Associated Earth Sciences, Inc.

Serving the Pacific Northwest Since 1981

March 3, 2014
Project No. KE140047A

Quadrant Corporation
14725 SE 36th Street, Suite 100
Bellevue, Washington 98006

Attention: Mr. Mike Behn

Subject: Subsurface Exploration and Geotechnical Engineering Assessment
Hussey Property
NE 122nd Street and 178th Avenue NE
Redmond, Washington

Dear Mr. Behn:

Associated Earth Sciences, Inc. (AESI) is pleased to present this report providing a summary of our subsurface exploration and limited geotechnical engineering study for Hussey Property in Redmond, Washington. This report has been prepared for the exclusive use of Quadrant Corporation, and their agents, for specific application to this project. Within the limitations of scope, schedule, and budget, our services have been performed in accordance with generally accepted geotechnical engineering practices in effect in this area at the time our report was prepared. No other warranty, express or implied, is made. Our observations, findings, and opinions are a means to identify and reduce the inherent risks to Quadrant Corporation.

INTRODUCTION

We understand that Quadrant Corporation is currently in the feasibility stage of purchasing the subject parcel with the intent of constructing single-family homes. We anticipate that the homes would be of wood-frame construction and would utilize conventional foundations with relatively light loading conditions.

The primary purpose of this study was to evaluate foundation bearing soil conditions. As such, AESI completed a series of exploration pits at the site using a backhoe excavator subcontracted to AESI. Our current work included use of this subsurface information to evaluate the thickness and quality of the subsurface sediments. Preparation of a Phase I Environmental Site Assessment (ESA) for this property by AESI is being prepared concurrently with this study.

SITE AND PROJECT DESCRIPTION

The site is located north of the intersection of NE 122nd Street and 178th Place NE in Redmond, Washington (Figure 1). The project site consists of one parcel (Parcel Number 252605-9023), totaling about 7 acres in area. The site is occupied by several abandoned outbuildings and an abandoned home foundation. The site is generally surrounded by existing single-family residential development. Vegetation on the site primarily consists of grass lawn areas in the southwest quadrant of the site, surrounding the existing buildings. The remainder of the site is undeveloped and vegetated with various trees and brush. A creek runs approximately north-south along the eastern site boundary. From this creek the site topography slopes up 50 to 60 feet to the west at an inclination of about 30 percent to a plateau that occupies the western side of the site. We understand that the project will include the construction of a residential development on the western plateau.

LITERATURE REVIEW

The following documents and plans were reviewed as part of our study. These documents were provided for our use by Quadrant Corporation.

Site reports: "Reports on Site Geology, Hydrogeology, and Engineering Geology" by RH2 Engineering, dated February, 2014.

The above-referenced reports by RH2 Engineering included exploration pit data for the above-referenced parcels and are discussed in greater detail below.

SUBSURFACE EXPLORATION

AESI observed the excavation of six exploration pits to depths up to 10.5 feet at the site on February 24, 2014. The approximate location of the pits are shown on the "Site and Exploration Plan," Figure 2. The exploration pits were excavated with a track-mounted mini excavator. The pits permitted direct, visual observation of subsurface conditions. Materials encountered in the exploration pits were studied and classified in the field by an engineering geologist from our firm. Disturbed soil samples were selected from the pits, placed in moisture-tight containers, and transported to our laboratory for further visual classification. After logging the exposed soils the exploration pits were backfilled with the excavated soil and lightly tamped with the excavator bucket. Detailed descriptions of the sediments encountered are provided on the exploration logs included in the Appendix.

Because of the nature of exploratory work below ground, extrapolation of subsurface conditions between explorations is necessary. It should be noted that differing subsurface

conditions may sometimes be present due to the random nature of deposition and the alteration of topography by past grading and/or filling. The nature and extent of any variations may not become fully evident until construction. If variations are observed at that time, it may be necessary to re-evaluate specific recommendations in this report and make appropriate changes.

Topsoil

An approximately 6- to 12-inch-thick layer of grass and topsoil was encountered at the surface. Topsoil is not suitable for structural support, and should be stripped from structural areas.

Fill

Fill soils (those not naturally placed) were encountered in explorations EP-2, EP-5, and EP-6 and are anticipated to be found around the outbuildings, other areas of past grading, and over buried utilities. The fill encountered extended to about 5 feet in depth at the location of EP-2 and may be related to past grading in relation to the abandoned home foundation just east of EP-2. The fill observed in EP-2 consisted of loose, very moist, brown fine sand with silt and few amounts of gravel. Organic-rich fill was encountered at the location of EP-5, extending to 7 feet in depth and consisting of dark brown to black, fine sand with silt with abundant woody debris. Fill encountered at the location of EP-6 extended to about 3 feet and consisted of loose, brown, fine sand with silt and trace to few amounts of organics. The approximate extent of existing fill based on our explorations and the explorations completed by RH2 Engineering is shown on Figure 2, "Site and Exploration Plan".

Fill soils are considered to be unsuitable for foundation or pavement support. Existing fill should be removed from below planned building areas. The fill encountered at the south end of the site (especially at the location of EP-5) contained a significant amount of organics and woody debris is not considered suitable for reuse as structural fill. Non-organic, excavated existing fill material may be suitable for reuse in structural fill applications if it is at a moisture content that allows compaction to the specified level for the intended use, and if all organic materials and any other deleterious materials are removed prior to use in structural fill applications. At the time of exploration, we estimate that the existing fill that we observed was above optimum moisture content for compaction purposes, and therefore will require drying during favorable weather prior to compaction in structural fill applications.

