EnviroSound Consulting Inc.

Geotechnical & Environmental Consulting

Limited Geotechnical Engineering Report

Project Information

Project Name: Poulsbo Recycling Center
Project Location: Poulsbo, Washington
Client: Edward Rose & Sons
Project #: ESC17-G037
Date: June 21, 2017

Company Information

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LIMITED GEOTECHNICAL ENGINEERING REPORT

POULSBO RECYCLING CENTER
VIKING WAY
POULSBO, WASHINGTON

Prepared for:

EDWARD ROSE & SONS
38525 WOODWARD AVENUE
BLOOMFIELD HILLS, MICHIGAN 48303

Prepared by:
ENVIROSOUND CONSULTING, INC.
P. O. BOX 776
TRACYTON, WASHINGTON 98393

Project No. ESC17-G037
June 21, 2017

EnviroSound Consulting Geotechnical & Environmental Consulting

June 21, 2017 Project: ESC17-G037

Edward Rose & Sons
Mr. Lindon Ivezaj, P. E.
38325 Woodward Avenue
Bloomfield, Michigan 48303

Limited Geotechnical Engineering Report
Proposed Access Road
21868 Viking Avenue NW
Poulsbo, Washington 98370
Parcel No: 102601-4-028-2003 & 112601-3-003-2003

Dear Mr. Ivezaj,

Submitted herewith is a report for EnviroSound Consulting's limited geotechnical engineering investigation for the subject project. The report presents findings from our limited geotechnical engineering investigation and provides recommendations for geotechnical engineering aspects of project design.

We appreciate the opportunity to work with you on this project. If we can be of further assistance, or if you have any questions regarding this project, please contact our office.

Sincerely yours,

Shawn E. Williams, L.E.G.
Senior Engineering Geologist

Michael F. Wnek, P.E.
Michael F. Wnek, P. E., P. S.

Enclosures

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1.0 INTRODUCTION

EnviroSound Consulting (EnviroSound) was retained by Edward Rose & Sons to conduct a limited geotechnical engineering investigation for the site located at 21868 Viking Avenue NW, in Poulsbo, Washington. The investigation was completed for a proposed access road and for general informational purposes for any potential buildings, and was performed in general accordance with our proposal ESC17- GE100.1 dated May 23, 2017.

In addition to the subsurface exploration program and site reconnaissance discussed in a following section, the following resource materials were referenced in the preparation of this report.

Resources used:

- "Slope Stability, Kitsap County, Washington", Jerry Deeter, 1979.
- "Geologic map of surficial deposits in the Seattle 30' by 60' quadrangle, Washington", Yount et al., 1993.
- "Geologic Map of Washington – Northwest Quadrant", Washington State Department of Natural Resources, Division of Geology and Earth Resources, GM – 50, 2002.
- U.S.G.S. 7.5-minute series topographic map "USGS Poulsbo Topographic Map".

1.1 Site Location

This subject property is located at 21868 Viking Avenue NW in Poulsbo, Washington. According to the United States Geologic Survey (USGS), 7.5 minute Poulsbo Washington topographic quadrangle map, the property is located in the City of Poulsbo in Section 10, Township 26 North, Range 1 East, 47°45'27.87" N and 122°39'03.95" W. The site location is shown on the Vicinity Map, Figure 1.

1.2 Proposed Construction

Based on our discussions and review of the preliminary site plan, we understand that the proposed site work includes the construction of an access road for the adjacent parcels to the east and proposed development. The proposed location of the access road was still in the preliminary stages at the time of this report. Long range plans may include buildings on the property at a later date.

1.3 Purpose

The purpose of this investigation was to provide geotechnical engineering recommendations for construction of a proposed access road. It is our understanding that proposed buildings may be designed and constructed at a later date. Specific recommendations are provided for site preparation, earthwork, excavations, utilities, drainage, erosion control with general recommendations for any potential buildings.

