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Critical Areas Report
(Geotechnical Aspects)

MAPLEWOOD (FORMERLY SHAUGHNESSY HEIGHTS WEST)

Redmond, Washington

Prepared For:

IBBO, LLC and AMALANI, LLC

Project No. KE120383B
October 9, 2015
Revised October 21, 2015

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October 9, 2015
Revised October 21, 2015
Project No. KE120383B

IBBO, LLC and Amalani, LLC
105 South Main Street, Suite 230
Seattle, Washington 98104

Attention: Mr. Barry Margolese

Subject: Critical Areas Report
(Geotechnical Aspects)
Maplewood (Formerly Shaughnessy Heights West)
167th Avenue NE and NE 85th Street
Redmond, Washington

Dear Mr. Margolese:

We are pleased to present the enclosed copies of the above-referenced Critical Areas Report. This Critical Areas Report summarizes our geotechnically-related critical area findings for the proposed project.

We have enjoyed working with you on this study. If you should have any questions, or if we can be of additional help to you, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

Stephen A. Siebert, P.E.
Associate Geotechnical Engineer

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CRITICAL AREAS REPORT
(GEOTECHNICAL ASPECTS)

MAPLEWOOD
(FORMERLY SHAUGHNESSY HEIGHTS WEST)

Redmond, Washington

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INTRODUCTION

This Critical Areas Report pertains to the proposed residential development known as Maplewood. The site consists of an undeveloped, forested parcel (King County Parcel No. 3426059071) of 0.65 acres located at the southeast corner of the intersection of 167th Avenue NE and NE 85th Street in Redmond, Washington. The project would include dividing the site into eight lots for construction of new multistory townhomes with a central north-south trending driveway that exits onto 167th Avenue NE. The townhomes would have partial below grade levels. Based on finished floor elevations of the townhomes provided by CORE Design, Inc. (CORE Design) we expect cuts from 10 to 15 feet will be required to reach final grades. Temporary slopes or shoring may be needed to reach final grades, especially in the northeast corner of the site. Retaining walls from 4 to 12 feet in height are planned along the north and south sides of the site. Low impact development stormwater features are being considered for the project.

This Critical Areas Report addresses geologic hazards associated with the proposed development located near the base of steep slopes on the property. The location of the proposed development is shown on the "Vicinity Map," Figure 1.

PURPOSE AND SCOPE

The purpose of this study was to fulfill the critical areas report requirements per Appendix 20D-2 of the *Redmond Municipal Code* (RMC).

WRITTEN AUTHORIZATION

Written authorization to proceed with the geotechnical aspects of this Critical Areas Report was granted by Mr. Barry Margolese of Amalani, LLC. This Critical Areas Report has been prepared for the exclusive use of IBBO, LLC and Amalani, LLC 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 engineering geology practices in effect in this area at the time our report was prepared. No other warranty, express or implied, is made.

It must be understood that no recommendations or engineering design can yield a guarantee of stable slopes. Our observations, findings, and opinions are a means to identify and reduce the inherent risks to the owner.

CRITICAL AREAS REPORT

The following sections of this report will be presented as responses to the City of Redmond Critical Areas Report criteria pertinent to the geotechnical aspects of the proposed project, as outlined in the RMC. The format will consist of the specific code sections in **bold** followed by the report responses to the code items. Any gaps in the listed sequence of code items are due to sections of the code not applicable to this Critical Areas Report.

APPENDIX 20D-2

I. GENERAL INFORMATION

A. Name of proposal as shown on City applications.

Maplewood

B. Name of applicant as shown on City applications.

IBBO, LLC and Amalani, LLC.

C. Name of organization and individual providing this information.

Stephen A. Siebert, P.E. and Bruce L. Blyton, P.E. with Associated Earth Sciences, Inc. (AESI) prepared this report.

D. List any technical expertise/special qualifications of person(s) providing this information.

The individuals preparing this report have in excess of 25 years geotechnical consulting experience. Stephen A. Siebert and Bruce L. Blyton are licensed professional engineers in the State of Washington.

E. Date the information was prepared.

October 2015.

F. Location of proposed activity.

The proposed development is located in the western portion of King County Tax Parcel No. 0125059114. The property is located at the southeast corner of the intersection of 167th

Avenue NE and NE 85th Street in Redmond, Washington. The location of the site is shown on the "Vicinity Map," Figure 1.

G. Clearly identify the development proposal being addressed; including City file number and key project drawing references.

At the time this report was prepared, no file number had been assigned to the project by the City.

Project Plans:

Reduced copies of the preliminary plans are included in Appendix A.

H. Give a succinct but inclusive description of the site, including acreage and current and past uses on the property.

The parcel on which the development will be located consists of approximately 0.65 acres which is primarily forested. The ground surface elevation ranges from 70 feet above mean sea level (amsl) in the southwest corner of the site to 125 feet amsl in the east portion of the site. The ground surface generally slopes to the west/southwest across most of the site. A steep slope inclined at greater than 40 percent is present on the east end of the parcel. An existing trail is located near the base of the slope. Remnants of a man-made steep slope created as a result of previous grading are present in the southwest portion of the site and south of the site. There is a faint, remnant stream channel, located in the eastern portion of the site, oriented roughly northeast-southwest, that creates a linear localized depression. Vegetation on the property consists of both large evergreen and deciduous trees with a moderately dense understory of ferns, low brush, vines, blackberries, and small saplings.

I. Aerial photograph with overlays displaying site boundaries and critical areas.

An aerial photograph of the site is shown on Figure 2 (attached).

J. A single map showing all critical areas at 1 inch equals 20 feet scale.

A site plan showing the location of the proposed development, disturbance limits, topography, critical areas, and other site features is included on Figure 3 (attached).

K. A statement specifying the accuracy of the report and key project specific assumptions made and relied upon.

The conclusions and recommendations presented in this report are based, in part, on the conditions encountered in the explorations completed for our previous February 2004 and October 2006 geotechnical studies, October 2015 geotechnical report, and review of available geologic information. Because of the nature of exploratory work below ground, extrapolation of subsurface conditions beyond the field explorations is necessary. Differing subsurface conditions may be present outside of the area of the field explorations 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 between the field explorations may not become fully evident until construction. We recommend that monitoring of subsurface conditions be conducted periodically by AESI at the time of construction. If variations are observed at that time, it may be necessary to re-evaluate specific recommendations in this report and make appropriate changes.

L. Provide a bibliography of published information referenced, including maps and best available science materials.

The following is a list of references subsequently cited in this report.

1. AESI, 2015, "Subsurface Exploration, Geologic Hazard, and Geotechnical Engineering Report, Maplewood," Project Number KE120383B.

2. AESI, 2006, "Supplementary Subsurface Explorations and Geotechnical Engineering Study, Shaughnessy Heights," Project Number KE03735C.

3. AESI, 2004, "Subsurface Exploration, Geologic Hazard, and Preliminary Geotechnical Engineering Report, Shaughnessy Heights," Project Number KE03735A.

4. Booth et al., 2006, Geologic Map of King County, Washington

5. Booth, Troost and Wisher, 2007, Geologic Map of the Redmond Bear Creek Area

6. Minard and Booth, 1988, Geologic Map of the Redmond Quadrangle, Washington

7. United States Department of Agriculture, Natural Resources Conservation Service on-line Web Soil Survey.

V. GEOLOGICALLY HAZARDOUS AREAS REPORTING REQUIREMENTS

C1. Geologically hazardous areas map.

A map showing critical areas consisting of designated geologically hazardous areas in and adjacent to the planned development is shown on Figure 3. Figure 3 also includes the surveyed topography at 2-foot contour intervals.

C2a. A written geologic hazards characterization.

As previously discussed, the planned development is located on the western portion of the site and the landslide hazard area is on the eastern portion.

Geologic Reconnaissance

We conducted a reconnaissance of the steep slope on October 5, 2015. During our reconnaissance, no evidence of historical landslide activity, such as scarps, hummocky topography, tension cracks, reversed slope benches, or unusually distorted trees, was observed. In addition, no areas of emergent seepage were observed on the slope.

Literature Review and Subsurface Exploration

In order to evaluate subsurface conditions at the site, we conducted a review of selected, available geologic literature, and explorations completed to date at the site.

Geologic Mapping and Review of Area Exploration Logs

The subject site is located at the southwestern base of the upland plateau. According to reports published by the City of Redmond (Parametrix et al., 1997) and other published geologic maps for the area, including Geologic Map of the Redmond Quadrangle, Washington (Minard and Booth, 1988), the Geologic Map of King County, Washington (Booth et al., 2006), and the Geologic Map of the Redmond Bear Creek Area (Booth, Troost, and Wisher, 2007), the Redmond plateau is mantled by Vashon lodgement till. Areas of Vashon recessional outwash are mapped near the base of the slope. Pre-Fraser deposits are also mapped on the slopes of the plateau in the vicinity of the site.

The review of the geologic mapping is consistent with the conditions encountered in explorations conducted at the site by AESI for the proposed residential development (AESI, 2004, 2006, and 2015).

Subsurface Exploration

In 2004, AESI conducted a site reconnaissance and observed the excavation of 10 exploration pits completed across the original 17.5-acre "Shaughnessy Heights" project area (AESI, 2004), which includes the 0.65-acre area currently being proposed for development known as "Maplewood". In 2006, AESI drilled five exploration borings in the vicinity of several steep slopes located within the original "Shaughnessy Heights" project area (AESI, 2006). Exploration EP-10 was located in between the currently proposed "Maplewood" Lots 2 and 3, and exploration boring EB-4 was completed near the southeast corner of proposed Lot 8. For our current phase of study, an additional two exploration borings (EB-5 and EB-6) were advanced along the north property line, in the location of the proposed retaining wall and on the north side of proposed Lot 5. The various types of materials and sediments encountered in the explorations, as well as the depths where characteristics of these materials changed, are indicated on the exploration logs presented in Appendix B and on Geologic Cross Section A-A' on Figure 4.

- *Vashon Recessional Outwash:* This unit was encountered below the surficial topsoil layer at the locations of exploration pit EP-10 and borings EB-5 and EB-6. These sediments generally consisted of loose to medium dense, tan to brown sand, with variable amounts of silt and gravel. The upper 1½ to 2½ feet of this unit in EP-10 was weathered to a tannish-orange color. The recessional outwash sediments were deposited by meltwater streams emanating from the retreating glacial ice during the latter part of the Vashon Stade of the Fraser Glaciation, approximately 12,500 years ago. This unit generally extended to a depth of 5 feet, but at the location of exploration boring EB-6 it extended to a depth of approximately 9.5 feet. Recessional outwash sediments were not encountered in boring EB-4.

- *Vashon Lodgement Till:* Sediments interpreted as Vashon lodgement till were encountered below the recessional outwash in EP-10, EB-5, and EB-6, and at ground surface in EB-4. The sediments consisted of medium dense to very dense, tan silty sand with variable amounts of gravel, and displayed an unsorted texture. Vashon lodgement till was deposited at the base of an active continental glacier and were subsequently overrun and compacted by about 3,000 feet of glacial ice in the project area during the Vashon Stade of the Fraser Glaciation, approximately 15,000 years ago.

- *Possession (?) Glaciomarine:* These sediments were encountered below the Vashon lodgement till deposits in borings EB-5 and EB-6. These sediments generally consisted of very stiff to hard, unsorted bluish gray silt to sandy silt with scattered dropstones, which exhibited a somewhat fractured texture, were slightly moist to moist, and reacted chemically with hydrochloric acid. These sediments are tentatively interpreted to be

representative of Possession-aged deposits, which were possibly deposited in a marine environment. This unit has been glacially consolidated.

- *Possession (?) Drift:* Sediments encountered below the Possession (?) glaciomarine at the location of boring EB-6, and below the Vashon lodgement till in EB-4 consisted of very dense, stratified silty sand and sandy silt with trace gravel. These sediments are tentatively interpreted to be representative of Possession-age drift deposits. These sediments were subsequently overridden by the Possession ice sheet and consolidated.

Geologic Hazard Areas

Landslide Hazard Areas

The eastern end of the site is inclined over 40 percent based on the supplied topographic data. The City of Redmond Sensitive Area maps indicate that these slopes are considered both Landslide Hazard and Erosion Hazard Areas. The near-surface soil underlying the site consists of loose to medium dense recessional outwash overlying very dense/hard lodgement till. We observed the steep slopes at the site for indications of slope instability, such as bowed or tilted trees, naturally occurring terraced topography, tension cracks, reversed drainage gradients, and unvegetated soil exposures. We did not observe any obvious indications of past or ongoing slope movement. The locations of the Landslide Hazard Areas are shown on Figure 3.

Erosion Hazard Areas

Section 20D.140.60-010(1)(a) of the RMC defines Erosion Hazard Areas as "lands or areas underlain by soils identified by the U.S. Department of Agriculture Soil Conservation Service (SCS) as having 'severe' or 'very severe' rill and inter-rill erosion hazards. This includes, but is not limited to, the following groups of soils when they occur on slopes of 15 percent or greater: Alderwood gravelly sandy loam (AgD) and Everett gravelly sandy loam (EvD)." Review of the SCS (now known as the Natural Resources Conservation Service) on-line soil mapping for the project area indicates that the southwestern portion of the site is mapped as Everett gravelly sandy loam (EvB) for 0 to 5 percent slopes and the northeastern portion of the site which contains the steep slopes is mapped as Alderwood gravelly sandy loam (AgD) for 15 to 30 percent slopes. The boundary of the Erosion Hazard Area having slopes greater than 15 percent is identified on Figure 3.

