Report
Geotechnical Engineering Services
East Lake Sammamish Master Plan Trail
South Sammamish Segment B
Sammamish, Washington

October 2016
ICE File No. 0105-010

Prepared For:
Parametrix

Prepared By:
Icicle Creek Engineers, Inc.

ICICLECREEK ENGINEERS

October 2016

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We are pleased to submit an electronic copy (pdf) and two original copies of our *Report, Geotechnical Engineering Services, East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Sammamish, Washington*. Icicle Creek Engineers' services were completed in general accordance with Parametrix Amendment Nos. 4, 5, 7 and 8 to Subconsultant Agreement for Professional Services, and were authorized in writing by John Perlic, Transportation Division Manager for Parametrix, on August 6, 2013, February 6, 2014, December 2, 2014 and March 31, 2015. Our report was submitted in preliminary draft form (DVD and one original copy) for your review and comment on October 19, 2016 (60% design).

Please contact us if you require additional information or an interpretation of the information presented in this report. We appreciate the opportunity to be of service to you.

Yours very truly,
Icicle Creek Engineers, Inc.

Kathy S. Killman, LEG
Principal Engineering Geologist

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Attachments

cc: Yammie Ho, Parametrix (pdf)

REPORT
GEOTECHNICAL ENGINEERING SERVICES
EAST LAKE SAMMAMISH MASTER PLAN TRAIL
SOUTH SAMMAMISH SEGMENT B
SAMMAMISH, WASHINGTON
FOR
PARAMETRIX

1.0 INTRODUCTION

This report presents the results of Icicle Creek Engineers' (ICE's) geotechnical engineering services for design related to the proposed East Lake Sammamish Master Plan Trail (ELST), South Sammamish Segment B that generally parallels East Lake Sammamish Parkway NE/SE for about 3.5 miles from the intersection with SE 33rd Street (Station 283+23) to near the intersection with NE Inglewood Hill Road (Station 468+00). In this report the ELST South Sammamish Segment B will be referred to as the "ELST SSS-B."

The general location of the ELST SSS-B alignment is shown on the Vicinity Map, Figure 1. Plans and profiles of the alignment are shown on the Plans and Profiles, Figures 2 through 39.

2.0 PROJECT DESCRIPTION

Phoebe Johannessen, PE Senior Civil Engineer with Parametrix, the Project Engineer, provided ICE with the following design documents for our use and review:

- Parametrix, September 2016 (60% review submittal), *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Sammamish, WA, Plan and Profile*, sheets AL1 through AL39; *Wall #3 Soldier Pile Wall*, sheets S1 and S2; *Wall #6 Soldier Pile Wall*, sheets S3 and S4; *Soldier Pile Wall Details*, sheets S5 and S6, *Wall Profiles*, sheets WP1 through WP9.
- Parametrix, July 2016 (60% review submittal), *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Sammamish, WA, Drainage Details*, sheets DD1 and DD2.

Based on our review of the project design plans and discussions with Ms. Johannessen, the ELST SSS-B will follow a former rail line that is between and parallels East Lake Sammamish Parkway NE/SE and the Lake Sammamish (east shore) waterfront. The rail line (tracks and ties) were removed several years ago as King County converted (railbanked) the former rail line into an approximately 10-foot wide, gravel-surfaced trail which provided temporary access for the public. Residential properties are adjacent to the former rail line in most areas.

The current plan is to widen the former rail line to 16 feet (12-foot paved surface and 2-foot shoulders). While the existing ELST South Sammamish Segment right-of-way (ROW) is relatively wide (up to 100 feet), wetland areas and steep slopes (including the road embankment for East Lake Sammamish Parkway SE in local areas), along with other local modifications (landscape walls, driveways, and other) within the ROW by adjacent property owners, constrain the space in some areas needed to accomplish the ELST SSS-B widening.

To widen the ELST SSS-B, additional fill will be required in most areas, typically on the downhill (west) side of the existing ELST SSS-B. The fill will be placed so as to widen the existing fill prism of the rail line. Some of this fill may be placed on open fill slopes, depending on available space. In other areas where space is limited (wetlands, residential encroachment, etc.). Structural Earth Walls (SEWs) will be used to support the fill. Soldier Pile Walls (SPWs) or Gravity Block Walls (GBWs) will be used were cuts into existing slopes

are needed to widen the trail. The proposed locations of these retaining walls are shown on Figures 2 through 39.

Based on our review of the design plans, the walls include the following:

- 30 SEWs ranging from 1.7 to 12.3 high (average height of about 5.3 feet).
- 2 soldier pile walls less than 13 feet high
- 7 GBWs ranging from 7 to 7.5 feet high (2 to 3 blocks high)

Additional stormwater runoff will result from ELST SSS-B widening. Where soil and groundwater conditions are favorable, the stormwater will be routed to an Infiltration Chamber (shown on Figure 3) and five Infiltration Trenches (shown in blue on Figures 17, 18, 20, 21, 34, 38 and 39). In other areas, stormwater runoff will disperse or flow to open ditches.

3.0 GEOLOGIC SETTING

The surficial geologic units along the ELST SSS-B were mapped based on published geologic information, review of aerial photographs, field reconnaissance and test borings. The most recent regional geologic mapping in the site area was completed by the US Geological Survey (USGS - Booth, D.B. and Minard, J.P., 1992, *Geologic Map of the Issaquah 7.5' Quadrangle, King County, Washington*, Miscellaneous Field Studies, Map MF-2206, scale 1 inch = 2,000 feet).

The geology and landforms of the site area are the result of interglacial, glacial and postglacial events within the Puget Sound area. Bedrock underlies the entire site area, though at a depth of several tens or hundreds of feet.

Native soils composed of interglacial, glacial and postglacial deposits overlie the bedrock. The most recent glaciation, the Vashon Stade of the Fraser glaciation, covered the entire site area with up to 3,000 feet of ice at its maximum extent. The Vashon ice sheet completely melted from the site area approximately 13,500 to 15,000 years ago.

Prior to the Vashon Stade, older interglacial and glacial soils were deposited over a period of several tens of thousands of years and are referred to as Pre-Fraser Sediments. Pre-Fraser Sediments have been overridden by glacial ice and are typically in dense to very dense (granular soils) or very stiff to hard (cohesive soils) condition. Ice-Contact Deposits and Recessional Outwash were deposited adjacent to or at the front of the melting ice sheet. Ice-Contact Deposits and Recessional Outwash are typically in a loose to medium dense condition.

Postglacial deposits consisting of Older Alluvium were deposited in the past 10,000 years overlying the glacial and interglacial sediments in low areas and during a time frame when Lake Sammamish was at a higher level. Older Alluvium is typically in a loose to medium dense (granular soils) or soft to medium stiff (cohesive soils) condition.

Recent sedimentation and human activities (cuts and fills) have modified the land surface along the ELST SSS-B alignment. Human activities, primarily the original rail line construction (dating to the 1880s) and other modifications for driveways, homes, etc., have resulted in regrading (cuts and fills) of the ground surface along the alignment. The native soils, described above, typically are mantled with Fill and/or Topsoil.

The interpreted geologic conditions that underlie the ELST SSS-B are shown on Figures 2 through 39.

4.0 REGIONAL HYDROGEOLOGY

The ELST SSS-B alignment, paralleling the Lake Sammamish waterfront along the toe of a hillside area, some of which is cut into the hillside, provides ideal conditions for emerging groundwater as springs and seepage. The native soils that underlie the hillside above the ELST SSS-B likely contain multiple layers of groundwater zones. These zones, or "layers" of subperched groundwater, have been truncated by glacial and postglacial erosion (hence the hillside) with this groundwater emerging as springs and seepage in local areas in the lower part of this hillside area. The lateral movement of groundwater has been locally disrupted as a result of the construction of the East Lake Sammamish Parkway NE/SE road embankment and the existing rail line embankment (alignment of the ELST SSS-B). The rail line embankment has resulted in several linear wetlands that parallel the uphill side of the ELST SSS-B alignment (e.g. Wetland 26A and others).

5.0 SEISMICITY

The Puget Sound region is seismically active. Seismicity in this region is attributed primarily to the interaction between the Pacific, Juan de Fuca, and North American plates. The Juan de Fuca plate is subducting beneath the North American plate. It is thought that the resulting deformation and breakup of the Juan de Fuca plate might account for the large-magnitude deep-focus earthquakes in this region.

Thick deposits of glacial and non-glacial sediments occur throughout most of the Puget Sound Basin. Due to the thick sediment cover, little is known regarding the nature of faults in the underlying bedrock. The Seattle Fault, the Southern Whidbey Island Fault and the Tacoma Fault zones are the only known structural geology features that have indicated ground displacement in the Quaternary age glacial and interglacial sediments in the Puget Sound region. The project site is located at the east end of the Seattle Fault Zone.

An abbreviated listing of major (greater than 5.0 magnitude) earthquake events in the Puget Sound region according to the Pacific Northwest Seismograph Network is presented below.

Summary of Major Seismic Events in the Puget Sound Region

Seismic Event	Date	Location	Richter Magnitude
North Cascades Earthquake	December 15, 1872	Chelan, WA	6.8*
Pickering Passage Earthquake	February 15, 1946	Olympia, WA	5.8
Strait of Georgia Earthquake	June 23, 1946	Courtenay, BC	7.4
Olympia Earthquake	April 13, 1949	Olympia, WA	7.1
Seattle-Tacoma Earthquake	April 29, 1965	SeaTac, WA	6.5
Duvall Earthquake	May 3, 1996	Duvall, WA	5.4
Satsop Earthquake	July 3, 1999	Satsop, WA	5.8
Nisqually Earthquake	February 28, 2001	Olympia, WA	6.8

Source: *Pacific Northwest Seismograph Network.*

* Estimated from historical information

6.0 SITE CONDITIONS

6.1 SURFACE CONDITIONS

Surface conditions were evaluated based on field reconnaissance completed by personnel from ICE on September 9 and 10, October 7, 8, 12, 14 through 19, 21 and 25, 2013. The weather during this time period was seasonably cool (40s) in the morning and warm (50s and low 60s) in the afternoon, though was unseasonably dry (rain occurred only on October 8, 2013). The weather preceding our field

reconnaissance was relatively normal. Jeff Schwartz of ICE completed a field reconnaissance of the ELST SSS-B on October 17, 2016 as an update to the earlier reconnaissance efforts.

The ELST SSS-B parallels the Lake Sammamish waterfront at the toe of a hillside at about Elevation 45 to 52 feet (NAVD88 vertical datum, Parametrix, September 2016, sheets AL1 through AL38). The level of Lake Sammamish ranges from about Elevation 25.6 to 30 feet according to USGS records from 2008 to 2016 (http://nwis.waterdata.usgs.gov).

Because much of the ELST SSS-B is located at the base of the hillside, the uphill (generally north to east) side of the ELST SSS-B is commonly in a "cut" and the downhill (generally south to west) side is in Fill. Private property improvements have cut into the toe of the ELST SSS-B embankment Fill in local areas. These cuts have often been replaced with a "landscape wall" such as a rockery or modular block wall. The term landscape wall implies that the walls are non-structural.

In other areas along the uphill side of the ELST SSS-B, the hillside is natural, sometimes nearly level, or gently to moderately sloping (less than 40 percent grade). Locally, the ELST SSS-B is entirely in Fill such as between Station 329+00 to 333+00 that crosses a yard area. In other places, the full fill embankments result in a closed depression on the uphill side that are often occupied by "wetlands" (wetlands have been identified by others); these wetlands are shown on Figures 2 through 38. Typically, the ELST SSS-B surface is raised (crowned) as would be expected for standard rail line construction, with ditch lines paralleling the uphill shoulder of the ELST SSS-B.

Typically, residential development, including access roads/driveways, parking areas, landscape areas, houses and cabins, occur along the downhill side of the ELST SSS-B. In other areas, East Lake Sammamish Parkway NE/SE parallels the uphill side of the ELST SSS-B. Numerous private roads and driveways cross the ELST SSS-B. The downhill side of the ELST SSS-B is notably "drier" than the uphill side of the ELST SSS-B.

Streams, some named, other not named, cross the ELST SSS-B at about Stations 316+10, 316+95, 379+10 (Pine Lake Creek), 384+25, 386+60, 411+95 (Ebright Creek), 424+55 (Zaccuse Creek), 432+80, 441+35, 449+95, 452+95, 454+50, 455+80, 700+60 and 464+30.

We did not observe evidence of landslides or severe erosion on either side of the ELST SSS-B.

Specific details of site conditions based on our October 17, 2016 field reconnaissance along the ELST SSS-B are described as follows:

Stations 283+23 to 290+00 – This segment crosses an area that is relatively wide, open and level to gently sloping.

Stations 290+00 to 295+00 – The segment narrows with an up to 20-foot high embankment between the trail and East Lake Sammamish Parkway (referred to in this section as the "Parkway" side in this report section). The embankment is sloped at between 2H:1V and 1H:1V. An open ditch (dry at the time of our field reconnaissance) was observed at the toe of the Parkway embankment. The Lake Sammamish side (referred to as the "Lake" side in this report section) of the trail slopes down at about a 2H:1V slope for about 10 vertical feet to a private driveway and houses for most of this segment. A rockery is located between the driveway and the trail for a portion of this segment.

Stations 295+00 to 313+00 – Portions of this segment are bordered by a steep embankment that extends up to houses along the Parkway side of the trail. The embankment is up to 25 feet high and slopes between 2H:1V and 1H:1V. The steepest portion of the slope is located between Stations 295+00 and 298+00 and between Stations 311+00 and 313+00, where a SPWs (Wall 3A and Wall 6) are planned. We observed the slope to be vegetated and stable in the existing condition with no evidence of landsliding or significant erosion. The lake side of the trail slopes down to a private driveway and houses at up to a 2H:1V grade for a vertical distance of up to about 10-feet.

