THE WATERSHED COMPANY

SCIENCE & DESIGN

October 14, 2013

David Barnes
City of Kirkland
Planning & Community Development
123 Fifth Avenue
Kirkland, WA 98033
Via email: jmcmahan@kirklandwa.gov

Re: Eclipse Holdings Property (Parcel No. 1926059070)
Stream &Wetland Delineation Study
The Watershed Company Reference Number: 120622.41

Dear David:

On October 1, 2013 Ryan Kahlo and I completed a stream and wetland delineation study at 143XX Simonds Road NE in the City of Kirkland (parcel number 1926059070). This letter summarizes the findings of this study and details applicable federal, state, and local regulations. The following attachments are included:

- Stream Delineation Sketch
- Wetland Determination Data Forms

Methods

Public-domain information on the subject property was reviewed for this delineation study. These sources include USDA Natural Resources Conservation Service Soil maps, Washington Department of Fish and Wildlife interactive mapping programs (PHS on the Web), King County's GIS mapping website (iMAP), and City of Kirkland GIS maps (nwMaps.net).

The study area was evaluated for wetlands using methodology from the *Washington State Wetlands Identification and Delineation Manual* (Manual) (Washington Department of Ecology [Ecology] 1997) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region Version 2.0* (Regional Supplement) (US Army Corps of Engineers [Corps] May 2010). Wetland determinations were made on the basis of an examination of vegetation, soils, and hydrology. Soil, vegetation, and hydrologic parameters were sampled at several locations along the wetland boundaries to make the determination. Data points on-site are marked with yellow- and black-striped flags. We recorded data at three of these locations.

The ordinary high water mark (OHWM) of Stream A was determined based on the definition provided by the Washington Department of Fish and Wildlife and WAC 220-

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110-020(69). The OHWM is located by examining the bed and bank physical characteristics and vegetation to ascertain the water elevation for mean annual floods. Areas meeting the definition were determined to be the OHWM and flagged. Field observations were used to classify streams according to the City of Kirkland code. The left bank of Stream A is marked with 42 blue- and white-striped flags.

Findings

The subject property is located in the Cedar/Sammamish River Water Resource Inventory Area (WRIA 8), within the Juanita Creek basin in the City of Kirkland. The undeveloped property is a forested hillside that rises up from Simonds Road NE, and then slopes down to the southeast. One off-site stream, Stream A, lies at the toe of the southeastern slope. As shown on the enclosed sketch, a second off-site stream (Stream B) was not flagged due its distance from the subject property. No jurisdictional wetlands were found on-site or in the immediate vicinity. The property also contains a few pedestrian paths and garbage piles.

Non-wetland

The subject property contains a native mixed forest community. The tree canopy is characterized by bigleaf maple, red alder, western red cedar, black cottonwood and bitter cherry. The shrub understory contains salmonberry, Indian plum, vine maple, salal, and Oregon grape. Sword fern, lady fern, and bracken fern dominate the groundcover. Pacific dewberry vines form a dense carpet in some areas. Locally dominant patches of Himalayan blackberry are present throughout the site. Sampled soils exhibit the Deplete Matrix (F3) hydric soil indicator, but were dry despite recent above average rainfall.

One marginal area along Stream A was previously identified as wetland, in a Watershed Company 2008 site study. The vegetation community is dominated by facultative species, including salmonberry, lady fern, and piggyback plant. Invasive Himalayan blackberry forms a dense thicket over approximately half the area; bigleaf maple, which is rooted upslope, overhangs the data points. The silty clay loam soil exhibits Redox Dark Surface (F6) hydric soil indicators. At data point 2 the top few inches were dampened by recent rain, but soil was dry below. Despite recent heavy rainfall, no ground water or saturation was observed. Based on a lack of wetland hydrology, this area is not a jurisdictional wetland (see DP-1 and DP-2).

Stream A

Stream A roughly parallels the south property line. It flows southeasterly in an off-site valley. The stream is well shaded by dense and diverse riparian corridor. The riparian plant community is generally native; however, dominant patches of invasive Himalayan blackberry and climbing nightshade are present. The stream bed contains large woody debris, resulting in numerous riffle and pool features. Stream bank erosion was

apparent in several areas. The streambed is a mix of silt, sand, gravel and cobbles. The stream approximately 12 feet wide on average and the gradient is gradual.

Stream B

Since the 2008 wetland and stream study, the alignment of Stream B has apparently changed. Stream B flows south under Simonds Rd NE via culvert and is directed into a narrow muddy roadside ditch. Another culvert conveys flows southeasterly under the driveway of the neighboring property (14377 Simonds Road NE) into an apparent wetland area. According to city and county maps, this tributary joins Stream A southeast of the subject property. The stream gradient is gradual; however, the wetland above the confluence may restrict fish passage. The stream was not flowing on the day of our site visit.

Local Regulations

Wetlands and streams in the City of Kirkland are regulated under the Kirkland Zoning Code, Chapter 90 – Drainage Basins. In Chapter 90, stream buffers are assigned based on the Kirkland stream class defined in the code and is based on permanence of flow and use by salmonid fish species. The subject property is in the Juanita Creek basin, a primary basin.

Stream A is presumed to support salmonid fish. Stream B is presumed to be accessible to salmonids during high flow events based on gradient and connectivity to Stream A. They are both Class A streams. Class A streams in primary basins in the City of Kirkland require a 75 foot buffer (KZC 90.90.1).

In general, site improvements should be designed to avoid and, if unavoidable, to minimize adverse impacts to sensitive areas (KZC 90.130). Buffer modification may be permitted as stipulated in KZC 90.100.

Additionally, structures shall be at least 10 feet from designated or modified stream buffers (KZC 90.90.2).

State and Federal Regulations

In general, neither the Corps nor Ecology regulates buffers, unless direct impacts are proposed.

Federally permitted actions that could affect endangered species (i.e. salmon or bull trout) may also require a biological assessment study and consultation with the U.S. Fish and Wildlife Service and/or the National Marine Fisheries Service. Application for Corps permits may also require an individual 401 Water Quality Certification and Coastal Zone Management Consistency determination from Ecology.

Disclaimer

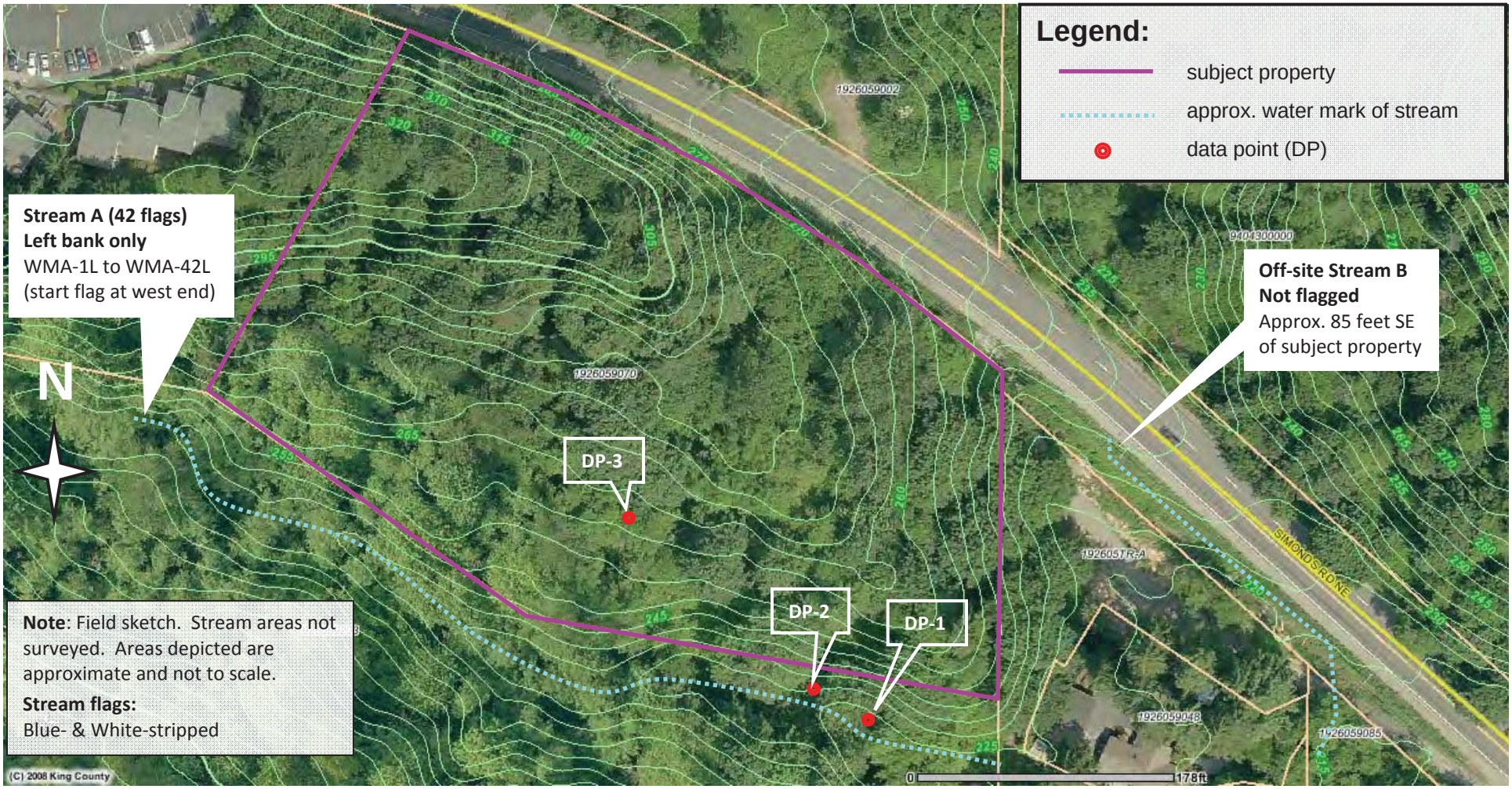
The information contained in this letter or report is based on the application of technical guidelines currently accepted as the best available science and in conjunction with the manuals and criteria outlined in the methods section. All discussions, conclusions and recommendations reflect the best professional judgment of the author(s) and are based upon information available to us at the time the study was conducted. All work was completed within the constraints of budget, scope, and timing. The findings of this report are subject to verification and agreement by the appropriate local, State and Federal regulatory authorities. No other warranty, expressed or implied, is made.

Please call if you have any questions or if we can provide you with any additional information.