Vashon Lodgement Till

Below the existing fill, where encountered, all explorations encountered lodgement till sediments. Lodgement till consists of an unsorted mixture of sand, silt, clay, gravel, and occasional cobbles. It was deposited at the base of an active continental glacier and was subsequently compacted to a very dense condition by the weight of the overlying glacial ice.

Lodgement till typically possesses high-strength and low-compressibility attributes that are favorable for support of foundations, floor slabs, and paving, with proper preparation. Lodgement till is silty and moisture-sensitive. In the presence of moisture contents above the optimum moisture content for compaction purposes, lodgement till can be easily disturbed by vehicles and earthwork equipment. Careful management of moisture-sensitive soils will be needed to reduce the potential for disturbance of wet lodgement till soils and costs associated with repairing disturbed soils. Excavated lodgement till material is suitable for use in structural fill applications if it can be compacted to the specified level for the intended use. At the time of exploration, we estimate that most of the lodgement till soils that we observed were above optimum moisture content for compaction purposes, and therefore may require drying during favorable weather prior to compaction in structural fill applications.

Previous Work by Others

The report prepared by RH2 Engineering, referenced previously, contained logs of 15 exploration pits completed in January 2005. The locations of these pits are shown on Figure 2. The near-surface soil conditions described in this report describe site soils as existing fill, in areas, over Vashon-age lodgement till. Existing fill was encountered at the locations of TP-2, TP-3, TP-9, and TP-10 to depths up to 7 feet. All of the pits were terminated in the lodgement till. AESI is in general agreement with the soil conditions described in the report described above. The natural, near surface site soils encountered during our explorations are similarly classified.

Geologic Mapping

Review of the regional geologic map (J.P. Minard, and D.B. Booth, 1988, *Geologic Map of the Redmond Quadrangle, King County, Washington*: U.S. Geological Survey [USGS], Miscellaneous Field Studies Map MF-2016, scale 1:24,000.) indicates that the subject site is underlain by Vashon lodgement till. Our interpretation of the sediments encountered in our explorations is in general agreement with the regional geologic map.

Hydrology

Slow to moderate ground water seepages were observed in all exploration pits at varying depths, generally deeper than 3 feet below existing ground surface. The seepages were typically observed near the contact between the existing fill and underlying till and the contact between the weathered and unweathered till. The observed seepages are interpreted to represent perched ground water. Perched water conditions can occur when surface water infiltrates down through relatively permeable soils, such as existing fill or weathered till and becomes trapped or "perched" atop a comparatively impermeable barrier such as unweathered till. This water may travel as interflow and typically will follow the ground surface topography. The duration and quantity of interflow seepage will largely depend on the soil

grain-size distribution, topography, seasonal precipitation, on- and off-site land usage, and other factors.

CONCLUSIONS AND RECOMMENDATIONS

Introduction

Our exploration indicates that, from a geotechnical standpoint, the subject site is suitable for the proposed project. Dense native sediments were observed to be relatively shallow in most explorations and will provide suitable support for structural fills, paving, and conventional spread-footing building foundations. Existing fill was encountered in several locations and should be removed from building and paving areas prior to placing structural fill. The following sections provide our recommendations for foundation support and support of slab-on-grade floors.

Site Preparation

Site preparation should include removal of all trees, brush, debris, existing buried utilities that are not to remain in service, and any other deleterious material. Additionally, the upper organic topsoil should be removed and the remaining roots should be grubbed. Once demolition has been completed, any existing fill should be addressed. Existing fill was observed at the locations EP-2, EP-5, and EP-6 to depths up to 7 feet. As described above, RH2 Engineering also encountered existing fill at the locations of TP-2, TP-3, TP-9, and TP-10 to depths up to 7 feet. We anticipate that existing fill will also be encountered surrounding the existing outbuildings and the abandoned house foundation (just east of EP-2). We recommend that existing fill be removed from below areas of planned foundations to expose underlying undisturbed native sediments. Once stripping and removal of existing fill has been completed, the exposed material should be recompacted to a firm and unyielding condition, as determined by an on-site AESI representative. Any soft or yielding areas may require further removal or other measures to provide a more stable surface for fill placement. After recompaction of the exposed ground is tested and approved by the geotechnical engineer structural fill may be placed to attain desired grades. Erosion and surface water control should be established around the clearing limits to satisfy local requirements.

In our opinion, stable construction slopes should be the responsibility of the contractor and should be determined during construction. For estimating purposes, however, we anticipate that temporary, unsupported cut slopes in the lodgement till may be made at a maximum slope of 1H:1V (Horizontal:Vertical). Temporary, unsupported cut slopes in the existing fill may be made at a maximum slope of 1.5H:1V. As is typical with earthwork operations, some sloughing and raveling may occur, especially if ground water seepage is present in the excavation cuts, and cut slopes may have to be adjusted in the field. In addition,

WISHA/OSHA regulations should be followed at all times. Permanent cut slopes in medium dense to dense, native sediments or structural fill must not exceed a 2H:1V inclination. Special approval from both the geotechnical engineer and the reviewing agency must be granted for proposed slopes steeper than 2H:1V.

A high percentage of fine-grained material within some of the on-site soils makes them moisture-sensitive and subject to disturbance when wet. The contractor must use care during site preparation and excavation operations so that the underlying soils are not softened. If disturbance occurs, the softened soils should be removed and the area brought to grade with structural fill. Consideration should be given to protecting access and staging areas with an appropriate section of crushed rock or asphalt treated base (ATB).