Along the Parkway side of the trail, we observed a two-tiered rockery wall (3½-foot high tiers) centered at about Station 300+00. A 9-foot diameter boulder was observed along the edge of the trail at about Station 303+00. We observed an approximate 50-foot long, up to 3½-foot high modular block wall along the edge of the trail centered at about Station 305+50, just north of Driveway #3.

Stations 313+00 to 321+00 – The Parkway side of the trail is generally level to gently sloping. We observed an open ditch with standing water at the edge of the trail along a portion of this segment. Along the Lake side of the trail, the ground surface gently slopes down to some houses and the lakeshore at up to a 2H:1V slope (steepest adjacent to the trail).

Stations 321+00 to 326+00 – We observed the trail to be bordered by 2H:1V to 1H:1V embankments, up to 10-feet high sloping up from trail level to houses and a private driveway on the Parkway and Lake sides of the trail, respectively. Both embankments had an open ditch with standing water at the toe.

Stations 326+00 to 333+75 – We observed the trail to be elevated with the ground surface sloping down at about a 2H:1V from trail level on both sides of the trail for most of this section. The trail surface is up to about 8 feet higher than the ground surface along the parkway side of the trail. The ground surface slopes down (abruptly from the trail edge in some places) by up to about 15 feet down to the lakeshore. Portions of this slope are buttressed with rip rap boulders along the lakeshore.

Stations 333+75 to 335+50 – We observed a high, steep embankment up to about 50 feet high and approaching 1H:1V extending up to houses along the Parkway side of the trail. We observed an approximate 50-foot long concrete crib wall along a portion of this slope. The slope along the Lake side of the trail are similar to the previous station interval.

Stations 335+50 to 339+00 – This segment is relatively wide, open and level to gently sloping along the sides of the trail.

Stations 339+00 to 344+00 – The Parkway side of the trail is relatively level. The ground surface slopes down at about a 2H:1V grade by about 10 feet to near lake level along the lake side of the trail. We observed evidence for erosion along the Lake side edge of the trail at top of the embankment between about Stations 341+50 and 343+00. We observed the chain-link fence to be tilted downslope along this interval.

Stations 344+00 to 355+25 – Along the Parkway side of the trail, we observed the ground surface to slope up at up to a 1H:1V grade for up to about 15 vertical feet up to lawn areas and houses. We observed an approximately 3½-foot high concrete retaining wall (2 tiers) along the trail edge at about Station 347+75. We observed the ground surface to slope gently down to near lake level along the Lake side of the trail (steepening along edge of the trail). We observed various landscape elements along this slope. We observed very slow seepage at the base of a set of concrete stairs at the edge of the Parkway side of the

trail at about Station 344+00. On February 13, 2014, we observed more significant seepage along the slopes above the trail between Stations 343+00 and 351+00.

Stations 355+25 to 379+00 – This segment is generally bordered by relatively level areas and gentle slopes. The ground surface slopes down from trail level along the Lake side of the trail and a water-filled ditch was observed along the Parkway side of the trail along the majority of this segment. An approximately 10-foot high, 2H:1V slope was observed on the Parkway side of the trail between about Stations 361+00 and 362+00.

Stations 379+00 to 446+00 – This majority of this segment is relatively open and level to gently sloping and is bordered by a ditch and wetlands with standing water on the parkway side of the trail. The trail is raised along portions of this interval.

Stations 446+00 to 464+00 – We observed the trail to narrow between Stations 446+00 and 458+00. In some areas along the Lake side of the trail, the ground surface slopes down (sometimes abruptly from the trail edge) down to some houses at an average 2H:1V slope for up to about 10 vertical feet. Along the Parkway side of the trail, we observed the ground surface to be level with short embankments in some areas and parking lot and driveway areas. Between about Stations 456+50 to 457+50 (along the Parkway side of the trail), we observed a parking lot/driveway area with a covered garage building elevated above trail level by about 6 feet; the area is supported on stacked concrete slab fragments near the edge of the existing trail.

Stations 464+00 to 468+50 – We observed the trail to be raised by up to about 6 feet above surrounding grades with gentle slopes extending down along both sides of the trail between about Stations 464+00 and 466+00. Between about Stations 466+50 and 468+00, we observed a 30-foot high, 1.5H:1V embankment adjacent to the trail that slopes up to the Parkway. The slope appears to stable in the current condition.

6.2 SUBSURFACE CONDITIONS

6.2.1 General

Subsurface conditions were evaluated based on published and unpublished geologic information for the area, including an on-line database of test borings maintained by the Washington State Department of Natural Resources (https://fortress.wa.gov/dnr/geology/?Site=subsurf). ICE also completed 72 test borings (Borings B-13 to B-71, B-73, B-76 to B-81, and B-93 to B-98) along the ELST SSS-B ranging from about 6½- to 26½-feet deep. The locations of the test borings are shown on Figures 2 through 39. Piezometers were installed in five of the test borings (Borings B-93, B-94, B-95, B-97 and B-98). We completed two Single-Ring Infiltrometer Tests (SRIT-4 and SRIT-5) at about Stations 288+25 (Boring B-93) and 420+23 (Boring B-97), respectively. Our field exploration program is described in Appendix A, along with our test boring logs. Details of the laboratory testing program, along with the test results, are presented in Appendix B.

In general, our test borings encountered native soil conditions consistent with the regional geologic mapping by the USGS (1992) including Older Alluvium, Recessional Outwash, Ice-Contact Deposits and Pre-Fraser Sediments. Fill was encountered in all of the test borings (with the exception of Boring B-42). It is important to note that Fill thicknesses can vary significantly as most of the trail is constructed into a hillside resulting in a wedge of Fill that is thicker on the downhill side of the ELST SSS-B. In other areas, Fill has been placed to maintain rail line grade and to fill in stream ravines. Much of the earthwork for this project will occur within the zone of Fill.

6.2.2 Soil Conditions

The following is a summary of the soil conditions encountered in our test borings.

Topsoil – Topsoil was encountered in Borings B-42 and B-49. Topsoil in the test borings consisted of loose silty sand or soft sandy silt with sod and abundant roots about 6-inches thick mantling the ground surface. We expect the thickness of Topsoil to vary in the adjacent areas along the existing rail line alignment.

Fill – Surficial Fill was encountered in all of the test borings with the exception of Boring B-42. Fill is typically in a loose to medium dense or soft to medium stiff condition. The Fill encountered in the test borings typically consisted of about 2 to 4 feet of fine gravel with sand and a trace of silt (crushed rock or railroad ballast – referred to in this report as Railroad Embankment Fill), although in some areas the Fill appeared to consist of reworked native soils and is up to 16-feet thick. In many areas, the Fill forms a "wedge" shape where the railroad grade is "cut" into an existing hillside. For that reason, Fill may be absent on the uphill side of the ELST SSS-B and be several feet thick on the downhill side.

Older Alluvium – Older Alluvium typically consists of very loose to medium dense sand or gravel with variable amounts of silt and organic material; very soft to stiff silt with variable amounts of sand and gravel and is often laminated (horizontally layered). Peat and/or organic silt was encountered underlying the Fill in four areas including vicinity of Boring B-41, Borings B-57, B-58, B-79 and B-80, Boring B-65 and Boring B-81.

Ice-Contact Deposits – Ice-Contact Deposits typically consists of medium dense silty sand with variable amounts of gravel. The density shown on the boring logs is not likely representative (overstated) because of the presence of gravel.

Recessional Outwash – Recessional Outwash typically consists of loose to medium dense (more typically medium dense) sand or gravel with variable amounts of silt. Less frequent discontinuous layers of soft to stiff silt can be present. As with the Ice-Contact Deposits, the density is not likely representative because of the presence of gravel.

Pre-Fraser Sediments – Pre-Fraser Sediments typically consist of very stiff to hard silt, clayey silt and clay with variable amounts of sand and occasional gravel.

6.2.3 Groundwater Conditions

Groundwater, if encountered, was measured at the time of drilling as shown on the boring logs in Appendix A, although this measurement can be much different from the actual groundwater level. Groundwater was subsequently measured in the piezometers that were installed in five of the test borings; selected measured depths to groundwater (seasonal highs and lows) are shown in the table presented below. Appendix A includes a detailed list of all groundwater measurements.

Boring (Piezometer) No. and Station	Piezometer Depth (feet)	Date of Measurement	Depth to Groundwater (feet)
B-93 (Station 285+25)	15.0	02/13/14	14.4
		11/13/13	Dry
B-94 (Station 293+42)	15.0	02/13/14	9.85
		11/13/13	11.8
B-95 (Station 322+18)	14.9	02/13/14	3.45
		11/13/13	3.45
B-97 (Station 420+23)	15.0	02/13/14	3.12
		11/13/13	3.75
B-98 (Station 434+25)	15.0	02/13/14	10.98
		11/13/13	11.2

Groundwater is expected to fluctuate seasonally as shown on the data obtained from our groundwater monitoring program (manual readings and continuous groundwater data obtained from the electronic dataloggers). Our test borings were completed during a time period when the groundwater level is expected to be rising (November to February) and likely do not peak until late March or early April. Shallow groundwater can occur as shallow (less than 10-feet deep) perched system during the late winter and early spring months and not indicated based on the test borings.

We observed several areas identified by others as known wetlands, adjacent to the ELST SSS-B at the following Station intervals:

Wetland Identifier	Station Location
15BC	315+40 to 316+15
15A	316+95 to 318+05
15D	320+60 to 325+75
15E	320+80 to 324+85
19A	347+60 to 349+25 (approximate)
19B	Vicinity of 348+00
20A	Vicinity of 353+50
21AC	Vicinity of 357+00
21B	Vicinity of 356+25
21D	Vicinity of 358+00
22AB	Vicinity of 364+00 to 366+00
22E	Vicinity of 366+00
22CD	Vicinity of 369+00
23A	373+45 to 374+30
23B	373+95 to 374+75
23C	377+20 to 378+45
24A	379+30 to 385+15
24B	379+75 to 384+95
24C	385+55 to 389+75
25A	395+95 to 402+75
25B	403+85 to 407+60
25C	408+45 to 410+90
25F	411+15 to 411+90
26A	421+10 to 431+50

26C	423+25 to 424+35
26D	431+90 to 432+80
28B	436+95 to 437+25
28E	445+55 to 446+60
28A	449+30 to 450+60
28D	453+00 to 453+30
29C	453+00 to 453+90
28C	455+50 to 456+80
29B	457+90 to 458+40
29D	457+90 to 700+25
30B	461+15 to 463+50

Based on our field observations, it is likely these wetlands were created because of the original construction of the ELST SSS-B rail line which impeded groundwater drainage from the hillside and formed a natural low area (linear depressions paralleling the ELST SSS-B) for wetlands to form.

7.0 ENVIRONMENTALLY CRITICAL AREAS

7.1 GENERAL

Based on our review of City of Sammamish Code (SMC) 21A.15 and our knowledge of surface and subsurface conditions along the ELST SSS-B, Environmentally Critical Areas (ESAs) including Landslide Hazard Areas and Seismic Hazard Areas occur within the trail corridor. Other ESAs may exist such as Wetlands, Erosion Hazard Areas, Critical Aquifer Recharge Areas (CARAs) and Shorelines of the State (Lake Sammamish), but are not subject to this report.

7.2 LANDSLIDE HAZARD AREAS

The City of Sammamish regulates modification of slopes defined as Landslide Hazard Areas. According to SMC 21A.15.680, Landslide Hazard Areas are defined (as applied to the ELST SSS-B) as *areas with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top, as defined in SMC 21A.15.1230, and measured by averaging the inclination over at least 10 feet of vertical relief*.

We observed several areas along the ELST SSS-B consistent with this general description as shown on Figures 2 through 39.

SMC provides for certain exemptions including SMC 21A.50.260 6. which states that *slopes that are 40 percent or steeper with a vertical elevation change of up to 20 feet if no adverse impact will result from the exemption based on the City's review of and concurrence with a soils report prepared by a licensed geologist or geotechnical engineer; and (b) The approved regrading of any slope that was created through previous legal grading activities.*

7.3 SEISMIC HAZARD AREAS

7.3.1 General

The City of Sammamish regulates development of areas identified as Seismic Hazard Areas. According to SMC 21A.15.1045, Seismic Hazard Areas are defined as *areas mapped as moderate to high and high liquefaction susceptibility and peat deposits on the Liquefaction Susceptibility Map of King County, Washington, Washington Division of Geology and Earth Sciences, OFR 2004-20, Palmer et al., September, 2004* (Washington State Department of Natural Resources – DNR, 2004).

Based on our review of regional liquefaction mapping by the DNR (2004) and our knowledge of the subsurface soil and groundwater conditions, we have identified the following areas along the ELST SSS-B alignment that are consistent with the SMC 21A.15.1045 definition of Seismic Hazard Areas:

Station	Length (feet)
315+50 to 321+00	550
323+50 to 333+25	975
340+25 to 345+25	500
355+50 to 372+00	1,650
377+75 to 434+00	5,625
438+25 to 442+75	450
446+50 to 457+00	1,050

7.3.2 Seismic Design Criteria

Based on our review of available geologic information and the subsurface soil conditions encountered in the test borings recently completed by ICE, we interpret the native soil conditions along the ESLT SSS-B to range from Seismic Site Class D to F, as defined by the 2015 International Building Code (IBC). This classification pertains to a very dense soil or rock profile with an average Standard Penetration Test (SPT) of greater than 50. If needed, ICE can provide recommendations of Seismic Site Class on a case-by-case (site specific) basis.

For an Extreme Event/Limit State, structures should be designed for a horizontal seismic acceleration coefficient of 0.22g. The kh value (horizontal component of peak ground acceleration experienced during an earthquake) is half of the seismic horizontal acceleration coefficient assuming zero wall displacement occurs and corresponds to walls which are capable of displacements of 1 to 2 inches or more during the design seismic event.