Sincerely,

Nell Lund, PWS
Ecologist

Enclosures



Stream Delineation Sketch

Parcel No. 1926059070

143XX Simonds Rd. NE

Kirkland, WA

Prepared for Jeremy McMahan

City of Kirkland, Planning & Community Development

Delineation Date: October 1, 2013

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ATTACHMENT 6

WETLAND DETERMINATION DATA FORM

Western Mountains, Valleys, and Coast Supplement to the 1987 COE Wetlands Delineation Manual

DP- 1

Project Site:	**143XX Simonds Rd. NE (Parcel 1926059070)**	Sampling Date:	**October 1, 2013**
Applicant/Owner:	**Eclipse Holdings**	Sampling Point:	DP- **1**
Investigator:	**N. Lund, R. Kahlo**	City/County:	**Kirkland / King County**
Sect., Township, Range	S **NE 19** T **26N** R **5E**	State:	**WA**
Landform (hillslope, terrace, etc)	**Riverbank** Slope (%) **~5%**	Local relief (concave, convex, none)	**concave**
Subregion (LRR)	**A** Lat	Long	Datum
Soil Map Unit Name	**KpD (Kitsap silt loam, 15-30% slopes)**	NWI classification	**N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation ☐, Soil, ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐, Soil, ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No	**Is this Sampling Point within a Wetland?** ☐ Yes ☒ No
Hydric Soils Present?	☒ Yes	☐ No	
Wetland Hydrology Present?	☐ Yes	☒ No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Acer macrophyllum***	**40**	**N***	**FACU**
2.			
3.			
4.			
* Rooted upslope of data point. Not dominant.	**40** = Total Cover		
Sapling/Shrub Stratum (Plot size 3m diam.)			
1. ***Rubus spectabilis***	**5**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	5 = Total Cover		
Herb Stratum (Plot size 1m diam.)			
1. ***Athyrium filix-femina***	**15**	**Y**	**FAC**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15 = Total Cover		
Woody Vine Stratum (Plot size)			
1. ***Rubus armeniacus***	**80**	**Y**	**FACU**
2.			
	80 = Total Cover		
% Bare Ground in Herb Stratum			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**67**	(A/B)

Prevalence Index Worksheet

Total % Cover of		Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

yes	Dominance test is > 50%
	Prevalence test is ≤ 3.0 *
	Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
	Wetland Non-Vascular Plants *
	Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP- 1**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	**10YR 3/2**	**95**	**10YR 3/6**	**5**	**C**	**M**	**Silty loam**	
12-16	**10YR 3/1**	**90**	**10YR ¾**	**10**	**C**	**M**	**Silty clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

Hydric soil present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	☐ Yes	☒ No	Depth (in):
Water Table Present?	☐ Yes	☒ No	Depth (in):
Saturation Present? (includes capillary fringe)	☐ Yes	☒ No	Depth (in):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Recorded rainfall from 9/27 to 10/1 totaled 2.6 inches and the total for September was 5.06 inches (http://www.wunderground.com). Despite heavy rain events preceding our visit, neither hydrology nor indicators were observed.

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DP- 2

Project Site:	**143XX Simonds Rd. NE (Parcel 1926059070)**	Sampling Date:	**October 1, 2013**
Applicant/Owner:	**Eclipse Holdings**	Sampling Point:	DP- **2**
Investigator:	**N. Lund, R. Kahlo**	City/County:	**Kirkland / King County**
Sect., Township, Range	S **NE 19** T **26N** R **5E**	State:	**WA**
Landform (hillslope, terrace, etc)	**River bank** Slope (%) **~10%**	Local relief (concave, convex, none)	**concave**
Subregion (LRR)	**A** Lat	Long	Datum
Soil Map Unit Name	**KpD (Kitsap silt loam, 15-30% slopes)**	NWI classification	**N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation ☐, Soil, ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐, Soil, ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No	**Is this Sampling Point within a Wetland?** ☐ Yes ☒ No
Hydric Soils Present?	☒ Yes	☐ No	
Wetland Hydrology Present?	☐ Yes	☒ No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Acer macrophyllum***	**50**	**N***	**FACU**
2.			
3.			
4.			
* Tree rooted on opposite stream bank, outside of data point.	**50**	= Total Cover	
Sapling/Shrub Stratum (Plot size 3m diam.)			
1. ***Rubus spectabilis***	**70**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	70	= Total Cover	
Herb Stratum (Plot size 1m diam.)			
1. ***Tolmiea menziesii***	**70**	**Y**	**FAC**
2. ***Athyrium filix-femina***	**20**	**Y**	**FAC**
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90	= Total Cover	
Woody Vine Stratum (Plot size)			
1.			
2.			
		= Total Cover	
% Bare Ground in Herb Stratum			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**3**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**100**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

yes	Dominance test is > 50%
	Prevalence test is ≤ 3.0 *
	Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
	Wetland Non-Vascular Plants *
	Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks:

SOIL **Sampling Point – DP- 2**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-4	**2.5Y 3/2**	**100**					**Silt clay loam**	
4-16	**2.5Y 3/2**	**90**	**7.5YR 2.5/3**	**10**	**C**	**M**	**Silt clay loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☒ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

Hydric soil present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	☐ Yes	☒ No	Depth (in):
Water Table Present?	☐ Yes	☒ No	Depth (in):
Saturation Present? (includes capillary fringe)	☐ Yes	☒ No	Depth (in):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Recorded rainfall from 9/27 to 10/1 totaled 2.6 inches and the total for September was 5.06 inches (http://www.wunderground.com). Despite heavy rain events preceding our visit, neither hydrology nor indicators were observed.
Top few inches of soil damp, not saturated; soil dry below.

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ATTACHMENT 6

WETLAND DETERMINATION DATA FORM

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DP- 3

Project Site:	**143XX Simonds Rd. NE (Parcel 1926059070)**	Sampling Date:	**October 1, 2013**
Applicant/Owner:	**Eclipse Holdings**	Sampling Point:	DP-
Investigator:	**N. Lund, R. Kahlo**	City/County:	**Kirkland / King County**
Sect., Township, Range	S **NE 19** T **26N** R **5E**	State:	**WA**
Landform (hillslope, terrace, etc)	**Hillslope** Slope (%) **~10%**	Local relief (concave, convex, none)	**concave**
Subregion (LRR)	**A** Lat	Long	Datum
Soil Map Unit Name	**KpD (Kitsap silt loam, 15-30% slopes)**	NWI classification	**N/A**

Are climatic/hydrologic conditions on the site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks.)
Are "Normal Circumstances" present on the site? ☒ Yes ☐ No
Are Vegetation ☐, Soil, ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐, Soil, ☐, or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No	**Is this Sampling Point within a Wetland?** ☐ Yes ☒ No
Hydric Soils Present?	☒ Yes	☐ No	
Wetland Hydrology Present?	☐ Yes	☒ No	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size 5m diam.)	Absolute % Cover	Dominant Species?	Indicator Status
1. ***Alnus rubra***	**95**	**Y**	**FAC**
2.			
3.			
4.			
	95 = Total Cover		
Sapling/Shrub Stratum (Plot size 3m diam.)			
1. ***Rubus spectabilis***	**60**	**Y**	**FAC**
2.			
3.			
4.			
5.			
	60 = Total Cover		
Herb Stratum (Plot size 1m diam.)			
1. ***Tellima grandiflora****	**5**	**Y**	**NI**
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	5 = Total Cover		
Woody Vine Stratum (Plot size)			
1. ***Rubus armeniacus***	**15**	**Y**	**FACU**
2.			
	15 = Total Cover		
% Bare Ground in Herb Stratum			

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC:	**2**	(A)
Total Number of Dominant Species Across All Strata:	**3**	(B)
Percent of Dominant Species that are OBL, FACW, or FAC:	**67%**	(A/B)

Prevalence Index Worksheet

	Total % Cover of	Multiply by
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column totals	(A)	(B)

Prevalence Index = B / A =

Hydrophytic Vegetation Indicators

yes	Dominance test is > 50%
	Prevalence test is ≤ 3.0 *
	Morphological Adaptations * (provide supporting data in remarks or on a separate sheet)
	Wetland Non-Vascular Plants *
	Problematic Hydrophytic Vegetation * (explain)

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic Vegetation Present? Yes ☒ No ☐

Remarks: *** No indicator status, omitted for dominance test.**

SOIL **Sampling Point – DP- 3**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	**10YR 4/2**	**20**					**Silt loam**	**Mixed matrix**
0-12	**10YR 5/2**	**70**	**10YR 5/6**	**10**	**C**	**M**	**Silt loam**	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2]Loc: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☒ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]

- ☐ 2cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)
- ☐

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):
Type: _____
Depth (inches): _____

Hydric soil present? Yes ☒ No ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required: check all that apply):

- ☐ Surface water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (**except MLRA 1, 2, 4A & 4B**) (B9)
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres along Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) (**LRR A**)
- ☐ Other (explain in remarks)

Secondary Indicators (2 or more required):

- ☐ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A & 4B**)
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) (**LRR A**)
- ☐ Frost-Heave Hummocks

Field Observations

Surface Water Present?	☐ Yes	☒ No	Depth (in):
Water Table Present?	☐ Yes	☒ No	Depth (in):
Saturation Present? (includes capillary fringe)	☐ Yes	☒ No	Depth (in):

Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Recorded rainfall from 9/27 to 10/1 totaled 2.6 inches and the total for September was 5.06 inches (http://www.wunderground.com). Despite heavy rain events preceding our visit, neither hydrology nor indicators were observed.

CITY OF KIRKLAND
Planning and Building Department
123 Fifth Avenue, Kirkland, WA 98033
www.kirklandwa.gov ~ 425.587.3600

DETERMINATION OF NON-SIGNIFICANCE (DNS)

Case No.: SEP16-03083 **DATE ISSUED:** September 7, 2017

Project Name: SIMONDS ROAD SUBDIVISION

Project Location: 9528 NE 144th PL

Project Description: Proposal to subdivide a 153,432 sq.ft. (3.52 acre) parcel into 12 lots in the RSA 4 Use Zone. All lots will receive access from a new internal public road connecting to Simonds Road NE.

Proponent: Corey Christensen, Eclipse Holdings LLC.

Project Planner: David Barnes

Lead agency is the City of Kirkland

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21.030 (2)(c). This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public upon request.

☒ This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date issued. Comments must be submitted to David Barnes, project planner at dbarnes@kirklandwa.gov by 5:00 PM on September 21, 2017. Please reference case number SEP16-03083.

Responsible official: September 1, 2017

Eric R. Shields, AICP, Planning Director Date
City of Kirkland
Planning & Building Department
123 Fifth Avenue, Kirkland, WA 98033 - (425) 587-3600

☒ You may appeal this determination to the Planning & Building Department at City of Kirkland, 123 Fifth Avenue, Kirkland, WA 98033 no later than 5:00 PM on September 21, 2017 (date, 14 days from date issued) by a Written Notice of Appeal. You should be prepared to make specific factual objections and reference case number SEP16-03083. Contact David Barnes, project planner in the Planning & Building Department at (425) 587-3250 to ask about the procedures for SEPA appeals. See also KMC 24.02.230 Administrative Appeals.