Structural Fill

After recompaction of the exposed ground is completed and approved by the geotechnical engineer as described above, structural fill may be placed as required to attain desired grades. Structural fill is defined as non-organic soil, acceptable to the geotechnical engineer, placed in maximum 8-inch loose lifts, with each lift being compacted to 95 percent of the modified Proctor maximum density using *American Society for Testing and Materials* (ASTM):D 1557 as the standard. The on-site native soils that are free of deleterious materials are suitable for reuse as structural fill provided they are present at a moisture content suitable for achieving the specified compaction. Use of the on-site materials containing high silt contents as structural fill will likely require some moisture conditioning. The top of the compacted fill should extend horizontally outward a minimum distance of 3 feet beyond the locations of the perimeter footings or parking lot edges before sloping down at an angle of 2H:1V.

Soils in which the amount of fine-grained material (smaller than the No. 200 sieve) is greater than approximately 5 percent (measured on the minus No. 4 sieve size) should be considered moisture-sensitive. Use of moisture-sensitive soil in structural fills will, on a practicable basis, be limited to favorable dry weather conditions. The on-site soils contain a relatively high content of silt and are considered moisture-sensitive. In addition, construction equipment traversing the site when the soils are wet can cause considerable disturbance. If structural fill is to be placed during wet weather or if proper compaction cannot be obtained, a select material consisting of a clean, free-draining gravel and/or sand should be used. Free-draining fill consists of non-organic soil with the amount of fine-grained material limited to 5 percent by weight when measured on the minus No. 4 sieve fraction.

A representative from AESI should inspect the stripped subgrade and be present during placement of structural fill to observe the work and perform a representative number of in-place density tests. In this way, the adequacy of the earthwork may be evaluated as filling progresses and any problem areas may be corrected at that time. Our field technicians and

engineer are available to aid the owner in developing a suitable monitoring and testing program, such that quality control is adequately provided.

Foundations

The foundation bearing stratum, consisting of medium dense to very dense native soils was observed to be relatively shallow (2 to 3 feet) in most exploration pits. The depth to bearing soils at the location of EP-2 and EP-5 was approximately 7 feet. For residential footings founded either directly on medium dense to very dense native soils prepared as described above, or on structural fill placed over these materials, we recommend that an allowable bearing pressure of 2,000 pounds per square foot (psf) be used for design purposes, including both dead and live loads. An increase of one-third may be used for short-term wind or seismic loading. Perimeter footings for the proposed buildings should be buried a minimum of 18 inches into the surrounding soil for frost protection. No minimum burial depth is required for interior footings; however, all footings must penetrate to the prescribed stratum, and no footings should be founded in or above loose, organic, or existing fill soils.

The area bounded by lines extending downward at 1H:1V from any footing must not intersect another footing or intersect a filled area that has not been compacted to at least 95 percent of ASTM:D 1557. In addition, a 1.5H:1V line extending down from any footing must not daylight because sloughing or raveling may eventually undermine the footing. Thus, footings should not be placed near the edges of steps or cuts in the bearing soils.

All footing areas should be observed by AESI prior to placing concrete to verify that the exposed soils can support the design foundation bearing capacity and that construction conforms with the recommendations in this report. Foundation bearing verification may also be required by the governing municipality.

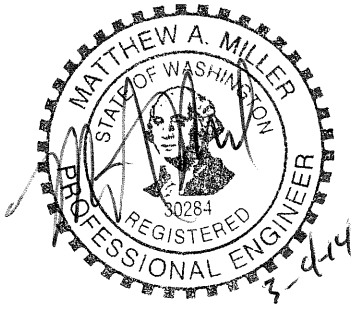
Floor Support

Slab-on-grade floors may be constructed either directly on the undisturbed, medium dense to very dense, native soils, or on structural fill placed over these materials. Areas of the slab subgrade that are disturbed (loosened) during construction should be recompacted to an unyielding condition prior to placing capillary break material, as described below. In order to control moisture vapor transfer through the slab, slab-on-grade floors should be constructed atop a capillary break consisting of a minimum thickness of 4 inches of washed pea gravel or $^{5}/_{8}$"-minus clean, washed crushed rock. The pea gravel or clean crushed rock should be overlain by a 10-mil (minimum thickness) plastic vapor retarder.

CLOSURE

We appreciate the opportunity to be of service to you on this project. Should you have any questions regarding this report or other geotechnical aspects of the project, please call us at your earliest convenience.

