project. Our report will include:
    - Description of the geologic materials encountered.
    - Description of depth to groundwater, if encountered.
    - Discussion of seismicity at the site along with seismic design parameters including Site Class and site coefficients based on current IBC criteria.
    - Recommendations for shallow foundations including allowable soil bearing values, minimum footing sizes, soil parameters for lateral load resistance, and footing drains.
    - Estimate the total and differential settlements of spread footings and floor slabs for variable loading within the building.
    - Geotechnical recommendations and considerations for support of concrete slab-on-grade floors.
    - Recommendations for parking subgrade preparation.
    - Recommendations for earthwork and site preparation. An evaluation of the effects of weather and/or construction equipment on site soils and mitigation of any unsuitable soil conditions at the site will be included.

SITE CONDITIONS

Surface Conditions

The roughly rectangular-shaped project site is about 0.37 acres in size and has maximum dimensions of approximately 135 feet in the east-west direction and 140 feet in the north-south direction. Access to the site is provided by 176th Avenue Southeast, bordering the easten edge of the site. The site is bordered to the north by undeveloped land and to the south and west by a private drive. A layout of the site is shown on the Site Plan in Figure 2.

The ground surface within the site slopes moderately to steeply down to the northeast. The site is vegetated mostly with blackberry bushes, ivy, ferns and several small- to- medium sized deciduous and evergreen trees. An approximately 1 to 1½ foot high rockery exists along the southern border of the site.

Geology

Most of the Puget Sound Region was affected by past intrusion of continental glaciation. The last period of glaciation, the Vashon Stade of the Fraser Glaciation, ended approximately 14,000 years ago. Many of the geomorphic features seen today are a result of scouring and overriding by glacial ice. During the Vashon Stade, areas of the Puget Sound region were overridden by over 3,000 feet of ice. Soil layers overridden by the ice sheet were compacted to a much greater extent than those that were not. Part of a typical glacial sequence within the area of the site includes the following soil deposits from newest to oldest:

Artificial Fill (af) – Fill material is often locally placed by human activities, consistency will depend on the source of the fill. The thickness and expanse of this material will be dependent of extent of fill required to grade land to the desired elevations. Density of the fill will depend on earthwork activities and compaction efforts made during the placement of the material. Fill ranging in depth from approximately 2 to 6 feet was disclosed in all the explorations

Recessional Outwash (Qvr) – These deposits were derived from the stagnating and receding Vashon glacier and consist of mostly of stratified sand and gravel, but include unstratified ablation and melt-out deposits. Recessional deposits were not compacted by the glacier and are typically not as dense as those that were.

Vashon Till (Qvt) – The till is a non-sorted mixture of clay, sand, pebbles, cobbles and boulders, all in variable amounts. The till was deposited directly by the ice as it advanced over and eroded irregular surfaces of previously deposited formations and sediments. The till was well compacted by the advancing glacier and exhibits high strength and stability. Drainage is considered very poor in the till. Vashon Till was observed in all of the explorations.

The geologic units for this area are mapped on the Geologic Map of the King County, Washington, by Derek B. Booth and Aaron P. Wisher (GeoMapNW, 2006). The site is mapped as being underlain by a deposit of recessional outwash and glacial till. Our site explorations encountered fill and glacial till.

Explorations

We explored subsurface conditions within the site on August 1, 2012, by excavating hand augers to depths ranging from 0.5 to 1.0 feet below the ground surface. Samples were obtained from the explorations at 0.5 feet. Due to the gravelly soils at shallow depths, we further explored the site with test pits on September 28, 2012. The test pits were completed with a subcontracted trackhoe, and ranged in depth from 6.2 to 10.0 feet below the ground surface. The hand augers and test pits were located in the field by representatives from this firm who also examined the soils and geologic conditions encountered, and maintained logs of the explorations. The approximate locations of the hand augers and test pits are shown on the Site Plan in Figure 2. The soils were visually classified in general accordance with the Unified Soil Classification System, a copy of which is presented as Figure 3. The logs of the hand augers and test pits are presented in Figures 4 through 6.

Subsurface Conditions

A brief description of the conditions encountered in our explorations is included below. For a more detailed description of the soils encountered, review the Hand Auger Logs in Figure 4, and the Test Pit Logs in Figures 5 and 6.

Brown, loose, silty gravel with sand and silty sand with gravel and trace debris interpreted as undocumented fill was encountered in all of the explorations ranging from 2.1 feet in Test Pit 4 to 6 feet in Test Pit 5. This was underlain by medium dense to very dense silty fine sand with varying amounts of gravel interpreted as weathered and unweathered glacial till in all the test pits, to the depths explored.

Hydrologic Conditions

Shallow groundwater seepage was not encountered in any of the test pits. The dense to very dense till interpreted to underlie the site is considered poorly draining. During the wetter times of the year, we expect perched water conditions will occur as pockets of water on top of the till layer. Perched water does not represent a regional groundwater "table" within the upper soil horizons. Volumes of perched groundwater vary depending upon the time of year and the upslope recharge conditions.