Publish in The Seattle Times on: September 11, 2017

Distribute this notice with a copy of the Environmental Checklist to:

GENERAL NOTICING

- Department of Ecology - Environmental Review
- Muckleshoot Tribal Council - Environmental Division, Tribal Archeologist
- Muckleshoot Tribal Council - Environmental Division, Fisheries Division Habitat
- Cascade Water Alliance – Director of Planning
- Finn Hill and Juanita Neighborhood Association
- Lake Washington School District No. 414: Budget Manager and Director of Support Services

AGENCIES WITH JURISDICTION, AFFECTED AGENCIES, AND/OR INTERESTED PARTIES

- Department of Ecology - Environmental Review Department of Fish and Wildlife – Olympia
- Department of Natural Resources – SEPA Center
- Muckleshoot Tribal Council - Environmental Division, Fisheries Division Habitat Program
- U.S. Army Corps of Engineers - Seattle District
- Eastside Audubon Society
- Northshore Utility District - Operations Department, Engineering Director, and Senior Civil Engineer
- King County Wastewater Treatment Division – SEPA Lead and Property Agent
- City of Kenmore - Director, Planning Dept.
- City of Bothell - Director, Planning Dept.
- Parties of Record

cc: Applicant
Planning Department File, Case No. SUB16-03082
Public Works Department Transportation Engineer

Distributed by: _____ September 7, 2017

(Karin S. Bayes, Office Specialist) Date

SAVE HARMLESS AGREEMENT - STREAM

The undersigned, being all of the owners of the hereinafter described real property, hereby agree to indemnify, defend, and save harmless the City of Kirkland, its officers and employees from any claim, real or imaginary, filed against the City of Kirkland, its officers, or employees, alleging damage or injury caused by fault on the part of the undersigned, their employees or agents, and/or the City of Kirkland, its officers, or employees and arising out of maintenance, flooding, damming or enlargement of the stream existing on the hereinafter described real property; provided, however, this agreement shall not include damage resulting from the sole fault of the City of Kirkland, its officers, or employees. Fault as herein used shall have the same meaning as set forth in RCW 4.22.01. This Agreement shall also include all reasonable cost and expense, including attorney's fees, incurred by the City of Kirkland in investigation and/or defense of any such claim.

This Agreement shall be binding upon the heirs, successors, and assigns of the parties hereto and shall run with the land.

The real property subject to this Agreement is situated in Kirkland, King County, Washington, and described as follows:

See Exhibit A

DATED at Kirkland, Washington, this _____day of _____, _____.

(Sign in blue ink)

(*Individuals Only*)

OWNER(S) OF REAL PROPERTY (INCLUDING SPOUSE)

_____

_____

_____

(*Individuals Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me known to be the individual(s) described herein and who executed the Save Harmless Agreement and acknowledged that _____ signed the same as _____ free and voluntary act and deed, for the uses and purposes therein mentioned.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington, Residing at: _____

My commission expires: _____

(*Partnerships Only*)

OWNER(S) OF REAL PROPERTY

_____
(Name of Partnership or Joint Venture)

_____
By General Partner

_____
By General Partner

_____
By General Partner

(*Partnerships Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me, known to be general partners of _____, the partnership that executed the Save Harmless Agreement and acknowledged the said instrument to be the free and voluntary act and deed of each personally and of said partnership, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington, Residing at: _____

My commission expires: _____

(Corporations Only)

OWNER(S) OF REAL PROPERTY

_____
(Name of Corporation)

_____
By President

_____
By Secretary

(*Corporations Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____ and _____ to me, known to be the President and Secretary, respectively, of _____, the corporation that executed the Save Harmless Agreement and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington, Residing at: _____

My commission expires: _____

NATURAL GREENBELT PROTECTIVE EASEMENT

Grantor: _____, owner of the hereinafter described real property, hereby grants to

Grantee: The City of Kirkland, a municipal corporation.

A natural greenbelt protective easement over and across the following described real property to wit ("Easement Area"):

No tree trimming, tree topping, tree cutting, tree removal, shrub or brush-cutting or removal of native vegetation, application of pesticides, herbicides, or fertilizers; construction; clearing; or alteration activities shall occur within the Easement Area without prior written approval from the City of Kirkland. Application for such written approval to be made to the Kirkland Department of Planning and Community Development who may require inspection of the premises before issuance of the written approval and following completion of the activities. Any person conducting or authorizing such activity in violation of this paragraph or the terms of any written approval issued pursuant hereto, shall be subject to the enforcement provisions of Chapter 170, Ordinance 3719, the Kirkland Zoning Code. In such event, the Kirkland Department of Planning and Community Development may also require within the immediate vicinity of any damaged or fallen vegetation, restoration of the affected area by planting replacement trees and other vegetation as required in applicable sections of the Kirkland Zoning Code. The Department also may require that the damaged or fallen vegetation be removed.

It is the responsibility of the property owner to maintain critical areas and their buffers by removing non-native, invasive, and noxious plants in a manner that will not harm critical areas or their buffers and in accordance with Kirkland Zoning Code requirements for trees and other vegetation within critical areas and critical area buffers.

The City shall have a license to enter the Easement Area (and the property if necessary for access to the Easement Area) for the purpose of monitoring compliance with the terms of this easement.

Development outside of this Natural Greenbelt Protective Easement may be limited by codified standards, permit conditions, or movement of the critical area.

Each of the undersigned owners agree to defend, pay, and save harmless the City of Kirkland, its officers, agents, and employees from any and all claims of every nature whatsoever, real or imaginary, which may be made against the City, its officers, agents, or employees for any damage to property or injury to any person arising out of the existence of said Natural Greenbelt Protective Easement over said owner's property or the actions of the undersigned owners in carrying out the responsibilities under this agreement, including all costs and expenses, and recover attorney's fees as may be incurred by the City of Kirkland in defense thereof; excepting therefrom only such claims as may arise solely out of the negligence of the City of Kirkland, its officers, agents, or employees.

This easement is given to satisfy a condition of the development permit approved by the City of Kirkland under Kirkland File/Permit No. _____, for construction of _____ upon the following described real property:

This easement shall be binding upon the parties hereto, their successors and assigns, and shall run with the land.

DATED at Kirkland, Washington, this _____ day of _____, _____.

(Sign in blue ink)

(*Individuals Only*)

OWNER(S) OF REAL PROPERTY (INCLUDING SPOUSE)

_____

_____

_____

(*Individuals Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____and _____to me known to be the individual(s) described herein and who executed the Natural Greenbelt Protective Easement and acknowledged that _____ signed the same as _____free and voluntary act and deed, for the uses and purposes therein mentioned.
WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington,
Residing at: _____
My commission expires: _____

(*Partnerships Only*)

OWNER(S) OF REAL PROPERTY

_____
(Name of Partnership or Joint Venture)

_____
By General Partner

_____
By General Partner

_____
By General Partner

(*Partnerships Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____and _____ to me, known to be general partners of _____, the partnership that executed the Natural Greenbelt Protective Easement and acknowledged the said instrument to be the free and voluntary act and deed of each personally and of said partnership, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington, Residing at: _____
My commission expires: _____

(Corporations Only)

OWNER(S) OF REAL PROPERTY

_____
(Name of Corporation)

_____
By President

_____
By Secretary

(*Corporations Only*)

STATE OF WASHINGTON)
) SS.
County of King)

On this _____ day of _____, _____, before me, the undersigned, a Notary Public in and for the State of Washington, duly commissioned and sworn, personally appeared _____and _____ to me, known to be the President and Secretary, respectively, of _____, the corporation that executed the Natural Greenbelt Protective Easement and acknowledged the said instrument to be the free and voluntary act and deed of said corporation, for the uses and purposes therein set forth, and on oath stated that they were authorized to sign said instrument and that the seal affixed is the corporate seal of said corporation.

WITNESS my hand and official seal hereto affixed the day and year first above written.

_____
Notary's Signature

_____
Print Notary's Name
Notary Public in and for the State of Washington,
Residing at: _____
My commission expires: _____

GEOTECHNICAL REPORT

Simonds Road Property
King County Parcel No. 1926059070
Kirkland, Washington

Project No. T-6997

Terra Associates, Inc.

Prepared for:

KLB Construction
Mukilteo, Washington

March 1, 2016

TERRA ASSOCIATES, Inc.
Consultants in Geotechnical Engineering, Geology
and
Environmental Earth Sciences

March 1, 2016
Project No. T-6997

Mr. Bill Grady
KLB Construction
P.O. Box 158
Mukilteo, Washington 98275

Subject: Geotechnical Report
Simonds Road Property
King County Parcel No. 1926059070
Kirkland, Washington

Dear Mr. Grady:

As requested, we conducted a geotechnical engineering study for the subject project. The attached report presents our findings and recommendations for the geotechnical aspects of project design and construction.

Our field exploration indicates the vast majority of the site is underlain by landslide deposits consisting of highly disturbed, medium dense, fine sandy silt. Light groundwater seepage was observed in 3 of the site explorations between depths of about 9 and 13 feet. The site conditions meet criteria defining a high landslide hazard area by the City of Kirkland Zoning Code.

In our opinion, the landslide hazard at the site can be mitigated by removing the unstable landslide deposits from the site and replacing it with structural fill. Upon completion of site grading, residences can be supported on conventional spread footings bearing on competent native soils or on properly placed and compacted structural fill. Floor slabs and pavements can be similarly supported.

Detailed recommendations addressing these issues and other geotechnical design considerations are presented in the attached report. We trust the information presented is sufficient for your current needs. If you have any questions or require additional information, please call.

Sincerely yours,
TERRA ASSOCIATES, INC.

John C. Sadler, E.E.G., L.H.G.
Project Manager

3-1-16

Theodore J. Schepper, P.E.
Principal

cc: Mr. Jonathan Turcott, P.E., SDA

12220 113th Avenue NE, Ste. 130, Kirkland, Washington 98034
Phone (425) 821-7777 • Fax (425) 821-4334

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Geotechnical Report
Simonds Road Property
King County Parcel No. 1926059070
Kirkland, Washington

1.0 PROJECT DESCRIPTION

The proposed project is a residential development. An undated site plan by SDA titled Composite Utility & Civil Plan indicates that the development will consist of 12 residential lots with associated infrastructure improvements. Site stormwater will be routed to a detention vault located in the northeastern portion of the site. No design elevations are shown on the plan; however, it is indicated that the vault will be 27 feet by 78 feet in area with a height of 14 feet. The plan shows the vault discharging to a level spreader located between the vault and the east site margin.