8.0 STORMWATER DISPOSAL

8.1 GENERAL

An Infiltration Chamber is planned at about Stations 287+90 to 288+70.

Five Infiltration Trenches (IT) are planned at the following locations for the purpose indicated:

IT No.	Station	Length (feet)	Purpose[1, 2]
1	355+00 to 359+78	478	BMP
2	371+72 to 378+76	704	BMP
3	395+91 to 399+02	311	Facility
4	441+53 to 444+15	262	BMP
5	461+37 to 464+22	285	BMP

(1) A BMP (Best Management Practice) will be installed according to Sammamish requirements.

(2) IT No. 3 (Facility) will require additional site specific testing for infiltration rate and design according to the 2009 King County Surface Water Design Manual.

8.2 INFILTRATION CHAMBER

Based on our review of the design plans, (Parametrix, September 2016, sheet DD2, detail 4) the Infiltration Chamber will be a 77-inch wide and 45-inch high, approximately 75-foot long pipe arch encapsulated in free-draining gravel. The ground surface at this location is at about Elevation 48 feet and the base is at about Elevation 38.5 feet. Excavation for the Infiltration Chamber will be at least 11-feet deep. Additional

field testing will be completed for the Infiltration Chamber including grain size analysis for the purpose of evaluating the field and design infiltration rate and the installation of piezometer and data logger for continuous groundwater monitoring.

8.3 INFILTRATION TRENCH

Based on our review of the design plans (Parametrix, September 2016, sheet DD1, detail 4), the Infiltration Trenches will consist of a 2-foot wide by 2-foot deep trench backfilled with free-draining gravel. Additional field testing will be completed for the Infiltration Trench Facility IT No. 3) including the installation of piezometers and data loggers for continuous groundwater monitoring at IT Nos. 1, 2, 3, and 5.

8.4 SINGLE-RING INFILTROMETER TEST (SRIT)

A Single-Ring Infiltrometer Test (SRIT) was completed adjacent to the Infiltration Chamber at about Station 288+25. The following is a summary of our field infiltration analysis using Method 1 (Single-Ring Infiltrometer Test – King County SWDM, 2009).

Test Location	Test Depth (feet)	Soil Type	Soil Infiltration Rate (iph)*
IT-4 / B-93	2	Sand with Gravel	55

* field (short-term) field infiltration rate, iph = inches per hour

A design (long-term) infiltration rate was evaluated by using the formulas presented in the King County 2009 SWDM (Appendix III-A) as follows:

$$I_{infiltration} = I_{measured} \times F_{testing} \times F_{geometry} \times F_{plugging}$$

where: $I_{measured}$ = field infiltration rate in iph
$F_{testing}$ = 0.5
$F_{geometry}$ = 1.0
$F_{plugging}$ = 0.9

Using the above equation and parameters, the calculated **long-term (design) infiltration rate is about 25 iph**. **However, King County SWDM (page 5-58) indicates that the design infiltration rate "must not exceed 20 inches/hour."**

8.5 GROUNDWATER MOUNDING ANALYSIS

The MODRET (Computer MODel to Design RETention Ponds) computer program will be used to simulate stormwater infiltration and groundwater mounding. The MODRET program uses the Greene and Ampt equation to simulate unsaturated flow conditions. The data input includes as-built design information, subsurface soil and groundwater conditions, and estimates of horizontal and vertical hydraulic conductivities. We expect that this analysis will be completed as the design progresses.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 GENERAL

Based on our field reconnaissance, explorations, testing and analyses, we conclude that proposed improvements for ELST SSS-B widening related to the geotechnical conditions along the alignment are feasible. The improvements most sensitive to the geotechnical conditions are related to limited space, especially from:

- **Stations 300+00, 303+00 and 305+50** – A rockery, modular block wall and boulder were observed at the existing trail edge and may impact construction activities.
- **Stations 326+00 to 333+75** – Based on the abrupt break in slope along the Lake side edge of the trail, we recommend that this interval be evaluated for the possible addition of SEWs.

- **Stations 341+50 and 343+00** – We observed evidence for erosion along the edge of the trail. No SEW is planned along a portion of this interval. We recommend extending the SEW down-station to at least Station 341+50.
- **Stations 343+00 and 351+00** – Based on site observations on October 17, 2016 and February 13, 2014, there is potential for near-surface groundwater conditions during SEW construction along this interval. An embankment directly off the lake side trail edge extending to some houses. No SEW is currently planned along this interval. We observed a concrete retaining wall along the existing trail edge at about Station 347+75 that may impact construction activities.
- **Stations 446+50 and 448+50** – The trail is narrow along this interval. We observed an abrupt break in slope along the Lake side trail edge with a steep slope extending down to some houses. We recommend that this interval be evaluated for the possible addition of SEWs.
- **Stations 456+50 to 457+50** – A parking lot area, about 6 feet higher than trail level, supported on stacked concrete slab fragments was observed along the Parkway side trail edge. A SEW is currently planned at this location, requiring potential modification of the parking lot for installation of the reinforced fill zone behind the SEW.

Some overexcavation of the Topsoil and Fill likely will be required in order to support SEWs, GBWs and culverts/wingwalls on a reasonably firm and uniform soil type. The actual amount of overexcavation should be a field decision depending on the surficial soils encountered. We suggest maintaining site grades as high as practical to preserve the existing Fill that occurs along the full length of the ELST SSS-B.

Because most of the near surface soils are "granular" (sand and gravel), it is likely that most of the settlements from new Fill will occur rapidly (within a few weeks) once the Fill is placed. Holding off as long as possible to place the pavement surfacing would help the performance of the pavement section where there is overlapping new Fill and the existing Railroad Embankment Fill.

Stormwater dispersion and infiltration is encouraged and feasible in most areas where groundwater is more than 5 feet below the ground surface during the seasonal high. Infiltration Trenches near wetlands need to be designed such at drainage of the wetlands does not occur. Infiltration Trenches and dispersion can be a benefit for wetland recharge.

9.2 ENVIRONMENTALLY SENSITIVE AREAS (ESAs)

9.2.1 Landslide Hazard Areas

As previously described, Landslide Hazard Areas as regulated by the City of Sammamish exist in local areas along the ELST SSS-B as shown on Figures 2 through 39. These mapped Landslide Hazard Areas shown on Figure 2 through 39 are defined by SMC 21A.15.680 as *areas with a slope of 40 percent or steeper and with a vertical relief of 10 or more feet except areas composed of consolidated rock. A slope is delineated by establishing its toe and top, as defined in SMC 21A.15.1230, and measured by averaging the inclination over at least 10 feet of vertical relief*.

SMC 21A allows for exemptions of regulated slopes provided certain conditions are met. SMC 21A.50.260 6. states *slopes that are 40 percent or steeper with a vertical elevation change of up to 20 feet if no adverse impact will result from the exemption based on the City's review of and concurrence with a soils report prepared by a licensed geologist or geotechnical engineer; and (b) The approved regrading of any slope that was created through previous legal grading activities.*

Based on our knowledge of the site conditions it is our opinion that most of the existing Landslide Hazard Areas shown on Figures 2 through 39 are less than 20-feet high and most were created as a result of

previous legal grading activities; all mapped Landslide Hazard Areas shown on Figures 2 through 39 satisfy one or both of these criteria for exemption.

In summary, we did not observe naturally-occurring (non-graded) Landslide Hazard Areas along the ELST SSS-B that are over 20-feet high. For this reason, it is our opinion that all of the Landslide Hazard Areas shown on Figures 2 through 39 should be exempt from regulation provided that any modification of these slopes (cuts, fills or clearing) should be evaluated on a case-by-case basis, especially with regard to the stability of East Lake Sammamish Parkway SE, and public safety along the ESLT SSS-B corridor.

9.2.2 Seismic Hazard Areas

As previously described in **Section 7.3** of this report, Seismic Hazard Areas occur along the ELST SSS-B corridor. We expect that all structures including SEWs, SPWs and GBWs will require seismic design considerations as mitigation of Seismic Hazards consistent with the AASHTO LRFD bridge design manual.

9.3 STRUCTURAL EARTH WALLS

9.3.1 General

SEWs are typically used in fill applications where sufficient space is available for fill placement within the Reinforced Fill Zone. The SEW system consists of a Reinforced Fill Zone, often reinforced with layers of geotextile fabric depending on the wall height, and a CBU facing which is usually connected (pinned) with the Reinforced Fill Zone geogrid reinforcement layers. The CBUs are typically supported on a Leveling Course Pad of crushed rock to provide uniform support and to allow for easier installation (leveling).

In cut sections, an SEW application is treated as a slope "facing" (such as a rockery) and is not regarded as a structural solution for cut slope retention. As a general guideline, a slope facing can typically be used (horizontal to vertical) for competent cut materials to heights of up to 8 feet for a level backslope and 6 feet for a 2H:1V backslope. The CBU supplier should be contacted regarding the height of cut that can be faced with CBUs.

9.3.2 SEW Design Parameters

SEW internal design (geogrid type, length and spacing, Reinforced Fill Zone soil material and compaction specification, drainage) should be completed by the SEW material supplier. To assist in this design, we recommend the following soil parameters.

Parameter	Reinforced Fill Zone	Retained Soil	Foundation Soil
Unit Weight (pcf)	125	120	125
Phi (degrees)	32	32	34
Cohesion (psf)	0	0	200

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

We strongly recommend that the Reinforced Fill Zone consist of free-draining soil such as Gravel Borrow as described in the 2016 Washington State Department of Transportation (WSDOT) Standard Specification Section 9-03.14(1). The on-site soils contain a relatively high percentage of fines and may not be suitable for use in the Reinforced Fill Zone.

We recommend using an allowable soil bearing capacity of 2,500 psf.

The design heights of SEWs should include the aboveground wall heights as well as the full embedment depths of the walls down to the Leveling Course Pad. The minimum embedment depth is as follows:

Slope in Front of Wall	Minimum Embedment Depth (feet)
Horizontal	H/20 or 1 foot, whichever is greater
3H:1V	H/10 or 1 foot, whichever is greater
2H:1V	H/7 or 1 foot, whichever is greater

H:V = horizontal to vertical H = Wall Height

The minimum embedment depth assumes use of a 6-inch thick, free-draining crushed rock leveling pad. The wall embedment could be further reduced to 0.5 feet if the leveling pad thickness is increased to 1 foot, or if non-frost susceptible soils are observed at wall subgrade at the time of construction.

Depending on the SEW type and height, geogrid reinforcement of the backfill may not be required and should be discussed with the SEW material supplier. For any height of SEW, we recommend the use of free-draining soil for backfill to provide adequate drainage.

SEWs should be designed with minimum factors of safety of 1.5 for sliding and pullout of reinforcing elements and 2.0 for overturning. If proprietary wall systems are used, the wall manufacturer is responsible for evaluating these items. However, we recommend that proprietary wall system designs be reviewed by a qualified geotechnical engineer to evaluate if valid assumptions were used relative to material properties and other factors such as site specific topography and soil/groundwater conditions.

If SEWs are subject to the influence of traffic loading or nearby retaining walls within a horizontal distance equal to the height of the SEW, the walls should be designed for the additional horizontal pressure using appropriate design methods. A common practice is to assume a surcharge loading equivalent to 2 feet of additional fill to simulate traffic loads.

9.3.3 SEW Subgrade Preparation

9.3.3.1 General

SEW subgrade preparation typically consists of first excavating the Leveling Course Pad for the SEW, followed by additional excavation for the Reinforced Fill Zone. We recommend that the subgrade be evaluated by probing by a representative of our firm. Acceptable Leveling Course Pad and Reinforced Fill Zone subgrade is generally defined by probe penetration of less than 12 inches.

9.3.3.2 Leveling Course Pad Subgrade Special Conditions

Special Condition 1 - Where subgrade soils cannot be adequately compacted, or where soft, loose or disturbed soil is present, these areas should be excavated to expose competent material or to a maximum depth of 18 inches below subgrade, and replaced with Structural Fill (Structural Fill is described in Section 7.8.2). Alternatively, a geotextile soil reinforcement fabric such as Tencate Mirafi RS380i or RS580i, or equivalent, may be placed over the soft, loose or disturbed subgrade, rather than overexcavation.

Special Condition 2 - Where subgrade preparation exposes Topsoil or other organic soils (such as peat or organic silt), these organic soils should be removed and replaced with Structural Fill. We expect the thickness of Topsoil or other organic soils to be less than 18 inches. It should be a field decision by the geotechnical engineer to evaluate the appropriate method of subgrade improvement when the Topsoil or other organic soils exceed 18 inches in thickness.

Special Condition 3 – Where groundwater or wet subgrade is encountered at the base of the excavation, quarry spalls as defined by Section 9-13.6 of the 2016 WSDOT Standard Specifications may be used to provide a stable base on which to place Structural Fill. We recommend placing a nonwoven geotextile soil separation fabric such as TenCate Mirafi 180N, or equivalent, on the subgrade to reduce the loss of this rock material into the underlying soils.

9.3.3.3 Reinforced Fill Zone Subgrade Preparation

Special Conditions 2 and 3 as described above apply to the preparation of subgrade for the Reinforced Fill Zone.

9.4 SOLDIER PILE WALL

9.4.1 Soldier Pile Wall Design Parameters

We recommend that the Soldier Pile Wall be designed using the earth pressure diagram shown on Earth Pressure Diagram, Figure 40 in accordance with the AASHTO Load and Resistance Factor Design (LRFD) approach. The earth pressures presented in Figure 40 are for a full height cantilever soldier pile wall for the Service, Strength and Extreme Limit states. The recommended resistance factors and seismic earth pressure are also presented in Figure 40.