GEOLOGIC HAZARDS

Erosion Hazard

The erosion hazard criteria used for determination of affected areas includes soil type, slope gradient, vegetation cover, and groundwater conditions. The erosion sensitivity is related to vegetative cover and the specific surface soil types (group classification), which are related to the underlying geologic soil units. We reviewed the Web Soil Survey (WSS) on the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) website for the King County Area, Washington to determine the erosion hazard of the on-site soils. The site surface soils were classified using the NRCS classification system as Alderwood gravelly sandy loam (AgD). The corresponding geologic unit for these soils is till, which is in agreement with the soils encountered in our site explorations. The erosion hazard for the soil is listed as being slight for the moderately to steeply sloping conditions at the site.

Seismic Hazard

It is our opinion based on our subsurface explorations that the Soil Profile, in accordance with the 2009 and 2012 International Building Code (IBC), is Site Class C with Seismic Design Category D. We used the US Geological Survey program "U.S. Seismic Design Maps Web

Application". The design maps summary reports with seismic design values are included in this report as Appendix A.

Additional seismic considerations include liquefaction potential and amplification of ground motions by soft soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. The underlying dense till soils are considered to have a very low potential for liquefaction and amplification of ground motion.

CONCLUSIONS AND RECOMMENDATIONS

General

It is our opinion that the site is compatible with the planned development. The underlying medium to very dense glacial till deposits are capable of supporting the planned structures and pavements. We recommend that the foundations for the structures extend through any fill, topsoil, loose, or disturbed soils, and bear on the underlying medium dense or firmer, native glacial soils, or on structural fill extending to these soils. Based on our site explorations, we anticipate these soils will generally be encountered at depths ranging from 2.4 to 6.0 feet below ground surface.

Site Preparation and Grading

The first step of site preparation should be to strip the vegetation, topsoil, fill, or loose soils to expose medium dense or firmer native soils in pavement and building areas. Approximately 2 ½ to 4 feet of fill was observed in Test Pits 1 through 4, and 6 feet of fill was encountered in Test Pit 5. The excavated material should be removed from the site, or stockpiled for later use as landscaping fill. The resulting subgrade should be compacted to a firm, non-yielding condition. Areas observed to pump or yield should be repaired prior to placing hard surfaces.

The on-site glacial till likely to be exposed during construction is considered highly moisture sensitive, and the surface will disturb easily when wet. We expect these soils would be difficult, if not impossible, to compact to structural fill specifications in wet weather. We recommend that earthwork be conducted during the drier months. Additional expenses of wet weather or winter construction could include extra excavation and use of imported fill or rock spalls. During wet weather, alternative site preparation methods may be necessary. These methods may include utilizing a smooth-bucket trackhoe to complete site stripping and diverting construction traffic around prepared subgrades. Disturbance to the prepared subgrade may be minimized by placing a blanket of rock spalls or imported sand and gravel in traffic and roadway areas. Cutoff drains or ditches can also be helpful in reducing grading costs during the wet season. These methods can be evaluated at the time of construction.

Structural Fill

General: All fill placed beneath buildings, pavements or other settlement sensitive features should be placed as structural fill. Structural fill, by definition, is placed in accordance with prescribed methods and standards, and is observed by an experienced geotechnical professional or soils technician. Field observation procedures would include the performance of a representative number of in-place density tests to document the attainment of the desired degree of relative compaction.

Materials: Imported structural fill should consist of a good quality, free-draining granular soil, free of organics and other deleterious material, and be well graded to a maximum size of about 3 inches. Imported, all-weather structural fill should contain no more than 5 percent fines (soil finer than a Standard U.S. No. 200 sieve), based on that fraction passing the U.S. 3/4-inch sieve.

The use of on-site soil as structural fill will be dependent on moisture content control. Some drying of the native soils may be necessary in order to achieve compaction. During warm, sunny days this could be accomplished by spreading the material in thin lifts and compacting. Some aeration and/or addition of moisture may also be necessary. We expect that compaction of the native soils to structural fill specifications would be difficult, if not impossible, during wet weather.

Fill Placement: Following subgrade preparation, placement of the structural fill may proceed. Fill should be placed in 8- to 10-inch-thick uniform lifts, and each lift should be spread evenly and be thoroughly compacted prior to placement of subsequent lifts. All structural fill underlying building areas, and within a depth of 2 feet below pavement and sidewalk subgrade, should be compacted to at least 95 percent of its maximum dry density. Maximum dry density, in this report, refers to that density as determined by the ASTM D1557 compaction test procedure. Fill more than 2 feet beneath sidewalks and pavement subgrades should be compacted to at least 90 percent of the maximum dry density. The moisture content of the soil to be compacted should be within about 2 percent of optimum so that a readily compactable condition exists. It may be necessary to overexcavate and remove wet surficial soils in cases where drying to a compactable condition is not feasible. All compaction should be accomplished by equipment of a type and size sufficient to attain the desired degree of compaction.