Proposed site grading will consist primarily of cuts with localized fill areas in the southwestern portion of the site. Significant cuts are proposed in the northern portion of the site where required excavation depths will range between about 6 and 34 feet. Maximum fill thicknesses of about nine feet are shown in the southwestern portion of the site. Grade transitions will be accomplished using permanent slopes inclined at gradients of 2:1 (H:V) to 3:1 (H:V), as well as structural walls and rockeries. The maximum heights of the retaining walls and rockeries are about 8 feet and 6 feet, respectively. The maximum height of rockeries constructed against fill is about four feet.

We expect that the residential structures will be two-story wood-frame buildings with their main floors framed over a crawl space or daylight basement, or constructed at grade. Foundation loads should be relatively light, in the range of 2 to 3 kips per foot for bearing walls and 25 to 50 kips for isolated columns.

The recommendations contained in the following sections of this report are preliminary and based on our understanding of conceptual design features. We should review design drawings as they become available to verify that our recommendations have been properly interpreted and incorporated into project design and to amend or supplement our recommendations, if required.

2.0 SCOPE OF WORK

We explored subsurface conditions at the site by observing soil conditions in 6 test pits excavated to maximum depths ranging between about 14 and 16 feet using a track-mounted excavator. We also reviewed the logs of 14 test pits and 4 test borings completed at the site by Associated Earth Sciences, Inc. (AESI) in 2002 and 2003. Using the results of our subsurface exploration and the existing geotechnical data review, analyses were undertaken to develop geotechnical recommendations for project design and construction. Specifically, this report addresses the following:

- Soil and groundwater conditions
- Geologic hazards per the City of Kirkland Zoning Code (KZC)
- Seismic design parameters per the 2012 International Building Code (IBC)
- Site preparation and grading
- Excavations
- Foundations

- Slab-on-grade floors
- Retaining walls and rockeries
- Stormwater detention vault
- Subsurface drainage
- Utilities
- Pavements

It should be noted that recommendations outlined in this report regarding drainage are associated with soil strength, design earth pressures, erosion, and stability. Design and performance issues with respect to moisture as it relates to the structure environment (i.e., humidity, mildew, mold) is beyond Terra Associates' purview. A building envelope specialist or contactor should be consulted to address these issues, as needed.

3.0 SITE CONDITIONS

3.1 Surface

The site is an undeveloped, 3.58-acre parcel located south of and adjacent to Simonds Road NE, approximately 0.32 miles west of 100th Avenue NE in Kirkland, Washington. The approximate location of the site is shown on Figure 1.

Existing surface gradients generally slope down to the north, south, and east from a northwest-trending ridge in the northwestern portion of the site. Topographic information on the site plan shows site elevations range from about 330 feet at the top of the ridge in the northwestern portion of the site to about 240 feet near the southeastern and eastern site margins. The northern and southern flanks of the ridge typically slope down about 30 to 50 feet in elevation at inclinations between about 50 and 83 percent before flattening to about 15 to 20 percent in the central portion of the site. Surface gradients near the eastern and southern site margins typically steepen to about 50 to 55 percent and 40 to 70 percent, respectively. Site vegetation consists primarily of mature deciduous trees and thick brush with scattered coniferous trees.

A stream channel generally parallels the southern site margin about 10 feet to 50 feet south of the site. Much of the material exposed in both stream banks and in the channel bottom appears to be older landslide deposits. Many of the steeper stream bank areas showed indications of recent shallow slumping. The topographic conditions observed on the mid to lower southern flank of the ridge are indicative of previous deep-seated ground movements.

3.2 Soils

Undisturbed native soils observed in the site explorations generally consist of medium dense to very dense silt to fine sandy silt. Landslide deposits overlie the undisturbed native soils across the vast majority of the site. The thickness of the landslide deposits range from about 6 feet in Test Pit TP-6 near the western site margin to about 24 feet in AESI Boring EB-3 in the central portion of the site. The landslide deposits observed in Test Pits TP-3 through TP-5 soils are underlain by a 1- to 2- foot thick layer of laminated, dense silt and hard silty clay.

The observed landslide deposits generally consist of highly disturbed, medium dense fine sandy silt and blocky, medium stiff to stiff silt containing varying amounts of angular to subangular, dense silt and hard clay clasts, and scattered organic debris including logs and other vegetation debris. Obvious landslide deposits were not observed in Test Pits TP-1 and TP-2, or in AESI Test Pits EP-2, EP-6, EP-8, and EP-11; however; based on their locations relative to known landslide deposits, it is likely that Test Pit TP-1 and AESI Test Pits EP-8 and EP-11 were excavated in relatively intact blocks of soil within the slide mass.

The *Geologic map of the Kirkland quadrangle, Washington*, by J.P. Minard (1983) shows the site underlain by glacial and nonglacial deposits comprised primarily of massive to bedded clay, silt, and fine to very fine sand described as transitional beds (Qtb). The undisturbed, medium dense to very dense fine sandy silt and hard clay observed in the site explorations are generally consistent with this map unit.

Detailed descriptions of the subsurface conditions we observed in our site explorations are presented on the Test Pit Logs in Appendix A. Logs of the previous test pits excavated at the site are presented in Appendix B. The approximate test pit locations are shown on Figure 2.

3.3 Groundwater

Groundwater seepage was observed in Test Pit TP-2 and AESI Test Pits EP-3 and EP-4. The observed seepage was generally light, and occurred between depths of about 9 and 13 feet. The vast majority of soil fractures observed in the site soils are iron-oxide stained, indicating past migration of moisture through the soil unit.

3.4 Geologic Hazards

We evaluated site conditions for the presence of geologic hazards. Chapter 85.13(3) of the Kirkland Zoning Code (KZC) defines geologically hazardous areas as erosion hazard areas, landslide hazard areas, and seismic hazard areas.

3.4.1 Erosion Hazard Areas

Chapter 85.13(2) of the KZC defines erosion hazard areas as "...those areas containing soils which, according to the USDA Soil Conservation Service King County Soil Survey dated 1973, may experience severe to very severe erosion hazard. This group of soils includes, but is not limited to, the following when they occur on slopes of 15 percent or greater: Alderwood gravelly sandy loam (AgD), Kitsap silt loam (KpD), Ragnar Indianola Association (RdE) and portions of the Everett gravelly sand loams (EvD) and Indianola loamy fine sands (InD)."

The site soils are mapped as Kitsap silt loam 15 to 30 percent slopes (KpD) by the Soil Conservation Service (SCS). Accordingly, per the above criteria, site areas having surface gradients of 15 percent and steeper are considered erosion hazard areas.

We did not observe indications of significant active erosion at the site; however, the site soils will be susceptible to erosion when exposed during construction. In our opinion, proper implementation and maintenance of Best Management Practices (BMPs) for erosion prevention and sedimentation control would adequately mitigate the erosion potential in the planned development area. All BMPs for erosion prevention and sedimentation control should conform to City of Kirkland requirements.

3.4.2 Landslide Hazard Areas

Chapter 85.13(4) of the KZC defines landslide hazard areas as both of the following:

a. High Landslide Hazard Areas – Areas sloping 40 percent or greater, areas subject to previous landslide activities, and areas sloping between 15 percent and 40 percent with zones of emergent groundwater or underlain by or embedded with impermeable silts or clays.

b. Moderate Landslide Hazard Areas – Areas sloping between 15 percent and 40 percent and underlain by relatively permeable soils consisting largely of sand and gravel or highly competent glacial till.

The vast majority of the site has been impacted by past landsliding. Therefore, using the criteria given above, the site would be classified as a high landslide hazard area.

In our opinion, it would be possible to eliminate the landslide hazard at the site by removing the landslide deposits from the site and restoring grade with an engineered fill. This is supported by the results of stability analysis discussed below:

Stability Analysis

We performed stability analyses of the site using the computer program WinStabl. The analysis was performed on a section line identified on Figure 2 as Section D-D' for the existing slope condition, and for static and pseudostatic (seismic) conditions for the mitigated site condition with proposed grading.

The input parameters utilized in our analysis include site topography shown on the Composite Utility & Civil Plan by SDA, geology and slide mass geometry interpreted from the site explorations, and soil parameters based on field data and our past experience with similar soils. These parameters are shown on the attached WinStabl output text. The pseudostatic analysis used a horizontal earthquake coefficient value of 0.3g to model ground motions expected from a severe earthquake. The USGS seismic hazard maps for a seismic event having a 10 percent probability of exceedance in a 50-year period indicates the subject site is located within an area where the peak horizontal ground acceleration for this return period is expected to range between 0.25g and 0.3g. Our analysis conservatively utilized the maximum value of this range. The lowest safety factors determined by our analyses are given below:

Condition Analyzed	**Minimum Safety Factors**	
	Static	Pseudostatic
D-D' Existing Slope	1.08	NA
D-D' Mitigated with Proposed Grading	4.01	1.80
D-D' Mitigated with Proposed Grading No Cohesion	2.78	NA

The factor of safety determined for the existing slope condition model indicates that the site is marginally stable. In our opinion, increased groundwater levels at the site or the occurrence of a severe seismic event would likely result in remobilization of portions of the existing slide mass.

As indicated above, hazard mitigation consisting of removal of existing landslide deposits and restoring grade with an engineered fill significantly increases the factors of safety against sliding to levels well in excess of the minimum safety factors considered acceptable for stable slopes by local geotechnical engineering practice (1.5 for static and 1.1 for pseudostatic.) Conservative analysis of the mitigated slope condition using soil types with no cohesion also yielded an acceptable safety factor. The results of the stability analysis are attached as Appendix B.

3.4.3 Seismic Hazard Areas

Chapter 85.13(5) of the KZC defines seismic hazard areas as "...those areas subject to severe risk of earthquake damage as a result of seismically induced settlement or soil liquefaction, which conditions occur in areas underlain by cohesionless soils of low density usually in association with a shallow groundwater table."

In our opinion, there is no risk for liquefaction to occur at this site during an earthquake for either the existing or mitigated condition. It is also our opinion that there is little to no risk for severe damage resulting from seismically-induced settlement. Therefore, in our opinion, seismic hazard areas do not exist at the site.

3.5 Seismic Design Parameters

Based on the site soil conditions and our knowledge of the area geology, per Chapter 16 of the 2012 International Building Code (IBC), site class "D" should be used in structural design. Based on this site class, in accordance with the 2012 IBC, the following parameters should be used in computing seismic forces:

Seismic Design Parameters (IBC 2012)

Spectral response acceleration (Short Period), S_{Ms}	1.254 g
Spectral response acceleration (1 – Second Period), S_{M1}	0.734 g
Five percent damped .2 second period, S_{Ds}	0.836 g
Five percent damped 1.0 second period, S_{D1}	0.490 g

Values determined using the United States Geological Survey (USGS) Ground Motion Parameter Calculator accessed on February 25, 2016 at the web site http://earthquake.usgs.gov/designmaps/us/application.php.