9.4.2 Soldier Pile Wall Lagging

We recommend timber lagging be sized using the procedures outlined in the Federal Highway Administration's Geotechnical Circular No. 4. The soils at the planned Soldier Pile Wall site are considered "competent soils."

The space behind the lagging should be filled with a permeable soil. Lagging should be installed as soon as practical where clean sand or gravel is present and caving conditions are likely. The earth pressure diagram presented in Figure 40 can be used to design lagging for the Soldier Pile Wall. However, we recommend applying a moment reduction factor of 0.5 to the bending moments when using the earth pressure diagram.

9.4.3 Soldier Pile Wall Drainage

The earth pressure diagram shown in Figure 40 assumes drained conditions immediately behind the wall. Therefore, an appropriate drainage system (underdrain) should be included in the design to prevent hydrostatic pressures from developing behind the Soldier Pile Wall. Water will tend to drain from gaps between the lagging. We recommend a vertical spacing of 3/8 inch to allow seepage to flow to the face of the lagging.

9.4.4 Soldier Pile Wall Constructability

Dense native soils, cobbles or boulders may be encountered while drilling the soldier pile shafts. The contractor should be prepared to utilize drilling methods which can penetrate through these materials where encountered.

Some of the surficial soils are in a loose condition and may contain perched ground water or deeper ground water zones within the Older Alluvium or Olympia Beds. This loose and/or wet material could tend to cave into the shaft excavation. The contractor should be prepared to complete the shaft excavation in such a way that caving is prevented (e.g., casing).

Temporary slopes may be necessary during installation of lagging. Temporary cut slopes of 1.5H:IV or flatter may be used provided that no significant ground water seepage is encountered. Flatter cut slopes are recommended when significant seepage is encountered or if caving is persistent. In any case, it is the

sole responsibility of the contractor to follow WISHA (Washington State Industrial Safety and Health Act) regulations for excavations and shoring.

9.5 GRAVITY BLOCK WALLS

9.5.1 Design Considerations

As previously mentioned, a seven GBWs up 2 to 3 PMUs high is being considered as a method to resupport the toe of the East Lake Sammamish Parkway NE embankment as shown on Figure 41. A GBW (ICE used the UltraBlock™ wall system as a design model) is considered a "gravity wall" that is comprised of several components including the following:

Prefabricated Modular Units (PMUs) – *Full Block* measuring 5-feet long 2.5-feet high and 2.5-feet wide, 4,320 pounds; *Cap Block* measuring 5-feet long, 1.25-feet high and 2-5 feet wide, 2,150 pounds.

Drainage Fill / Drainage Composite – Drainage Fill consists of free-draining aggregate that is placed behind the PMUs such as 2016 WSDOT Standard Specifications Section 9-03.9(2) (Permeable Ballast). If a Drainage Composite, such as Strata 350, Synteen 55, or equal, is used, we recommend combining the Drainage Fill and Drainage Composite. The Drainage Composite is not a substitute for the Drainage Fill, however, Drainage Fill alone is satisfactory.

Retained Soil – The native soil where cuts are made into existing slopes.

Leveling Pad / Wall Foundation – Compacted and free-draining crushed rock such as the 2016 WSDOT Standard Specifications Section 9-03.9(3) (Base Course) pad upon which the PMUs are placed.

Embedment – The minimum depth (0.5 foot) to which the base PMU is embedded into the ground.

Foundation Subgrade – Medium dense or better, existing fill or native soil, or structural fill that extends to the competent native soils.

Drain Pipe – 4-inch diameter, smooth-walled perforated PVC pipe placed at the base of the wall that discharges by gravity to a suitable location.

Drainage Swale – A small depression adjacent to the top of the wall to collect surface water runoff to the Drainage Fill.

Geotextile Filter – A non-woven geotextile fabric, such as Tencate Mirafi 180N or equal, which is placed between the Retained Soil and the Drainage Fill.

Backslope – The ground surface slope behind (uphill from) the wall.

Foreslope – The ground surface slope in front of the wall.

Tilt – The inclination of the face of the wall (1H:8V).

9.5.2 Slope Stability Analysis (Global Stability) (in-progress)

Our global stability analysis of the GBW system will be completed by using UltraBlock™ Retaining Wall Software Version 3.1.13029.1447, design method National Concrete Masonry Association (NCMA)-09, 3rd Addition, provided to ICE by Rick Ianello of UltraBlock, Inc. This software has the capability of completing a full analysis (sliding, bearing, overturning, overall stability and compound stability) of wall sections, considering the site topography and soil conditions. For the purpose of this analysis, ICE plans to select a variety of representative sections ranging from typical walls with flat foreslopes and backslopes to high walls with steep backslopes or foreslopes.

The following is a summary of the soil strength parameters that will be used in our analysis.

Soil Type	Moist Unit Weight (pcf)	Φ (degrees)	C (psf)
Retained Soil [1]	125	34	0
Foundation Subgrade	125	34	0

[1] Drainage Fill that is placed between the PMUs and the Retained Soil should consist of "Permeable Ballast" consistent with the 2016 WSDOT Standard Specifications Section 9-03.9(2).

Φ = angle of internal friction

C = cohesion

For the section geometry, we will use the following input parameters:

Design Height (maximum)	7.5 feet
Tilt	1H:8V
Embedment	0.5 foot
Leveling Pad Thickness	0.5 foot
Backslope Angle	1.5H:1V (33 degrees)
Foreslope Angle	Level (0 degrees)
Peak Ground Acceleration[1]	0.22g

[1] For seismic evaluation

The general minimum FOS (static) for gravity wall structures is 1.5 for sliding and overturning, and 2.0 for bearing. The FOS for seismic conditions is typically acceptable at 75 percent of the static FOS.

The output file for the GBW (UltraBlock™ wall) system will be included in Appendix X.

Based on our analysis, UltraBlock™ walls up to 6 feet in height (includes the 0.5 foot embedment) with up to a 1.5H:1V backslope may be used. A diagram showing the primary wall structure components for the UltraBlock™ wall will be included in Appendix X. A summary of the FOS results is presented below:

Wall Condition	FOS (static)	FOS (seismic)
Sliding	XX	XX
Bearing	XX	XX
Overturning	XX	XX
Compound Stability[1]	XX	XX)
Global Stability[2]	XX	XX)

[1] Compound stability relates to overall slope failure through the face of the wall.

[2] Global stability relates to a slope failure below the base of the wall.

9.6 BOX (FISH PASSAGE) CULVERTS

9.6.1 Foundation Support

We expect that the box culverts and wing walls will be founded on medium dense or better soil. Foundations designed for these soil conditions may be proportioned using an allowable bearing pressure of 2,500 psf. This allowable bearing pressure includes a factor of safety of 3.0. The anticipated settlement of the foundation designed for this allowable bearing capacity is less than 1 inch. This allowable bearing pressure may be increased by one-third for short-term transient loads such as seismic.

9.6.2 Lateral Earth Pressures

For buried structures that are free to displace laterally, active soil pressures may be used for design. An equivalent fluid pressure of 35 pcf may be used to calculate active lateral earth pressures on the culvert walls and wingwalls. The equivalent fluid pressure does not include line load surcharge.

If buried structures are fixed against lateral deflection, at-rest pressures will be appropriate for design. An equivalent, at-rest fluid pressure of 50 pcf may be used to calculate at-rest earth pressures on the culvert walls. This equivalent fluid pressure does not include live load surcharge.

As needed, an equivalent fluid pressure of 300 pcf may be used to resist the active lateral pressures.

9.7 SUBGRADE WALLS (CULVERT WINGWALLS)

9.7.1 Lateral Soil Pressures

For walls that are free to yield at the top at least one one-thousandth of the height of the wall, an active pressure obtained using equivalent fluid densities of 35, 45, and 55 pcf should be used for level backslopes, 4H:1V backslopes and 2H:1V backslopes, respectively. These values assume that the soil behind the wall is free draining. For "at rest" conditions where the wall is restrained against movement, a lateral pressure based on equivalent fluid densities of 50, 55, and 75 pcf should be used for level backslopes, 4H:1V backslopes and 2H:1V backslopes, respectively. These values assume that the soil behind the wall is free draining. Surcharge effects should be considered as appropriate.

Wall backfill should be compacted to between 90 and 92 percent of the MDD. Measures should be taken to prevent the buildup of excess lateral soil pressures due to the overcompaction of the backfill behind the wall. Care must be exercised by the contractor to avoid overcompaction.

A drainage zone consisting of clean, free-draining granular material containing less than five percent fines at least 18-inches wide should be placed against the back face of the wall for its full height. We expect that this drainage zone can be tied in to the interceptor trench that parallels the ditchline.

9.7.2 Lateral Resistance

Lateral loads can be resisted by passive resistance on the sides of culvert wingwalls and by friction on the base of concrete wingwall. Passive resistance may be evaluated using an equivalent fluid density of 250 pcf for a level foreslope assuming that the soil in the foreslope area (assumed to be the East Lake Sammamish Trail) is either medium dense undisturbed soil or Structural Fill. Frictional resistance can be evaluated using 0.4 for the coefficient of base friction against the base slab. The above values incorporate a factor of safety of about 1.5. These values may be increased by one-third when considering transient loads such as wind or seismic.

9.8 INFILTRATION CHAMBER

9.8.1 General

The soil conditions encountered in Boring B-93 suggests favorable conditions for the installation of the Infiltration Chamber. Boring B-93 encountered about 2 feet of loose Fill underlain by Recessional Outwash consisting of loose sand with silt and fine gravel or medium dense gravel with sand to a completion depth of about 16.5 feet (Elevation 31.5 feet). Groundwater was measured at a depth of about 14.4 feet (Elevation 33.6 feet) on February 13, 2014. The base of the Infiltration Chamber is proposed at about Elevation 38.5 feet.

Groundwater could be encountered in the excavation for the Infiltration Chamber, especially if this earthwork is completed in the early Spring (March/April). If groundwater is encountered, the walls of the

excavation may tend to cave, and also may require dewatering within the excavation to maintain a suitable reasonably dry condition for foundation subgrade preparation.

9.8.2 Excavation Cut Slopes

The Recessional Outwash soils classify as a Type C soil (WAC 296-155-66401 – Appendix A, Soil Classification) and will require protection of employees in accordance with WAC 296-155-657 – Requirements for Protection Systems. Type C soils in excavations that are less than 20-feet deep may be inclined (temporary slope) as steep as 1.5H:1V. Flatter slopes may be necessary to maintain safe working conditions if instability is observed. Some sloughing and raveling of the temporary cut slopes should be expected. Temporary covering, such as heavy plastic sheeting, should be used to protect these slopes during periods of wet weather. Surface water runoff from above cut slopes should be prevented from flowing over the slope face by using berms, drainage ditches, swales or other appropriate methods.

9.8.3 Construction Dewatering

See **Section 8.10.4.**

9.8.4 Temporary Shoring

See **Section 8.10.6.**

9.8.5 Design Considerations

Any loosened subgrade soil at the base of the excavation should be removed and replaced with Structural Fill. We recommend that a layer of "Base Course Crushed Surfacing" (as specified by the 2016 WSDOT Standard Specifications, Section 9-03.9(3)) at least 6-inches thick be placed and compacted beneath the Infiltration Chamber Vault to provide uniform support.

For subgrade prepared as described above, we estimate that settlement of the Infiltration Chamber will be less than 1 inch using an allowable bearing pressure of 5,000 psf. Settlements are expected to occur rapidly as loads are applied.

We understand that the Infiltration Chamber will be encapsulated within a zone of free drainage gravel. For this purpose, we recommend the free drainage gravel should consist of "Gravel Backfill for Drywells" as specified in the 2016 WSDOT Standard Specifications 9-03.12(5).

9.9 PAVEMENT SUBGRADE

We understand that the standard pavement section for the ELST SSS-B consists of 3 inches of Hot Mix Asphalt (HMA) pavement underlain by 4 inches of Crushed Surfacing Base Course (CSBC). If soft subgrade is encountered during subgrade preparation, the CSBC should be increased to 8 inches (which will require a 4-inch deep overexcavation) underlain by a geotextile reinforcement fabric such as Tencate Mirafi RS380i or RS580i, or equivalent.

Based on our experience with the Issaquah Segment and North Segment of the ELST project construction, the depth of overexcavation may be up to 12 inches or more depending on the subgrade conditions, along with use of 2-inch-minus crushed rock (railroad ballast) to replace the CSBC, especially if the subgrade area is used for heavy construction traffic during wet or cool weather. As previously mentioned, **maintaining the highest final subgrade level is recommended so that the existing suitable Fill is not removed to expose less suitable subgrade conditions**.

9.10 CONSTRUCTION CONSIDERATIONS

9.10.1 General

Where the ELST SSS-B widening crosses areas underlain by soft organic soils or loose/soft, wet Fill, we recommend that these soils be removed. This may require overexcavation of up to 2 feet of unsuitable soil.

We recommend that the ELST SSS-B subgrade be evaluated by proofrolling and/or probing by a representative of our firm. Where subgrade soils cannot be adequately compacted, or where soft or disturbed soil is present, these areas should be excavated to expose competent material or to a maximum depth of 2 feet below the final trail grade, and replaced with Structural Fill.

It is important to note that the underlying soil conditions (Recessional Outwash) from Stations 251+25 to 272+75 and Stations 278+50 to 283+03 are relatively clean (low silt content) soils; it is reasonable to schedule earthwork in this area during the winter and early spring months with less delays as compared to the rest of the ELST SSS-B. Earthwork in other areas should be scheduled during the normally drier months, unless project delays and extra costs associated with maintaining an adequate trail subgrade for use by heavy construction equipment are acceptable.