2.0 SITE INVESTIGATION

(RESULTANT PARCELS I-IV OF BLA BEING SUBMITTED CONCURRENTLY)

2.1 Site Description

The area of the study is located at 21868 Viking Avenue NW in Poulsbo, Washington and consists of two parcels. The larger of the two parcels is currently developed with a recycling facility. The southwestern portion of the parcel is paved with drop-off containers, liquid receptacles and portable structures are located along the perimeter of the paved area. A stormwater detention pond is located on the eastern portion of the site. The northern and eastern portion of the site are forested with mixed evergreen and deciduous trees. The topography changes from 177 feet at the northwestern portion of

the property to approximately 157 feet on the eastern portion of the lot and approximately 140 feet on the southeast portion of the property. There is a slight north-south trending ~~swale area~~ on the property.

UNNAMMED, TYPE Ns STREAM

2.2 Geologic Setting

The subject site lies within the central Puget Lowland. The lowland is part of a regional north-south trending trough that extends from southwestern British Columbia to near Eugene, Oregon. North of Olympia, Washington, this lowland is glacially carved with a depositional and erosional history including at least four separate glacial advance/retreats. The Puget Lowland is bounded on the west by the Olympic Mountains and on the east by the Cascade Range. The lowland is filled with glacial and nonglacial sediments consisting of interbedded gravel, clay, sand, silt, till, and peat lenses.

The Washington Division of Geology and Earth Resource (WDGER), Geologic Map of Washington - Northwest Quadrant indicates that the site is in a contact zone between Vashon recessional outwash deposits (Qvr), Transitional Beds (Qtb) and Vashon till (Qvt). Vashon recessional outwash deposits consists of a complex of poorly to moderately sorted and stratified gravel and sand with minor amount of silt and clay. Transitional Beds include interbedded light brown to gray clay silt and fine- to medium-grained sand. Vashon till is composed of light to dark gray, nonsorted, nonstratified mixture of clay, silt, sand and gravel.

2.3 Subsurface Exploration

The subsurface conditions at the project site were explored by drilling six (6) borings, designated B-1 through B-6, on June 5, 2017. Geologic Drill Exploration Inc. of Spokane, Washington, under subcontract to EnviroSound drilled the borings using a truck mounted hollow stem auger drill rig. Exploration depths went to a maximum depth of 19.0 feet below the existing ground surface (bgs). The approximate locations of the borings are shown in Figure 1 and were determined in the field by measuring relative to existing site features.

Split Spoon (1-3/8 inch inner diameter) samples were obtained from the borings in general accordance with Standard Penetration Test Procedures (ASTM D 1586), at 5-foot intervals. The split spoon sampler is driven 18 inches into the soil by a 140-lb hammer falling 30 inches. The number of blows required to drive the sampler are counted for each 6 inches of penetration. The blow count for the first 6 inches of penetration is discarded, and the remaining blow counts are summed to produce the Standard Penetration Resistance (N). Samples of the soils encountered in the borings were collected in plastic bags and returned to our office for further review. The logs of the borings can be found in Appendix A.

2.3.1 Soil

The soils encountered in the borings were relatively consistent. Boring B-1 encountered a packed gravel base, Borings B-2, B-3 and B-4 encountered a thin layer of topsoil. There was a 6-inch to 1-foot cap of forest duff material often with roots in borings B-5 and B-6. The near surface soil was typically underlain by a loose to medium dense reddish tan or tan, sandy Silt with gravels to a depth of approximately 2.5 feet. With the exception of fill materials in boring B-1, the silty sand was underlain by layers of dense to very dense silty Sand or sandy Silt with gravels. All of the borings were terminated in very dense glacial Till to the depths explored. The till consisted of gravelly silty sand.

Detailed descriptions of the soils encountered in the borings are presented in Appendix A. Boring locations are shown on Figure 1.

2.3.2 Groundwater

Groundwater seepage was encountered in boring B-1 at 12.5 feet, B-2 at 7.5 feet, B-5 at 15.0 feet, and B-6 at 14.0 feet. There was standing water in the detention pond at the time of the fieldwork.

Water table elevations can fluctuate with time. Groundwater levels are typically influenced by seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors. Groundwater level observations at the time of the field investigation may vary from those encountered during the construction phase of the project.