4.0 DISCUSSION AND RECOMMENDATIONS

4.1 General

The vast majority of the site has been impacted by past ground movements extending to depths of about 6 to 24 feet below existing ground surface. In our opinion, the landslide hazard at the site can be mitigated by excavating the existing landslide deposits to expose undisturbed soils and restoring grade with structural fill and application of appropriate site drainage measures.

Following completion of the mitigation grading, residences can be supported on conventional spread footings bearing on undisturbed nonorganic native soils or on structural fill that is placed and compacted in accordance with our recommendations. Floor slabs and pavements can be similarly supported. Undisturbed bearing surfaces composed of native soil or structural fill derived from the fine-grained native soils will be easily disturbed by normal construction activity, particularly when wet. If disturbed, the soil will not be suitable for support, and the affected material would need to be removed and replaced with structural fill.

The site soils consist predominantly of silt and will require careful control of the soil moisture content to adequately compact as structural fill. As such, the ability to use soils from site excavations as structural fill will depend on the natural soil moisture content, the prevailing weather conditions at the time of construction, and the ability of the contractor to properly moisture condition the soil. During the normally dry summer months, it may be possible to dry soils that are wet of optimum by aeration; however, we anticipate that significant effort would be needed to accomplish this. As an alternative, stabilizing the moisture in the native soil with cement or lime can be considered. Moisture conditioning of soils that are dry of optimum would require the addition of water to the soils and thoroughly blending the material prior to compaction. Because of the fine-grained nature of the site soils, this process would also require significant effort to achieve proper blending. If grading activities will take place during the winter season, the contractor should be prepared to import clean granular material for use as structural fill and backfill.

Detailed recommendations regarding these issues and other geotechnical design considerations are provided in the following sections of this report. These recommendations should be incorporated into the final design drawings and construction specifications.

4.2 Site Mitigation Grading

Because of the thickness and relatively low strength characteristics of the existing landslide deposits, we recommend that removal of the existing landslide debris begin at the higher site elevations and transition downslope to the site margins. Planned grading in the northern site area will remove a portion of the landslide debris. Where not removed the excavation should continue to expose competent undisturbed native soils. Estimated excavation depths to remove the landslide debris are shown on Figure 2 adjacent the test pit and test boring locations.

A representative of Terra Associates, Inc. should observe the excavation to verify adequate removal of the landslide deposits and to verify that the exposed subgrade is suitable for placement of structural fill or direct support of building and pavement elements.

Our study indicates that the native soils consist predominantly of silt and will be difficult to compact as structural fill when too wet or too dry. Accordingly, the ability to use these native soils from site excavations as structural fill will depend on their moisture content and the prevailing weather conditions when site grading activities take place. Native soils that are too wet to properly compact could be dried by aeration during dry weather conditions or mixed with an additive such as lime or Portland cement to reduce and stabilize the soil's moisture content. If soil amendment products are used, additional Temporary Erosion and Sedimentation Control (TESC) BMPs will need to be implemented to mitigate potential impacts to stormwater runoff associated with possible elevated pH levels.

If grading activities are planned during the wet winter months, or if they extend into fall and winter, the owner should be prepared to import wet weather structural fill. For this purpose, we recommend importing a granular soil that meets the following grading requirements:

U.S. Sieve Size	Percent Passing
6 inches	100
No. 4	75 maximum
No. 200	5 maximum*

*Based on the 3/4-inch fraction.

Prior to use, Terra Associates, Inc. should examine and test all materials planned to be imported to the site for use as structural fill.

Structural fill should be placed in uniform loose layers not exceeding 12 inches and compacted to a minimum of 95 percent of the soil's maximum dry density, as determined by American Society for Testing and Materials (ASTM) Test Designation D-698 (Standard Proctor). The moisture content of the soil at the time of compaction should be within two percent of its optimum, as determined by this ASTM standard. If materials used as structural fill are derived from the site soils or similar fine-grained soils, we recommend using a sheep's foot roller to compact the fill.

4.3 Slopes and Embankments

All permanent cut and fill slopes should be graded with a finished inclination of 2:1 (H:V) or flatter. Upon completion of grading, slope faces should be appropriately vegetated or provided with other physical means to guard against erosion. Final grades at the top of slopes must promote surface drainage away from the slope crest to prevent uncontrolled flow over the slope face. If surface runoff must be directed towards the top of a slope, it may be necessary to route collected water to an appropriate point of discharge beyond the toe in a closed system.

Excavated and restored landslide soils or embankment fills placed on slopes exceeding a grade of 20 percent must be keyed and benched into competent native soils. A generalized slope fill detail is shown on Figure 4. We recommend constructing a toe drain in the key trench for the fill embankment. Additional drainage may be necessary. The locations and extent of additional sub-fill drainage should be based on field conditions at the time of construction. All fill placed for embankment construction should meet the structural fill requirements provided in Section 4.2 of this report.

4.4 Excavations

All excavations at the site associated with confined spaces, such as lower building level retaining walls, must be completed in accordance with local, state, and federal requirements. Based on the Washington State Safety and Health Administration (WSHA) regulations, the existing landslide deposits and medium dense, undisturbed native silt would typically be classified as Type B soils. The dense to very dense fine sandy silt would typically be classified as a Type A soil.

Accordingly, for temporary excavations of more than 4 feet and less than 20 feet in depth, the side slopes in Type B soils should be laid back at a slope inclination of 1:1 (H:V) or flatter. The landslide deposits have highly variable composition and are typically highly disturbed. As such, temporary excavations in these soils may need to be excavated at an inclination flatter than 1.5:1 to prevent sloughing. Temporary excavations in Type A soils can be laid back at inclinations of .75:1 or flatter.

Localized, light groundwater seepage may be encountered in site excavations between depths of about 9 and 13 feet. Based on our experience, we anticipate that the volume of water and rate of flow into the excavation would be relatively minor and would not be expected to impact the stability of the excavations when completed, as described above. Conventional sump pumping procedures along with a system of collection trenches, if necessary, should be capable of maintaining a relatively dry excavation for construction purposes in these soils.

The above information is provided solely for the benefit of the owner and other design consultants, and should not be construed to imply that Terra Associates, Inc. assumes responsibility for job site safety. It is understood that job site safety is the sole responsibility of the project contractor.

4.5 Foundations

The residential structures may be supported on conventional spread footing foundations bearing on competent native soils or on structural fill placed above these native soils. Foundation subgrades should be prepared, as recommended in Sections 4.2 and 4.3 of this report.

Perimeter foundations exposed to the weather should bear at a minimum depth of 1.5 feet below final exterior grades for frost protection. Interior foundations can be constructed at any convenient depth below the floor slab. We recommend designing foundations for a net allowable bearing capacity of 2,500 pounds per square foot (psf). For short-term loads, such as wind and seismic, a one-third increase in this allowable capacity can be used in design. With the anticipated loads and this bearing stress applied, building settlements should be less than one-half inch total and one-fourth inch differential.

For designing foundations to resist lateral loads, a base friction coefficient of 0.3 can be used. Passive earth pressure acting on the sides of the footings may also be considered. We recommend calculating this lateral resistance using an equivalent fluid weight of 300 pounds per cubic foot (pcf). We recommend not including the upper 12 inches of soil in this computation because they can be affected by weather or disturbed by future grading activity. This value assumes the foundations will be constructed neat against competent native soil or the excavations are backfilled with structural fill, as described in Section 4.2 of this report. The recommended passive and friction values include a safety factor of 1.5.

4.6 Slab-on-Grade Floors

Slab-on-grade floors may be supported on a subgrade prepared as recommended in Section 4.2 of this report. Immediately below the floor slab, we recommend placing a four-inch thick capillary break layer composed of clean, coarse sand or fine gravel that has less than three percent passing the No. 200 sieve. This material will reduce the potential for upward capillary movement of water through the underlying soil and subsequent wetting of the floor slab.

The capillary break layer will not prevent moisture intrusion through the slab caused by water vapor transmission. Where moisture by vapor transmission is undesirable, such as covered floor areas, a common practice is to place a durable plastic membrane on the capillary break layer and then cover the membrane with a layer of clean sand or fine gravel to protect it from damage during construction, and aid in uniform curing of the concrete slab. It should be noted that if the sand or gravel layer overlying the membrane is saturated prior to pouring the slab, it will be ineffective in assisting uniform curing of the slab and can actually serve as a water supply for moisture seeping through the slab and affecting floor coverings. Therefore, in our opinion, covering the membrane with a layer of sand or gravel should be avoided if floor slab construction occurs during the wet winter months and the layer cannot be effectively drained.

4.7 Retaining Walls and Rockeries

Conventional Cast-in-Place Retaining Walls

The magnitude of earth pressures developing on below-grade walls will depend on the quality and compaction of the wall backfill. We recommend placing and compacting wall backfill as structural fill, as described in Section 4.2 of this report. To prevent overstressing the walls during backfilling, heavy construction machinery should not be operated within five feet of the wall. Wall backfill in this zone should be compacted with hand-operated equipment. To prevent hydrostatic pressure development, wall drainage must also be installed. A typical wall drainage detail is shown on Figure 4.

With wall backfill placed and compacted as recommended, and drainage properly installed, we recommend designing unrestrained walls for an active earth pressure equivalent to a fluid weighing 35 pounds per cubic foot (pcf). For restrained walls, an additional uniform load of 100 psf should be added to the 35 pcf.

To account for typical traffic surcharge loading, the walls can be designed for an additional imaginary height of two feet (two-foot soil surcharge). For evaluation of wall performance under seismic loading, a uniform pressure equivalent to 8H psf, where H is the height of the below-grade portion of the wall should be applied in addition to the static lateral earth pressure. These values assume a horizontal backfill condition and that no other surcharge loading, sloping embankments, or adjacent buildings will act on the wall. If such conditions exist, then the imposed loading must be included in the wall design. Friction at the base of foundations and passive earth pressure will provide resistance to these lateral loads. Values for these parameters are provided in Section 4.5 of this report.

Gravity block or mechanically stabilized earth (MSE) walls can also be used to accommodate vertical breaks in grade that may be required to achieve desired site elevations. We can design or provide soil design parameters for a design build approach for these alternative wall systems, if requested.

Rockeries

Based on our study, it is our opinion that construction of rockeries against cuts into the undisturbed, native soils will be feasible. Rockeries are not engineered structures that are designed to retain earth in a manner similar to a cast-in-place concrete or gravity block wall systems. Rocks used to construct the wall will enhance stability by virtue of their mass; however, the soil against which the rockery is constructed must be inherently stable and able to stand unsupported in a near-vertical condition. In our opinion, the undisturbed native silt observed at the site would meet this requirement. A typical cut rockery detail is shown on Figure 5.