Characterization of Ground Water Conditions

Ground water was not encountered in any of the on-site explorations, with the exception of a small amount of water within the Possession (?) Drift unit observed in EB-6. However, based on the information obtained to date (existing literature and on-site explorations), the principal

ground water "regime" in the site vicinity is the alluvial aquifer. The alluvial aquifer has limited hydrogeologic connection to the pre-Fraser ground water we encountered. The depth to ground water in the alluvial aquifer is variable. Based on the static water levels reported on water well logs, the depth to water in the alluvial aquifer ranges from approximately 8.5 to 18 feet west of the site.

C2b. A written analysis of proposed clearing, grading, and construction activities.

We understand that the project would include dividing the site into eight lots for construction of new multistory townhomes with a central north-south trending driveway that exits onto 167th Avenue NE. The townhomes would have partial below grade levels. Based on finished floor elevations of the townhomes provided by CORE Design we expect cuts from 10 to 15 feet will be required to reach final grades. Temporary slopes or shoring may be needed to reach final grades, especially in the northeast corner of the site. Retaining walls from 4 to 12 feet in height are planned along the north and south sides of the site. We understand that low impact development stormwater features are being considered for the project.

C3. Critical landslide hazard areas.

C3a-c. Site history, site reconnaissance, subsurface exploration.

A brief site history and the findings of our site reconnaissance and subsurface exploration, are described in the preceding sections of this report.

C3d. Detailed slope stability analysis.

We evaluated slope stability across the site using the computer software program Slope/W Version 5.20. We developed a cross section of the slope for our stability analysis using a topographic survey of the site developed by CORE Design. The location of the Cross Section AA-AA' is shown on Figure 3. The effects of seismic accelerations on the slope during a potential earthquake were also evaluated using a pseudostatic lateral acceleration value of 0.26g.

Soil parameters used for our stability analyses are summarized in Table 1. These parameters were derived based on the soils encountered in our borings, established correlations, and previous experience in similar soils in the Puget Sound area.

Table 1
Summary of Soil Parameters for Stability Analysis

Soil Unit	Friction Angle (degrees)	Cohesion (psf)	Unit Weight (pcf)
Recessional Outwash	30	0	115
Lodgement Till	32	250	130
Possession Sediments	29	500	125

psf = pounds per square foot
pcf = pounds per cubic foot

The elevation of the water table assumed for the stability analysis is based on the levels observed in our explorations completed to date.

Our stability analysis indicates a safety factors greater than 1.5 for the static loading case and greater than 1.1 for the seismic loading case for critical deep seated failure surfaces at the location evaluated. Our stability analyses focused on failure surfaces located at the edge of the recommended 25-foot buffer from the base of the steep slope. Details of our stability analysis are included in Appendix C.

C3e. Recommend detailed surface water management controls during construction and operation.

Under existing and anticipated site conditions, there is a moderate potential for erosion to occur in sloping areas. The potential for increased erosion during and after construction can be mitigated by following Best Management Practices (BMP) required by the City of Redmond and the recommendations listed below.

1. All storm water from impermeable surfaces should be tightlined into an approved storm water drainage system or temporary storage facilities.

2. If possible, construction should proceed during the drier periods of the year and disturbed areas should be revegetated as soon as possible.

3. Clearing beyond the areas to be developed should be avoided. Disturbed areas should be revegetated as soon as possible. Vegetation cover should be maintained outside the work areas.

4. Temporary silt fences should be provided along the lower margins of cleared/disturbed areas.

5. Check dams should be provided along any swale or temporary ditches.

6. Temporary sediment catchment facilities should be cleaned out and maintained periodically, as necessary, to maintain their capacity and function.

7. Soils that will be reused around the site should be stored in such a manner as to reduce erosion from the stockpile. Protective measures may include, but are not necessarily limited to, covering with plastic sheeting or the use of straw bales/silt fences around pile perimeters. Soil should not be stockpiled either temporarily or permanently on any slope that is steeper than 30 percent.

9. Temporary construction entrances should be constructed with quarry spalls or equivalent according to City of Redmond regulations.

C3f. Establish recommendations for site monitoring and inspection during construction.

We recommend that AESI be on-site on a part-time to full-time basis during site grading, placement of structural fill and utility trench backfilling to provide compaction testing. We recommend AESI be on-site on a part-time basis to monitor foundation excavation and subsurface drainage. We recommend that erosion control monitoring be conducted at the time of our other site visits and during/following any significant rainfall events. For the purposes of erosion control monitoring, any rainfall event resulting in approximately ½ inch or more precipitation in a 24-hour period would be considered a significant rainfall event.

C3g. Recommended minimum steep slope buffer.

Townhouses proposed on Lots 7 and 8 will be located near the base of the steep (greater than 40 percent) slope on the east side of the site. A minimum 25-foot buffer is recommended from the base of the steep slopes for the planned structures.

C4. Critical Erosion Hazard Areas

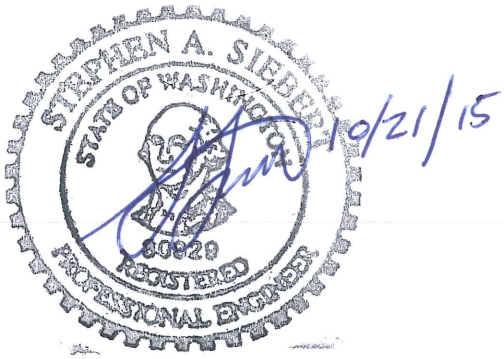
C4a-c. Site history, reconnaissance, surface water management, erosion, and sediment control.

These issues were discussed in previous sections of this report.

CLOSURE

We have enjoyed working with you on this study and are confident that these recommendations will aid in the successful completion of your project. Should you have any questions, or require further assistance, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington

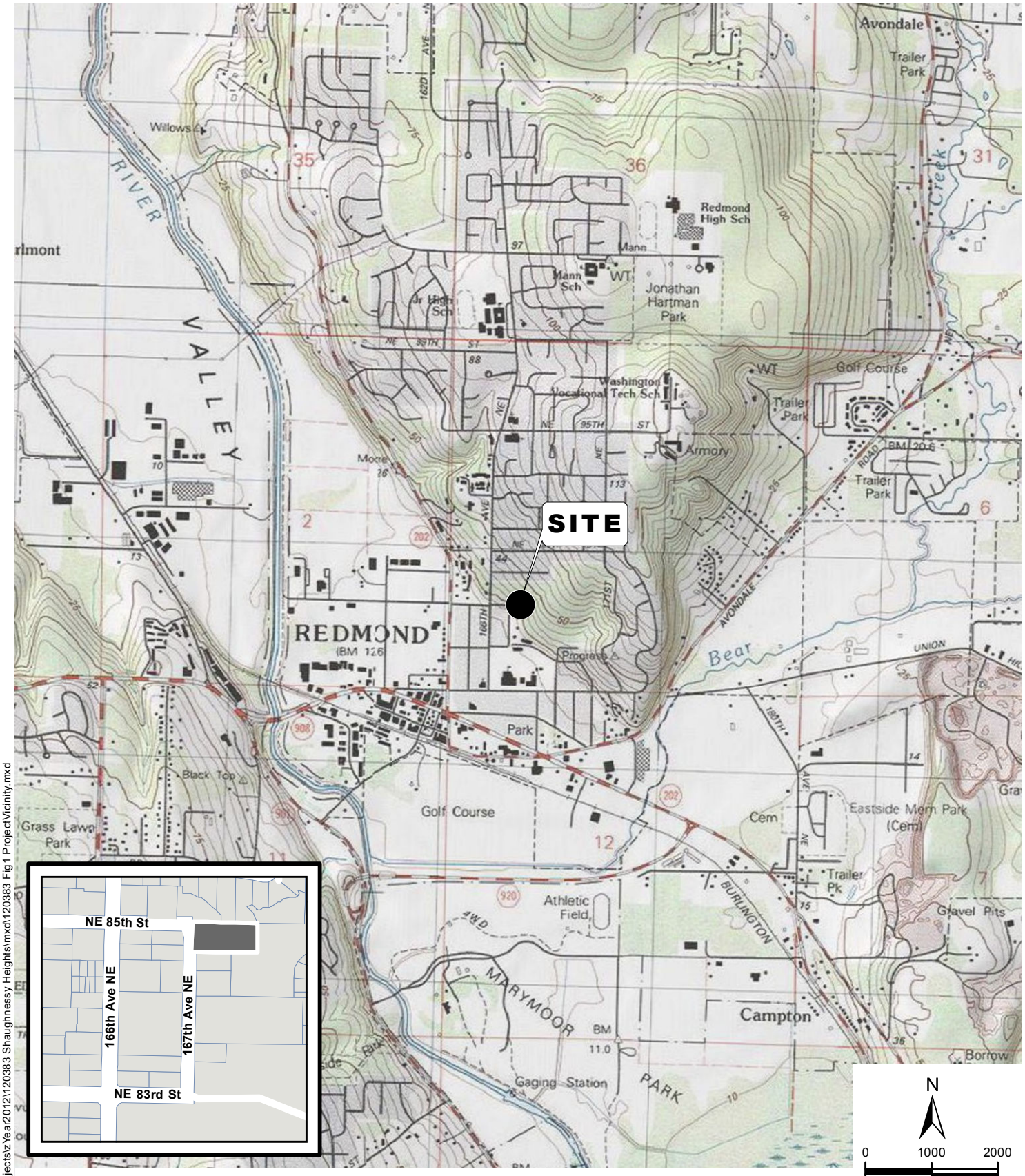


Bruce L. Blyton, P.E.
Senior Principal Engineer

Stephen A. Siebert, P.E.
Associate Geotechnical Engineer

Attachments:

	Figure 1:	Vicinity Map
	Figure 2:	Aerial Photograph
	Figure 3:	Site and Exploration Plan
	Figure 4:	Geologic Cross Section A-A'
	Appendix A:	Development Plans
	Appendix B:	Exploration Logs
	Appendix C:	Slope/W Profiles and Slope Stability Analysis Results



REFERENCE: USGS, KING CO

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

Document Path: H:\GIS_Projects\z Year2012\120383 Shaughnessy Heights\mxd\120383 Fig1 ProjectVicinity.mxd

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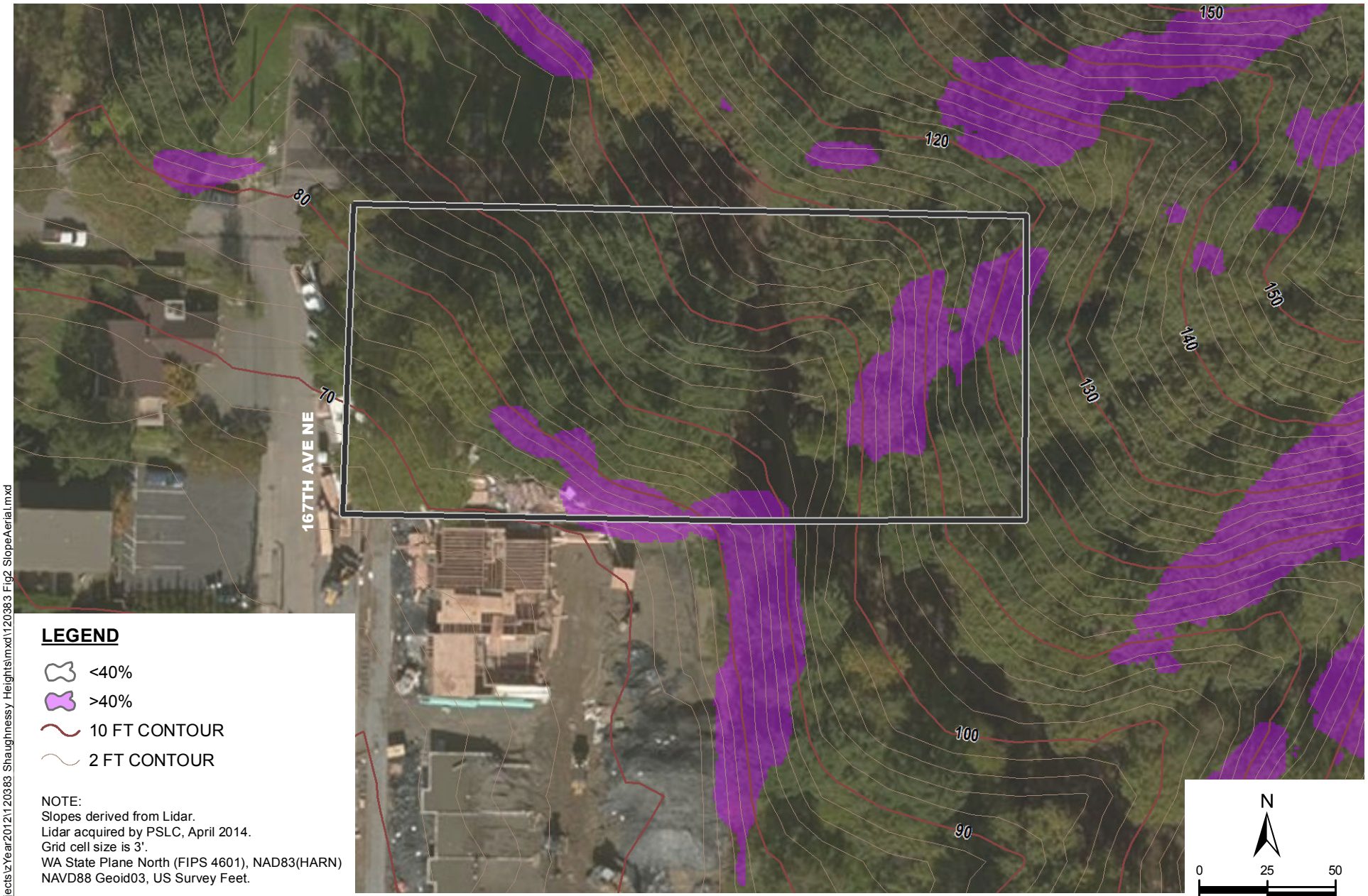
VICINITY MAP

MAPLEWOOD
REDMOND, WASHINGTON

FIGURE 1

DATE 10/15

PROJ. NO. KE120383B



LEGEND

- <40%
- >40%
- 10 FT CONTOUR
- 2 FT CONTOUR

NOTE:
Slopes derived from Lidar.
Lidar acquired by PSLC, April 2014.
Grid cell size is 3'.
WA State Plane North (FIPS 4601), NAD83(HARN)
NAVD88 Geoid03, US Survey Feet.