2.4 Seattle Fault

Based on our review of the United States Geological Survey (USGS) information for the Seattle Fault Zone and available LIDAR (Puget Sound LIDAR Consortium) information for the Poulsbo area, the subject site lies within the generally delineated area of the Seattle Fault Zone. Although fault surface ruptures have not been mapped or observed in the Poulsbo area, surface ruptures of Seattle Fault strands have been observed and mapped on south Bainbridge Island approximately 10.0 miles away.

3.0 CONCLUSIONS AND RECOMMENDATIONS

3.1 General

The proposed access road appears to be feasible from a geotechnical standpoint provided the recommendations provided in this report are followed. Based on the findings of this investigation and previous geotechnical experience in the area of this project, it is our opinion that the proposed access road can be placed on the subject parcels with standard grading practices. We recommend that EnviroSound be involved in the process of planning the construction, configurations and elevations for the proposed road. We also recommend that EnviroSound review future building plans, as these documents become available, to verify that geotechnical recommendations are applicable.

Dense to very dense soils were encountered in the 6 exploratory borings, to depths ranging from 2.5 feet to 7.5 feet.

3.2 Erosion Control

A Storm Water Pollution Prevention Plan (SWPPP) is required for all projects that disturb greater than 7,000 square feet. The SWPPP will be prepared by others. Native soils contain moderate amount of silt. Basic erosion control measures should be adequate to trap sediments within the project limits, in light of the moderate area of disturbance proposed for development.

3.3 Drainage

Roadway surfaces should be sloped for drainage, and ground surfaces should be sloped away from buildings; with runoff directed into an appropriately designed stormwater disposal system. Design of stormwater disposal and/or mitigation systems shall be according to local codes and regulations.

3.4 Foundations

Buildings can be supported on perimeter foundations founded on the medium dense soil encountered in the borings or upon compacted structural fill that has been placed over competent native soils. Footings founded in the medium dense soil or fill could be designed for an allowable bearing load pressure of 2,000 pounds per square foot (psf). Footings should have adequate embedment for local frost penetration requirements. In the area of this project, the minimum depths are typically 18 inches for exterior footings and 12 inches for interior footings.

The allowable bearing pressures given could be increased by one-third for wind or earthquake loads.

Footing excavations should be cleaned of all loose soil, leveled, and protected from water. Footing excavations should be kept free of water at all times. If the soils in the footing become wet it is recommended that the wet/soft soils be excavated to suitable soil and replaced with crushed rock.

Each footing excavation should be evaluated by a representative of EnviroSound to confirm suitable bearing conditions and to determine that all loose materials have been removed.

Lateral footing displacement can be resisted by friction along the base of the foundation and passive pressure acting against the appropriate footing faces. We recommend an allowable friction factor of 0.4 and an allowable equivalent fluid passive pressure of 240 psf/ft of depth. These values include a factor of safety of 1.5 for the allowable friction factor and 2.0 for the allowable equivalent fluid passive pressure.

3.5 Floor Slabs

All fills under slab-on-grade floors, including backfills for footing excavations, utilities, etc., should be structural fill placed over medium dense or denser original ground. Floor slab subgrade areas should be evaluated by a representative of the geotechnical engineer. Re-compaction of in place soils may be recommended for subgrade improvement.

A vapor barrier consisting of plastic sheeting is recommended beneath a slab-on-grade floor. The moisture barrier system should be installed in accordance with ASTM guidelines. The vapor barrier can be placed over a layer of washed pea gravel or clean crushed rock a minimum of 4 inches in thickness. The crushed rock could be compacted with a vibrating plate compactor in order to provide a working surface on which to place the reinforcement and concrete.

3.6 Pavement

In the exploratory borings placed on the property we encountered soils consisting of loose to dense sand with silt. We assigned this soil a relative quality of "Fair". The access road will be a public road subject to the City of Poulsbo standards of 4-inches asphalt, 4-inches top coarse and a 6-inch gravel base.

Prior to the placement of surfacing we recommend that the subgrade be proof rolled with heavy construction equipment such as a loaded dump truck or water truck to ensure that the subgrade is relatively stiff and unyielding.

3.7 Earthwork Considerations

During wet weather conditions, which are typically present from October through April, subgrade stability problems and grading difficulties may develop due to high moisture content in the soil, disturbance of sensitive soils. Therefore, we recommend that earthwork activity be performed during the dry season.