9.10.2 Structural Fill

9.10.2.1 General

All new Fill for the ELST SSS-B should be placed as Structural Fill. Structural Fill material should be free of debris, organic contaminants and rock fragments larger than 6 inches. The suitability of material for use as Structural Fill will depend on the gradation and moisture content of the soil. As the amount of fines (portion of 3/4-inch-minus soil particles passing the US Standard No. 200 sieve) increases, soil becomes increasingly sensitive to small changes in moisture content and adequate compaction becomes more difficult to achieve.

9.10.2.2 Unclassified Fill

We recommend that unclassified imported fill consist primarily of granular material with less than 30 percent passing the US Standard No. 200 sieve. Unclassified material will be sensitive to changes in moisture content and compaction will be difficult or impossible to achieve during wet weather. We recommend that unclassified material be used as Structural Fill only during dry weather conditions when proper moisture conditioning can be achieved.

9.10.2.3 Gravel Borrow

We recommend that Structural Fill consist of Gravel Borrow for the Reinforced Fill Zone for SEWs. Gravel Borrow should conform with Section 9-03.14(1) of the 2016 WSDOT Standard Specifications.

9.10.2.4 Reuse of On-Site Materials

The site soils (Fill, Older Alluvium, Recessional Outwash and Pre-Fraser Sediments may be reused for Structural Fill during periods of extended dry weather, though may be of limited use within the Reinforced Fill Zone (for SEWs) depending on the fines content (see **Section 8.3.2** for material specifications). Recessional Outwash is typically considered an “all-weather” Fill because of the low silt content and could be used for the SEWs Reinforced Fill Zone.

Soil containing more than 20 percent organic material (roots, forest duff and topsoil) should only be used in landscaping areas or for other purposes where specific compaction criteria is not required.

9.10.2.5 Base and Drainage Layer

We recommend that the base and drainage layer material for the pavement section consist of Gravel Borrow as described above with the further restriction that the Gravel Borrow contain no more than five percent fines (based on the fraction of ¾-inch-minus material passing the US Standard No. 200 sieve).

9.10.2.6 Placement and Compaction

All Structural Fill placed in trail and shoulder areas should be compacted to at least 95 percent of the MDD (ASTM Test Method D 1557). Waste fill in landscaping areas need only be compacted to the extent required for trafficability of construction equipment and erosion control.

As a guideline, we recommend that Structural Fill for the ELST SSS-B be placed in horizontal lifts which are 10 inches or less in loose thickness. The actual lift thickness will be a function of the fill quality and size of the compaction equipment used. Each lift should be compacted to the required specification before placing subsequent layers.

For placement during wet weather or on wet subgrades, Structural Fill should contain no more than five percent fines. Structural Fill placement over wet ground should commence with an initial lift of about 12 to 18 inches of clean sand and gravel with less than five percent fines, or quarry spalls (Section 9-13.3, 2016 WSDOT Standard Specification. During dry weather, the fines content may be up to about 30 percent, provided that the fill can be moisture-conditioned and compacted to the degree specified below.

We recommend that a representative from our firm observe the preparation for, placement, and compaction of Structural Fill. An adequate number of in-place density tests should be completed in the fill to evaluate if the desired degree of compaction is being achieved.

Nonstructural Fill placed in landscape and waste-fill areas where the existing surface slope is no steeper than 4H:1V needs to be compacted only to the degree required for trafficability of construction equipment and effective surface drainage/erosion control. All Nonstructural Fills should be sloped no steeper than 4H:1V. Nonstructural Fill is very susceptible to erosion. Therefore, we recommend that all Nonstructural Fill areas be immediately seeded, planted, or otherwise protected from erosion.

9.10.3 Fill Settlement

Most of the Structural Fill placed for the ELST SSS-B widening will be underlain by loose to dense or soft to stiff soils. Settlement of these underlying soils is expected to range from ½ to 1 inch and should occur rapidly as Structural Fill is placed. Some settlement will also occur within the Structural Fill itself, especially where the Structural Fill thickness is greater than 5 feet. We estimate that the maximum amount of settlement within the Structural Fill will be no more than 1 percent of the Structural Fill thickness. Thus, for a 5-foot Structural Fill section, settlements on the order of ½ to 1 inch might occur. Therefore, we recommend placing the final ELST SSS-B pavement at least three weeks after placement of Structural Fill where the fill thickness is greater than 5 feet.

9.10.4 Construction Dewatering

It is possible that excavation dewatering may be required in local areas along the ELST SSS-B alignment. The level and amount of groundwater will depend on when earthwork occurs. In the late Winter and early Spring, groundwater levels would be highest.

Because of the complex layering (discontinuous layers of variably permeable soils), pockets of groundwater seepage will likely be encountered; we expect that pumping from a sump within the trench

may be used for small to moderate amounts of groundwater seepage. Well points or pumped wells will be necessary if large amounts of groundwater seepage are encountered. We recommend that the contractor be required to submit a proposed dewatering system design and plan layout to the project engineer for review and comment prior to beginning construction.

9.10.5 Cut and Fill Slopes

9.10.5.1 Cut Slopes

Temporary cuts less than 4 feet in height may be made near-vertical in medium dense or better soil. Temporary cuts greater than 4 feet in height may be made at 1H:1V or flatter.

Permanent cut slopes should be inclined no steeper than 2H:1V. We recommend constructing a bench on all cut slopes for every 15 feet of vertical height of slope face.

Some of the upper portions of cut slopes will expose loose soil that may be several feet thick. The loose soil will be subject to localized raveling and sloughing and must therefore be sloped no steeper than 3H:1V or covered with quarry spalls or a suitable Turf Reinforcement Mat (TRM) consisting of straw, coir (coconut) and jute for the purpose of stabilization.

Where cut benches are required (cut slopes more than 10-feet high), the benches should be sloped downward into the hill to allow for collection of surface water runoff. We recommend that the benches be sloped no steeper than five percent.

Maintenance of safe working conditions, including temporary excavation stability, is the responsibility of the contractor. All excavations more than 4 feet in depth should be sloped in accordance with WAC 296-66401 and WAC 296-155-657 or be shored. Flatter slopes may be required where groundwater seepage occurs and dewatering may be required to lower the groundwater table below the base of the excavation. Alternatively, trench boxes may be used where the excavation is more than 4-feet deep.

9.10.5.2 Fill Slopes

Structural Fill slopes may be sloped at 2H:1V or flatter. All surfaces which will receive Structural Fill should be properly stripped of vegetation and organic matter prior to placing Structural Fill. Structural Fill placed on existing slopes which are steeper than 4H:1V should be properly keyed into the native slope surface. This can be accomplished by constructing the Structural Fill in a series of 4- to 8-foot-wide horizontal benches cut into the slope. The Structural Fill should be placed in horizontal lifts. We recommend that Structural Fill be placed on the cut benches as soon as possible following construction of the benches.

Steeper (1V to 1.5H:1V) Structural Fill slopes are possible provided that these slopes are covered with quarry spalls or a permanent erosion control mat or blanket such as Tensar® Hydramax™, EroNet™, BioNet® or VMax® products, as appropriate.

9.10.6 Shored Excavations

It may be necessary to support the temporary excavations to maintain the integrity of the surrounding undisturbed soils and to reduce disruption of adjacent areas, as well as to protect the personnel working within the excavation. Because of the diversity of available shoring systems and construction techniques, the design of temporary shoring is most appropriately left up to the contractor proposing to complete the installation. We recommend that the shoring be designed by a licensed Professional Engineer in Washington, and that the PE-stamped shoring plans and calculations be submitted to the Project Engineer for review and comment prior to construction.

The majority of the materials (Fill, Older Alluvium, Recessional Outwash, Ice-Contact Deposits and Pre-Fraser Sediments) within the project area can be retained using conventional trench shoring systems such as trench boxes or sheet piles, with lateral restraint, provided that the excavation is dewatered. The design of temporary shoring should allow for lateral pressures exerted by the adjacent soil, and surcharge loads due to traffic, construction equipment, and temporary stockpiles adjacent to the excavation, etc. Lateral load resistance can be mobilized through the use of braces, tiebacks, anchor blocks and passive pressures on members that extend below the bottom of the excavation. Temporary shoring utilized to support trench excavations typically uses internal bracing such as aluminum hydraulic shoring or trench shield bracing.

It should be understood that a "standard" trench box does not usually provide adequate support of the trench excavation slope, but instead only provides safety for workers in the trench. Because the trench box typically is placed after excavation, a significant amount of soil deformation will likely take place. Ground movements can be severe, especially in the presence of groundwater. The contractor should be held responsible for all damages related to ground movements. It should be noted that trench boxes can be modified and fitted with drivable, watertight walls which may be driven below the bottom of the trench excavation in a similar manner as a standard sheet pile wall. Trench boxes can also be placed with excavation of the soil from within the box, coupled with pushing down on the box, or allowing the box to sink under gravity as the soil is excavated from beneath. If trench boxes are proposed by the contractor, it would be advisable to require the contractor to attempt a test section using the proposed equipment and methods.

Temporary trench shoring can be designed using active soil pressures. We recommend that temporary shoring be designed using a lateral pressure equal to an equivalent fluid density of 40 pcf, for conditions with a level ground surface adjacent to the excavation. If the ground within 5 feet of the excavation rises at an inclination of 1H:1V or steeper, the shoring should be designed using an equivalent fluid density of 75 pcf. For adjacent slopes flatter than 1H:1V, soil pressures can be interpolated between this range of values. Other conditions should be evaluated on a case-by-case basis. Internally-braced shoring may be designed using a uniform lateral soil pressure equal to 40H (where H is the distance from the ground surface to the base of the excavation) in soft soils (Older Alluvium) or 35H for all other soil types.

These lateral soil pressures do not include traffic or construction surcharges that should be added separately, if appropriate. It is typical for shoring to be designed for a traffic influence equal to a uniform lateral pressure of 240 psf acting over a depth of 10 feet from the ground surface. More conservative pressure values should be used if the designer deems them appropriate. These soil pressure recommendations are predicated upon the construction being essentially dewatered; therefore, hydrostatic water pressures are not included.

9.11 STORMWATER INFILTRATION (in-progress)

9.11.1 General

At this time, additional field exploration and testing is needed to evaluate field and design infiltration rates for this project. Because of the width of the ELST SSS-B area (small) compared to its length, and past favorable performance of the existing trail, stormwater dispersion may be considered. Stormwater dispersion is effective where the ground surface is mantled with a thin layer of poorly-drained soil (such as compacted Fill, Topsoil or Older Alluvium) and sufficient distance is maintained from developed areas.

9.11.2 Stormwater Infiltration Rate

We recommend using a long-term (design) infiltration rate ranging from XX to XX iph.

Stormwater infiltration may be difficult or impossible in other areas of the ELST SSS-B because of the presence of shallow, nearly impermeable soils (Older Alluvium, Ice-Contact Deposits or Pre-Fraser Sediments) and/or shallow groundwater.

10.0 USE OF THIS REPORT

We have prepared this report for use by Parametrix in the design of a portion of the project. The data and report should be provided to prospective contractors for bidding or estimating purposes, but our report, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.

If there are significant changes in the grades, configurations or types of facilities to be constructed, the conclusions and recommendations presented in this report may not be fully applicable. When the design has been finalized, we recommend that we be retained to review those portions of the specifications and drawings which relate to geotechnical considerations to see that our recommendations have been interpreted and implemented as intended.

Variations in subsurface conditions are possible between the locations of the explorations. Variations may also occur with time. Some contingency for unanticipated conditions should be included in the project budget and schedule. Sufficient observation, testing and consultation should be provided by our firm during construction to evaluate whether the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions during the work differ from those anticipated, and to evaluate whether or not earthwork and foundation installation activities comply with the contract plans and specifications.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in this area at the time the report was prepared. No warranty or other conditions, express or implied, should be understood.

****

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

Yours very truly,
Icicle Creek Engineers, Inc.

Kathy S. Killman, LEG
Principal Engineering Geologist

Brian R. Beaman, PE, LEG, LHG
Principal Engineer/Hydrogeologist

Document ID: 0105010.ELSTSSSB.REP

FIGURES

VICINITY MAP - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

ICICLE CREEK ENGINEERS
29335 NE 20th Street
Carnation, Washington 98014
(425) 333-0093

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DESIGNED: ---	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	1
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