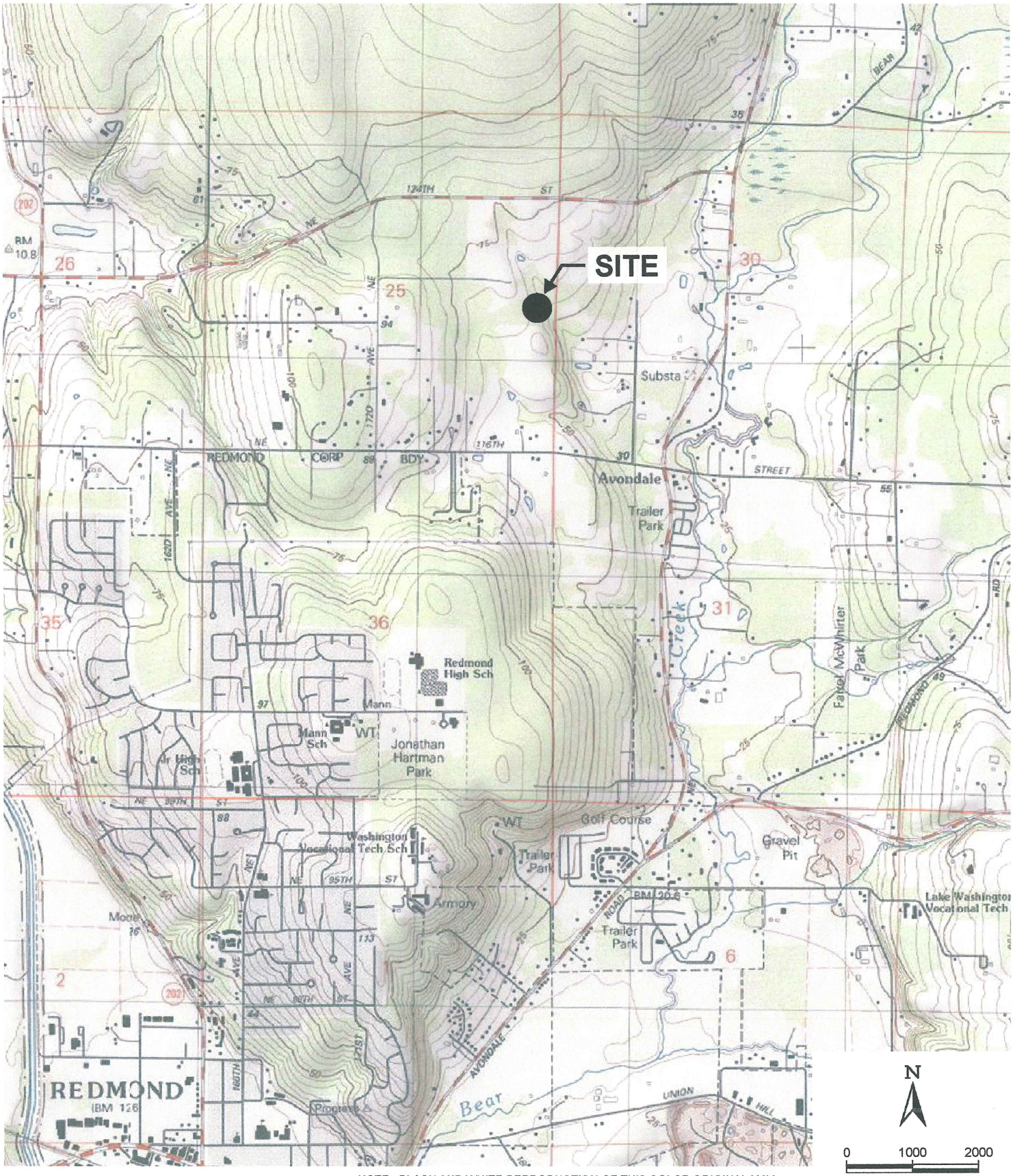
Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington



Luke Mioduszewski
Senior Staff Geologist

Matthew A. Miller, P.E.
Principal Engineer

Attachments: Figure 1: Vicinity Map
Figure 2: Site and Exploration Plan
Appendix: Exploration Pit Logs



REFERENCE: USGS TOPO!

NOTE: BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION.

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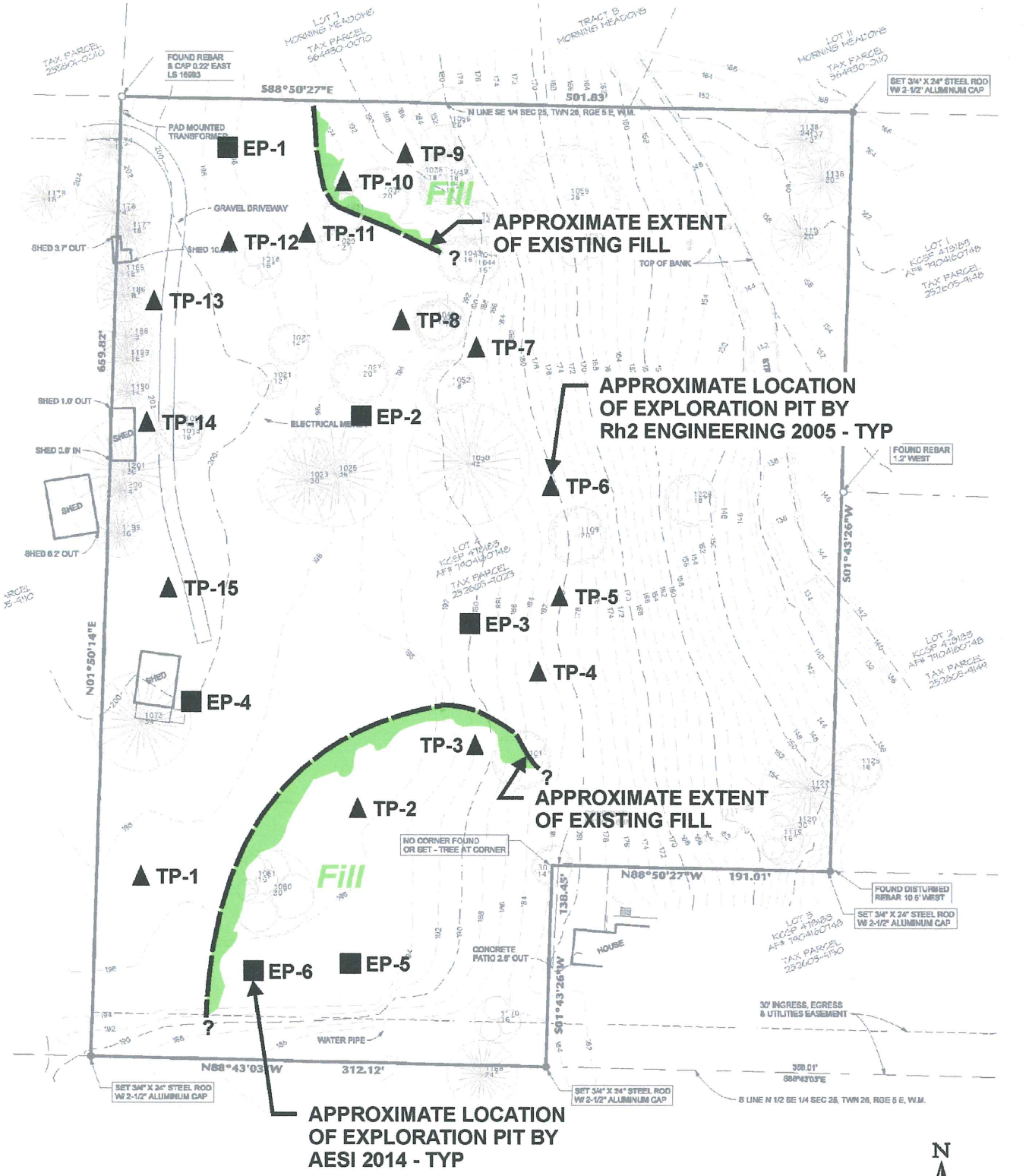
VICINITY MAP