REFERENCES: BING 2013, PSLC 2014, KING CO

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

Document Path: H:\GIS_Projects\zYear2012\120383 Shaughnessy Heights\mxd\120383 Fig2 SlopeAerial.mxd

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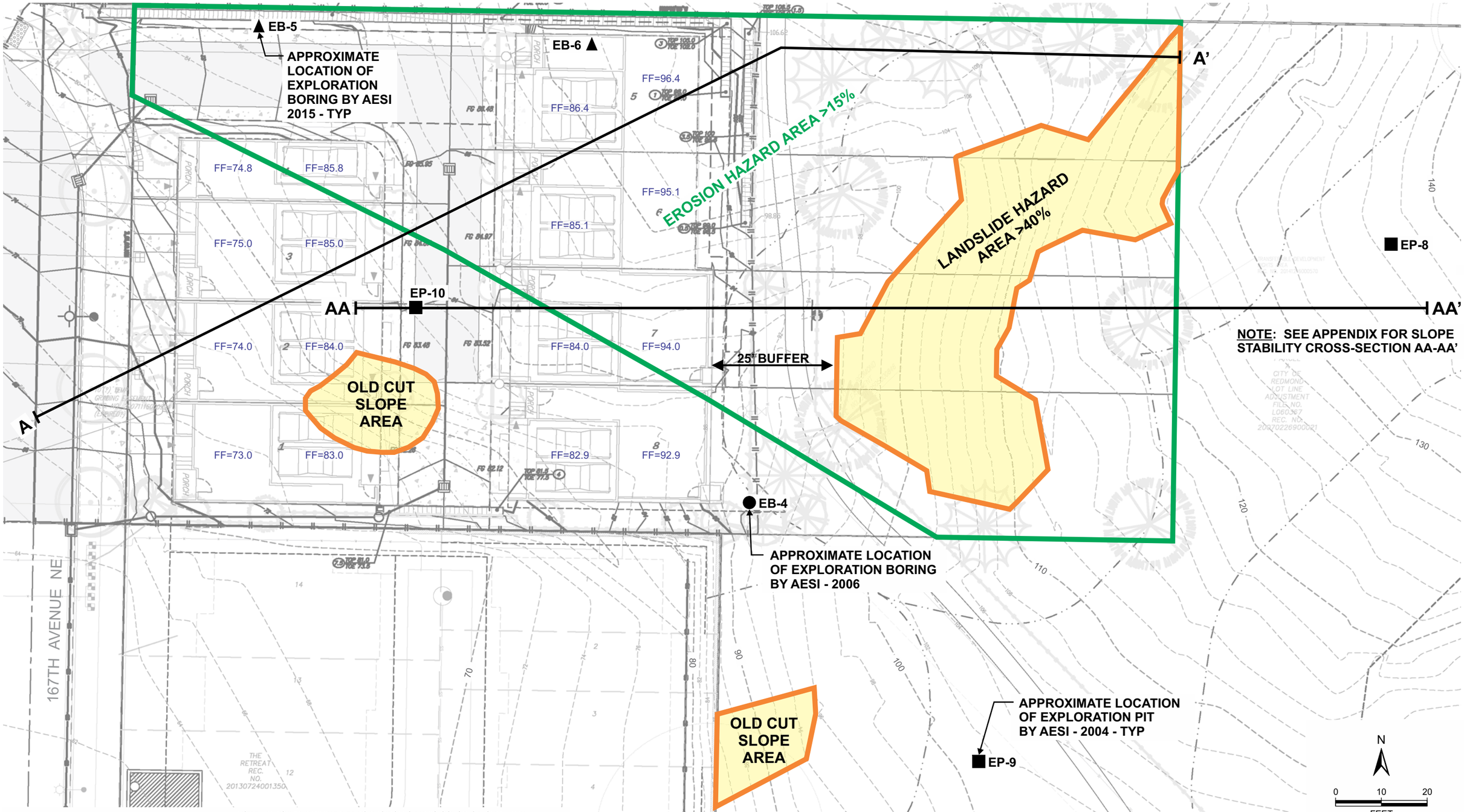
SLOPES > 40%

MAPLEWOOD
REDMOND, WASHINGTON

FIGURE 2

DATE 10/15

PROJ. NO. KE120383B



REFERENCE: CORE DESIGN

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

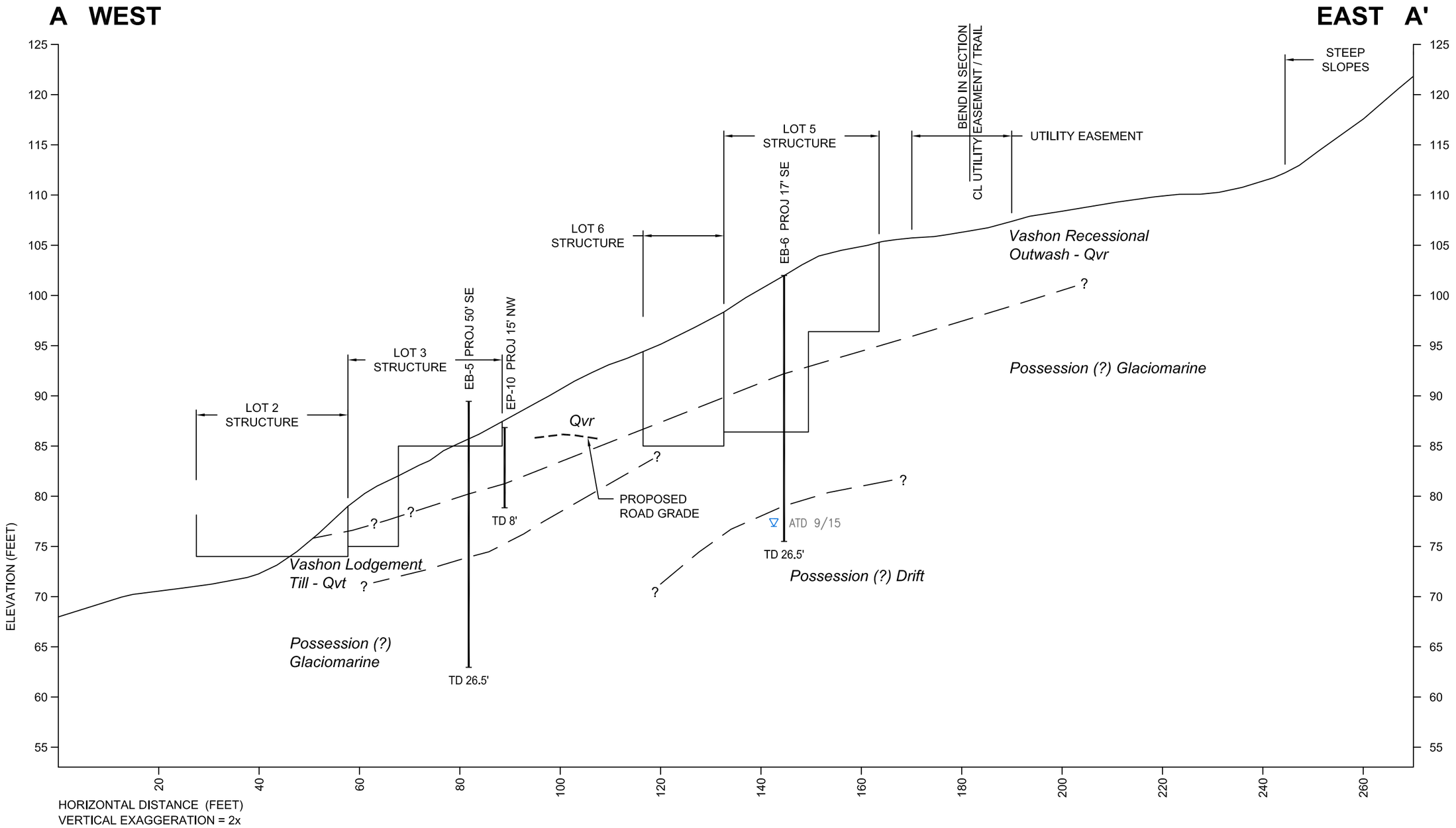
MAPLEWOOD

REDMOND, WASHINGTON

FIGURE 3

DATE 10/15

PROJ. NO. KE120383B



120383 Shaughnessy Heights West \ 120383 Geo Sects.dwg LAYOUT: F4 Section A-A

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GEOLOGIC CROSS-SECTION A - A'

MAPLEWOOD
REDMOND, WASHINGTON

FIGURE 4

DATE 10/15

PROJECT NO. KE120383B

APPENDIX A

Development Plans

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
		≥12% 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
		≥12% 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)

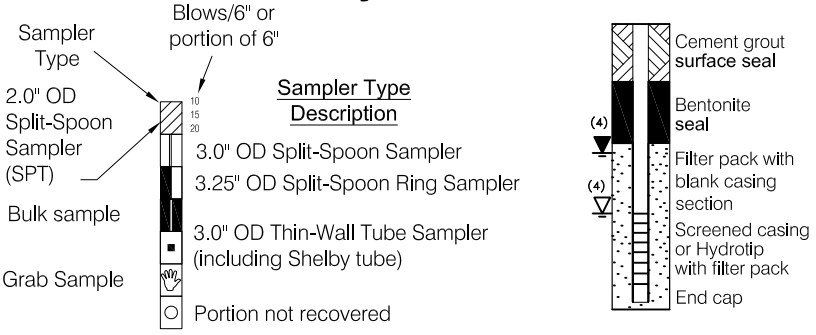
[3] Estimated Percentage

Component	Percentage by Weight
Trace	<5
Some	5 to <12
Modifier (silty, sandy, gravelly)	12 to <30
Very *modifier* (silty, sandy, gravelly)	30 to <50

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 12%

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.

LOG OF EXPLORATION PIT NO. EP-8

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

Duff/Topsoil

1

Recessional Outwash

Loose, moist, orange-tan, fine SAND with few silt and gravel.

2

3

Medium dense, moist, tan, fine to medium SAND with some gravel.

4

5

6

Becomes interbedded, tan, SILTY very fine SAND and tan fine SAND.

7

8

9

Till

Dense, moist, tan, very fine SAND with few silt and gravel, scattered cobbles.

10

11

12

Bottom of exploration pit at depth 12 feet
No seepage. No caving.

13

14

15

16

17

18

19

20

KCTP3 03735A-1.GPJ October 9, 2015

Shaughnessy Heights
Redmond, WA

Logged by: MM

Approved by:

associated earth sciences incorporated

Project No. KE03735A

January 2004

LOG OF EXPLORATION PIT NO. EP-9

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**
	Duff/Topsoil
1	Loose, moist, tan-orange, fine SAND with few silt and gravel.
2	
3	Medium dense, moist, tan, fine to medium SAND with some gravel.
4	
5	**Till**
6	Becomes dense, moist, tan, fine to medium SAND with some gravel.
7	
8	
9	Dense, moist, slightly oxidized, tan, SILTY very fine SAND with few gravel.
10	
11	Bottom of exploration pit at depth 10 feet No seepage. No caving.
12	
13	
14	
15	
16	
17	
18	
19	
20	

Shaughnessy Heights
Redmond, WA

Logged by: MM

Approved by:

associated earth sciences incorporated

Project No. KE03735A

January 2004

KCTP3 03735A-1.GPJ October 9, 2015

LOG OF EXPLORATION PIT NO. EP-10

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.