Temporary and Permanent Slopes

Temporary cut slope stability is a function of many factors, such as the type and consistency of soils, depth of the cut, surcharge loads adjacent to the excavation, length of time a cut remains open, and the presence of surface or groundwater. It is exceedingly difficult under these variable conditions to estimate a stable temporary cut slope geometry. Therefore, it should be the responsibility of the contractor to maintain safe slope configurations, since the contractor is continuously at the job site, able to observe the nature and condition of the cut slopes, and able to monitor the subsurface materials and groundwater conditions encountered.

For planning purposes, we recommend that temporary cuts in the near-surface weathered soils or fill should be no steeper than 1.5 Horizontal to 1 Vertical (1.5H:1V). Cuts in the dense to very dense till may stand at a 0.75H:1V inclination or possibly steeper. If groundwater seepage is encountered, we would expect that flatter inclinations would be necessary.

We recommend that cut slopes be protected from erosion. Measures taken may include covering cut slopes with plastic sheeting and diverting surface runoff away from the top of cut slopes. We do not recommend vertical slopes for cuts deeper than 4 feet, if worker access is necessary. We recommend that cut slope heights and inclinations conform to local and WISHA/OSHA standards.

Final slope inclinations for granular structural fill and the native soils should be no steeper than 2H:1V. Lightly compacted fills, common fills, or structural fill predominately consisting of fine grained soils should be no steeper than 3H:1V. Common fills are defined as fill material with some organics that are "trackrolled" into place. They would not meet the compaction specification of structural fill. Final slopes should be vegetated and covered with straw or jute netting. The vegetation should be maintained until it is established.

Foundations

Conventional shallow spread foundations should be founded on undisturbed, medium dense or firmer soil. If the soil at the planned bottom of footing elevation is not suitable, it should be overexcavated to expose suitable bearing soil. Footings should extend at least 18 inches below the lowest adjacent finished ground surface for frost protection. Minimum foundation widths should conform to IBC requirements. Standing water should not be allowed to accumulate in footing trenches. All loose or disturbed soil should be removed from the foundation excavation prior to placing concrete.

For foundations constructed as outlined above, we recommend an allowable design bearing pressure of 2,000 pounds per square foot (psf) be used for the footing design. IBC guidelines should be followed when considering short-term transitory wind or seismic loads. Potential foundation settlement using the recommended allowable bearing pressure is estimated to be less than 1-inch total and ½-inch differential between footings or across a distance of about 30 feet. Higher soil bearing values may be appropriate with wider footings. These higher values can be determined after a review of a specific design.

Lateral Loads

The lateral earth pressure acting on retaining walls is dependent on the nature and density of the soil behind the wall, the amount of lateral wall movement, which can occur as backfill is placed, and the inclination of the backfill. Walls that are free to yield at least one-thousandth of the height of the wall are in an "active" condition. Walls restrained from movement by stiffness or bracing are in an "at-rest" condition. Active earth pressure and at-rest earth pressure can be calculated based on equivalent fluid density. Equivalent fluid densities for active and at-rest earth pressure of 35 pounds per cubic foot (pcf) and 55 pcf, respectively, may be used for design for a level backslope. Equivalent fluid densities for active and at-rest earth pressure of 50 pounds per cubic foot (pcf) and 80 pcf, respectively, may be used for design for a 2H:1V backslope. These values assume that the on-site soils or imported granular fill are used for backfill, and that the wall backfill is drained. The preceding values do not include the effects of surcharges, such as due to foundation loads or other surface loads. Surcharge effects should be considered where appropriate. The above drained active and at-rest values should be increased by a uniform pressure of 6.5H and 20.0H psf, respectively, when considering seismic conditions for a level backslope. The above drained active and at-rest values should be increased by a uniform pressure of 24.4H and 20.0H psf, respectively, when considering seismic conditions for a 2H:1V backslope. H represents the wall height.

The above lateral pressures may be resisted by friction at the base of the wall and passive resistance against the foundation. A coefficient of friction of 0.5 may be used to determine the base friction in the native glacial soils. An equivalent fluid density of 285 pcf may be used for passive resistance design. To achieve this value of passive pressure, the foundations should be poured "neat" against the native dense soils, or compacted fill should be used as backfill against the front of the footing, and the soil in front of the wall should extend a horizontal distance at least equal to three times the foundation depth. A factor of safety of 1.5 has been applied to the passive pressure to account for required movements to generate these pressures. The friction coefficient does not include a factor of safety.

All wall backfill should be well compacted. Care should be taken to prevent the buildup of excess lateral soil pressures due to overcompaction of the wall backfill.