HUSSEY PROPERTY
REDMOND, WASHINGTON

FIGURE 1
DATE 2/14
PROJ. NO. KE140047A

140047 Hussey Property \ 140047 Vicinity.cdr PAGE 2: KE



REFERENCE: GEO DATUM

NOTE: BLACK AND WHITE REPRODUCTION OF THIS COLOR ORIGINAL MAY REDUCE ITS EFFECTIVENESS AND LEAD TO INCORRECT INTERPRETATION.

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SITE AND EXPLORATION PLAN

HUSSEY PROPERTY
REDMOND, WASHINGTON

FIGURE 2
DATE 2/14
PROJ. NO. KE140047A

140047 Hussey Property \ 140047 Site and Expl.cdr

APPENDIX

Exploration Pit Logs

Coarse-Grained Soils - More than 50% [1] Retained on No. 200 Sieve	Gravels - More than 50% [1] of Coarse Fraction Retained on No. 4 Sieve	≤5% Fines [5]	GW	Well-graded gravel and gravel with sand, little to no fines
			GP	Poorly-graded gravel and gravel with sand, little to no fines
		≥15% Fines [5]	GM	Silty gravel and silty gravel with sand
			GC	Clayey gravel and clayey gravel with sand
	Sands - 50% [1] or More of Coarse Fraction Passes No. 4 Sieve	≤5% Fines [5]	SW	Well-graded sand and sand with gravel, little to no fines
			SP	Poorly-graded sand and sand with gravel, little to no fines
		≥15% Fines [5]	SM	Silty sand and silty sand with gravel
			SC	Clayey sand and clayey sand with gravel
Fine-Grained Soils - 50% [1] or More Passes No. 200 Sieve	Silts and Clays Liquid Limit Less than 50		ML	Silt, sandy silt, gravelly silt, silt with sand or gravel
			CL	Clay of low to medium plasticity; silty, sandy, or gravelly clay, lean clay
			OL	Organic clay or silt of low plasticity
	Silts and Clays Liquid Limit 50 or More		MH	Elastic silt, clayey silt, silt with micaceous or diatomaceous fine sand or silt
			CH	Clay of high plasticity, sandy or gravelly clay, fat clay with sand or gravel
			OH	Organic clay or silt of medium to high plasticity
Highly Organic Soils			PT	Peat, muck and other highly organic soils

Terms Describing Relative Density and Consistency

	Density	SPT [2] blows/foot
Coarse-Grained Soils	Very Loose	0 to 4
	Loose	4 to 10
	Medium Dense	10 to 30
	Dense	30 to 50
	Very Dense	>50
	Consistency	**SPT [2] blows/foot**
Fine-Grained Soils	Very Soft	0 to 2
	Soft	2 to 4
	Medium Stiff	4 to 8
	Stiff	8 to 15
	Very Stiff	15 to 30
	Hard	>30

Test Symbols

G = Grain Size
M = Moisture Content
A = Atterberg Limits
C = Chemical
DD = Dry Density
K = Permeability

Component Definitions

Descriptive Term	Size Range and Sieve Number
Boulders	Larger than 12"
Cobbles	3" to 12"
Gravel	3" to No. 4 (4.75 mm)
Coarse Gravel	3" to 3/4"
Fine Gravel	3/4" to No. 4 (4.75 mm)
Sand	No. 4 (4.75 mm) to No. 200 (0.075 mm)
Coarse Sand	No. 4 (4.75 mm) to No. 10 (2.00 mm)
Medium Sand	No. 10 (2.00 mm) to No. 40 (0.425 mm)
Fine Sand	No. 40 (0.425 mm) to No. 200 (0.075 mm)
Silt and Clay	Smaller than No. 200 (0.075 mm)

[3] Estimated Percentage

Component	Percentage by Weight
Trace	<5
Few	5 to 10
Little	15 to 25
With	- Non-primary coarse constituents: ≥ 15%
	- Fines content between 5% and 15%