The Composite Utility & Civil Plan by SDA shows rockeries constructed against fill to a maximum height of about 4 feet. In this case, reinforcement of the structural fill is not required provided the structural fill can be overbuilt beyond the rockery face a minimum distance of four feet, and then cut back for construction of the rockery wall. If the fill cannot be overbuilt due to site constraints, or the fill will be surcharged by structures, pavements, or sloping geometry above the rockery, the fill should be constructed with geosynthetic reinforcement.

4.8 Stormwater Detention Vault

The Composite Utility & Civil Plan by SDA indicates that site stormwater will be routed to a detention vault located in the northeastern portion of the site. No design elevations are shown on the plan; however, it is indicated that the vault will be 27 feet by 78 feet in area with a height of 14 feet. The plan shows the vault discharging to a level spreader located between the vault and the east site margin. Existing surface grades in the area of the level spreader are about 50 to 55 percent.

Available subsurface information in the area of the proposed vault location indicates that landslide deposits underlie to the vault location to a depth of at least 8 feet. Comprehensive subsurface exploration will be necessary in the proposed vault location to adequately characterize the soils conditions for vault foundation design and construction, and to fully evaluate potential impacts to existing slope areas due to vault construction.

The magnitude of earth pressures developing on the vault walls will depend in part on the quality and compaction of the wall backfill. We recommend placing and compacting wall backfill as structural fill, as recommended in the Section 4.2 of this report. Lateral earth pressures recommended in Section 4.7 can be used in designing the below-grade vault walls. If it is not possible to discharge collected water at the footing elevation, we recommend setting the invert elevation of the wall drainpipe equivalent to the outfall invert and connecting the drain to the outfall pipe for discharge. For any portion of the wall that falls below the invert elevation of the wall drain, an earth pressure equivalent to a fluid weighing 85 pcf should be used. For evaluating walls under seismic loading, an additional uniform earth pressure equivalent to 8H psf, where H is the height of the below-grade wall in feet, can be used. These values assume a horizontal backfill condition. Where applicable, a uniform horizontal traffic surcharge value of 75 psf should be included in design of vault walls.

The vault may be subject to uplift pressures if drainage is not provided the full depth of the structure. The weight of the structure and the weight of the backfill soil above its foundation will provide resistance to uplift. A soil unit weight of 125 pcf can be used for the vault backfill provided the backfill is placed and compacted as structural fill as recommended above.

We do not recommend discharging stormwater from the vault to a level spreader constructed on a 50 to 55 percent grade. In our opinion, water discharged from the vault should be conveyed to a point of controlled release at the toe of the slope.

4.9 Drainage

Surface

Final exterior grades should promote free and positive drainage away from the building areas. If a positive gradient cannot be provided, provisions for collection and disposal of surface water adjacent to the structure should be provided.

Surface water from developed areas must not be allowed to flow in an uncontrolled and concentrated manner over the crests of site slopes and embankments. Surface water should be directed away from the slope crests to a point of collection and controlled discharge. If site grades do not allow for directing surface water away from the slopes, then the water should be collected and tightlined to an approved point of controlled discharge.

Subsurface

In addition to wall drainage as discussed in Section 4.7, we recommend installing a continuous drain along the outside lower edge of shallow perimeter building foundations. Wall and foundation drains should be tightlined to an approved point of controlled discharge independent of the roof drain system. Subsurface drains must be laid with a gradient sufficient to promote positive flow to the point of discharge. All drains should be provided with cleanouts at easily accessible locations. These cleanouts should be serviced at least once every year.

4.10 Utilities

Utility pipes should be bedded and backfilled in accordance with American Public Works Association (APWA) or local jurisdictional requirements. At minimum, trench backfill should be placed and compacted as structural fill as described in Section 4.2 of this report. As noted, the native soils are moisture sensitive and will require careful control of moisture to facilitate proper compaction. If utility construction takes place during the winter or if it is not feasible to properly moisture condition the excavated soil at the time of construction, it may be necessary to import suitable wet weather fill for utility trench backfilling.

4.11 Pavements

Pavements should be constructed on subgrades prepared as recommended in Section 4.2 of this report. Regardless of the degree of relative compaction achieved, the subgrade must be firm and relatively unyielding before paving. Proofrolling the subgrade with heavy construction equipment should be completed to verify this condition.

The pavement design section is dependent upon the supporting capability of the subgrade soils and the traffic conditions to which it will be subjected. As we understand, traffic will mainly consist of light passenger and commercial vehicles with only occasional heavy traffic in the form of moving trucks and trash removal vehicles. Based on this information, with a stable subgrade prepared as recommended, we recommend the following pavement sections:

- Two inches of asphalt concrete (AC) over four inches of crushed rock base (CRB)
- Four inches full depth HMA

The paving materials used should conform to the Washington State Department of Transportation (WSDOT) specifications for ½-inch class HMA and CRB.

Long-term pavement performance will depend on surface drainage. A poorly-drained pavement section will be subject to premature failure as a result of surface water infiltrating into the subgrade soils and reducing their supporting capability. For optimum performance, we recommend surface drainage gradients of at least two percent. Some degree of longitudinal and transverse cracking of the pavement surface should be expected over time. Regular maintenance should be planned to seal cracks when they occur.

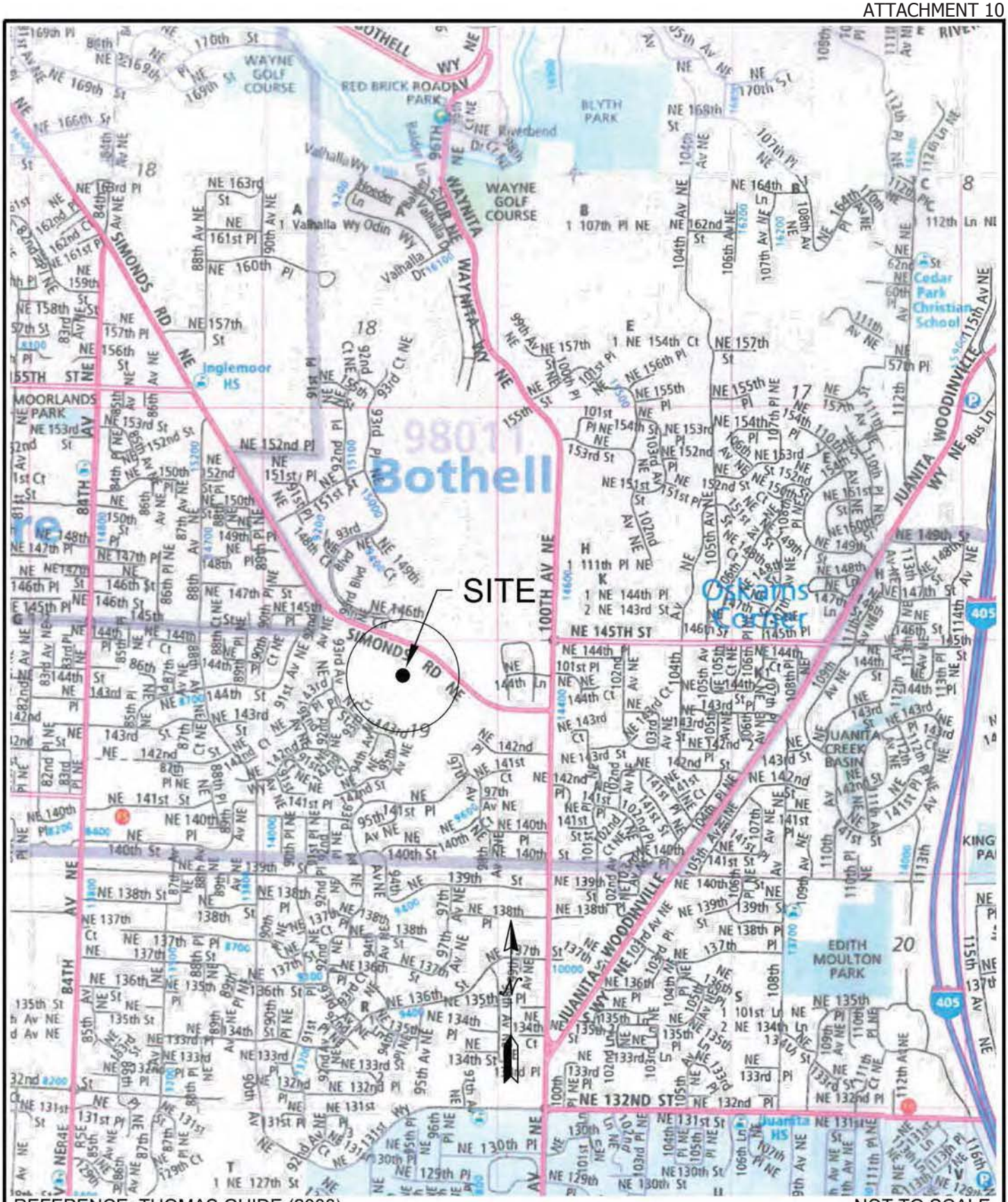
5.0 ADDITIONAL SERVICES

Terra Associates, Inc. should review the final designs and specifications in order to verify that earthwork and foundation recommendations have been properly interpreted and implemented in project design. We should also provide geotechnical services during construction in order to observe compliance with our design concepts, specifications, and recommendations. This will allow for design changes if subsurface conditions differ from those anticipated prior to the start of construction.

6.0 LIMITATIONS

We prepared this report in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made. This report is the copyrighted property of Terra Associates, Inc. and is intended for specific application to the Simonds Road Property project. This report is for the exclusive use of KLB Construction and its authorized representatives. No other warranty, expressed or implied, is made.

The analyses and recommendations presented in this report are based on data obtained from our on-site test pits. Variations in soil conditions can occur, the nature and extent of which may not become evident until construction. If variations appear evident, Terra Associates, Inc. should be requested to reevaluate the recommendations in this report prior to proceeding with construction.