Slabs-On-Grade

Slab-on-grade areas should be prepared as recommended in the **Site Preparation and Grading** subsection. Slabs should be supported on medium dense or firmer native soils, or on structural fill extending to these soils. Where moisture control is a concern, we recommend that slabs be underlain by 6 inches of pea gravel for use as a capillary break. A suitable vapor barrier, such as heavy plastic sheeting, should be placed over the capillary break. An additional 2-inch-thick damp sand blanket can be used to cover the vapor barrier to protect the membrane and to aid in curing the concrete. This will also help prevent cement paste bleeding down into the capillary break through joints or tears in the vapor barrier. The capillary break material should be connected to the footing drains to provide positive drainage.

Drainage

We recommend that runoff from impervious surfaces, such as roofs, driveway and access roadways, be collected and routed to an appropriate storm water discharge system. The finished ground surface should be sloped at a gradient of 5 percent minimum for a distance of at least 10 feet away from the buildings, or to an approved method of diverting water from the foundation, per IBC Section 1803.3. Surface water should be collected by permanent catch basins and drain lines, and be discharged into a storm drain system.

We recommend that footing drains be used around all of the structures where moisture control is important. The underlying till may pond water that could accumulate in crawlspaces. It is good practice to use footing drains installed at least 1 foot below the planned finished floor slab or crawlspace elevation to provide drainage for the crawlspace. At a minimum, crawlspaces should be sloped to drain to an outlet tied to the drainage system. If drains are omitted around slab-on-grade floors where moisture control is important, the slab should be a minimum of 1 foot above surrounding grades.

Where used, footing drains should consist of 4-inch-diameter, perforated PVC pipe that is surrounded by free-draining material, such as pea gravel. Footing drains should discharge into tightlines leading to an appropriate collection and discharge point. Crawlspaces should be sloped to drain, and a positive connection should be made into the foundation drainage system. For slabs-on-grade, a drainage path should be provided from the capillary break material to the footing drain system. Roof drains should not be connected to wall or footing drains.

Our experience with moderately to steeply-sloping till sites is that the volume of water collected by residence foundation drains and routed to the stormwater detention system is insignificant when considered in the storm drainage design. We do not expect that the foundation drain water will impact the design of the stormwater detention system.

Utilities

Our explorations indicate that deep dewatering will not be needed to install standard depth utilities. Anticipated groundwater is expected to be handled with pumps in the trenches. We also expect that some groundwater seepage may develop during and following the wetter times of the year. We expect this seepage to mostly occur in pockets. We do not expect significant volumes of water in these excavations.

The soils likely to be exposed in utility trenches after site stripping are considered highly moisture sensitive. We recommend that they be considered for trench backfill during the drier portions of the year. Provided these soils are within 2 percent of their optimum moisture content, they should be suitable to meet compaction specifications. During the wet season, it may be difficult to achieve compaction specifications, therefore, soil amendment with kiln dust or cement may be needed to achieve proper compaction with the on-site materials.

Pavement Subgrade

The performance of roadway or driveway pavement is critically related to the conditions of the underlying subgrade. We recommend that the subgrade soils within the roadways be prepared as described in the **Site Preparation and Grading** subsection of this report. Prior to placing base material, the subgrade soils should be compacted to a non-yielding state with a vibratory roller compactor and then proof-rolled with a piece of heavy construction equipment, such as a fully-loaded dump truck. Any areas with excessive weaving or flexing should be overexcavated and recompacted or replaced with a structural fill or crushed rock placed and compacted in accordance with recommendations provided in the **Structural Fill** subsection of this report.

CONSTRUCTION OBSERVATION

We should be retained to provide observation and consultation services during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, and to provide recommendations for design changes, should the conditions revealed during the work differ from those anticipated. As part of our services, we would also evaluate whether or not earthwork and foundation installation activities comply with contract plans and specifications.

USE OF THIS REPORT

We have prepared this report for HSGC General Contractors and its agents, for use in planning and design of this project. The data and report should be provided to prospective contractors for their bidding and estimating purposes, but our report, conclusions and interpretations should not be construed as a warranty of subsurface conditions.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractors' methods, techniques, sequences or procedures, except as specifically described in our report, for consideration in design. There are possible variations in subsurface conditions. We recommend that project planning include contingencies in budget and schedule, should areas be found with conditions that vary from those described in this report.

Within the limitations of scope, schedule and budget for our services, we have strived to take care that our services have been completed in accordance with generally accepted practices followed in this area at the time this report was prepared. No other conditions, expressed or implied, should be understood.

We appreciate the opportunity to be of service to you. If there are any questions concerning this report or if we can provide additional services, please call.

Sincerely,

Robinson Noble, Inc.