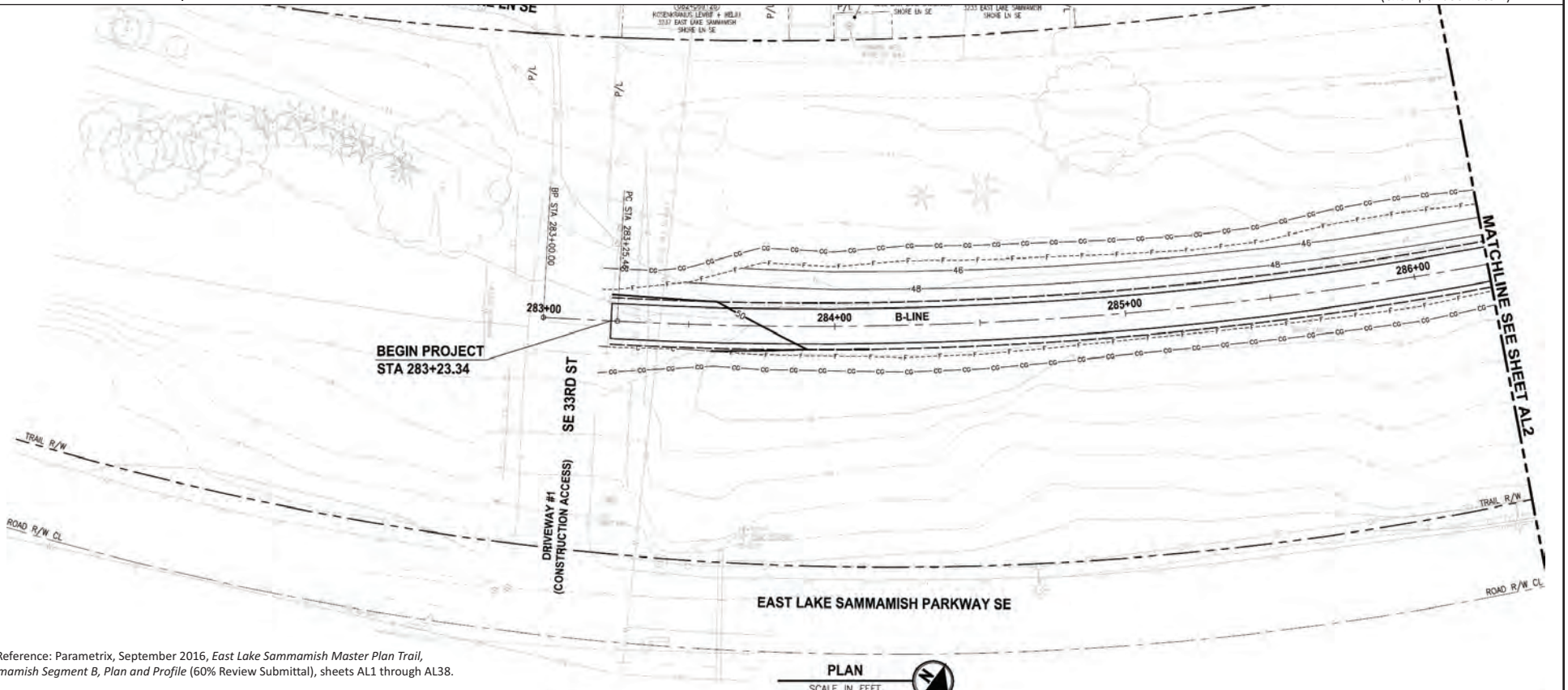
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

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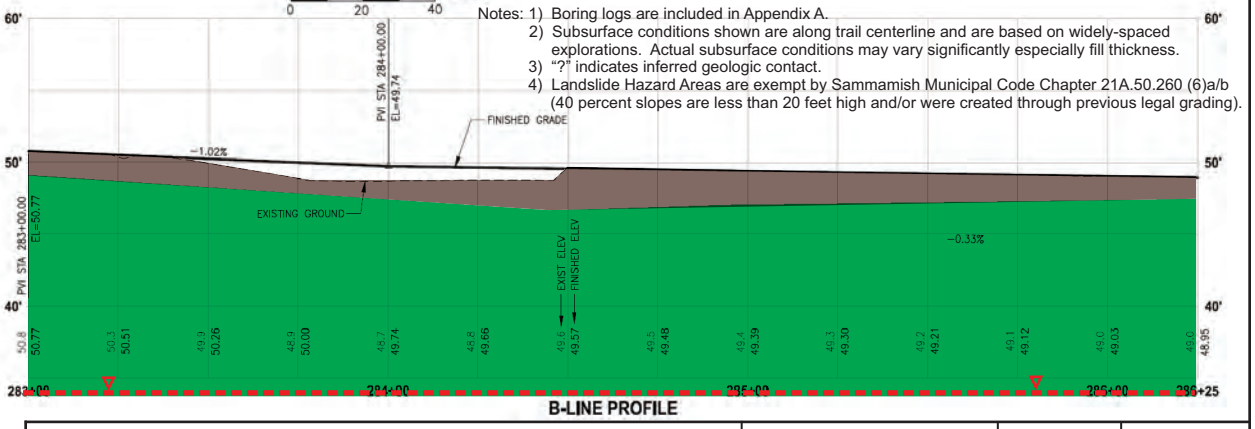

B-LINE PROFILE

Notes:
1) Boring logs are included in Appendix A.
2) Subsurface conditions shown are along trail centerline and are based on widely-spaced explorations. Actual subsurface conditions may vary significantly especially fill thickness.
3) "?" indicates inferred geologic contact.
4) Landslide Hazard Areas are exempt by Sammamish Municipal Code Chapter 21A.50.260 (6)a/b (40 percent slopes are less than 20 feet high and/or were created through previous legal grading).

EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

72 SPT blow count* (* blow count may not be representative because of the presence of gravel)

Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)

0 50 100
Horizontal Scale in Feet (approximate)

0 10 20
Vertical Scale in Feet (approximate)

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

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EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

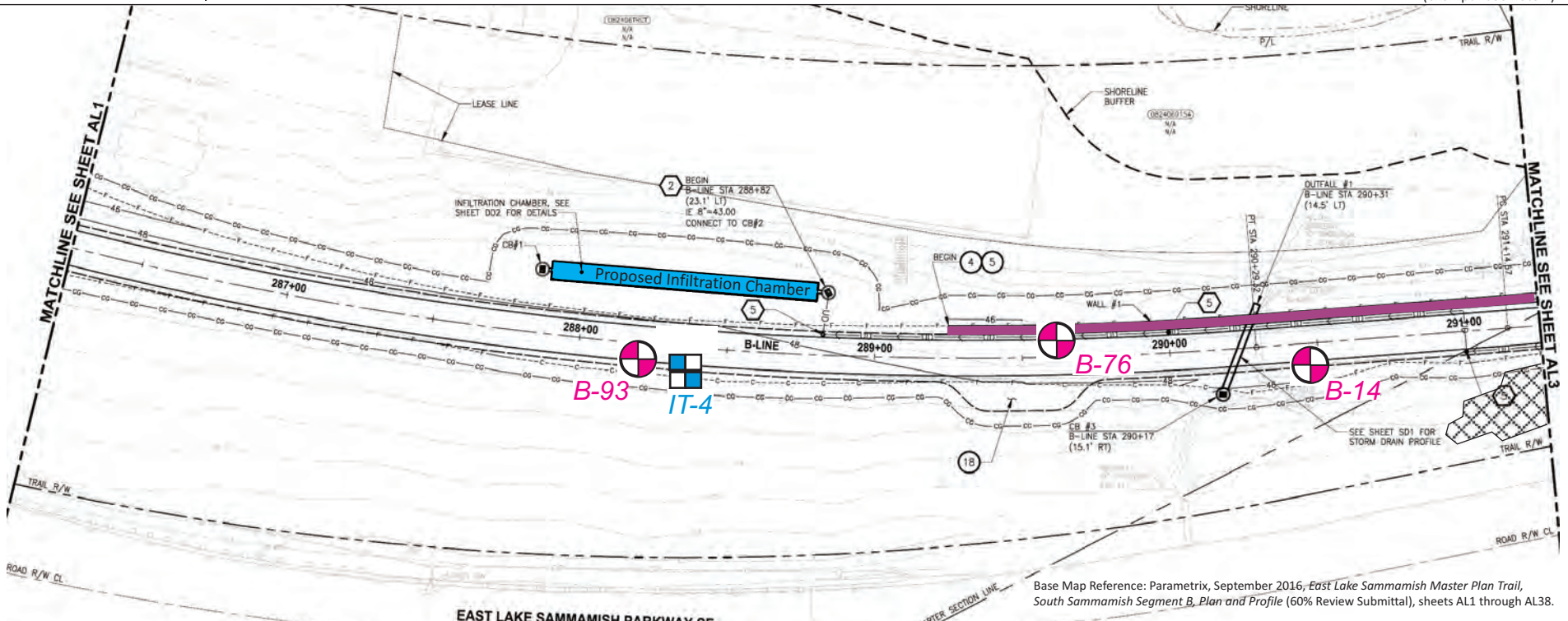
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



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PLAN

SCALE IN FEET

0 20 40

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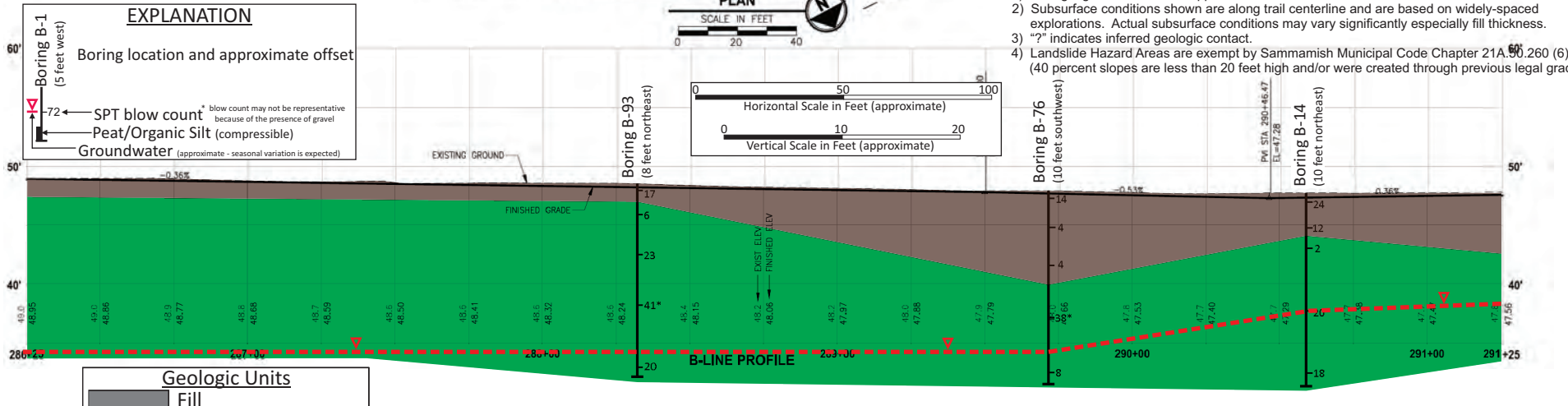

Geologic Units
- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

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Figure 3

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

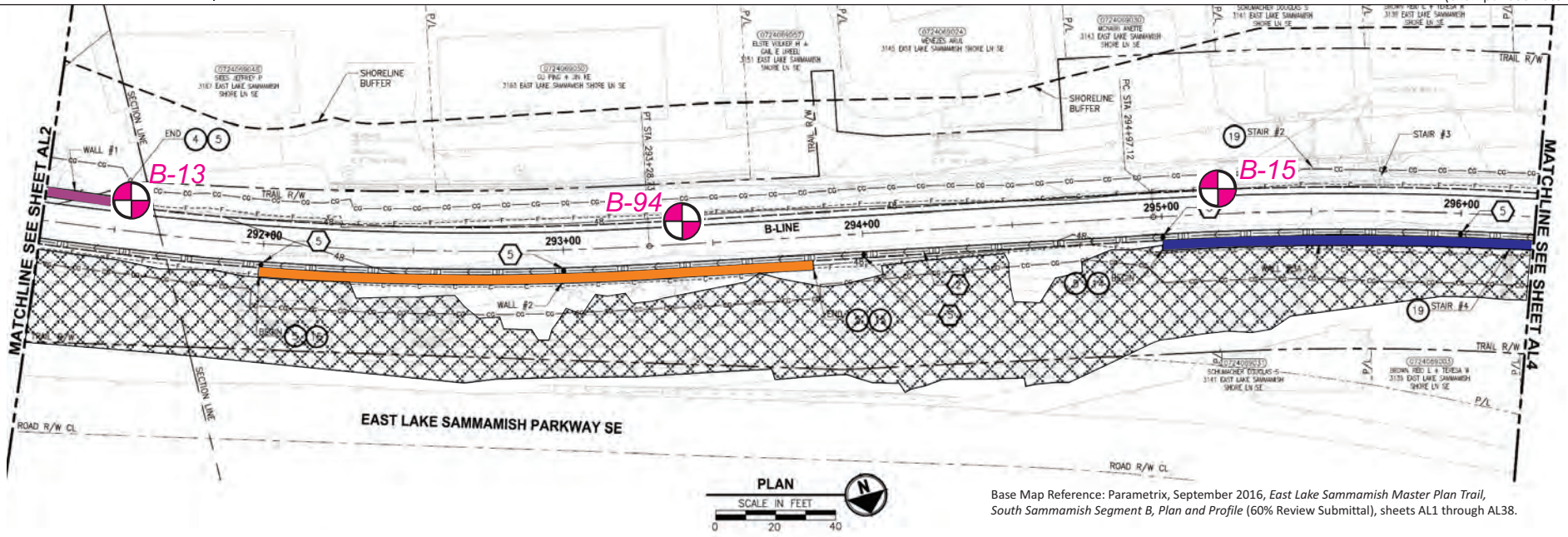
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



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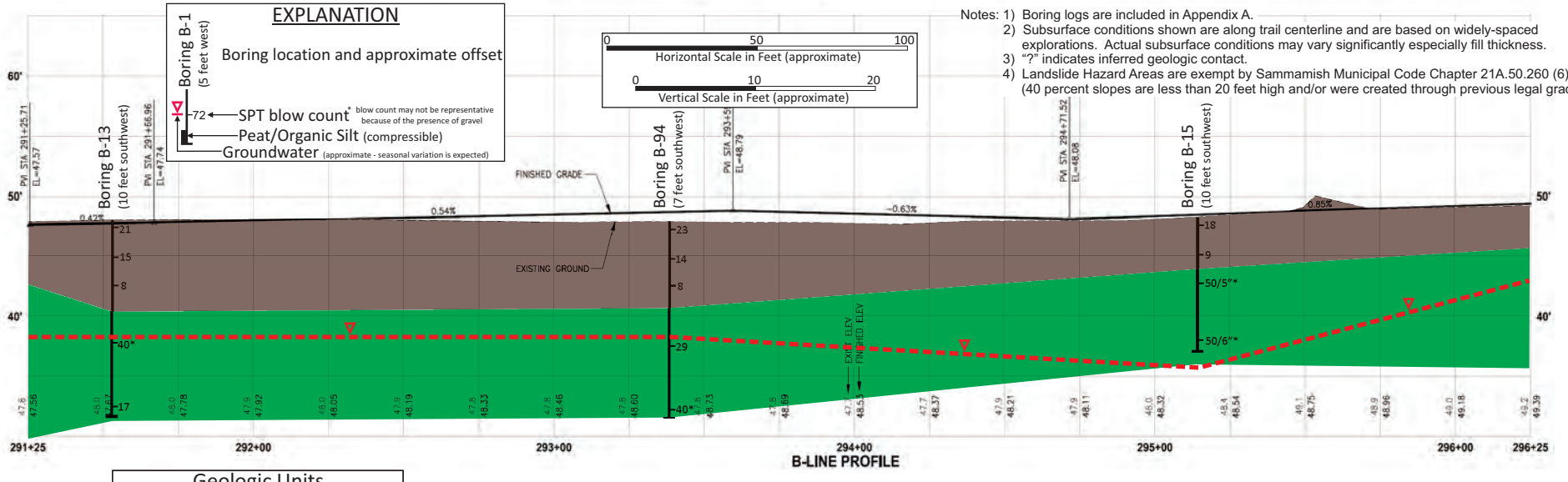