3.7.1 Groundwater Concerns

Groundwater seepage was encountered in borings B-1 at 12.5 feet, B-2 at 7.5 feet, B-5 at 15.0 feet, and B-6 at 14.0 feet. There was standing water in the detention pond at the time of the fieldwork.

Water table elevations fluctuate with time, being dependent upon seasonal precipitation, irrigation, land use, and climatic conditions, as well as other factors.

3.7.2 Excavations & Constructed Slopes

It is our opinion that the soils encountered in the upper 5 to 7 feet of the borings, are Type B material as defined by the Washington Industrial Safety and Health Act's (WISHA) regulations on excavation, trenching and shoring. Temporary

slopes excavated in Type B material should be inclined no steeper than 1.0 H:1.0 V, and these slopes may need to be reduced if groundwater is encountered. A representative of our firm should evaluate temporary and permanent slopes to ensure that they are appropriate for the soils encountered during construction.

In areas where it is not possible to maintain the recommended slopes due to space constraints, temporary shoring would be required. Such shoring would need to be properly designed by an engineer.

The Contractor should be familiar with applicable local, state, and federal safety regulations, including the current WISHA regulations on excavation, trenching and shoring. Construction site safety is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations. ESC is providing this information only as a service to our client. Under no circumstances should the information provided above be interpreted to mean that ESC is assuming responsibility for construction site safety or the Contractor's activities; such responsibility is not being implied and should not be inferred.

3.7.3 Structural Fill

The majority of the near surface on site soil have a high percentage of fines and will not likely be suitable for use as structural fill during wet weather conditions, due to the high moisture sensitivity of these materials. The upper six inches to one foot of the soils will not be suitable for structural fill due to organic content such as large roots and root mats. If the earthwork is to take place during the normally wet period of the year, provisions should be in place for export of wet, moisture sensitive soil and import of granular structural fill material. Imported structural fill should consist of well-graded gravel and/or sand with a maximum grain size of 1½ inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve).

Structural fill should be placed in loose lifts no more than 12 inches thick, moisture conditioned as necessary (moisture content of soil should be within 2 percent of optimum moisture) and compacted to at least 95 percent of the maximum dry density as determined by ASTM Test Method D-1557. Additional lifts should not be placed if the previous lift did not meet the required dry density or if soil conditions are not stable. Note that, although in place density testing of fill is frequently used as the primary criterion for acceptance of fill, it should not be the only criterion. If, in the judgment of the geotechnical engineer or his representative, placed fill is not suitable it should be rejected regardless of in place density test results. As an example, fill that is compacted wet of the optimum moisture content may exhibit "pumping" behavior even if in place density test results indicate greater than 95 percent compaction has been achieved. In such a situation, the fill should be removed and replaced with drier material.

3.7.4 Utility Trench Fill

Excavations for utilities should be completed and maintained during utility installation and backfilling, in accordance with Occupational Safety and Health Administration (OSHA) requirements. The utility contractor should be responsible for maintaining safety within open trenches. Care should be taken to reduce surcharge loads and vibrations adjacent to utility excavations. Due to groundwater seepage being encountered during excavation, the contractor should allow for shoring in the event that the groundwater destabilizes the trench sidewalls.

The subsurface soils at this site generally included medium dense soils in the upper 7.0 feet. We expect that the potential for significant caving within open excavations will be low to moderate in the upper 0 to 7.0 feet, such that the utility contractor should exercise caution and be prepared to slope excavation sidewalls at gentler angles or install temporary shoring, if conditions indicate that caving may occur. The factors that may influence the potential for caving could include the depth and length of trench that is opened at any one time, along with the length of time the trench is to remain open and surface and groundwater conditions. The utility contractor should be aware of these factors and observe the excavation for signs of possible caving, such as heavy seepage and tension cracks within and above the excavation sidewalls.

Backfill for utility trenches should consist of suitable material, as described in the **Structural Fill** section of this report. Utility trench backfill placed beneath building and pavement areas should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D-1557. The utility trench backfill placed beneath pavement areas,

at depths greater than 2 feet below the final grade may be compacted to a minimum of 90 percent of the maximum dry density, as defined by ASTM Test Method D-1557. The bedding material for utility pipes should be in accordance with the manufacturer's specifications. The utility contractor should use equipment and backfill placement methods, which will reduce the possibility of damage to utilities or structures during placement and compaction.