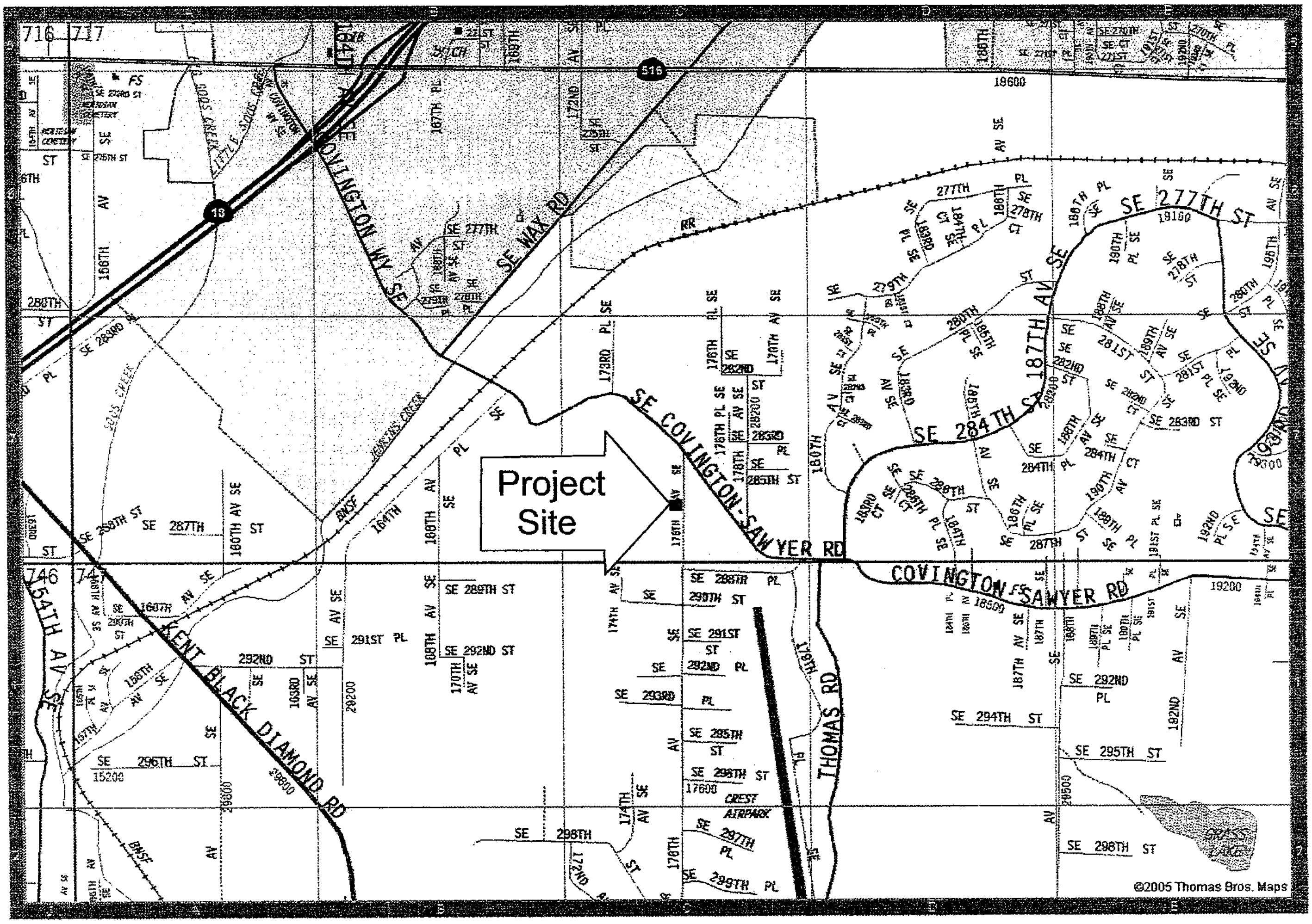
Barbara A. Gallagher, PE
Senior Project Engineer