REFERENCE: THOMAS GUIDE (2008)

NOT TO SCALE

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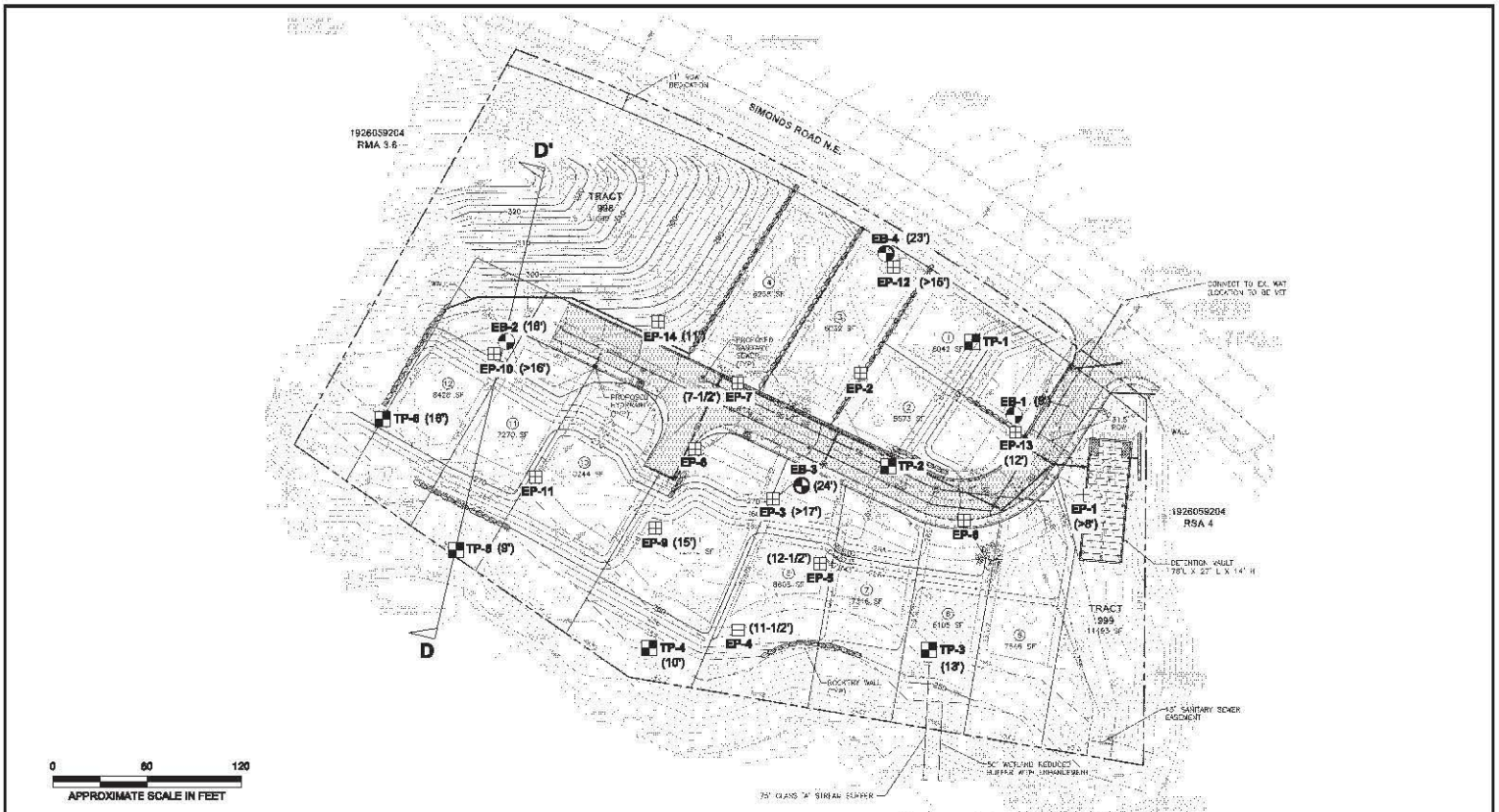
Geology and
Environmental Earth Sciences

VICINITY MAP
SIMONDS ROAD PROPERTY
KIRKLAND, WASHINGTON

Proj. No.T-6997	Date MAR 2016	Figure 1



NOTE:

THIS SITE PLAN IS SCHEMATIC. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE. IT IS INTENDED FOR REFERENCE ONLY AND SHOULD NOT BE USED FOR DESIGN OR CONSTRUCTION PURPOSES.

REFERENCE:

SITE PLAN BY SDA

LEGEND:

- TP-1 APPROXIMATE TEST PIT LOCATION (Terra 2014)
- EB-1 APPROXIMATE BORING LOCATION (AESI 2008)
- EP-1 APPROXIMATE EXPLORATION PIT LOCATION (AESI 2008)
- (15') LANDSLIDE DEBRIS THICKNESS

N

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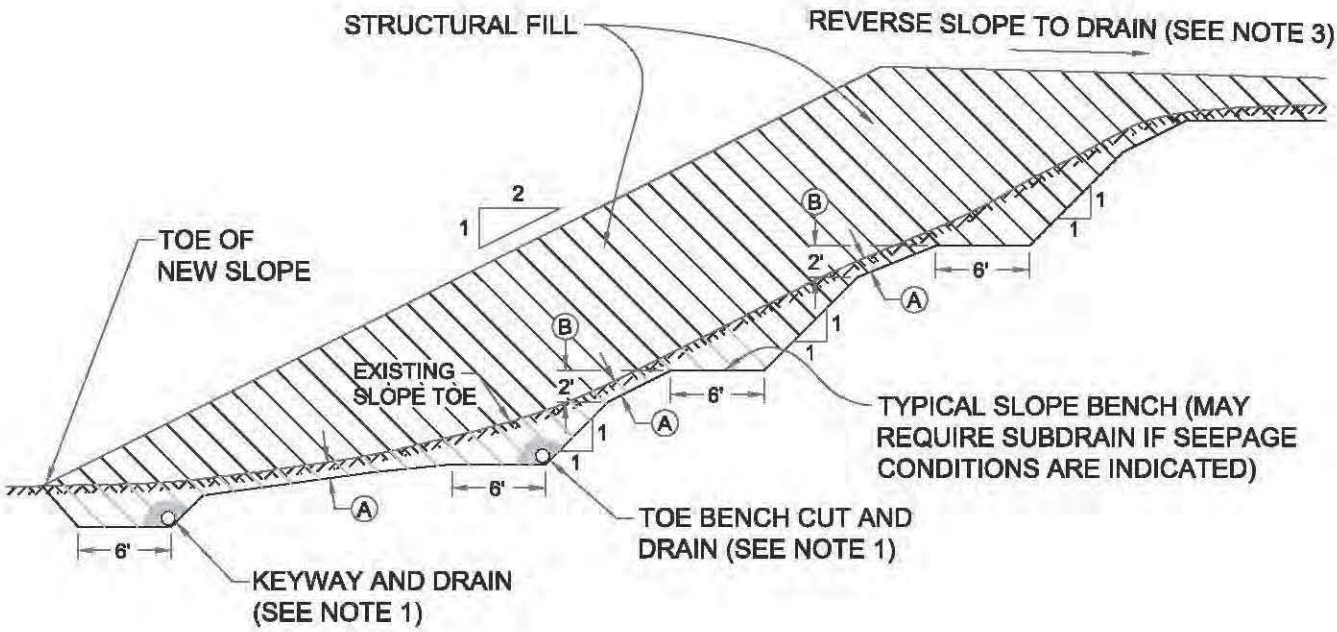
EXPLORATION LOCATION PLAN
SIMONDS ROAD PROPERTY
KIRKLAND, WASHINGTON

Proj. No.T-6997	Date MAR 2016	Figure 2



NOT TO SCALE

NOTES:

1) DRAINS SHALL CONSIST OF 6" DIAMETER PERFORATED PVC PIPE ENVELOPED IN 1 cu. ft. OF WASHED 3/4" MINUS DRAINAGE GRAVEL.

2) (A) – TOPSOIL REMOVAL THICKNESS BETWEEN KEYWAY AND BENCHES.

   (B) – VERTICAL ELEVATION DIFFERENCE BETWEEN TOP OF LOWER BENCH BACKCUT AND UPPER BENCH ELEVATION.

3) RECOMMENDED PRIOR TO ESTABLISHMENT OF PERMANENT EROSION CONTROL MEASURES AND SITE DRAINAGE.

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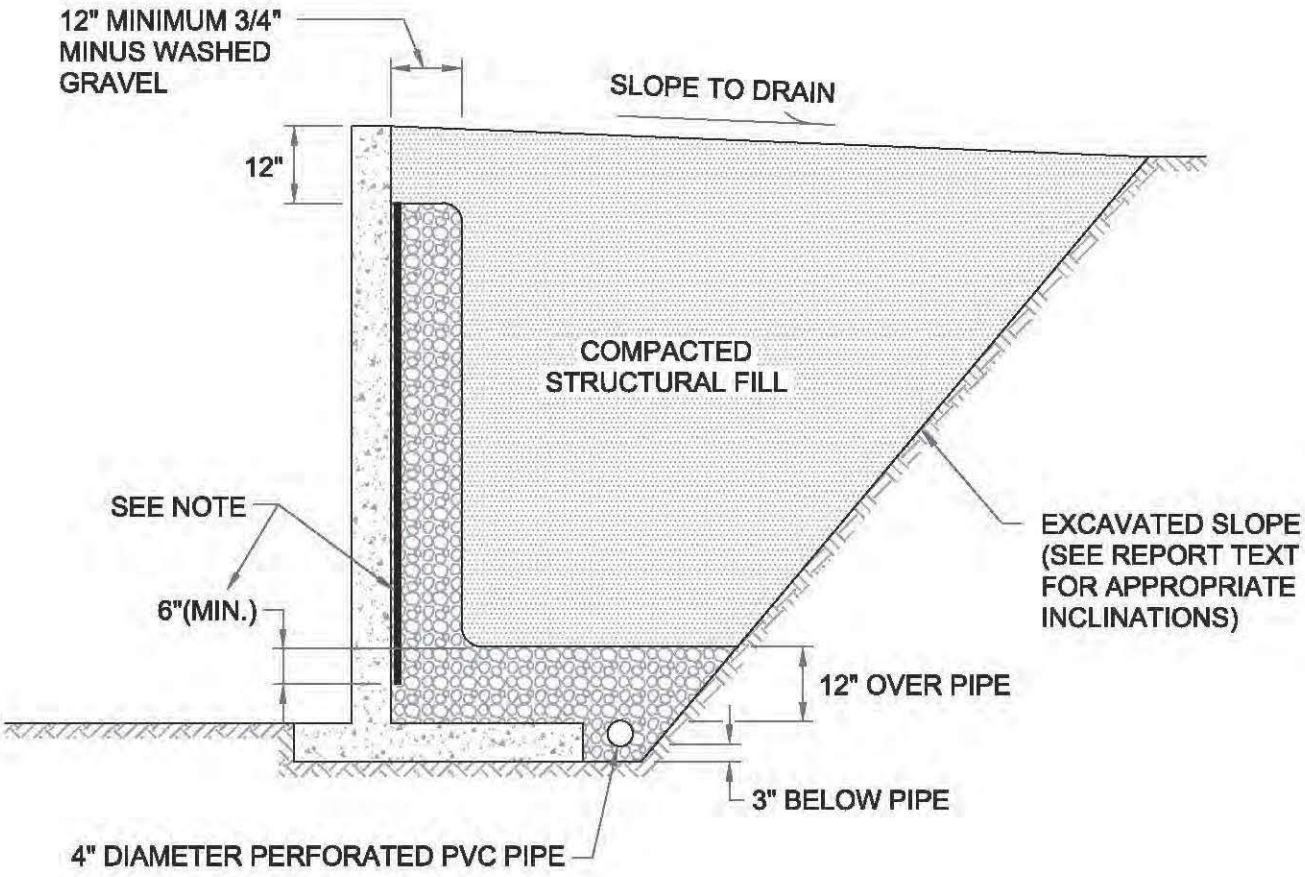
GENERALIZED SLOPE FILL DIAGRAM
SIMONDS ROAD PROPERTY
KIRKLAND, WASHINGTON

Proj. No.T-6997	Date MAR 2016	Figure 3



NOT TO SCALE

NOTE:

MIRADRAIN G100N PREFABRICATED DRAINAGE PANELS OR SIMILAR PRODUCT CAN BE SUBSTITUTED FOR THE 12-INCH WIDE GRAVEL DRAIN BEHIND WALL. DRAINAGE PANELS SHOULD EXTEND A MINIMUM OF SIX INCHES INTO 12-INCH THICK DRAINAGE GRAVEL LAYER OVER PERFORATED DRAIN PIPE.