4.0 LIMITATIONS

This report has been prepared for Edward Rose & Sons regarding the subject project. Information presented in this report has been collected and interpreted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions, and in accordance with sound and generally accepted principles consistent with normal consulting practice. No other warranty, expressed or implied, including (but not limited to) any warranty or merchantability or fitness for a particular use has been made.

Edward Rose & Sons and EnviroSound discussed the risks and rewards associated with this project, as well as EnviroSound's fee for services. Edward Rose & Sons and EnviroSound agreed to allocate certain of the risks so that, to the fullest extent permitted by law, EnviroSound's total aggregate liability to the Edward Rose & Sons is limited to $50,000 or the fee, whichever is less, for any and all injuries, claims (including any claims for costs of defense or other incurred costs), losses, expenses, or damages whatsoever arising out of or in any way related to EnviroSound's services for this project, from any cause or causes whatsoever, including but not limited to, negligence, errors, omissions, strict liability, breach of contract, breach of warranty, negligent misrepresentation, or other acts giving rise to liability based upon contract tort, or statute.

In the event that change in the nature, design, or location of the proposed construction is made, or any physical changes to the site occur, recommendations are not be considered valid unless the changes are reviewed by EnviroSound and conclusions of this report are modified or verified in writing.

The subsurface exploration logs and related information depicts conditions only at the specific locations and at the particular time designated on the logs. The passage of time may result in a change of subsurface conditions at these exploration locations. Subsurface conditions at other locations may differ from conditions occurring at the exploration locations. The nature and extent of variations of subsurface conditions between explorations are not known. If variations appear during additional explorations or construction, reevaluation of recommendations in this report may be necessary.

Stratification lines designating the interface between soil types in subsurface exploration logs represent approximate boundaries. The transition between materials may be gradual.

Analyses and recommendations provided in this report are based in part upon the data obtained from the subsurface explorations.

The scope of EnviroSound services did not include an environmental assessment for the presence or absence of hazardous and/or toxic materials, in the soil and groundwater.

Map adapted from Kitsap County–Geographic Information Systems, accessed 06–06–17

EnviroSound Consulting

FIGURE 1. Site Vicinity
Project Name: Recycle Center
Location: Poulsbo, WA
Project: ESC17–G037
Client: Edward Rose & Sons
Date: June, 2017

Legend
B-1 ESC 2017 Approximate Boring Location

N.T.S.

APPENDIX A

EnviroSound Boring Logs

ESC uses a soil classification system modified from the Unified Soil Classification (USC) System. Elements of the USC and other definitions are provided on this and the following page. Soil descriptions are based on visual-manual procedures (ASTM D 2488-93) unless otherwise noted.

ESC CLASSIFICATION OF SOIL CONSTITUENTS

- MAJOR constituents compose more than 50 percent, by weight,of the soil. Major constituents are capitalized (SAND).
- Minor constituents compose 12 to 50 percent of the soil and precede the major constituents (silty SAND). Minor constituents preceded by "slightly" compose 5 to 12 percent of the soil (slightly silty SAND).
- Trace constituents compose 0 to 5 percent of the soil (slightly silty SAND, trace of gravel).

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

ABBREVIATIONS

ATD	At Time of Drilling
Elev.	Elevation
ft	feet
HSA	Hollow Stem Auger
ID	Inside Diameter
In	Inches
lbs	pounds
Mon.	Monument cover
N	Blows for last 2 six-inch increments
NA	Not Applicable or Not Available
OD	Outside Diameter
OVA	Organic Vapor Analyzer
PID	Photolonization Detector
ppm	parts per million
PVC	Polyvinyl Chloride
SS	Split Spoon sampler
SPT	Standard Penetration Test
USC	Unified Soil Classification
WLI	Water Level Indicator