10/17/2012

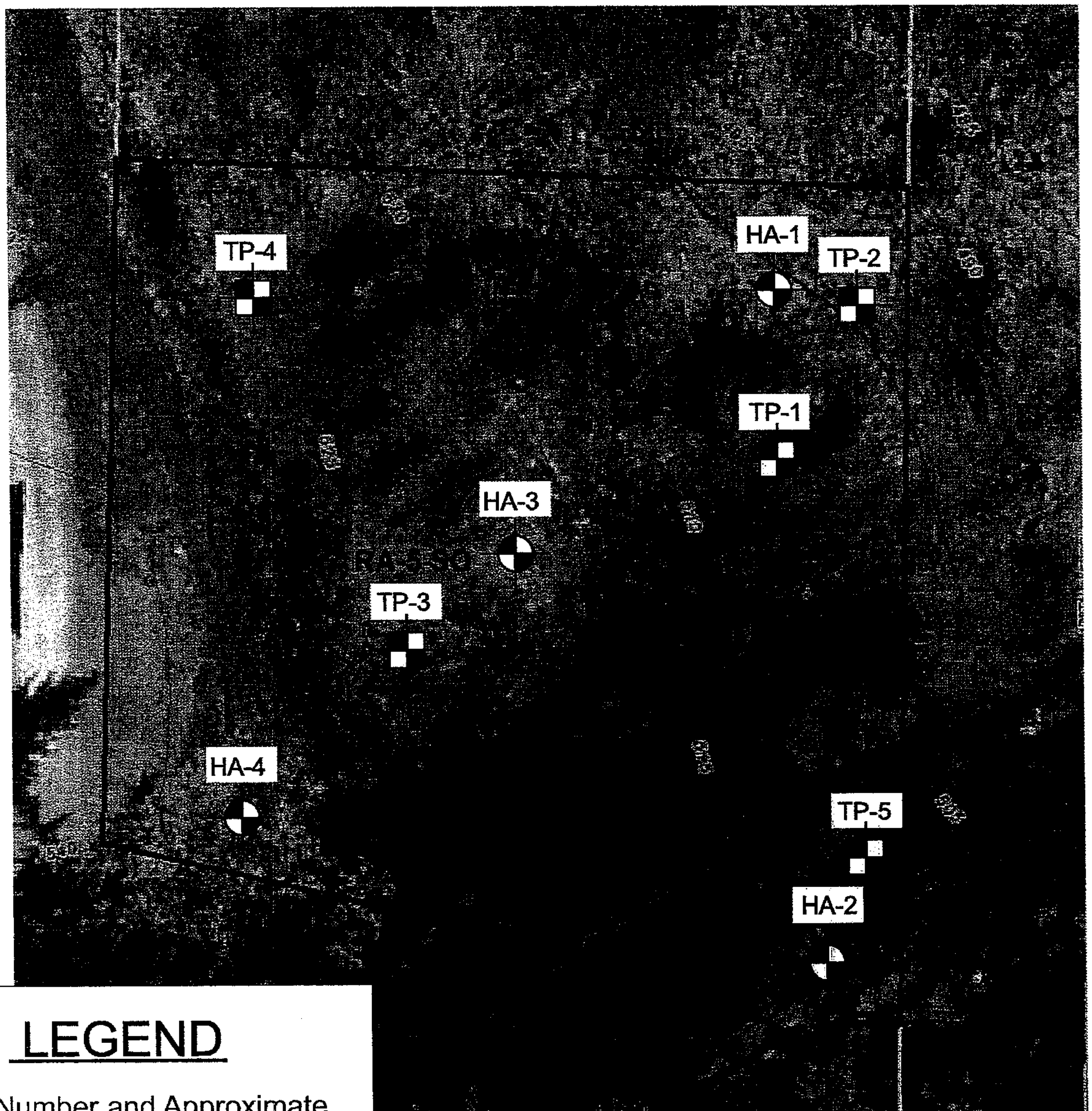
Rick B. Powell, PE
Principal Engineer

BAG:RBP:am

Three Copies Submitted
Six Figures
Appendix A



ROBINSON™ NOBLE		PM: RBP October 2012 2744-001A		Figure 1 Vicinity Map HSGC General Contractors: Sidhu Residence



LEGEND

HA-1 — Number and Approximate Location of Hand Auger

TP-1 — Number and Approximate Location of Test Pit

0' — 30'

Approximate Scale

ROBINSON NOBLE	Source: King County iMAP - Property Information (http://www.metrokc.gov/GIS/iMAP) 8/2/2012	PM: RBP October 2012 2744-001A		Figure 2 Site Plan HSGC General Contractors: Sidhu Residence

Unified Soil Classification System

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE - GRAINED SOILS MORE THAN 50% RETAINED ON number 200 SIEVE	GRAVEL MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND MORE THAN 50% OF COARSE FRACTION PASSES NO. 4 SIEVE	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE - GRAINED SOILS MORE THAN 50% PASSES NO. 200 SIEVE	SILT AND CLAY LIQUID LIMIT LESS THAN 50%	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY LIQUID LIMIT 50% OR MORE	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1) Field classification is based on visual examination of soil in general accordance with ASTM D 2488-83.
2) Soil classification using laboratory tests is based on ASTM D 2487-83.
3) Descriptions of soil density or consistency are based on interpretation of blowcount data, visual appearance of soils, and/or test data.

SOIL MOISTURE MODIFIERS

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

Moist- Damp, but no visible water

Wet- Visible free water or saturated, usually soil is obtained from below water table