Moisture Content

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

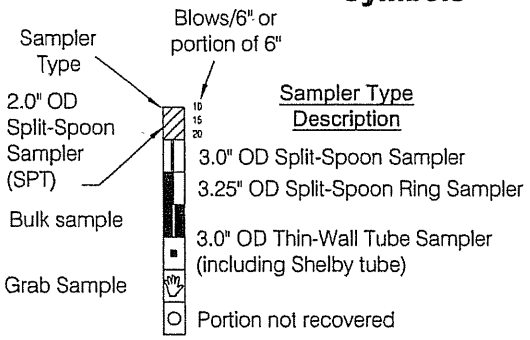
Slightly Moist - Perceptible moisture

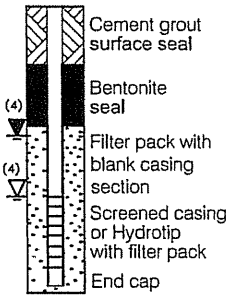
Moist - Damp but no visible water

Very Moist - Water visible but not free draining

Wet - Visible free water, usually from below water table

Symbols





(1) Percentage by dry weight
(2) (SPT) Standard Penetration Test (ASTM D-1586)
(3) In General Accordance with Standard Practice for Description and Identification of Soils (ASTM D-2488)
(4) Depth of ground water
▼ ATD = At time of drilling
▽ Static water level (date)
(5) Combined USCS symbols used for fines between 5% and 15%

Classifications of soils in this report are based on visual field and/or laboratory observations, which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless presented herein. Visual-manual and/or laboratory classification methods of ASTM D-2487 and D-2488 were used as an identification guide for the Unified Soil Classification System.

Associated Earth Sciences, Inc.

EXPLORATION LOG KEY

FIGURE A1

blocksllog_key.dwg LAYOUT: Layout2

LOG OF EXPLORATION PIT NO. EP-1

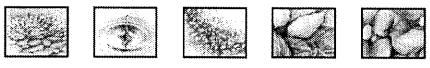
Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplfication of actual conditions encountered. **DESCRIPTION**
	Topsoil
1	**Weathered Vashon Lodgement Till**
2	Loose, very moist to wet, reddish brown to brown, fine SAND, with silt, few fine to coarse gravel, trace organics (SM).
3	
	Vashon Lodgement Till
4	Dense to very dense, very moist, mottled brown to gray, fine SAND, trace medium to coarse sand, with silt, few fine to coarse gravel; diamict (SM).
5	Few cobbles.
6	Becomes gray.
7	
8	Very dense, very moist, gray, fine SAND, few medium to coarse sand, with silt, few fine to coarse gravel, trace cobbles; diamict (SM).
9	
10	Bottom of exploration pit at depth 9.5 feet Seepage at 3.5 feet. No caving.
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Hussey Property
Redmond, WA

Logged by: LDM

Approved by:

Associated Earth Sciences, Inc.



Project No. KE140047A

2/24/14

KCTP3 140047.GPJ February 28, 2014

LOG OF EXPLORATION PIT NO. EP-2

Depth (ft)

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplfication of actual conditions encountered.

DESCRIPTION

Fill

1

2 Loose, very moist, dark brown, fine SAND, with silt, few fine to coarse gravel (SM),

3

4 Loose, very moist, brown, fine to medium SAND, with silt, few fine to coarse gravel (SM).

5 Relict topsoil (6 to 12 inches thick).

Weathered Vashon Lodgement Till

6 Loose to medium dense, very moist to wet, reddish brown, fine SAND, with silt, few fine to coarse gravel (SM).

7

8

Vashon Lodgement Till

9 Dense, very moist, brown, fine to coarse SAND, with silt, few to little fine to coarse gravel (SM).

10

11 Bottom of exploration pit at depth 10.5 feet
Seepage at 6 feet. Slight caving abover 6 feet.

12

13

14

15

16

17

18

19

20

KCTP3 140047.GPJ February 25, 2014

Hussey Property
Redmond, WA

Logged by: LDM

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Associated Earth Sciences, Inc.

Project No. KE140047A

2/24/14

LOG OF EXPLORATION PIT NO. EP-3

Depth (ft)	This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplfication of actual conditions encountered. **DESCRIPTION**	
	Topsoil	
1	**Weathered Vashon Lodgement Till**	
2	Medium dense, very moist to wet, reddish brown, fine SAND, with silt, trace medium to coarse sand, few fine to coarse gravel (SM).	
3		
	Vashon Lodgement Till	
4	Dense to very dense, very moist, brown to gray, fine SAND, trace medium to coarse sand, with silt, few fine to coarse gravel, with thin layers (2 to 4 inches) of fine to medium sand, few silt; diamict (SM).	
5		
6		
7		
8	As above.	
9		
10	Bottom of exploration pit at depth 9 feet Mderate seepage at approximately 3 feet. No caving.	
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		

Hussey Property
Redmond, WA

Associated Earth Sciences, Inc.

Logged by: LDM

Approved by:

Project No. KE140047A

2/24/14

KCTP3 140047.GPJ February 28, 2014

LOG OF EXPLORATION PIT NO. EP-4

Depth (ft)

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplfication of actual conditions encountered.

DESCRIPTION

Topsoil

Weathered Vashon Lodgement Till

Medium dense, very moist to wet, reddish brown, fine SAND, with silt, trace medium to coarse sand, few fine to coarse gravel (SM).