GRAIN SIZE DEFINITIONS

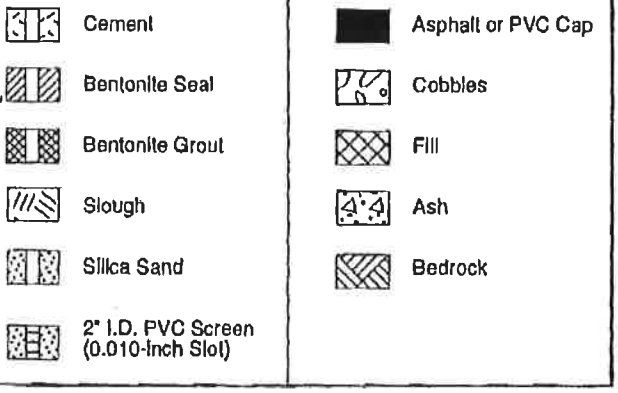
DESCRIPTION	SIEVE SIZE
FINES	< #200 (0.08 mm)
SAND*	
• Fine	• #200 - #40 (0.4 mm)
• Medium	• #40 - #10 (2 mm)
• Coarse	• #10 - #4 (5 mm)
GRAVEL*	
• Fine	• #4 - 3/4 inch
• Coarse	• 3/4 - 3 inches
COBBLES	3 - 12 inches
BOULDERS	> 12 inches

* Unless otherwise noted, sand and gravel, when present, range from fine to coarse in grain size.

RELATIVE DENSITY / CONSISTENCY

COARSE-GRAINED SOILS		FINE-GRAINED/COHESIVE SOILS	
N, SPT, BLOWS/FT.	RELATIVE DENSITY	N, SPT, BLOWS/FT.	RELATIVE CONSISTENCY
0 - 4	Very loose	<2	Very soft
4 - 10	Loose	2 - 4	Soft
10 - 30	Medium dense	4 - 8	Medium stiff
30 - 50	Dense	8 - 15	Stiff
Over 50	Very dense	15 - 30	Very stiff
		Over 30	Hard

WELL AND OTHER SYMBOLS



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UNIFIED SOIL CLASSIFICATION SYSTEM (From ASTM D-2488-93 & 2487-93)

MAJOR DIVISIONS			GROUP/GRAPHIC SYMBOL②		TYPICAL DESCRIPTION
Coarse-Grained Soils *(more than 50% retained on No. 200 sieve)* *(Use Dual Symbols for 5 - 12% Fines (i.e. GP-GM))①*	Gravels *(more than 50% of coarse fraction retained on No. 4 sieve)*	Clean Gravels① *(less than 5% fines)*	GW		Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
			GP		Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
		Gravels with① 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 Sands① *(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 with① 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, Rock Flour, 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	CH		Inorganic Clays of Medium to High Plasticity, Sandy Fat Clay, Gravelly Fat Clay
			MH		Inorganic Silts, Micaceous or Diatomaceous Fine Sands or Silty Soils, Elastic Silt
		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 (See D 4427-92)

NOTES

1. Dual symbols (symbols separated by a hyphen, i.e. SP-SM, slightly silty fine SAND) are used for soils with between 5% and 12% fines or when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart.
2. Borderline symbols (symbols separated by a slash, i.e. CL/ML, silty CLAY/clayey SILT; GW/SW, sandy GRAVEL/gravelly SAND) indicated that the soil may fall into one of two possible basic groups.

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Log of Test Boring B-1

Project Name: Recycle Center
Client: Edward Rose and Sons
Project Number: ESC17-G037

Boring Elevation: 149.0'
Boring Location: See Site Plan
Depth to Groundwater: @ 12.5'

DEPTH (FT.)	USCS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	BLOW COUNTS PER 6 INCHES	N VALUE	RECOVERY (INCHE)	LAB TESTING RESULTS FOR SAMPLE
0		0-0.5' gravels, base.							
	SM	0.5'- 2.5' Brown, loose, sandy SILT (FILL); dry.							
	SM	2.5'-7.5' Gray, loose, slightly sandy SILT (Fill)with woody debris and trace gravels; slightly moist.	S-1	2.5	SPT	4, 3, 4	7	10	
5.0									
	SM	7.5'-12.5' Gray, dense, slightly silty medium SAND, trace gravels; very moist to wet.	S-2	7.5'	SPT	10, 16, 20	36	8	
10.0									
	SM	12.5'-17.5' Gray, very dense, sandy SILT, trace gravels; very moist to wet.	S-3	12.5'	SPT	14, 40, 50/5.5	50+	10	
15.0									
	SP	17.5'-19.0' Gray, very dense, gravelly, compacted medium SAND, trace silt (TILL); moist.	S-4	17.5'	SPT	40, 50/4	50+	10	
20		Total depth "19.0' Groundwater @ 12.5'							