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Figure 3

Unified Soil Classification System

HSGC General Contractors: Sidhu Residence

LOG OF EXPLORATION

DEPTH	USC	SOIL DESCRIPTION
HAND AUGER ONE		
0.0 – 1.0	SM	Brown silty fine to medium sand with roots and gravel(loose, moist) **(FILL)**
		Samples were collected at 0.5 feet Groundwater seepage was not encountered Hand auger caving was not encountered Hand auger refusal at 1.0 feet on 8/1/2012
HAND AUGER TWO		
0.0 – 0.5	SM	Brown silty fine sand with roots and gravel(loose, moist) **(FILL)**
		Samples were collected at 0.5 feet Groundwater seepage was not encountered Hand auger caving was not encountered Hand auger refusal at 0.5 feet on 8/1/2012
HAND AUGER THREE		
0.0 – 0.5	SM	Brown silty fine sand with roots and gravel(loose, moist) **(FILL)**
		Samples were collected at 0.5 feet Groundwater seepage was not encountered Hand auger caving was not encountered Hand auger refusal at 0.5 feet on 8/1/2012
HAND AUGER FOUR		
0.0 – 1.0	SM	Brown silty fine sand with roots and gravel(loose, moist) **(FILL)**
		Samples were collected at 0.5 feet Groundwater was not encountered Hand auger caving was not encountered Hand auger refusal at 1.0 feet on 8/1/2012

LOG OF EXPLORATION

DEPTH	USC	SOIL DESCRIPTION
TEST PIT ONE		
0.0 – 0.5	SM	Brown silty sand with gravel, grass, ivy and blackberry roots (loose, dry to moist) **(TOPSOIL)** (MC = 5.9%)
0.5 – 3.0	GM	Brown silty gravel with sand and trace cobbles (medium dense to dense, dry to moist) **(FILL)** (MC = 5.3%)
3.0 – 6.0	SM	Brownish-gray silty fine sand with gravel (very dense, moist) **(TILL)** (MC=8.2%)
6.0 – 8.0	SM	Gray silty gravelly fine sand with trace cobbles (very dense, moist) **(TILL)** (MC=9.1%)
		Samples were collected at 0.4, 2.5, 4.0 and 8.0 feet Groundwater seepage was not encountered Test pit caving was not encountered Test pit was completed at 8.0 feet on 9/28/2012
TEST PIT TWO		
0.0 – 4.0	SM	Brown silty sand with gravel (loose, moist) **(FILL)** (MC=6.6%)
4.0 – 7.0	SM	Reddish brown to brown silty fine silty sand with gravel (medium dense, moist) **(WEATHERED TILL)** (MC = 4.9%)
7.0 – 9.0	SM	Brownish gray silty sand with trace gravel and cobbles (dense to very dense, moist) **(TILL)** (MC=7.3%)
		Samples were collected at 2.0, 4.2, and 9.0 feet Groundwater seepage was not encountered Test pit caving was not encountered Test pit was completed at 9.0 feet on 9/28/2012
TEST PIT THREE		
0.0 – 0.5	SM	Brown silty sand with trace gravel with grass and blackberry roots (loose, moist) **(TOPSOIL)**
0.5 – 3.8	SM	Brown silty fine to medium sand with gravel and trace organics (loose to medium dense, moist) **(FILL)** (MC=6.2%)
3.8 – 6.0	SM	Reddish-brown silty fine sand with gravel and trace cobbles (dense, moist) **(WEATHERED TILL)** (MC=6.2%)
6.0 – 8.0	SM	Grayish-brown silty fine sand with trace cobbles (very dense, moist) **(TILL)**
8.0 – 8.3	SM	Gray silty fine sand with trace gravel and trace silt clasts **(TILL)** (very dense, moist) (MC=13%)
		Samples were collected at 3.0, 4.0 and 8.3 feet Groundwater seepage was not encountered Test pit caving was not encountered Test pit was completed at 8.3 feet on 9/28/2012

MC = Moisture Content

LOG OF EXPLORATION

DEPTH	USC	SOIL DESCRIPTION
TEST PIT FOUR		
0.0 – 2.1	SM	Brown silty sand with fine gravel and cobbles (loose, dry to moist) **(FILL)** (MC=5.8%)
2.1 – 2.4	SP	Dark brown fine sand with gravel, roots and trace cobbles (loose, moist) (MC=4.9%)
2.4 – 6.0	SM	Reddish-brown silty fine sand with gravel (medium dense to dense, moist) **(WEATHERED TILL)** (MC=7.0%)
6.0 – 9.5	SM	Grayish-brown silty fine sand with gravel and trace cobbles (very dense, moist) **(TILL)** (MC=7.9%)
9.5 – 10.0	SM	Brownish-gray silty fine sand with gravel and trace cobbles (very dense, moist) **(TILL)** (MC=8.0%)
		Samples were collected at 2.0, 2.3, 4.0, 7.0 and 10.0 feet Groundwater seepage was not encountered Test pit caving was not encountered Test pit was completed at 10.0 feet on 9/28/2012
TEST PIT FIVE		
0.0 – 3.0	SM	Dark brown silty sand with gravel and trace debris (loose, moist) **(FILL)** (MC=16.0%)
3.0 – 6.0	SM	Brown and gray silty sand with gravel and timber (loose, moist) **(FILL)** (MC=9.1%)
6.0 – 6.2	SM	Reddish-brown silty fine to coarse sand with gravel, trace clay and cobbles (loose to medium dense, moist) **(WEATHERED TILL)** (MC=11.6%)
		Samples were collected at 2.0 and 6.0 feet Groundwater seepage was not encountered Test pit caving was not encountered Test pit was completed at 6.2 feet on 9/28/2012