Depth (ft)	DESCRIPTION
	Duff/Topsoil
1	**Recessional Outwash**
2	Loose, moist, tan-orange, fine to medium SAND.
3	Medium dense, moist, tan, fine to medium SAND with some gravel, scattered cobbles.
4	
5	**Till**
6	Becomes dense, moist, tan, fine to medium SAND with some gravel.
7	Dense, moist, tan, SILTY very fine SAND with few gravel and scattered cobbles.
8	
9	Bottom of exploration pit at depth 8 feet No seepage. No caving.
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Shaughnessy Heights
Redmond, WA

Logged by: MM

Approved by:

associated earth sciences incorporated

Project No. KE03735A

January 2004

KCTP3 03735A-1.GPJ October 9, 2015

associated earth sciences incorporated

Exploration Log

Project Number	Exploration Number	Sheet
KE03735C	EB-4	1 of 1

Project Name	Shaughnessy Heights	Ground Surface Elevation (ft)	~88
Location	Redmond, WA	Datum	N/A
Driller/Equipment	Holt/CME 850 Mud Rotary	Date Start/Finish	10/4/06,10/4/06
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	4 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Lodgement Till					
		S-1		Moist, brown with iron oxide stains, silty SAND with gravel.			8 13 17	▲30	
5		S-2					13 17 13	▲30	
		S-3		No recovery - bad blow counts, sampler tip broken bentonite chips in sampler.			5 6 11	▲17	
10		S-4		**Possession Drift?** Moist, dark blue-gray, SILT with sand, scattered dropstones.			8 22 34	▲56	
		S-5		Wet (perched water), dark blue-gray, fine SAND with trace silt interbedded with silty very fine sand, scattered silt seams.		▼	22 34 22	▲56	
15		S-6		Becomes moist, silty fine SAND to sandy SILT with broken rock piece.			50/5"	▲50/5"	
20		S-7					50/5"	▲50/5"	
25				Moist, blue-gray, clayey SILT, scattered dropstones.					
		S-8					22 38 38	▲76	
30				Bottom of exploration boring at 29 feet Perched ground water observed at approximately 13 feet at time of drilling.					
35									

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: EJL

Approved by:

AESIBOR 03735C.GPJ October 5, 2015

associated earth sciences incorporated

Exploration Log

Project Number	Exploration Number	Sheet
KE120383B	EB-5	1 of 1

Project Name	Maplewood	Ground Surface Elevation (ft)	88
Location	Redmond, WA	Datum	Core Design
Driller/Equipment	Bortec / Track-Mounted	Date Start/Finish	9/24/15,9/24/15
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	4 1/4 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Grass / Topsoil					
				Recessional Outwash					
		S-1		Very dense, slightly moist, brown, gravelly, fine to coarse SAND, trace silt; blow counts overstated due to rock in drill tip (SP).			23 50/6"	▲	73/12"
5		S-2		Very dense, slightly moist, tan, very gravelly, fine to coarse SAND, some silt; blow counts overstated due to rock in drill tip (SM).			26 32 41	▲	73
		S-3		Very dense, slightly moist, tan, silty, fine to coarse SAND, some gravel; blow counts overstated due to rock in drill tip (SM).			50/4"	▲	50/4"
10		S-4		**Vashon Lodgement Till** Very dense, slightly moist, gray, very silty, fine SAND, some gravel (SM).			50/2"	▲	50/2"
				Possession (?) Glaciomarine					
15		S-5		Hard, moist, blue gray, sandy SILT, trace gravel; diamict; unsorted; mild reaction with HCl (ML).			11 22 32	▲	54
20		S-6		Hard, moist, blue gray, SILT, trace gravel; diamict; unsorted; mild reaction with HCl (ML).			15 23 34	▲	58
25		S-7		As above.			14 25 37	▲	62
				Bottom of exploration boring at 26.5 feet No ground water encountered.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

Logged by: DV

Approved by: JHS

AESIBOR 120383.GPJ October 9, 2015

associated earth sciences incorporated

Exploration Log

Project Number	Exploration Number	Sheet
KE120383B	EB-6	1 of 1

Project Name	Maplewood	Ground Surface Elevation (ft)	103
Location	Redmond, WA	Datum	Core Design
Driller/Equipment	Bortec / Track-Mounted	Date Start/Finish	9/24/15,9/24/15
Hammer Weight/Drop	140# / 30"	Hole Diameter (in)	4 1/4 inches

Depth (ft)	ST	Samples	Graphic Symbol	DESCRIPTION	Well Completion	Water Level	Blows/6"	Blows/Foot (10 20 30 40)	Other Tests
				Topsoil					
				Recessional Outwash					
		S-1		Medium dense, slightly moist, tan, gravelly, fine SAND, trace silt (SP).			4 8 7	▲15	
5		S-2		As above.			9 11 18	▲29	
		S-3		Medium dense, slightly moist, tannish brown, gravelly, fine to coarse SAND (SP).			10 11 10	▲21	
				Possession (?) Glaciomarine					
10		S-4		Very stiff, moist, tan, SILT, trace fine to medium sand, trace gravel; diamict; unsorted; mild reaction with HCl (ML).			5 8 11	▲19	
15		S-5		Very stiff, moist, blue gray, SILT, trace sand; diamict; unsorted; mild reaction with HCl (ML).			6 11 14	▲25	
20		S-6		Hard, slightly moist, blue gray, sandy SILT, trace gravel; diamict; unsorted; mild reaction with HCl (ML).			23 50/5"	▲73/11"	
				Possession (?) Drift					
25		S-7		Very dense, wet, blue gray, silty, fine to coarse SAND, trace gravel (SM).		▼	25 34 30	▲64	
				Bottom of exploration boring at 26.5 feet Unable to measure static water level because hole collapsed up to 12 feet.					

Sampler Type (ST):

- 2" OD Split Spoon Sampler (SPT)
- 3" OD Split Spoon Sampler (D & M)
- Grab Sample
- No Recovery
- Ring Sample
- Shelby Tube Sample

M - Moisture

- Water Level ()
- Water Level at time of drilling (ATD)

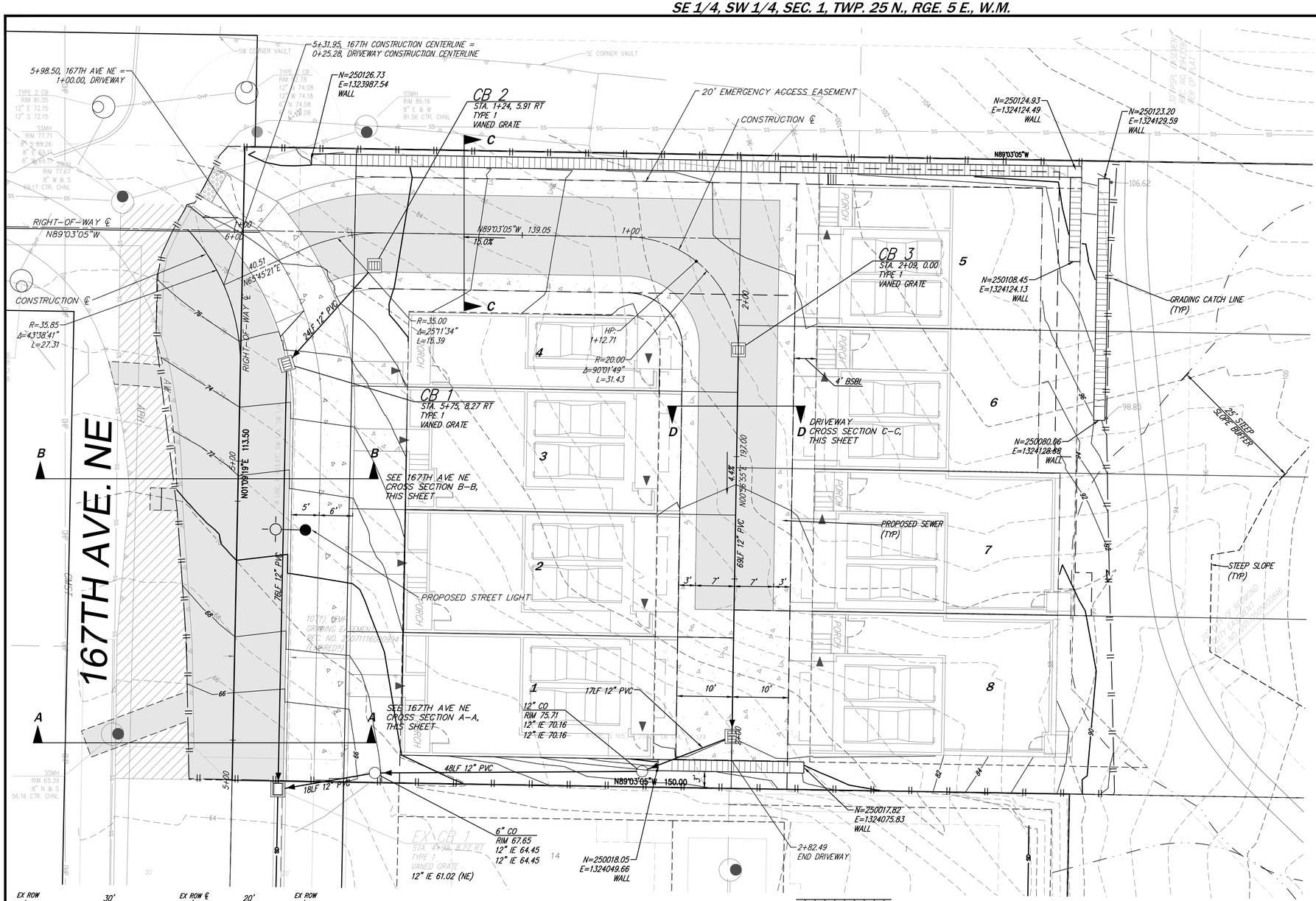
Logged by: DV

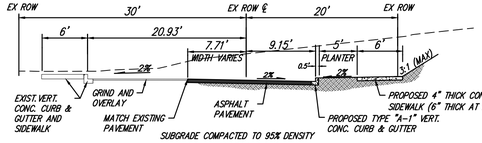
Approved by: JHS

AESIBOR 120383.GPJ October 9, 2015

APPENDIX B

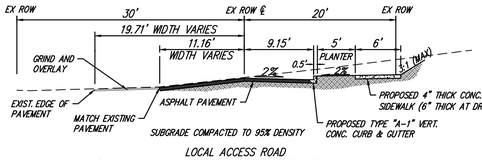
Exploration Logs





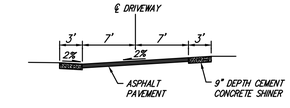
167TH AVE NE - SECTION A-A

NO SCALE



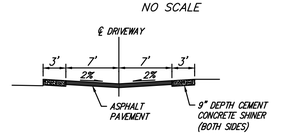
167TH AVE NE - SECTION B-B

NO SCALE



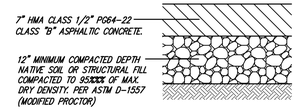
DRIVEWAY C-C

NO SCALE



DRIVEWAY D-D

NO SCALE



ROAD PAVEMENT SURFACING SECTION

LEGEND

- EXISTING CONTOUR — 90 —
- PROPOSED CONTOUR — 90 —
- ROCKERY
- BUILDING SETBACK LINE
- PROPOSED FULL ASPHALT PAVING PER SEC. THIS SH.T
- 2" GRIND & OVERLAY
- FIRE LANE MARKING TYPE 1 PAINTED CURB

NOTES

1. NEAT CUT EXISTING PAVEMENT FULL DEPTH.
2. STREET TREES TO BE "SUMMIT GREEN ASH" - QTY (2).
3. USE COMPOST AMENDED SOIL PER COR STD PLAN 632.
4. TRANSITION TO EXISTING SIDEWALK.
5. CURB AND SIDEWALK JOINTS PER COR STD PLAN 303
6. ADJUST RIM TO MATCH NEW GRADE.
7. REMOVE EXISTING ASPHALT AND CONCRETE PAVEMENT AND RECONSTRUCT PER ROAD PAVEMENT SURFACING SECTION.

SCALE: 1" = 10'

0 5 10 20

GRADING NOTES

1. ALL SITE WORK IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE APPROVED PLANS. ANY DEVIATION FROM THESE PLANS WILL REQUIRE PRIOR APPROVAL FROM THE OWNER, ENGINEER AND APPROPRIATE PUBLIC AGENCIES. ALL WORK AND MATERIALS TO BE PER CITY OF REDMOND STANDARDS.

2. THE FACILITIES SHOWN ON THE APPROVED EROSION/SEDIMENTATION CONTROL PLANS SHALL BE CONSTRUCTED AND IMPLEMENTED PRIOR TO ANY EXTENSIVE GRADING OR LAND CLEARING IN ACCORDANCE WITH THAT PLAN. THESE FACILITIES MUST BE SATISFACTORILY MAINTAINED UNTIL CONSTRUCTION AND LANDSCAPING IS COMPLETED AND THE POTENTIAL FOR ON-SITE EROSION HAS PASSED.

3. ALL TEMPORARY STOCKPILES AND ANY AREA WHICH HAS BEEN STRIPPED OF VEGETATION AND WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 30 DAYS OR MORE SHALL BE IMMEDIATELY STABILIZED WITH MULCHING, GRASS SEEDING OR OTHER APPROVED EROSION CONTROL TREATMENT APPLICABLE TO THE TIME OF YEAR IN QUESTION. GRASS SEEDING ALONE WILL BE ACCEPTABLE ONLY DURING THE MONTHS OF APRIL THROUGH SEPTEMBER INCLUSIVE. SEEDING MAY PROCEED WHENEVER IT IS IN THE INTEREST OF THE PERMITTEE, BUT MUST BE AUGMENTED WITH MULCHING, NETTING, OR OTHER CITY OF REDMOND-APPROVED TREATMENT. STRAW MULCH SHALL CONSIST OF A MINIMUM THICKNESS OF TWO INCHES SPREAD EVENLY OVER THE SURFACE TO BE PROTECTED. NETTING MAY BE REQUIRED TO HOLD MULCH IN PLACE ON STEEP SLOPES. GRASS SEEDING SHALL BE ACCOMPLISHED THROUGH THE USE OF A CITY OF REDMOND-APPROVED HYDROSEEDER AND SEED MIXTURE OR THROUGH PLACEMENT OF AN ACCEPTABLE SOD.

4. MAJOR EXPOSED, GRADED SLOPES SHALL BE PROTECTED BY CLEAR PLASTIC SHEETING OR SIMILAR APPROVED METHOD UNTIL SUCH TIME AS THE VEGETATIVE COVER HAS BEEN ESTABLISHED SUFFICIENTLY TO INHIBIT EROSION.

5. SILTATION CONTROL AREAS SHALL BE RETURNED TO ORIGINAL GROUND CONDITIONS OR BROUGHT TO FINISH GRADE AT THE PROJECT'S COMPLETION. ANY PERMANENT STORM DRAINAGE FACILITIES USED FOR EROSION/SEDIMENTATION CONTROL SHALL BE CLEANED PRIOR TO PROJECT ACCEPTANCE.