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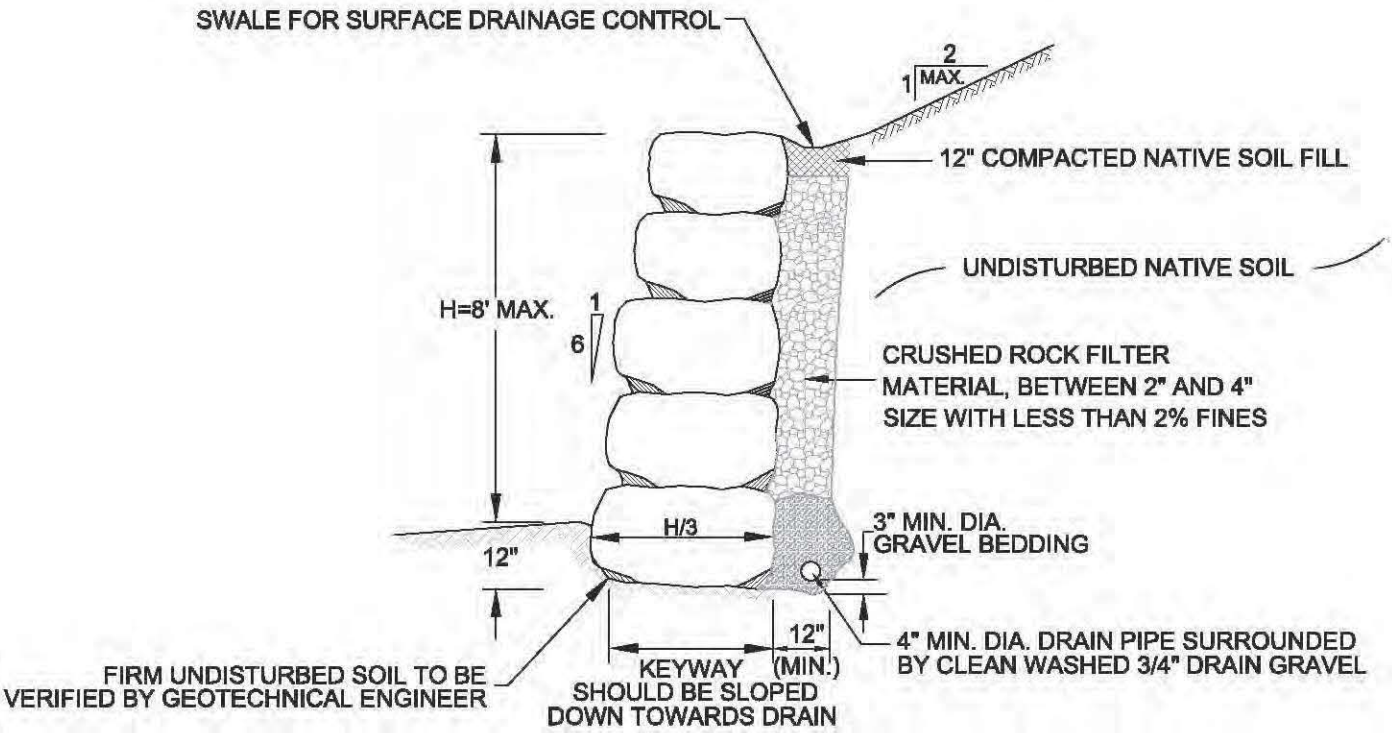
TYPICAL WALL DRAINAGE DETAIL
SIMONDS ROAD PROPERTY
KIRKLAND, WASHINGTON

Proj. No.T-6997	Date MAR 2016	Figure 4



NOT TO SCALE

ROCKERY NOTES

1. ROCKERY CONSTRUCTION SHALL BE COMPLETED IN ACCORDANCE WITH THE ASSOCIATION OF ROCKERY (ARC) CONTRACTORS GUIDELINES.

2. ROCK USED MUST MEET THE REQUIREMENTS FOR ROCK QUALITY SPECIFIED IN SECTIONS 9-13.7(1) OF THE WSDOT STANDARDS SPECIFICATIONS (2012).

3. ALL CAP ROCKS MUST BE SECURE AND NOT ABLE TO BE DISLODGED BY HAND.

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CUT ROCKERY DETAIL
SIMONDS ROAD PROPERTY
KIRKLAND, WASHINGTON

Proj. No.T-6997	Date MAR 2016	Figure 5

APPENDIX A
FIELD EXPLORATION AND LABORATORY TESTING

Simonds Road Property
Kirkland, Washington

On January 20, 2014, we investigated subsurface conditions at the site by observing conditions in 6 test pits excavated to maximum depths of about 14 to 16 feet using a track-mounted excavator. The test pit locations are shown on Figure 2. The test pit locations were approximately determined in the field by sighting relative to existing surface features and using GPS coordinates obtained with handheld equipment. The Test Pit Logs are presented on Figures A-2 through A-7.

An engineering geologist from our office maintained a log of each test pit as it was excavated, classified the soil conditions encountered, and obtained representative soil samples. All soil samples were visually classified in the field in accordance with the Unified Soil Classification System. A copy of this classification is presented as Figure A-1.

MAJOR DIVISIONS			LETTER SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS More than 50% material larger than No. 200 sieve size	**GRAVELS** More than 50% of coarse fraction is larger than No. 4 sieve	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
			GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines.
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS More than 50% of coarse fraction is smaller than No. 4 sieve	Clean Sands (less than 5% fines)	SW	Well-graded sands, sands with gravel, little or no fines.
			SP	Poorly-graded sands, sands with gravel, little or no fines.
		Sands with fines	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS More than 50% material smaller than No. 200 sieve size	**SILTS AND CLAYS** Liquid Limit is less than 50%		ML	Inorganic silts, rock flour, clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity. (Lean clay)
			OL	Organic silts and organic clays of low plasticity.
	SILTS AND CLAYS Liquid Limit is greater than 50%		MH	Inorganic silts, elastic.
			CH	Inorganic clays of high plasticity. (Fat clay)
			OH	Organic clays of high plasticity.
HIGHLY ORGANIC SOILS			PT	Peat.

DEFINITION OF TERMS AND SYMBOLS

COHESIONLESS

Density	Standard Penetration Resistance in Blows/Foot
Very Loose	0-4
Loose	4-10
Medium Dense	10-30
Dense	30-50
Very Dense	>50

COHESIVE

Consistancy	Standard Penetration Resistance in Blows/Foot
Very Soft	0-2
Soft	2-4
Medium Stiff	4-8
Stiff	8-16
Very Stiff	16-32
Hard	>32

I	2" OUTSIDE DIAMETER SPILT SPOON SAMPLER
II	2.4" INSIDE DIAMETER RING SAMPLER OR SHELBY TUBE SAMPLER
▼	WATER LEVEL (Date)
Tr	TORVANE READINGS, tsf
Pp	PENETROMETER READING, tsf
DD	DRY DENSITY, pounds per cubic foot
LL	LIQUID LIMIT, percent
PI	PLASTIC INDEX
N	STANDARD PENETRATION, blows per foot

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Environmental Earth Sciences

UNIFIED SOIL CLASSIFICATION SYSTEM
SIMONDS ROAD PROPERTY
KIRKLAND, WASHINGTON

Proj. No.T-6997	Date MAR 2016	Figure A-1

LOG OF TEST PIT NO. 1

FIGURE A-2

PROJECT NAME: Simonds Road Property **PROJ. NO:** T-6997 **LOGGED BY:** JCS

LOCATION: Kirkland, Washington **SURFACE CONDS:** **APPROX. ELEV:** 109

DATE LOGGED: 1-20-14 **DEPTH TO GROUNDWATER:** NA **DEPTH TO CAVING:** NA

DEPTH (FT.)	SOIL SAMPLE	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)
1		12 inches Duff and Topsoil.			
2	1	Gray-brown fine sandy SILT, moist, mottled, scattered charcoal fragments. (ML)	Medium Dense		
3		Gray-brown fine sandy SILT, moist, mottled, slightly blocky texture, scattered fractures with iron oxide staining, trace of fine roots. (ML)			
4					
5					
6	2				
7					
8			Medium Dense to Dense		
9					
10					
11					
12					
13					
14	3	Test pit terminated at 14 feet. No groundwater seepage.			
15					
16					
17					
18					
19					
20					

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

Terra Associates, Inc.
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LOG OF TEST PIT NO. 2

FIGURE A-3

PROJECT NAME: Simonds Road Property **PROJ. NO:** T-6997 **LOGGED BY:** JCS

LOCATION: Kirkland, Washington **SURFACE CONDS:** **APPROX. ELEV:** 114

DATE LOGGED: 1-20-14 **DEPTH TO GROUNDWATER:** 9 - 11 ft **DEPTH TO CAVING:** NA

DEPTH (FT.)	SOIL SAMPLE	DESCRIPTION	CONSISTENCY/ RELATIVE DENSITY	W (%)	POCKET PEN. (TSF)
1, 2, 3, 4, 5		6 inches Duff and Topsoil. Gray-brown fine sandy SILT, moist, scattered mottling, blocky texture, numerous iron-oxide stained fractures. (ML)	Medium Dense to Dense		
6, 7, 8, 9, 10, 11, 12, 13	1 2	Gray fine sandy SILT, moist, scattered blocky zones, scattered to numerous iron-oxide stained fractures. (ML)	Dense to Very Dense		
14, 15, 16, 17, 18, 19, 20		Test pit terminated at 14 feet. Light groundwater seepage and faint hydrocarbon odor from localized blocky zone between about 9 and 11 feet on the west side of the test pit.			

NOTE: This subsurface information pertains only to this test pit location and should not be interpreted as being indicative of other locations at the site.

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