MC = Moisture Content

Appendix A

Centre Pointe Consultants,
P.O. Box 6639
Kent, WA 98064

Invoice

Invoice #
3293
Date
5/16/2012

PAID

Bill To
HSGC Hospitality Stones LLC 5313 Highland Dr. SE Auburn, WA 98092

Phone #	Fax #
253-813-1901	253-813-1908

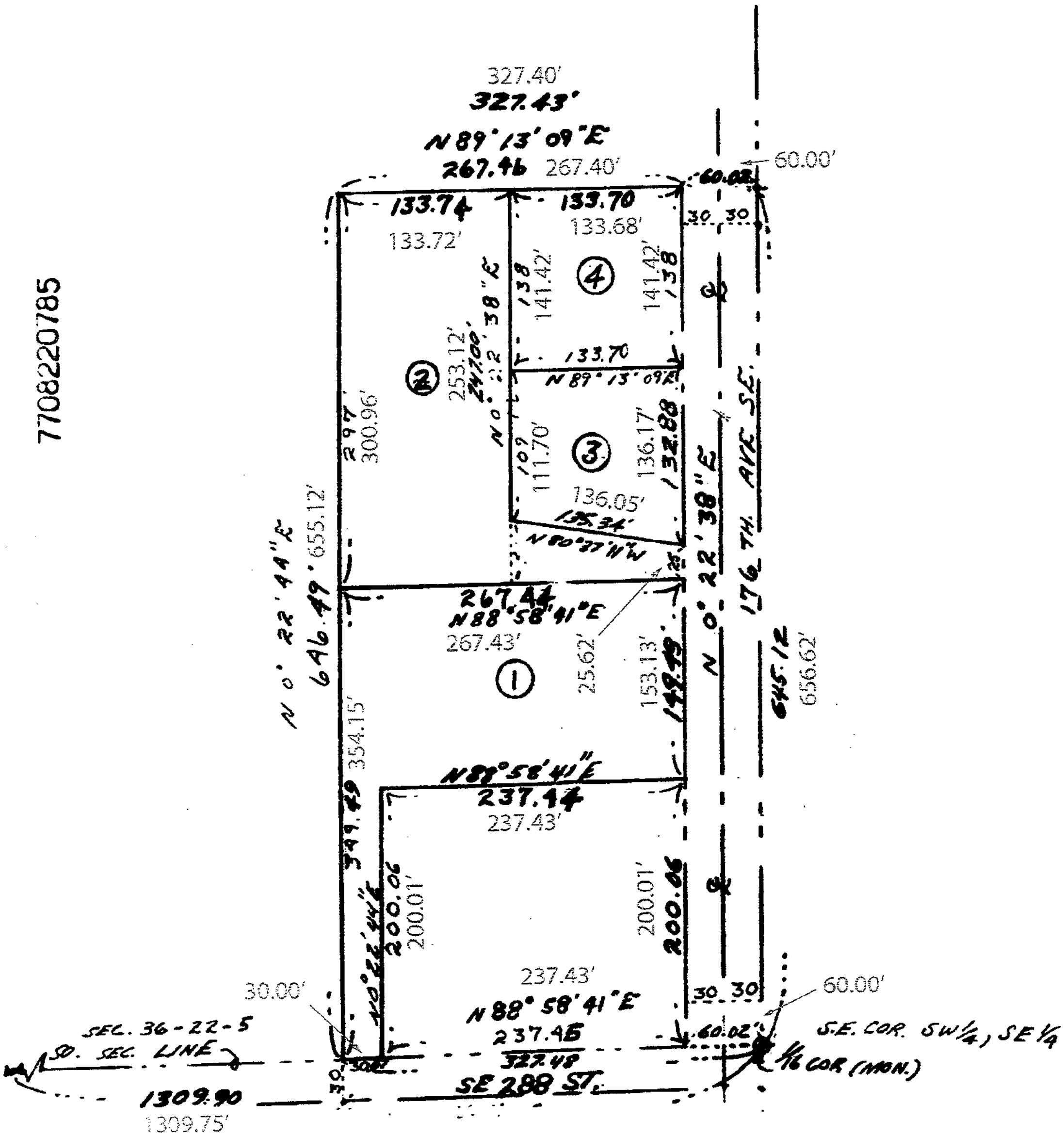
	Terms	Due Date	Project
www.CPConsult.us	Net 30	6/15/2012	Covington

Item	Description	Quote	Prior %	Curr %	Total...	Rate	Qty	Amount
Stake Boundary		800.00		100.00%	100.00%	800.00		800.00

Terms are 30 days
Thank You

Total	$800.00
Payments/Credits	$-800.00
Balance Due	$0.00

7708220785



\# 10442

Map on File in Vault

Direction:

Scale: 0 50 100 150 200 250

Short Plat No: 676007