Drill Contractor: Geologic Drill
Equipment: Track Mounted
Sampling Method: SPT
Driller: Wade

Excavation Date: 06-05-2017
ESC Representative: Amanda Locatelli

Log of Test Boring B-2

Project Name: Recycle Center
Client: Edward Rose & Sons
Project Number: ESC17-G037

Boring Elevation: 139.0'
Boring Location: See Site Plan
Depth to Groundwater: @ 7.5'

DEPTH (FT.)	USCS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	BLOW COUNTS PER 6 INCHES	N VALUE	RECOVERY (INCHE)	LAB TESTING RESULTS FOR SAMPLE
0		0-0.5' Topsoil, grass							
	SM	0.5'- 2.5' Brown, slightly sandy silt, trace gravels; moist							
	SM	2.5'-7.5' Brown, dense to very dense, sandy SILT, trace gravels with some iron staining; very moist.	S-1	2.5	SPT	16, 24, 20	44	11	
5.0									
	SP	7.5'-12.5' Brown, very dense, medium SAND, trace gravels, trace silt; very moist to wet.	S-2	7.5'	SPT	25, 50/6	50+	8	
10.0									
	SM	12.5'-17.5' Dark gray, very dense, compacted SAND (TILL); moist to very moist.	S-3	12.5'	SPT	30, 50/5.5	50+	8	
15.0									
	SP	17.5'-18.5' Gray, dense, medium SAND; very moist.	S-4	17.5'	SPT	21, 50/5.5	50+	10	
	SP	18.5'-19.0' Dark gray, very dense, compacted SAND (TILL); dry.							
20		Total depth 19.0' Groundwater @ 7.5'							

Drill Contractor: Geologic Drill
Equipment: Track Mounted
Sampling Method: SPT
Driller: Wade

Excavation Date: 06-05-2017
ESC Representative: Amanda Locatelli

Log of Test Boring B-3

Project Name: Recycle Center
Client: Edward Rose & Sons
Project Number: ESC17-G037

Boring Elevation: 169.0'
Boring Location: See Site Plan
Depth to Groundwater: None encountered

DEPTH (FT.)	USCS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	BLOW COUNTS PER 6 INCHES	N VALUE	RECOVERY (INCHE)	LAB TESTING RESULTS FOR SAMPLE
0	SM	0-0.5' Topsoil, brown silty sand 0.5'- 2.5' Brownish-red, silty SAND; moist.							
	SM	2.5'-7.5' Gray, medium dense, sandy SILT, trace gravels, some iron stained soils in upper 1.0'; moist.	S-1	2.5	SPT	3, 4, 24	28	6	
5.0	SP	7.5'-8.0' Dark gray, dense, compact, medium SAND; moist.	S-2	7.5'	SPT	14, 20, 23	43	14	
	SP	8.0'-9.0' Gray, medium SAND; moist.							
10.0	SP	9.0'-19.0' Dark gray, dense, compact, medium SAND (TILL?); moist.							
		Becomes very dense	S-3	12.5'	SPT	27, 50/3	50+	6	
15.0			S-4	17.5'	SPT	36, 50/4	50+	12	
20		Total depth 19.0' Groundwater: None encountered							

Drill Contractor: Geologic Drill
Equipment: Track Mounted
Sampling Method: SPT
Driller: Wade

Excavation Date: 06-05-2017
ESC Representative: Amanda Locatelli

Log of Test Boring B-4

Project Name: Recycle Center
Client: Edward Rose & Sons
Project Number: ESC17-G037

Boring Elevation: 158.0'
Boring Location: See Site Plan
Depth to Groundwater: None encountered