Vashon Lodgement Till

Very dense, very moist, gray, fine SAND, trace medium to coarse sand, with silt, few fine to coarse gravel; diamict (SM).

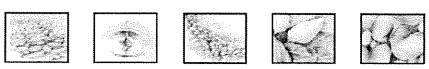
Bottom of exploration pit at depth 6.5 feet
Slight seepage at 3 to 4 feet. No caving.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Hussey Property
Redmond, WA

Logged by: LDM
Approved by:

Associated Earth Sciences, Inc.



Project No. KE140047A

2/24/14

KCTP3 140047.GPJ February 25, 2014

LOG OF EXPLORATION PIT NO. EP-5

Depth (ft)

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplfication of actual conditions encountered.

DESCRIPTION

Fill

1 Very loose to loose, very moist to wet, black to dark brown, fine SAND, with silt, with organics and wood debris (SM).

2

3

4

5

6

7

Weathered Vashon Lodgement Till

8 Medium dense, very moist to wet, brown, fine SAND, trace medium to coarse sand, with silt, few fine to coarse gravel; diamict (SM).

9 Becomes gray with occasional mottling.

10 Bottom of exploration pit at depth 9.5 feet
Moderate seepage at 6 to 7 feet. Moderate caving above 7 feet.

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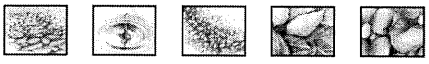
KCTP3 140047.GPJ February 28, 2014

Hussey Property
Redmond, WA

Logged by: LDM

Approved by:

Associated Earth Sciences, Inc.



Project No. KE140047A

2/24/14

LOG OF EXPLORATION PIT NO. EP-6

Depth (ft)

This log is part of the report prepared by Associated Earth Sciences, Inc. (AESI) for the named project and should be read together with that report for complete interpretation. This summary applies only to the location of this trench at the time of excavation. Subsurface conditions may change at this location with the passage of time. The data presented are a simplfication of actual conditions encountered.

DESCRIPTION

Fill

1 Loose, very moist to wet, brown, fine SAND, with silt, few fine to coarse gravel, with organics (SM).

2

3

Weathered Vashon Lodgement Till

4 Loose to medium dense, very moist to wet, reddish brown to brown, fine SAND, with silt, few fine to coarse gravel (SM).

5

Vashon Lodgement Till

6 Dense to very dense, very moist, gray to brown, fine SAND, trace medium to coarse sand, with silt, few fine to coarse gravel; diamict (SM).

7

8 Bottom of exploration pit at depth 7 feet
Moderate seepage at 3 to 4 feet. No caving.

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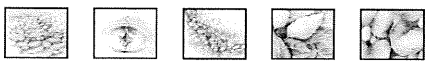
KCTP3 140047.GPJ February 25, 2014

Hussey Property
Redmond, WA

Logged by: LDM

Approved by:

Associated Earth Sciences, Inc.



Project No. KE140047A

2/24/14

Test Pit Logs – Redmond Low Impact Development

TEST PIT 1 (TP1)

Depth	*Soil Interpretation*
0-0.5 ft	O Horizon; dark brown; roots, silty sand/sandy silt, bioturbated; moist (ALDERWOOD SOIL)
0.5-1.0 ft	A Horizon; orange-brown; roots, silty sand/sandy silt, bioturbated; moist (ALDERWOOD SOIL)
1-2.5 ft	B Horizon; brown-gray, mottling; fewer roots, silty sand/sandy silt, firm but bioturbated; moist (ALDERWOOD SOIL)
2.0-4.5 ft	C Horizon; brown to gray, mottling; silty sand/sandy silt with occasional gravel, firm but bioturbated; moist (ALDERWOOD SOIL)
4-6 ft	Unweathered; brownish gray; silty sand/sandy silt with gravel and occasional cobble; massive (no bedding) and dense; moist; stable pit walls; (TILL)
Notes:	Test pit completed at approx. 6'. No groundwater seepage or caving observed. Test pit observed and logged by Andrea Mast on 01/27/2005.

TEST PIT 2 (TP2)

Depth	*Soil Interpretation*
0-4 ft	Dark brown; roots, sandy silt very organic-rich, occasional gravel or small cobble, moist to damp, bioturbated; (FILL)
~3.5-4 ft	Transition from fill to Alderwood soils.
3.5-4.5 ft	O & A Horizons; brown; roots, silty sand/sandy silt, (ALDERWOOD SOIL)
4-5ft	B Horizon; brown; fewer roots, silty sand/sandy silt, firm but bioturbated; (ALDERWOOD SOIL)
5-7 ft	C Horizon; brown to gray, mottling; silty sand with occasional gravel, moist to wet; medium-dense. Seepage at 5'. (ALDERWOOD SOIL)
6.5-7 ft	Unweathered; brownish gray; silty sand with occasional gravel; massive (no bedding) and dense; moist; stable pit walls; (TILL)
Notes:	Test pit completed at approx. 7'. No caving observed. Groundwater seepage observed at 5'. Piezometer (P1) installed on west side of test pit. Test pit observed and logged by Andrea Mast on 01/27/2005.