6. ALL LIMITS OF CLEARING AND AREAS OF VEGETATION PRESERVATION, AS PRESCRIBED ON THESE PLANS, SHALL BE LOCATED BY SURVEY AND OBSERVED DURING CONSTRUCTION. SPECIAL PROTECTIVE FENCING WILL BE REQUIRED. THIS SPECIAL PROTECTIVE FENCING SHALL CONSIST OF 42" HIGH ORANGE SAFETY FENCE. NO DISTURBANCE OR REMOVAL OF ANY GROUND COVER IS TO OCCUR WITHIN THESE PRESERVATION AREAS.

7. GRADES SHOWN ON THIS PLAN REPRESENT THE ENGINEER'S ESTIMATE OF APPROXIMATE OPTIMUM EARTHWORK AND OTHER GRADING/SOIL CONSIDERATIONS. THE CONTRACTOR MAY ALTER THE GRADES SHOWN TO BETTER ACHIEVE THESE RESULTS PROVIDED THAT ANY ALTERATION IS SUBJECT TO THE PRIOR APPROVAL IN WRITING BY THE ENGINEER, OWNER, AND THE APPROPRIATE CITY OF REDMOND DEPARTMENTS.

8. GRADING INTO AREAS OUTSIDE OF THIS PROPERTY IS SUBJECT TO THE WRITTEN CONSENT OF ADJOINING PROPERTY OWNERS. FAILURE TO OBTAIN SUCH CONSENT MAY REQUIRE ADDITIONAL ROCKERY OR OTHER SUITABLE SOIL STABILIZATION SUCH THAT ALL GRADING OCCURS WITHIN THE PROJECT'S BOUNDARIES. THE CONTRACTOR SHALL VERIFY THE STATUS OF THE ADJOINING PROPERTY OWNER'S CONSENT BY CONTACTING THE DEVELOPER PRIOR TO PERFORMING WORK OUTSIDE OF PROJECT BOUNDARIES.

9. ALL SURPLUS OR UNSUITABLE MATERIALS CLEARED OR EXCAVATED AND REMOVED FROM THE SITE SHALL BE DISPOSED OF IN AN APPROVED FILL SITE. IT WILL BE THE PERMITTEE'S RESPONSIBILITY TO LOCATE AN ACCEPTABLE DISPOSAL SITE AND TO ASSURE THAT ALL SURPLUS MATERIAL IS PROPERLY DEPOSITED IN SAME.

10. NO FINAL GRADE CUT OR EMBANKMENT SLOPE SHALL EXCEED 3:1 (HORIZ:VERT) WITHOUT STABILIZATION BY ROCKERY (NOT TO EXCEED 8') OR BY RETAINING WALL, UNLESS SPECIFICALLY AUTHORIZED BY A LICENSED SOILS ENGINEER AND APPROVED BY CITY OF REDMOND. ALL ROCKERIES OVER 4 FEET HIGH AND ALL RETAINING WALLS OUTSIDE OF CITY OF REDMOND RIGHT-OF-WAY WILL REQUIRE A SEPARATE BUILDING PERMIT.

12. ALL EARTHWORK UNDER PAVING TO BE USED BY VEHICULAR TRAFFIC SHALL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY PER MODIFIED PROCTOR ASTM D1557, OR PER SPECIFICATION IN THE SOILS REPORT.

13. UNLESS OTHERWISE NOTED, ALL SPOT ELEVATIONS SHOWN IN PAVED AREAS ARE TOP OF PAVING.

14. ALL PARKING, DRIVEWAY AND LANDSCAPED AREAS SHALL HAVE AT LEAST A 1.0% SLOPE TOWARD THE NEAREST STORM DRAINAGE INTERCEPTION/CONVEYANCE SYSTEM. PLAN DETAILS OR FIELD MODIFICATIONS SHALL NOT SUPERCEDE THIS REQUIREMENT.

15. EXTRUDED CEMENT CONCRETE CURBING, WHERE SPECIFIED, SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF REDMOND STANDARDS AND DETAILS (E.G. CITY OF REDMOND STANDARD PLAN #304A) OR DETAILS SHOWN ON THESE PLANS.

16. ANY OPEN CUTS OF EXISTING PUBLIC ROADWAYS SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH CITY OF REDMOND STANDARDS. ALL CUTS INTO EXISTING ASPHALT SHALL BE ALONG NEAT, CONTINUOUS, SAWED LINES. A TEMPORARY COLD MIX PATCH SHALL BE PLACED IMMEDIATELY AFTER BACKFILL AND COMPACTION. THE EXISTING SURFACING MUST BE REPLACED IN KIND (OR 4 INCHES OF COMPACTED CLASS "B" ASPHALT CONCRETE, WHICHEVER IS GREATER) WITHIN 30 DAYS OF TEMPORARY PATCHING. THE CONTRACTOR SHALL CLOSELY FOLLOW REQUIREMENTS OF THE RIGHT-OF-WAY PERMIT--SPECIFICALLY; ALLOWABLE WORKING HOURS, DETOUR AND WARNING SIGNS, AND NOTIFICATION OF ROAD ALTERATIONS TO THE POLICE AND/OR OTHER EMERGENCY SERVICES.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACT. ANY WORK WITHIN THE TRAVELED RIGHT-OF-WAY THAT MAY INTERRUPT NORMAL TRAFFIC FLOW SHALL REQUIRE AT LEAST ONE FLAGGER FOR EACH LANE OF TRAFFIC AFFECTED. ALL SECTIONS OF THE WSDOT STANDARD SPECIFICATIONS 1-07.23 TRAFFIC CONTROL SHALL APPLY.

18. THE CONTRACTOR SHALL KEEP OFF-SITE STREETS CLEAN AT ALL TIMES BY SWEEPING. FLUSHING OF THESE STREETS WILL NOT BE ALLOWED.

19. IMPERVIOUS SURFACES (ROOFS, STREETS, DRIVEWAYS, ETC.) SHALL BE DIRECTED INTO THE COMPLETED STORM DRAINAGE SYSTEM AS SOON AS POSSIBLE.

20. ANY WORK WITHIN AN EXISTING STREET SHALL NOT COMMENCE UNTIL THE CONTRACTOR PREPARES A TRAFFIC CONTROL PLAN, AND RECIEVES APPROVAL OF THE PLAN FROM THE CITY TRANSPORTATION DIVISION AND CITY CONSTRUCTION INSPECTOR.

NOTE: THIS DEVELOPMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE YEAR 2012 CITY OF REDMOND STANDARD SPECIFICATIONS AND DETAILS.

This approval is for design concept only. These plans appear to be in conformance with City of Redmond design standards for construction. This approval shall not be construed as authorizing construction not in accordance with applicable City standards. The City reserves the right to require revisions to the approved plans to assure conformance with City of Redmond design standards for construction at any time that it is discovered that the proposed construction does not otherwise meet the applicable construction standards. The owner is required to provide designs and plans in accordance with applicable City standards and assure that construction is accomplished in accordance with those standards. The owner and/or design engineer and/or developer, as the case may be, may be required to make necessary approved field revisions to correct any errors or omissions found to exist on the approved plan.

APPROVED FOR CONSTRUCTION

Director of Public Works
City of Redmond

Date _____

Plan Check Engineer _____

For Sheet(s) _____

Storm Drainage Engineer _____

Utility Engineer _____

Fire Department _____

Trans. Engineer _____

Planning Dept. _____

DATE | NO. | REVISIONS | DATE

3-21-14

CORE DESIGN
ENGINEERING · PLANNING · SURVEYING
14711 NE 29th Place Suite 101
Bellevue, Washington 98007
425.885.7877 Fax 425.885.7963

DEVELOPMENT PLAN
MAPLEWOOD

AMALANI, LLC/IBBO, LLC
105 SOUTH MAIN STREET, SUITE 230
SEATTLE, WA 98104

DATE	OCTOBER 2015
DESIGNED	MICHAEL A. MOODY, P.E.
DRAWN	FLAVIO BAHNOTTI
APPROVED	MICHAEL A. MOODY, P.E.
	JOSH P. BEARD — PROJECT MANAGER

SHEET	OF
P6	13

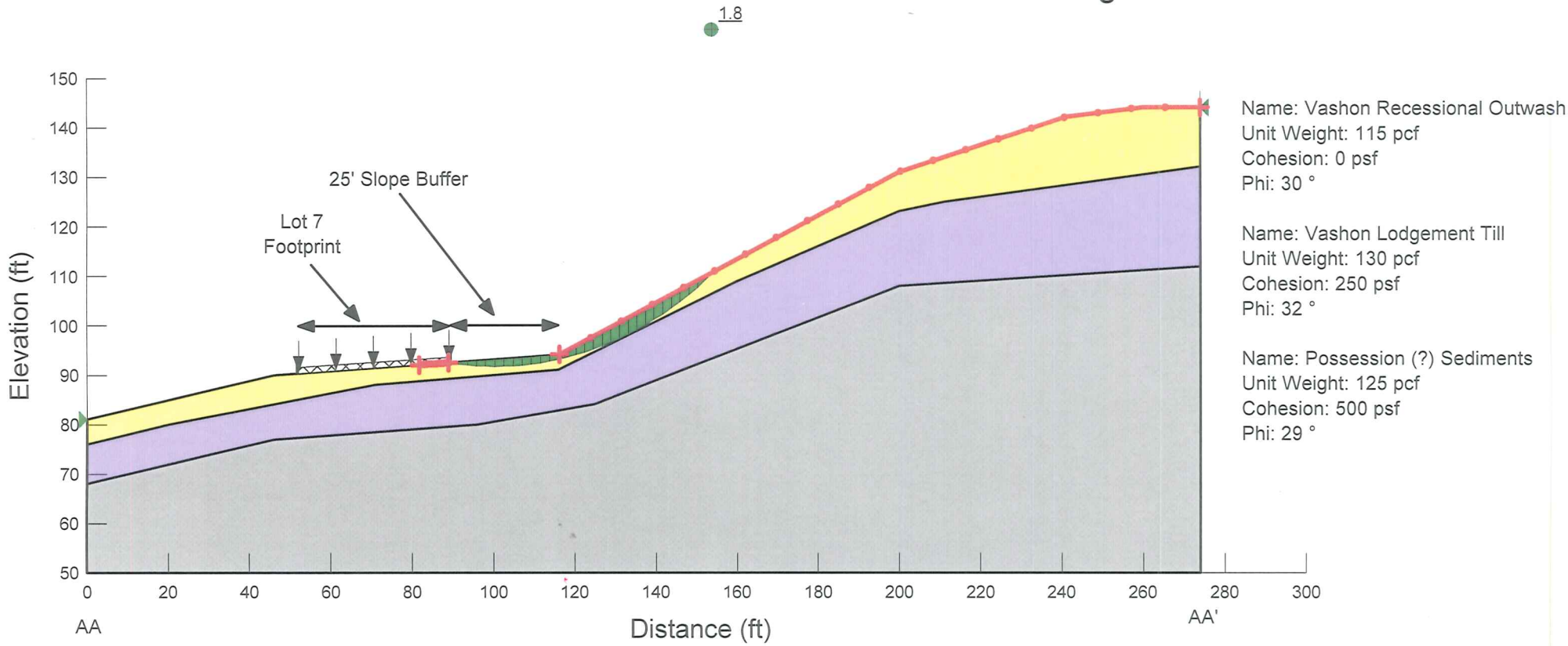
PROJECT NUMBER 15099

J:\2015\15099\Engineering\Preliminary\Sheets\15099 P6.dwg, 10/20/2015 1:34:54 PM, DWG To PDF.pc3

APPENDIX C

Slope/W Profiles and Slope Stability Analysis Results

Maplewood Development Stability Analysis
Static
10/7/2015
Seismic Load: 0g

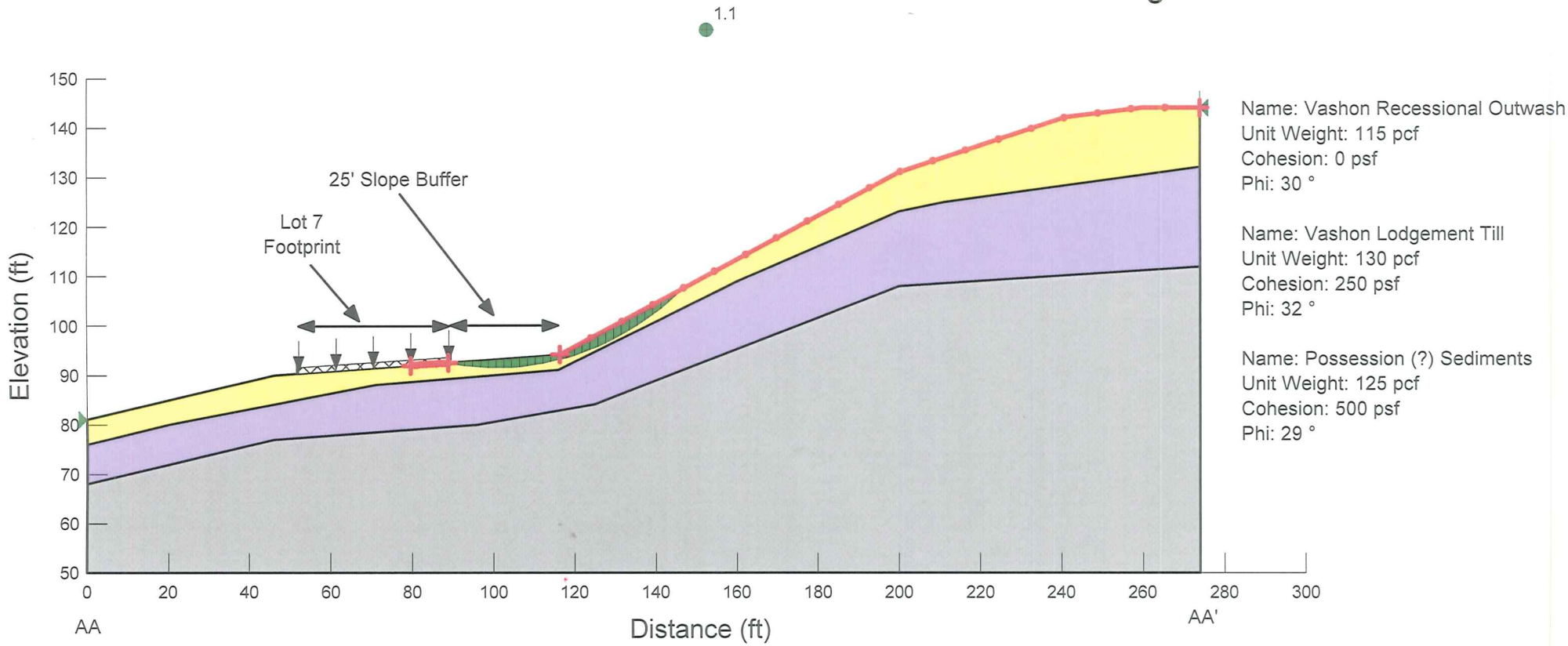


Name: Vashon Recessional Outwash
Unit Weight: 115 pcf
Cohesion: 0 psf
Phi: 30 °

Name: Vashon Lodgement Till
Unit Weight: 130 pcf
Cohesion: 250 psf
Phi: 32 °

Name: Possession (?) Sediments
Unit Weight: 125 pcf
Cohesion: 500 psf
Phi: 29 °

Maplewood Development Stability Analysis
Pseudo-Static
10/7/2015
Seismic Load: 0.26g