DEPTH (FT.)	USCS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	BLOW COUNTS PER 6 INCHES	N VALUE	RECOVERY (INCHE)	LAB TESTING RESULTS FOR SAMPLE
0		0-0.5' Topsoil brown silty sand							
	SM	0.5'- 2.5' Brownish-red, loose to medium dense, silty SAND; moist.							
	SM	2.5'-7.5' Reddish brown, dense, sandy SILT, trace gravels; moist.	S-1	2.5	SPT	6, 8, 30	38	13	
5.0									
	SP	7.5'-19.0' Dark gray, very dense, compact SAND (TILL?) trace gravels; very moist.	S-2	7.5'	SPT	14, 27, 46	73	16	
10.0									
			S-3	12.5'	SPT	28, 50/5	50+	16	
15.0									
			S-4	17.5'	SPT	29, 50/5	50+	15	
20		Total depth 19.0' Groundwater: None encountered							

Drill Contractor: Geologic Drill
Equipment: Track Mounted
Sampling Method: SPT
Driller: Wade

Excavation Date: 06-05-2017
ESC Representative: Amanda Locatelli

Log of Test Boring B-5

Project Name: Recycle Center
Client: Edward Rose & Sons
Project Number: ESC17-G037

Boring Elevation: 150.0'
Boring Location: See Site Plan
Depth to Groundwater: @ 15.0'

DEPTH (FT.)	USCS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	BLOW COUNTS PER 6 INCHES	N VALUE	RECOVERY (INCHE)	LAB TESTING RESULTS FOR SAMPLE
0		0-0.5' Forest duff, sandy SILT; moist.							
	SM	0.5'- 2.5' Reddish brown, loose to medium dense, silty SAND, dry							
	SM	2.5'-7.5' Reddish brown, medium dense, gravelly sandy SILT: moist.	S-1	2.5	SPT	4, 5, 11	16	13	
5.0									
	SM	7.5'-12.5' Dark gray, very dense, silty SAND (TILL?) trace gravels; dry.	S-2	7.5'	SPT	42, 24, 28	52	18	
10.0									
	SP	12.5'-15.0' Gray, very dense, coarse, SAND with black gravels; wet.	S-3	12.5'	SPT	16, 27, 35	62	16	
15.0	SM	15.0'-19.0' Gray, very dense, medium, compact, slightly silty SAND (TILL?) with black gravels.							
			S-4	17.5'	SPT	33, 50/3.5	50+	15	
20		Total depth 19.0' Groundwater: @15.0'							

Drill Contractor: Geologic Drill
Equipment: Track Mounted
Sampling Method: SPT
Driller: Wade

Excavation Date: 06-05-2017
ESC Representative: Shawn Williams

Log of Test Boring B-6

Project Name: Recycle Center
Client: Edward Rose & Sons
Project Number: ESC17-G037

Boring Elevation: 156.0'
Boring Location: See Site Plan
Depth to Groundwater: @ 14.0'

DEPTH (FT.)	USCS Classification	VISUAL PHYSICAL DESCRIPTION	SAMPLE NO.	DEPTH (FEET)	SAMPLE TYPE	BLOW COUNTS PER 6 INCHES	N VALUE	RECOVERY (INCHE)	LAB TESTING RESULTS FOR SAMPLE
0		0-0.5' Forest duff, sandy SILT; moist							
	SM	0.5'- 2.5' Reddish brown, loose to medium dense silty SAND; dry.							
	SP	2.5'-7.5' Reddish brown, loose, medium SAND, trace gravels; moist.	S-1	2.5	SPT	2, 2, 2	4	8	
5.0									
	SM	7.5'-19.0' Gray, very dense, silty SAND (TILL?), trace gravels (angular); moist to very moist.	S-2	7.5'	SPT	14, 22, 39	61	10	
10.0									
			S-3	12.5'	SPT	25, 50/4	50+	-	
15.0									
			S-4	17.5'	SPT	36, 50/5	50+	16	
20		Total depth 19.0' Groundwater: @14.0'							

Drill Contractor: Geologic Drill
Equipment: Track Mounted
Sampling Method: SPT
Driller: Wade

Excavation Date: 06-05-2017
ESC Representative: Shawn Williams