TEST PIT 5 (TP5)

Depth	*Soil Interpretation*
0-9 in	O Horizon; dark brown; roots, silty sand/sandy silt, bioturbated; (ALDERWOOD SOIL)
6-10 in	A Horizon; brown; roots, silty sand/sandy silt, bioturbated; (ALDERWOOD SOIL)
10 in-4 ft	B Horizon; brown; fewer roots, silty sand/sandy silt, firm but bioturbated; (ALDERWOOD SOIL)
4-7.5 ft	C Horizon; brown to gray, moist to damp; mottling; silty sand with gravel, firm; (ALDERWOOD SOIL)
7.5-8 ft	Unweathered; blue-gray; silty sand with gravel and occasional cobble; massive (no bedding) and dense; moist; stable pit walls; (TILL)
Notes:	Test pit completed at approx. 8'. No groundwater seepage or caving observed. Piezometer (P2) installed in test pit. Test pit observed and logged by Andrea Mast & Geoff Clayton on 01/27/2005.

TEST PIT 6 (TP6)

Depth	*Soil Interpretation*
0-12 in	O Horizon; dark brown; roots, silty sand/sandy silt, bioturbated; (ALDERWOOD SOIL)
6-14 in	A Horizon; brown; roots, silty sand/sandy silt, bioturbated; (ALDERWOOD SOIL)
14 in-2.5 ft	B Horizon; brown; fewer roots, silty sand/sandy silt, moist to damp; firm but bioturbated; (ALDERWOOD SOIL)
2.5-10 ft	C Horizon; brown to gray, mottling; silty sand with gravel, firm and dense; moist to damp; no blue-grey till observed like in TP5. Material was starting to become "blocky" at base of pit; (ALDERWOOD SOIL)
Notes:	Test pit completed at approx. 10'. Minor groundwater seepage at 9'. No caving observed. Test pit observed and logged by Andrea Mast on 01/27/2005.

TEST PIT 9 (TP9)

Depth	*Soil Interpretation*
0-7 ft	Fill; dark brown; roots and stumps, silty sand/sandy silt, bioturbated; (FILL)
7-11 ft	C-horizon; brown; roots, sandy silt, dense; moist; no visual indication of other soil horizons; (ALDERWOOD SOIL)
Notes:	Test pit completed at approx. 11'. No groundwater seepage or caving observed. Test pit observed and logged by Andrea Mast on 01/27/2005. Test pit located near back northeast corner of existing abandoned foundation at top of slope.

TEST PIT 10 (TP10)

Depth	*Soil Interpretation*
0-2 ft	Fill; dark brown; roots, silty sand/sandy silt with gravel, bioturbated; (FILL)
1.5-2.5 ft	A Horizon; brown; roots, silty sand/sandy silt, bioturbated; (ALDERWOOD SOIL)
2-4ft	B Horizon; brown; fewer roots, silty sand/sandy silt, firm but bioturbated; (ALDERWOOD SOIL)
4-11 ft	C Horizon; brown to gray, mottling; silty sand with gravel and occasional cobble, firm and dense; moist; (ALDERWOOD SOIL)
Notes:	Test pit completed at approx. 11'. Minor seepage at 9'. No caving observed. Piezometer (P4) installed in test pit. Test pit observed and logged by Andrea Mast on 01/27/2005.

TEST PIT 11 (TP11)

Depth	*Soil Interpretation*
0-18 in	O/A Horizons; dark brown to brown; roots, sandy silt, moist; bioturbated; (ALDERWOOD SOIL)
18in-3.5 ft	B Horizon; brown; roots, sandy silt, moist; firm but bioturbated; (ALDERWOOD SOIL)
3.5-8.5 ft	C Horizon; brown to gray, mottling; silty sand with gravel, dense; damp; did not reach unweathered till, but was more dense with depth; (ALDERWOOD SOIL)
Notes:	Test pit completed at approx. 8.5'. Minor to moderate seepage observed at 7'. Very minor caving observed at 7'. Test pit observed and logged by Andrea Mast on 01/27/2005.

TEST PIT 14 (TP14)

Depth	*Soil Interpretation*
0-1 ft	O Horizon; dark brown; roots, sandy silt, bioturbated; (ALDERWOOD SOIL)
1-1.5 ft	A Horizon; brown; roots, sandy silt, bioturbated; (ALDERWOOD SOIL)
1.5-3 ft	B Horizon; brown; fewer roots, sandy silt, moist; firm but bioturbated; (ALDERWOOD SOIL)
3-5 ft	C Horizon; brown to gray, mottling; sandy silt with occasional gravel, moist; firm; very fine grained similar to TP13; (ALDERWOOD SOIL)
4.5-8 ft	Unweathered; brownish gray; very fine grained sandy silt with gravel; massive (no bedding) and dense; moist; stable pit walls; (TILL)
Notes:	Test pit completed at approx. 8'. No groundwater seepage or caving observed. Test pit observed and logged by Andrea Mast on 01/27/2005.

TEST PIT 15 (TP15)

Depth	*Soil Interpretation*
0-6 in	O/A Horizons; dark brown to brown; roots and burnt wood, silty sand/sandy silt, bioturbated; (ALDERWOOD SOIL)
6 in-2.5 ft	B Horizon; brown; fewer roots, silty sand/sandy silt, firm but bioturbated; (ALDERWOOD SOIL)
2.5-6 ft	C Horizon; brown to gray, mottling/oxidation; very fine grained sandy silt with occasional gravel, moist; firm but bioturbated; (ALDERWOOD SOIL)
6-7.5 ft	Unweathered; brownish gray; very fine grained sandy silt with gravel; massive (no bedding) and dense; blocky; moist; stable pit walls; (TILL)
Notes:	Test pit completed at approx. 7.5'. No groundwater seepage or caving observed. Test pit observed and logged by Andrea Mast on 01/27/2005.