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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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DATE: 10/XX/16	4

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

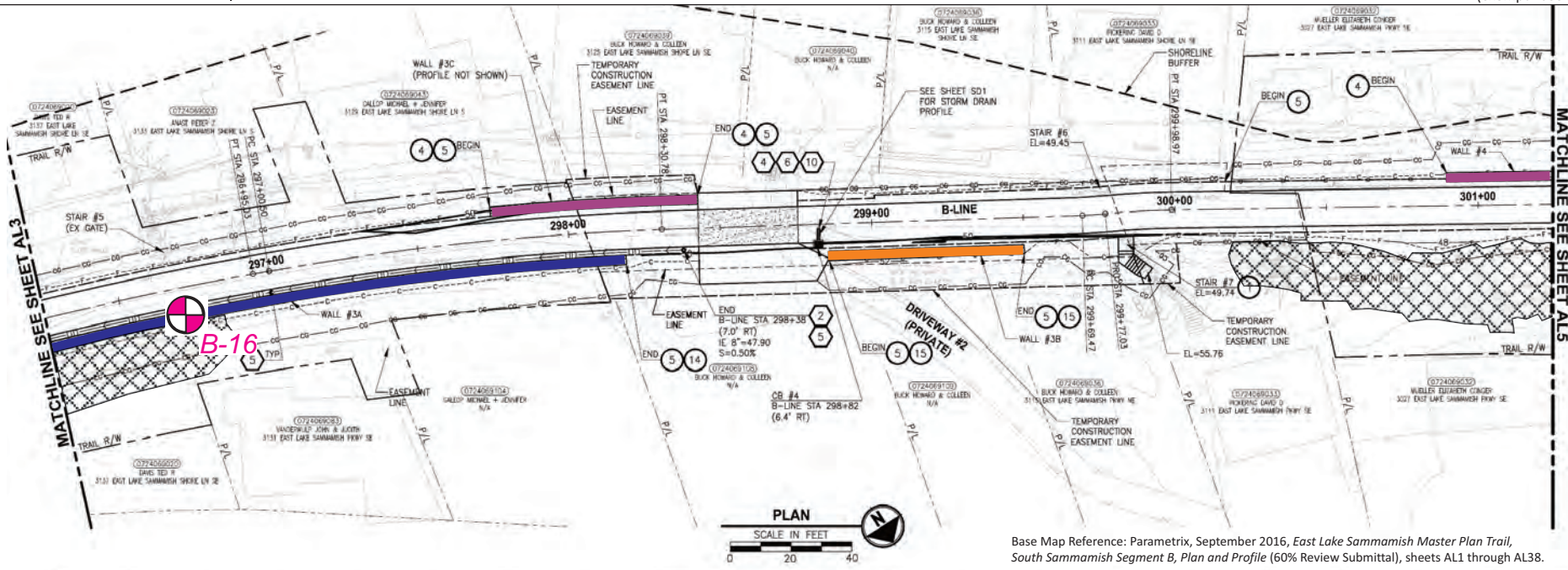
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



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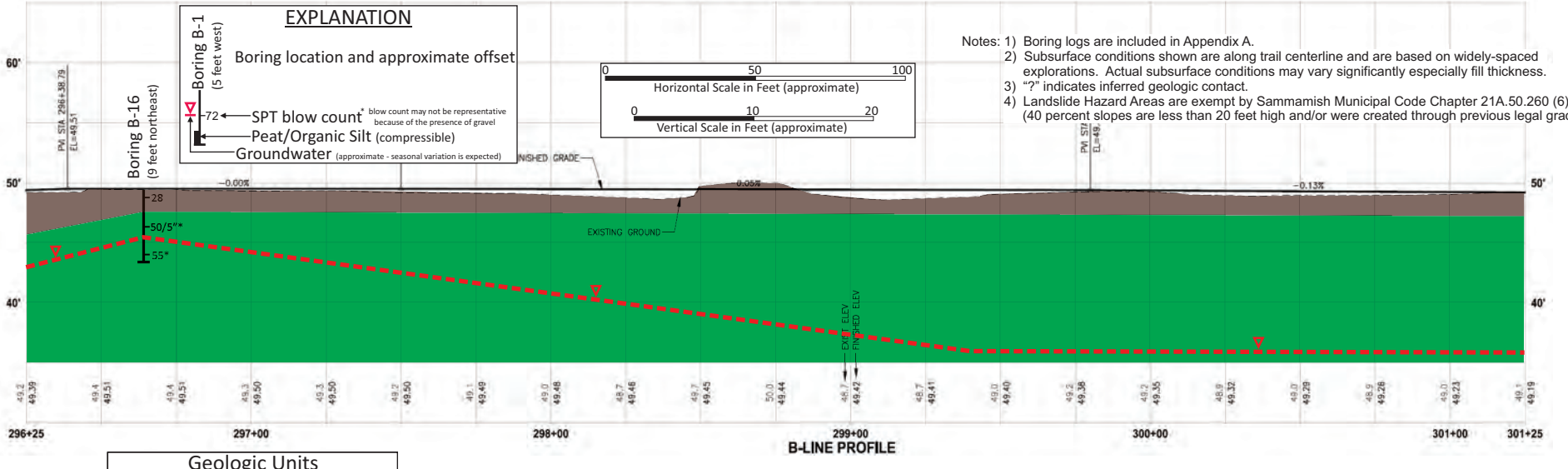

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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

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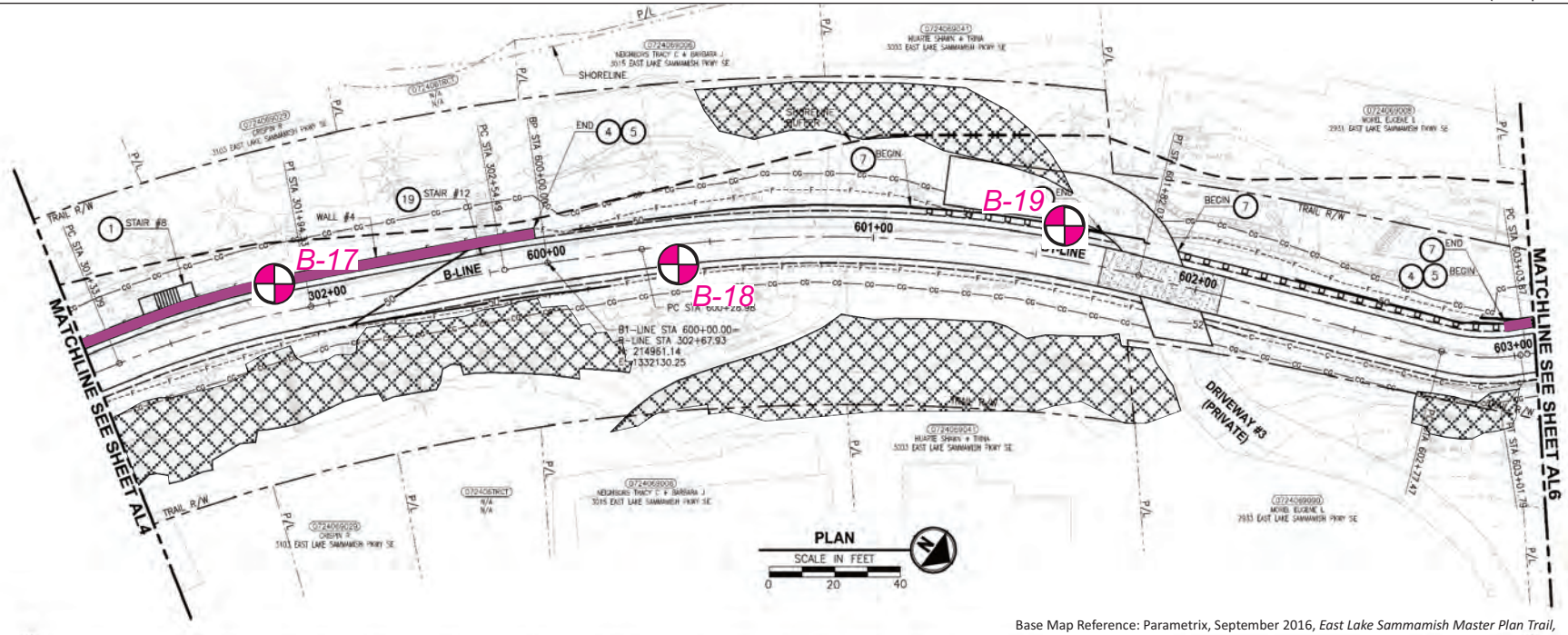
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location | IT-1 Infiltration Test Location | Structural Earth Wall | Gravity Block Wall | Soldier Pile Wall | Infiltration Trench | Landslide Hazard Area (exempt - see note 4)



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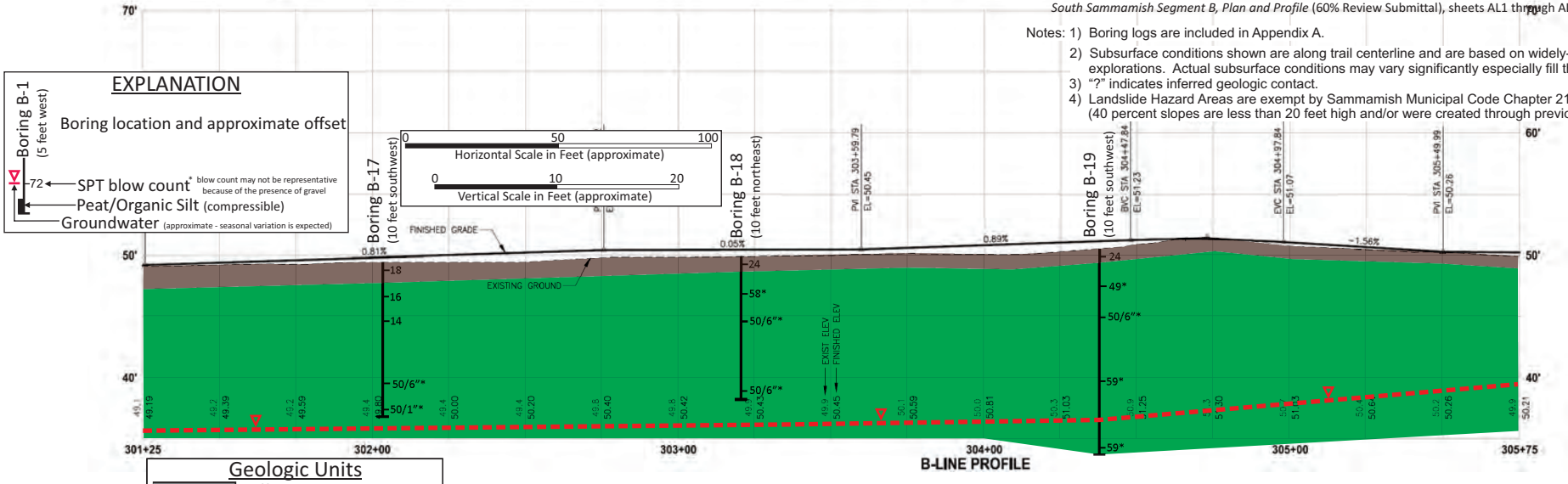

Geologic Units
- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

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EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

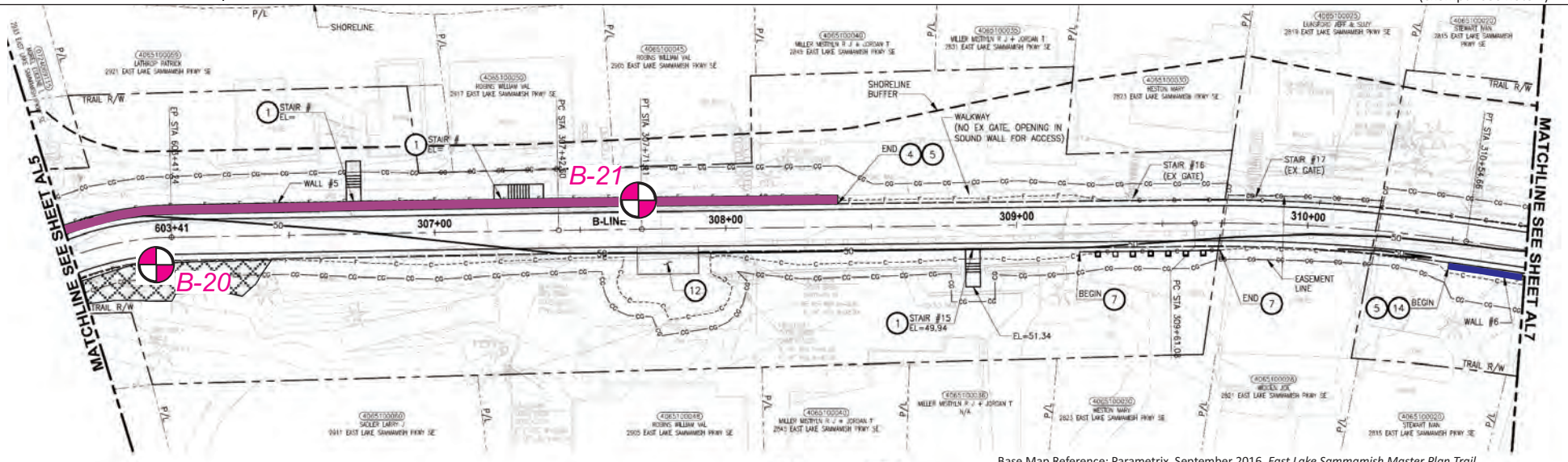
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