Name: Vashon Recessional Outwash
Unit Weight: 115 pcf
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Phi: 30 °

Name: Vashon Lodgement Till
Unit Weight: 130 pcf
Cohesion: 250 psf
Phi: 32 °

Name: Possession (?) Sediments
Unit Weight: 125 pcf
Cohesion: 500 psf
Phi: 29 °

associated earth sciences incorporated

Technical Memorandum

Date:	December 21, 2015	**From:**	Jennifer H. Saltonstall, L.G., L.Hg.
To:	IBBO, LLC and Amalani, LLC	**Project Manager:**	Stephen A. Siebert, P.E.
	105 South Main Street, Suite 230	**Principal in Charge:**	Curtis J. Koger, L.G., L.E.G, L.Hg.
	Seattle, Washington 98104	**Project Name:**	Maplewood (formerly Shaughnessy Heights West)
Attn:	Mr. Barry Margolese	**Project No:**	KE120383B
cc:	Mr. Joshua P. Beard, P.L.A. jpb@coredesigninc.com		
Subject:	Ground water recharge evaluation, Maplewood Project, Redmond, WA		

Associated Earth Sciences, Inc. (AESI) provides this technical memorandum summarizing the results of ground water recharge calculations performed for the Maplewood project in Redmond, Washington. This technical memorandum is based on information presented in previous reports for the project including:

- AESI, February 9, 2004, Subsurface Exploration, Geologic Hazards, and Preliminary Geotechnical Engineering Report, Shaughnessy Heights
- AESI, October 13, 2006, Supplementary Subsurface Explorations and Geotechnical Engineering Study, Shaughnessy Heights
- AESI, September 26, 2012, Geotechnical Findings and Recommendations, Downspout Infiltration Suitability Assessment, Shaughnessy Heights West
- AESI, October 15, 2012, Critical Aquifer Recharge Areas Report, Shaughnessy Heights West
- AESI, October 21, 2015, Critical Aquifer Recharge Areas Report, Maplewood (formerly Shaughnessy Heights West)
- AESI, October 21, 2015, Critical Areas Report (Geotechnical Aspects), Maplewood (formerly Shaughnessy Heights West)
- AESI, October 21, 2015, Subsurface Exploration, Geologic Hazards, and Preliminary Geotechnical Engineering Report, Maplewood (formerly Shaughnessy Heights West)
- Core Design, Inc. (CORE), September 2015, Preliminary Storm Drainage Report for Maplewood Short Plat.

PROJECT DESCRIPTION AND SITE CONDITIONS SUMMARY

The proposed Maplewood project is an 8-unit multi-family residential development located on the southwest margin of a north-south trending upland referred to as Education Hill. The Education Hill upland is bounded to the west by the Sammamish River Valley and to the east by the Bear Creek Valley. The site is

located in a portion of southwest ¼ of Section 1, Township 25 North, Range 5 East, W.M., King County, on the south side of NE 85th Street extended and just east of 167th Avenue NE (see Figure 1, Vicinity Map).

The following is a summary of our understanding of the project and the surrounding area.

- The proposed Maplewood project is a tract from the Shaughnessy Heights development. The tract consists of a single parcel to the northwest of the Shaughnessy Heights development and the project was previously called Shaughnessy Heights West. The subject property is approximately 2.34 acres in size (King County parcel 0125059114). Approximately 1.69 acres of the parcel is located within a Transferable Development Rights easement (Tract "A") and will remain undeveloped. The remainder of the property in which the townhomes are proposed is approximately 0.65 acres (Tract "B").
- The developed site plan includes creation of an 8 unit multi-family development along with associated driveways, sidewalks, utilities, and open space areas and frontage improvements along 167th Avenue NE, as shown as the attached Development Plan (CORE, October 2015). The open space areas are to remain in the existing condition. The townhomes would have partial below grade levels. Based on finished floor elevations of the townhomes provided by CORE we expect cuts from 10 to 15 feet will be required to reach final grades. Retaining walls from 4 t o12 feet in height are proposed on the north and south sides of the tract.
- The existing site is currently an undeveloped forested parcel. On the 0.65-acre tract proposed for townhomes, the ground surface elevation ranges from about 65 feet above mean sea level (amsl) in the southwest corner rising to about 125 feet amsl on the eastern edge. The ground surface generally slopes to the west/southwest across most of the site. A steep slope inclined at greater than 40 percent is present on the eastern portion of the tract. Remnants of a man-made steep slope created as a result of previous grading are present in the southwest portion of the site and south of the site. There is a faint remnant drainage located in the eastern portion of the tract, oriented roughly northeast-southwest, that creates a linear localized depression. Vegetation on the tract consists of both large evergreen and deciduous trees with a moderately dense understory.
- The Preliminary Storm Drainage Report (CORE, 2015) describes that under the existing condition, discharge from the site is to the existing natural discharge location in the southwest corner, and that the proposed condition discharge from the site will be to a new tight line storm drainage system proposed under the adjacent (to the south) project referred to as "The Retreat" project. Drainage is then routed to the south and west as it does in its natural condition through a series of ditches, culverts and pipes. Flow control and water quality treatment will be provided by a public drainage and water quality facility located downstream of the project site. All upstream runoff is collected in the detention facility on the adjacent property.
- Clean roof runoff will be discharged through perforated stub-out drainpipes that connect to the storm system, allowing for minor infiltration through the perforated pipe. Domestic water and sewer service will be provided by the City of Redmond. Irrigation using imported water was not included in the water balance calculations due to the limited landscape/lawn areas.
- As described in our above-referenced reports, the subject site is located at the southwestern base of the Education Hill upland. The upland is mantled by Vashon lodgement till and till sediments were encountered onsite at or within a few feet of ground surface. Areas of Vashon recessional outwash are mapped near the base of the slope and areas of thin outwash were encountered on the slope. Till-like pre-Fraser-age low-permeability deposits are also mapped on the upland margin in the vicinity of the site and were encountered generally less than 10 feet below ground surface.

- As described in our above-referenced reports, ground water was not encountered in any of the on-site explorations, with the exception of an isolated amount of water within the pre-Fraser-age Possession (?) Drift unit observed at a depth 25 feet of in one exploration. Based on the information obtained to date (existing literature and on-site explorations), the principal ground water "regime" in the site vicinity includes the interflow zone and, west of the site, an extensive alluvial aquifer present on the valley floor. The alluvial aquifer has limited hydrogeologic connection to the pre-Fraser ground water we encountered. The depth to ground water in the alluvial aquifer is variable. Based on the static water levels reported on water well logs, the depth to water in the alluvial aquifer ranges from approximately 8.5 to 18 feet west of the site.

GROUND WATER RECHARGE SUMMARY

Water balance analyses were conducted to evaluate the potential hydrologic impacts associated with the proposed development on ground water recharge. The water balance provided estimates of precipitation, evapotranspiration, recharge, and runoff from the site. Water balance analyses for existing and developed condition scenarios were conducted using land use cover types provided by CORE (CORE, 2015) and soil/geologic conditions described in our above-referenced reports. We understand from past communication with City of Redmond Public Works that for SEPA analyses project ground water recharge impacts from the developed condition should be evaluated with respect to the existing condition. Table 1 summarizes existing and developed land use cover types. Table 2 summaries the results of the water balance calculations. The monthly distribution of the difference in recharge is presented in Table 3. It should be noted that the water balance does not account for sources of recharge that are difficult to quantify. The calculated difference in annual recharge between the existing conditions and developed conditions, based on the 0.65-acre townhome tract, is approximately 0.38 acre-feet. This represents a calculated reduction in ground water recharge under the developed conditions.

Table 1
Existing and Developed Condition Land Cover Types

Soil and Land Cover	Outwash	Till*		Impervious	Total (acres)**
	Forest (acres)	Forest (acres)	Grass (acres)	Lot Areas (roof, driveway) (acres)	
Existing areas in acres	0.05	0.60	0	0	0.65
Developed areas in acres	0	0.30	0.08	0.27	0.65

*Areas where Vashon lodgement till or low-permeability pre-Fraser-age Possession deposits were present at about 5 feet or less were considered as Till for ground water recharge/water balance calculations.
**Total acreage is based on Tract "B" acreage and does not include offsite adjacent right-of-way improvements (0.08 acres of road, planter strip and sidewalk) or Tract "A" (1.69 acres of undisturbed forest).

Table 2
Existing and Developed Conditions Monthly Water Balance

		Existing Condition			Developed Condition		
Month	**Rainfall (inches)**	**ET (inches)**	**RCH (inches)**	**RO (inches)**	**ET (inches)**	**RCH (inches)**	**RO (inches)**
Oct	4.45	1.55	1.43	1.47	1.35	0.77	2.33
Nov	6.72	1.07	2.78	2.87	1.04	1.48	4.18
Dec	6.5	0.76	2.83	2.91	0.80	1.51	4.18
Jan	6.2	0.50	2.81	2.89	0.50	1.49	4.19
Feb	4.39	0.43	1.95	2.01	0.41	1.04	2.93
Mar	4.68	0.62	2.00	2.06	0.53	1.07	3.07
Apr	3.68	1.34	1.15	1.19	1.00	0.62	2.06
May	2.83	2.45	0.19	0.19	1.67	0.12	1.04
Jun	2.40	3.16	-	-0.76	2.07	-	0.33
Jul	1.35	4.11	-	-2.77	2.37	-	-1.03
Aug	1.46	3.46	-	-2.01	2.09	-	-0.64
Sep	2.46	2.18	0.14	0.14	1.58	0.09	0.79
TOTAL	**47.1**	**21.63**	**15.27**	**10.22**	**14.40**	**8.58**	**24.07**

Table 3
Comparison of Existing and Developed Condition Monthly Recharge Volumes with Infiltration

Month	Existing Condition Recharge (acre-feet)	Developed Condition Recharge (acre-feet)	Difference (acre-feet)
Oct	0.08	0.04	-0.04
Nov	0.15	0.08	-0.07
Dec	0.15	0.08	-0.07
Jan	0.15	0.08	-0.07
Feb	0.11	0.06	-0.05
Mar	0.11	0.06	-0.05
Apr	0.06	0.03	-0.03
May	0.01	0.01	-
Jun	-	-	-
Jul	-	-	-
Aug	-	-	-
Sep	0.01	-	-
TOTAL	**0.83**	**0.44**	**-0.38**

WATER BALANCE COMPONENTS

The primary components of the water balance for the project site are precipitation (PPT), evapotranspiration (ET), ground water recharge (RCH), and runoff (RO). These components are related by the following equation:

Water Balance**: PPT – RCH – ET – RO = 0**

Where: PPT = Precipitation
RCH = Recharge from rainfall falling on pervious areas
ET = Evapotranspiration
RO = Runoff

Precipitation - PPT

Annual precipitation for the site is based on data recorded at the Redmond Ridge rainfall gauges, 18U and 18V, and at the Carnation rain gauge over the period from October 1949 through December 2004. As shown on Table 2 (attached), the average annual rainfall is approximately 47 inches. The mean monthly rainfall distribution shows that approximately 80 percent of the annual average rainfall occurs between the months of October through May.

Evapotranspiration - ET

Average monthly ET values for forest and grass are based on Hydrological Simulation Program – Fortran (HSPF) simulations conducted by Goldsmith (2004) for the Redmond Ridge and Redmond Ridge East projects and are provided in Table 4. The Redmond Ridge development is located about 3.5 miles east of the site. ET data for the HSPF simulations was estimated from monthly average potential ET data obtained from the Washington State University (WSU) Puyallup station for the period from June 1995 through February 2002 by applying a pan to lake evaporation coefficient of 0.75 to the Puyallup evaporation data.

Table 4
Average Monthly Evapotranspiration Volumes

Month	Forest (in/ac)	Grass (in/ac)	Impervious (in/ac)
Oct	1.55	1.45	1.11
Nov	1.07	1.04	1.02
Dec	0.76	0.76	0.87
Jan	0.50	0.50	0.51
Feb	0.43	0.43	0.40
Mar	0.62	0.61	0.42
Apr	1.34	1.29	0.53
May	2.45	2.12	0.68
Jun	3.16	2.43	0.75
Jul	4.11	2.59	0.38
Aug	3.46	2.16	0.56
Sep	2.18	1.83	0.84
Total	21.63	17.21	8.05

Existing Condition Recharge (RCH) and Runoff (RO)

Recharge under the existing condition is from precipitation falling on pervious areas (RCH). Recharge can vary significantly depending on the near-surface soils. Recharge calculations in this assessment examine flux

of water through the surficial sediments. Ground water recharge through the low-permeability soils (similar in behavior to glacial till for storm water runoff and ground water recharge purposes) was estimated using Equation 1 in combination with the USGS methodology described in Bidlake and Payne (2001). The Bidlake and Payne (2001) study presents predictive equations for annual recharge based on annual precipitation. The equations are derived from an intensive near-surface water balance for four study areas. The equation for till soils provides an estimate of 14.01 inches per year for till soils. The average annual RCH of 14.01 inches per year for till was partitioned monthly by examining the monthly percentage of PPT remaining after ET is subtracted, and multiplying by the total average annual RCH of 14.01 inches.

Thick outwash is interpreted to be present in the southwest corner of the site for purposes of ground water recharge calculations. Ground water recharge through outwash soils was estimated using Equation 1 rearranged as follows: RCH (outwash) = PPT – ET, with RO assumed to be zero for the portion of the site interpreted to be underlain with thicker outwash.

For the purposes of our analysis, the runoff term includes both surface runoff and interflow. Precipitation at this site soaks through the weathered till and thin recessional outwash sediments, and accumulates in the weathered horizon or on underlying low permeability geologic units, creating perched water conditions or an interflow zone during the wetter winter and spring seasons. Ground water flow direction in the interflow zone is largely controlled by the topography of the underlying low-permeability surface, which generally corresponds to surface topography. Based on the topography of this site, the interflow is interpreted to flow offsite to the west. For those summer months where average monthly ET exceeded PPT, the excess ET is interpreted to represent ET from interflow storage. This can result in a calculated negative runoff value during those summer months.

Developed Condition Recharge (RCH)

Recharge under the developed condition has several components. Precipitation falling on pervious areas will continue to provide recharge (RCH) across the site. Under the developed condition, proposed grading will remove much of the weathered till and thin recessional outwash soils. For purposes of ground water recharge calculations, the developed condition soil in pervious areas is assumed to be till.

Additional sources of recharge are available from the proposed stormwater management system including minor infiltration of roof runoff via perforated stub-outs, and also minor infiltration from watering of landscape areas using imported water. Calculations of recharge from perforated stub-out and water of landscape areas were not conducted.

DISCUSSION OF RESULTS

The water balance results indicate that under the developed condition there is a calculated reduction in recharge of about 0.38 acre-feet, or 46 percent, based on a site development of 0.65 acres. For comparison, if the 1.69-acre tract of undisturbed forest is included in the calculation, the reduction of 0.38 acre-feet is about 14 percent. The calculated reduction in recharge does not account for sources of recharge that are difficult to quantify such as the following:

- Some recharge will occur from irrigation using ‘imported’ water within open space and right-of-way landscaping areas.

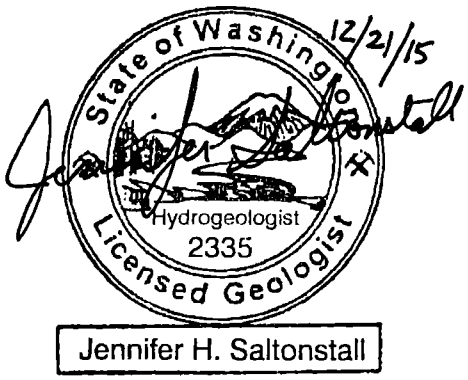
- Some recharge will occur from roof perforated stub-out connections.
- Some water will run off the edges of impervious surfaces (roofs, pavement, sidewalks) onto the ground resulting in local recharge through the underlying soil column.
- Paved surfaces and sidewalks are treated as nearly fully impervious surfaces; however, some slow leakage through these surfaces is likely to occur.
- Backfill along utility trenches in low-permeability, parent material typically has a higher permeability than the un-weathered native soil and can provide a pathway for some additional recharge.
- Some water transported offsite will have opportunity to soak into the ground in transit to the City facility.

LIMITATIONS

The conclusions and interpretations presented in this memorandum should not be construed as a warranty of the subsurface conditions. Our conclusions and recommendations are based on information provided by others and our experience in the area. Our experience has shown that soil and ground water conditions can vary significantly over small distances.

Within the limitations of scope, schedule, and budget, AESI attempted to execute these services in accordance with generally accepted professional principles in the fields of engineering geology and hydrogeology at the time this report was prepared. No warranty, express or implied, is made. If you should have any questions, or require further assistance, please do not hesitate to call.

Sincerely,
ASSOCIATED EARTH SCIENCES, INC.
Kirkland, Washington



-FOR-

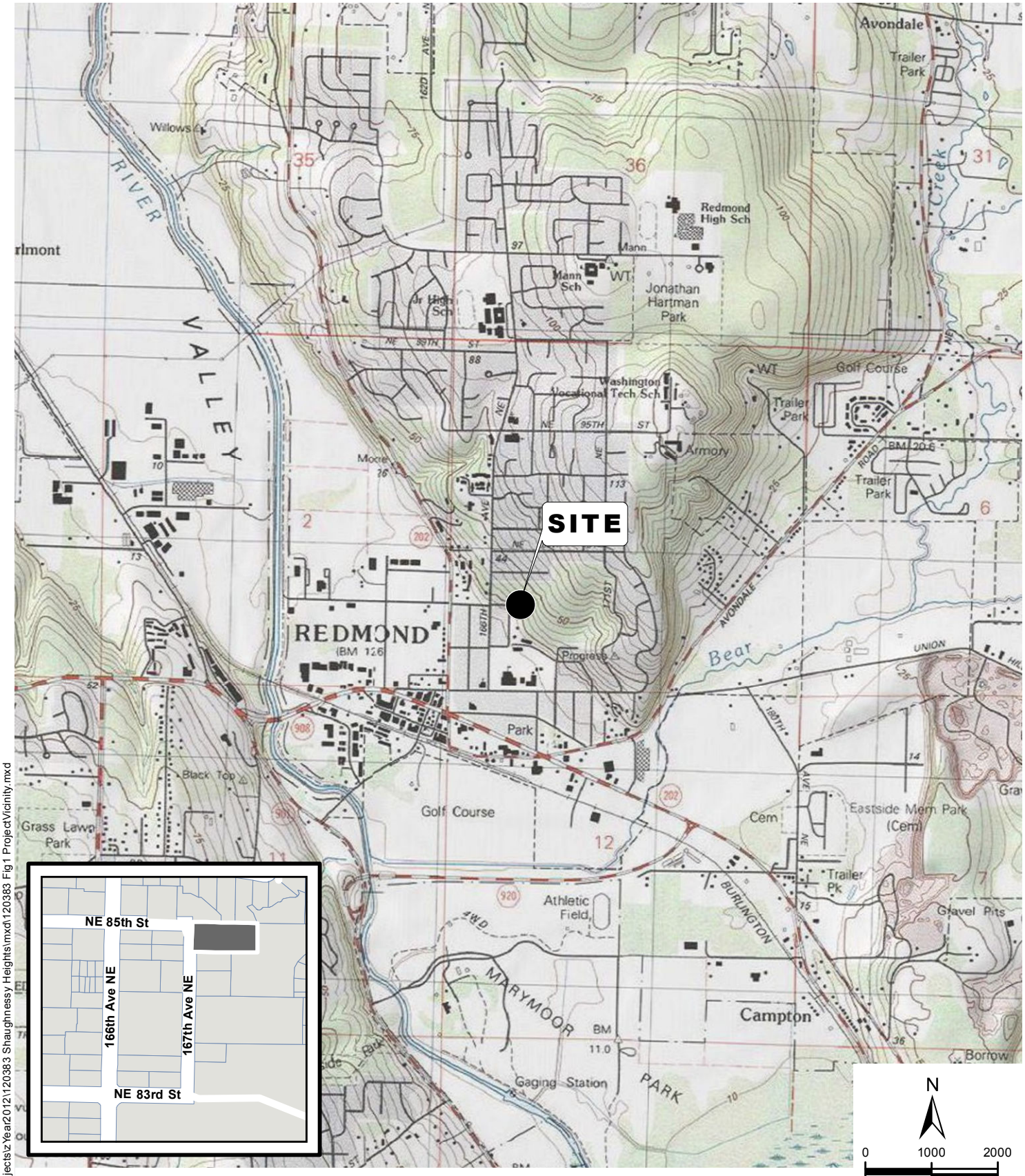
Curtis J. Koger, L.G., L.E.G., L.Hg.
Senior Principal Geologist/Hydrogeologist

Jennifer H. Saltonstall, L.G., L.Hg.
Associate Geologist/Hydrogeologist

ATTACHMENTS

Figure 1 - Vicinity Map
CORE Design, Inc. Development Plan, Sheet P6 of 13, print date October 20, 2015

JHS/KE120383B Projects\20120383\KE\WP



REFERENCE: USGS, KING CO

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

Document Path: H:\GIS_Projects\z Year2012\120383 Shaughnessy Heights\mxd\120383 Fig1 ProjectVicinity.mxd

associated earth sciences incorporated

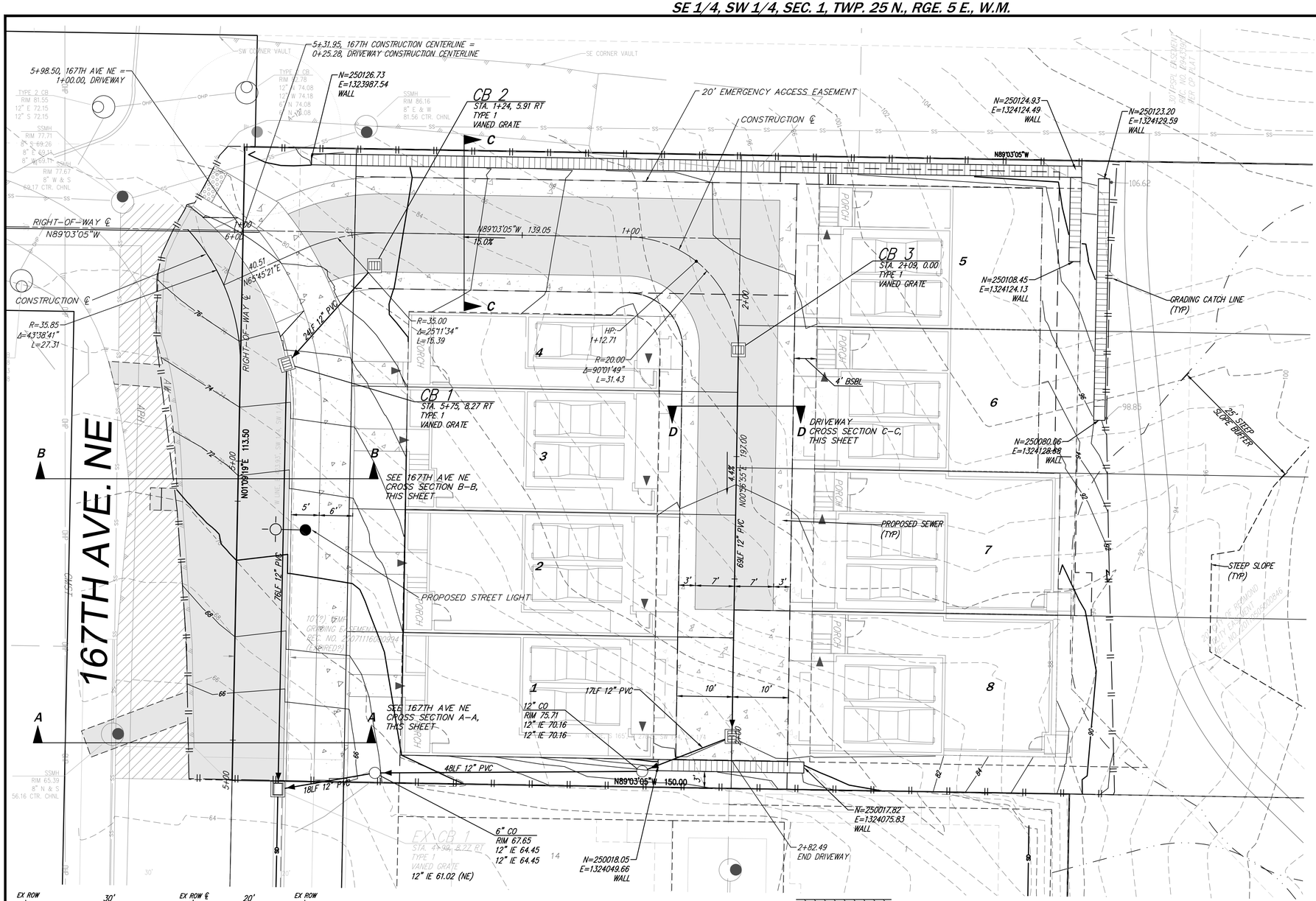
VICINITY MAP

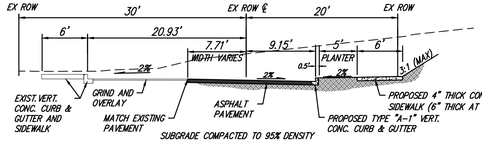
MAPLEWOOD
REDMOND, WASHINGTON

FIGURE 1

DATE 10/15

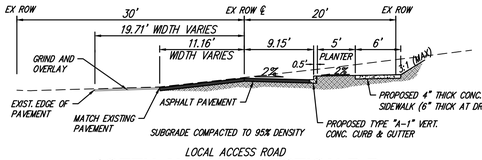
PROJ. NO. KE120383B





167TH AVE NE - SECTION A-A

NO SCALE



167TH AVE NE - SECTION B-B

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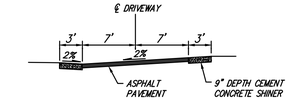

DRIVEWAY C-C

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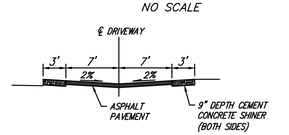

DRIVEWAY D-D

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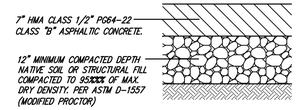

ROAD PAVEMENT SURFACING SECTION

LEGEND

- EXISTING CONTOUR — 90 —
- PROPOSED CONTOUR — 90 —
- ROCKERY
- BUILDING SETBACK LINE
- PROPOSED FULL ASPHALT PAVING PER SEC. THIS SH.T
- 2" GRIND & OVERLAY
- FIRE LANE MARKING TYPE 1 PAINTED CURB

NOTES

1. NEAT CUT EXISTING PAVEMENT FULL DEPTH.
2. STREET TREES TO BE "SUMMIT GREEN ASH" - QTY (2).
3. USE COMPOST AMENDED SOIL PER COR STD PLAN 632.
4. TRANSITION TO EXISTING SIDEWALK.
5. CURB AND SIDEWALK JOINTS PER COR STD PLAN 303
6. ADJUST RIM TO MATCH NEW GRADE.
7. REMOVE EXISTING ASPHALT AND CONCRETE PAVEMENT AND RECONSTRUCT PER ROAD PAVEMENT SURFACING SECTION.

SCALE: 1" = 10'

0 5 10 20

GRADING NOTES

1. ALL SITE WORK IMPROVEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THESE APPROVED PLANS. ANY DEVIATION FROM THESE PLANS WILL REQUIRE PRIOR APPROVAL FROM THE OWNER, ENGINEER AND APPROPRIATE PUBLIC AGENCIES. ALL WORK AND MATERIALS TO BE PER CITY OF REDMOND STANDARDS.

2. THE FACILITIES SHOWN ON THE APPROVED EROSION/SEDIMENTATION CONTROL PLANS SHALL BE CONSTRUCTED AND IMPLEMENTED PRIOR TO ANY EXTENSIVE GRADING OR LAND CLEARING IN ACCORDANCE WITH THAT PLAN. THESE FACILITIES MUST BE SATISFACTORILY MAINTAINED UNTIL CONSTRUCTION AND LANDSCAPING IS COMPLETED AND THE POTENTIAL FOR ON-SITE EROSION HAS PASSED.

3. ALL TEMPORARY STOCKPILES AND ANY AREA WHICH HAS BEEN STRIPPED OF VEGETATION AND WHERE NO FURTHER WORK IS ANTICIPATED FOR A PERIOD OF 30 DAYS OR MORE SHALL BE IMMEDIATELY STABILIZED WITH MULCHING, GRASS SEEDING OR OTHER APPROVED EROSION CONTROL TREATMENT APPLICABLE TO THE TIME OF YEAR IN QUESTION. GRASS SEEDING ALONE WILL BE ACCEPTABLE ONLY DURING THE MONTHS OF APRIL THROUGH SEPTEMBER INCLUSIVE. SEEDING MAY PROCEED WHENEVER IT IS IN THE INTEREST OF THE PERMITTEE, BUT MUST BE AUGMENTED WITH MULCHING, NETTING, OR OTHER CITY OF REDMOND-APPROVED TREATMENT. STRAW MULCH SHALL CONSIST OF A MINIMUM THICKNESS OF TWO INCHES SPREAD EVENLY OVER THE SURFACE TO BE PROTECTED. NETTING MAY BE REQUIRED TO HOLD MULCH IN PLACE ON STEEP SLOPES. GRASS SEEDING SHALL BE ACCOMPLISHED THROUGH THE USE OF A CITY OF REDMOND-APPROVED HYDROSEEDER AND SEED MIXTURE OR THROUGH PLACEMENT OF AN ACCEPTABLE SOD.

4. MAJOR EXPOSED, GRADED SLOPES SHALL BE PROTECTED BY CLEAR PLASTIC SHEETING OR SIMILAR APPROVED METHOD UNTIL SUCH TIME AS THE VEGETATIVE COVER HAS BEEN ESTABLISHED SUFFICIENTLY TO INHIBIT EROSION.

5. SILTATION CONTROL AREAS SHALL BE RETURNED TO ORIGINAL GROUND CONDITIONS OR BROUGHT TO FINISH GRADE AT THE PROJECT'S COMPLETION. ANY PERMANENT STORM DRAINAGE FACILITIES USED FOR EROSION/SEDIMENTATION CONTROL SHALL BE CLEANED PRIOR TO PROJECT ACCEPTANCE.

6. ALL LIMITS OF CLEARING AND AREAS OF VEGETATION PRESERVATION, AS PRESCRIBED ON THESE PLANS, SHALL BE LOCATED BY SURVEY AND OBSERVED DURING CONSTRUCTION. SPECIAL PROTECTIVE FENCING WILL BE REQUIRED. THIS SPECIAL PROTECTIVE FENCING SHALL CONSIST OF 42" HIGH ORANGE SAFETY FENCE. NO DISTURBANCE OR REMOVAL OF ANY GROUND COVER IS TO OCCUR WITHIN THESE PRESERVATION AREAS.

7. GRADES SHOWN ON THIS PLAN REPRESENT THE ENGINEER'S ESTIMATE OF APPROXIMATE OPTIMUM EARTHWORK AND OTHER GRADING/SOIL CONSIDERATIONS. THE CONTRACTOR MAY ALTER THE GRADES SHOWN TO BETTER ACHIEVE THESE RESULTS PROVIDED THAT ANY ALTERATION IS SUBJECT TO THE PRIOR APPROVAL IN WRITING BY THE ENGINEER, OWNER, AND THE APPROPRIATE CITY OF REDMOND DEPARTMENTS.

8. GRADING INTO AREAS OUTSIDE OF THIS PROPERTY IS SUBJECT TO THE WRITTEN CONSENT OF ADJOINING PROPERTY OWNERS. FAILURE TO OBTAIN SUCH CONSENT MAY REQUIRE ADDITIONAL ROCKERY OR OTHER SUITABLE SOIL STABILIZATION SUCH THAT ALL GRADING OCCURS WITHIN THE PROJECT'S BOUNDARIES. THE CONTRACTOR SHALL VERIFY THE STATUS OF THE ADJOINING PROPERTY OWNER'S CONSENT BY CONTACTING THE DEVELOPER PRIOR TO PERFORMING WORK OUTSIDE OF PROJECT BOUNDARIES.

9. ALL SURPLUS OR UNSUITABLE MATERIALS CLEARED OR EXCAVATED AND REMOVED FROM THE SITE SHALL BE DISPOSED OF IN AN APPROVED FILL SITE. IT WILL BE THE PERMITTEE'S RESPONSIBILITY TO LOCATE AN ACCEPTABLE DISPOSAL SITE AND TO ASSURE THAT ALL SURPLUS MATERIAL IS PROPERLY DEPOSITED IN SAME.

10. NO FINAL GRADE CUT OR EMBANKMENT SLOPE SHALL EXCEED 3:1 (HORIZ:VERT) WITHOUT STABILIZATION BY ROCKERY (NOT TO EXCEED 8') OR BY RETAINING WALL, UNLESS SPECIFICALLY AUTHORIZED BY A LICENSED SOILS ENGINEER AND APPROVED BY CITY OF REDMOND. ALL ROCKERIES OVER 4 FEET HIGH AND ALL RETAINING WALLS OUTSIDE OF CITY OF REDMOND RIGHT-OF-WAY WILL REQUIRE A SEPARATE BUILDING PERMIT.

12. ALL EARTHWORK UNDER PAVING TO BE USED BY VEHICULAR TRAFFIC SHALL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY PER MODIFIED PROCTOR ASTM D1557, OR PER SPECIFICATION IN THE SOILS REPORT.

13. UNLESS OTHERWISE NOTED, ALL SPOT ELEVATIONS SHOWN IN PAVED AREAS ARE TOP OF PAVING.

14. ALL PARKING, DRIVEWAY AND LANDSCAPED AREAS SHALL HAVE AT LEAST A 1.0% SLOPE TOWARD THE NEAREST STORM DRAINAGE INTERCEPTION/CONVEYANCE SYSTEM. PLAN DETAILS OR FIELD MODIFICATIONS SHALL NOT SUPERCEDE THIS REQUIREMENT.

15. EXTRUDED CEMENT CONCRETE CURBING, WHERE SPECIFIED, SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF REDMOND STANDARDS AND DETAILS (E.G. CITY OF REDMOND STANDARD PLAN #304A) OR DETAILS SHOWN ON THESE PLANS.

16. ANY OPEN CUTS OF EXISTING PUBLIC ROADWAYS SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH CITY OF REDMOND STANDARDS. ALL CUTS INTO EXISTING ASPHALT SHALL BE ALONG NEAT, CONTINUOUS, SAWED LINES. A TEMPORARY COLD MIX PATCH SHALL BE PLACED IMMEDIATELY AFTER BACKFILL AND COMPACTION. THE EXISTING SURFACING MUST BE REPLACED IN KIND (OR 4 INCHES OF COMPACTED CLASS "B" ASPHALT CONCRETE, WHICHEVER IS GREATER) WITHIN 30 DAYS OF TEMPORARY PATCHING. THE CONTRACTOR SHALL CLOSELY FOLLOW REQUIREMENTS OF THE RIGHT-OF-WAY PERMIT--SPECIFICALLY; ALLOWABLE WORKING HOURS, DETOUR AND WARNING SIGNS, AND NOTIFICATION OF ROAD ALTERATIONS TO THE POLICE AND/OR OTHER EMERGENCY SERVICES.

17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ADEQUATE SAFEGUARDS, SAFETY DEVICES, PROTECTIVE EQUIPMENT, FLAGGERS, AND ANY OTHER NEEDED ACTIONS TO PROTECT THE LIFE, HEALTH, AND SAFETY OF THE PUBLIC, AND TO PROTECT PROPERTY IN CONNECTION WITH THE PERFORMANCE OF WORK COVERED BY THE CONTRACT. ANY WORK WITHIN THE TRAVELED RIGHT-OF-WAY THAT MAY INTERRUPT NORMAL TRAFFIC FLOW SHALL REQUIRE AT LEAST ONE FLAGGER FOR EACH LANE OF TRAFFIC AFFECTED. ALL SECTIONS OF THE WSDOT STANDARD SPECIFICATIONS 1-07.23 TRAFFIC CONTROL SHALL APPLY.

18. THE CONTRACTOR SHALL KEEP OFF-SITE STREETS CLEAN AT ALL TIMES BY SWEEPING. FLUSHING OF THESE STREETS WILL NOT BE ALLOWED.

19. IMPERVIOUS SURFACES (ROOFS, STREETS, DRIVEWAYS, ETC.) SHALL BE DIRECTED INTO THE COMPLETED STORM DRAINAGE SYSTEM AS SOON AS POSSIBLE.

20. ANY WORK WITHIN AN EXISTING STREET SHALL NOT COMMENCE UNTIL THE CONTRACTOR PREPARES A TRAFFIC CONTROL PLAN, AND RECIEVES APPROVAL OF THE PLAN FROM THE CITY TRANSPORTATION DIVISION AND CITY CONSTRUCTION INSPECTOR.

NOTE: THIS DEVELOPMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE YEAR 2012 CITY OF REDMOND STANDARD SPECIFICATIONS AND DETAILS.

This approval is for design concept only. These plans appear to be in conformance with City of Redmond design standards for construction. This approval shall not be construed as authorizing construction not in accordance with applicable City standards. The City reserves the right to require revisions to the approved plans to assure conformance with City of Redmond design standards for construction at any time that it is discovered that the proposed construction does not otherwise meet the applicable construction standards. The owner is required to provide designs and plans in accordance with applicable City standards and assure that construction is accomplished in accordance with those standards. The owner and/or design engineer and/or developer, as the case may be, may be required to make necessary approved field revisions to correct any errors or omissions found to exist on the approved plan.

APPROVED FOR CONSTRUCTION

Director of Public Works
City of Redmond

Date _____

Plan Check Engineer _____

For Sheet(s) _____

Storm Drainage Engineer _____

Utility Engineer _____

Fire Department _____

Trans. Engineer _____

Planning Dept. _____

DATE | NO. | REVISIONS | DATE

3-21-14

CORE DESIGN
ENGINEERING · PLANNING · SURVEYING
14711 NE 29th Place Suite 101
Bellevue, Washington 98007
425.885.7877 Fax 425.885.7963

DEVELOPMENT PLAN
MAPLEWOOD

AMALANI, LLC/IBBO, LLC
105 SOUTH MAIN STREET, SUITE 230
SEATTLE, WA 98104

DATE	OCTOBER 2015
DESIGNED	MICHAEL A. MOODY, P.E.
DRAWN	FLAVIO BAHNOTTI
APPROVED	MICHAEL A. MOODY, P.E.
	JOSH P. BEARD — PROJECT MANAGER

SHEET	OF
P6	13

PROJECT NUMBER 15099

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