PLAN

SCALE IN FEET

0 20 40

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EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

72 SPT blow count* (* blow count may not be representative because of the presence of gravel)

Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)

Notes:
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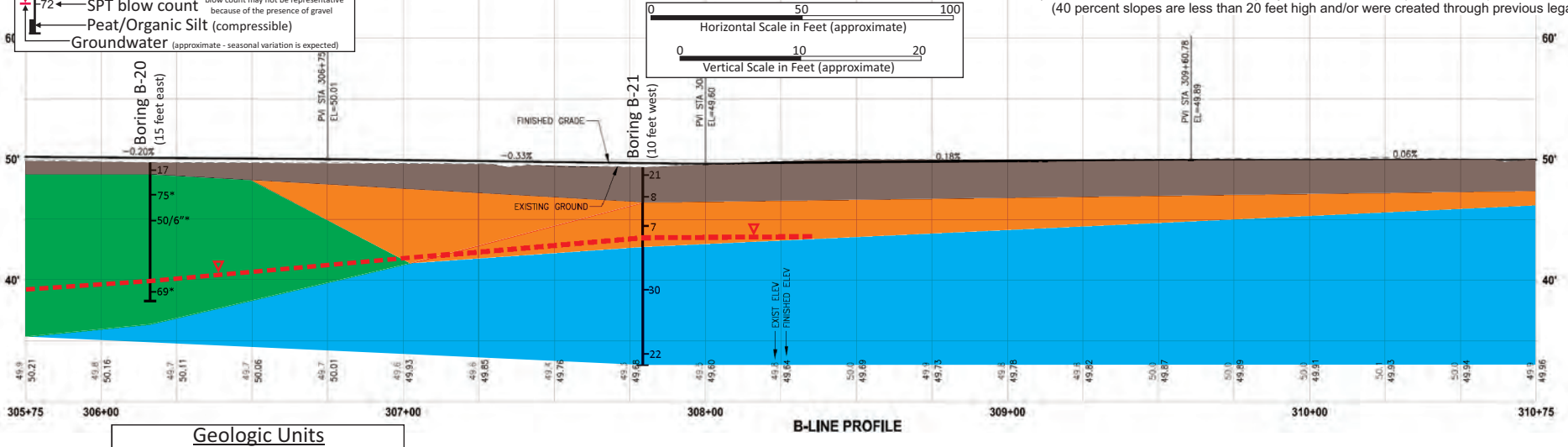

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

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EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

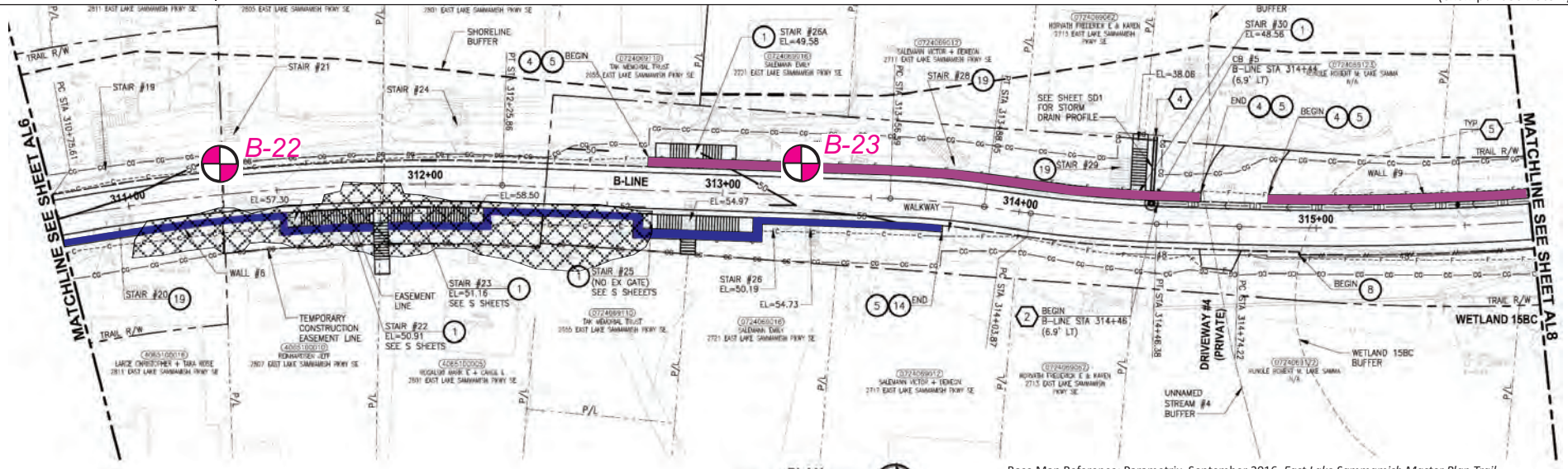
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



PLAN

SCALE IN FEET

0 20 40

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EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

72 ← SPT blow count * blow count may not be representative because of the presence of gravel

Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)

Notes: 1) Boring logs are included in Appendix A.
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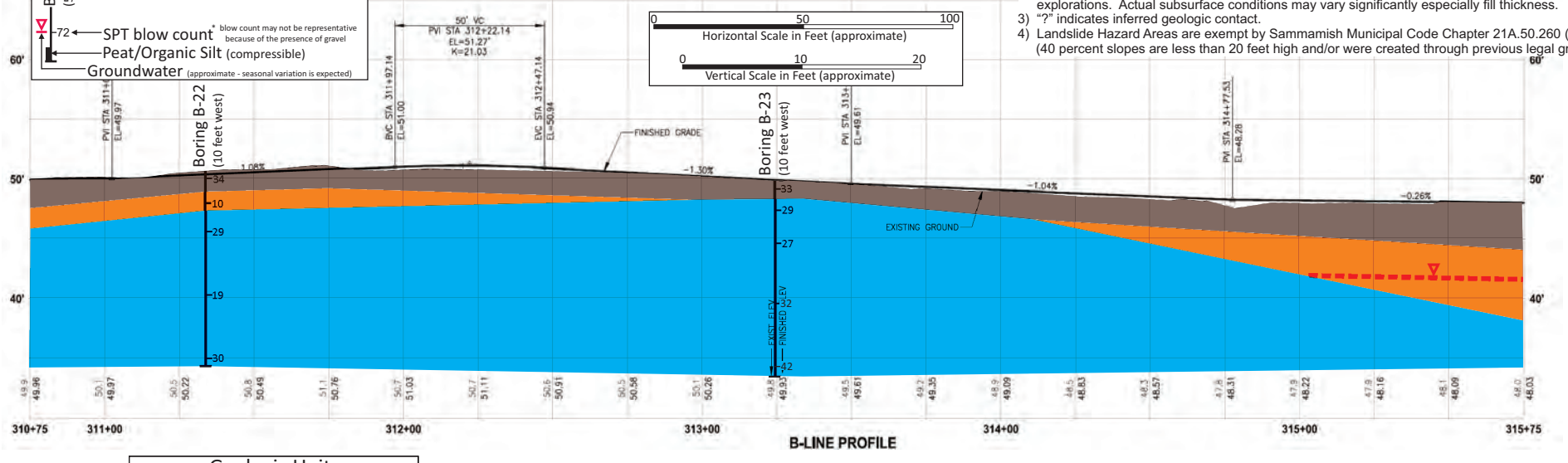

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

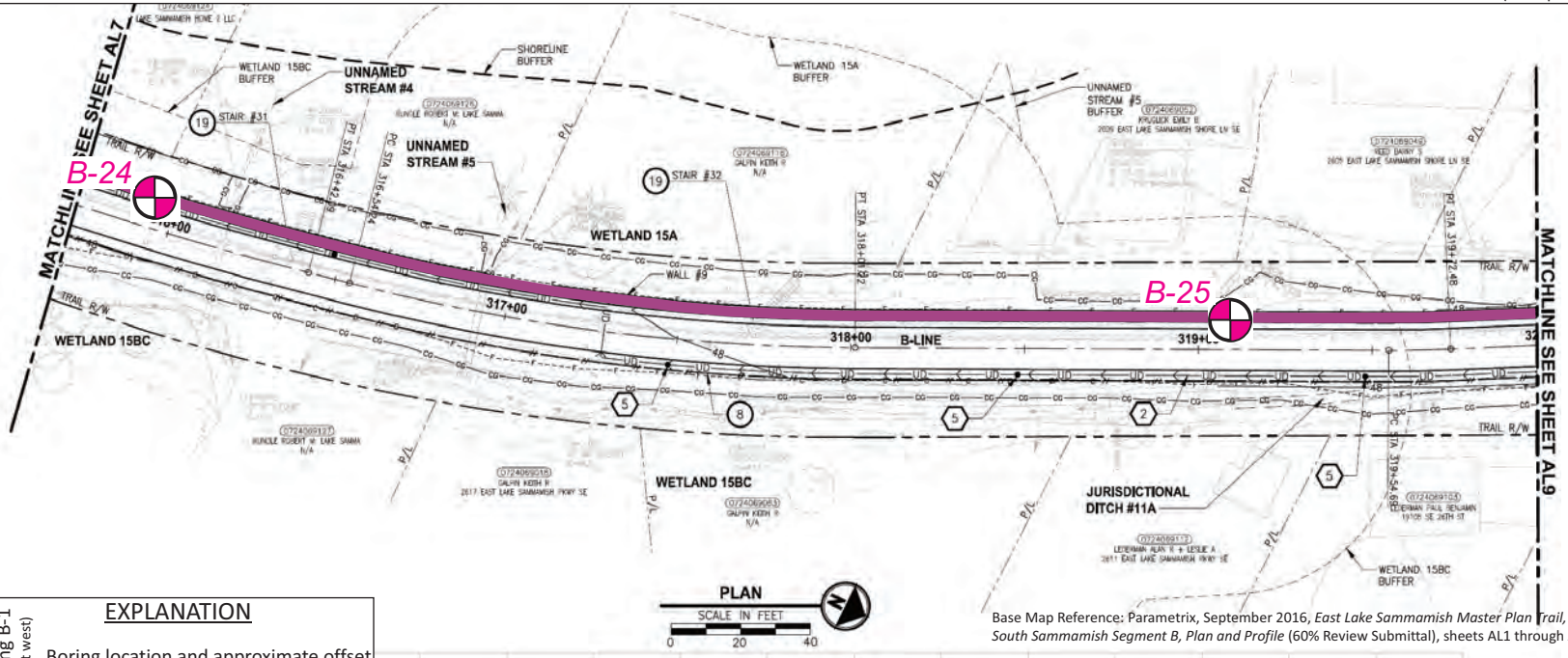
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



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EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

72 ← SPT blow count * blow count may not be representative because of the presence of gravel

Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)

Notes:
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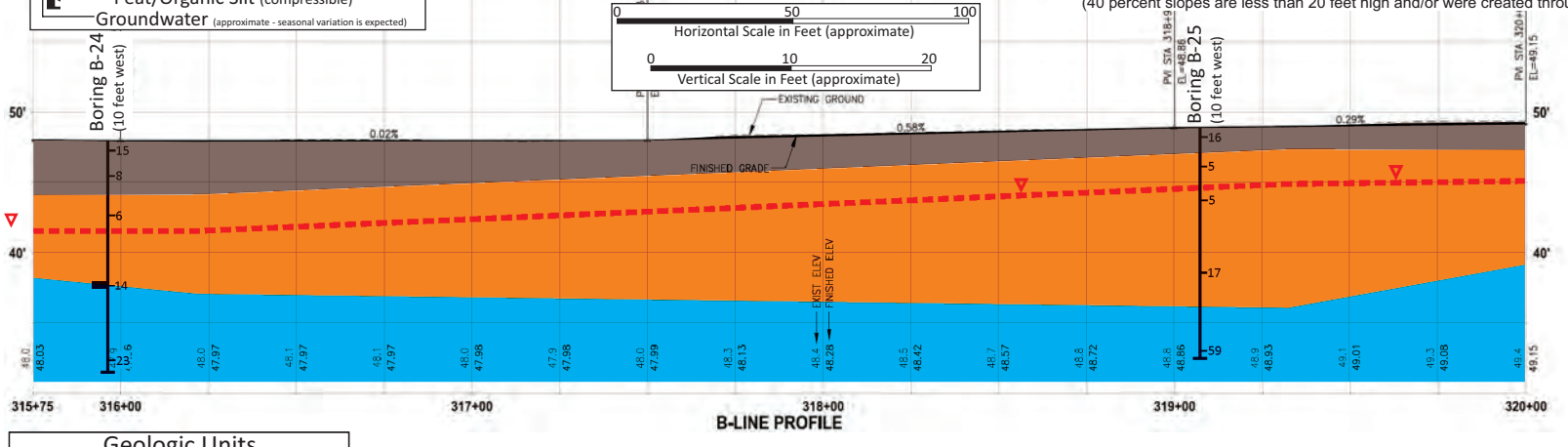


Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

ICICLE CREEK ENGINEERS
29335 NE 20th Street
Carnation, Washington 98014
(425) 333-0093

SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	9
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

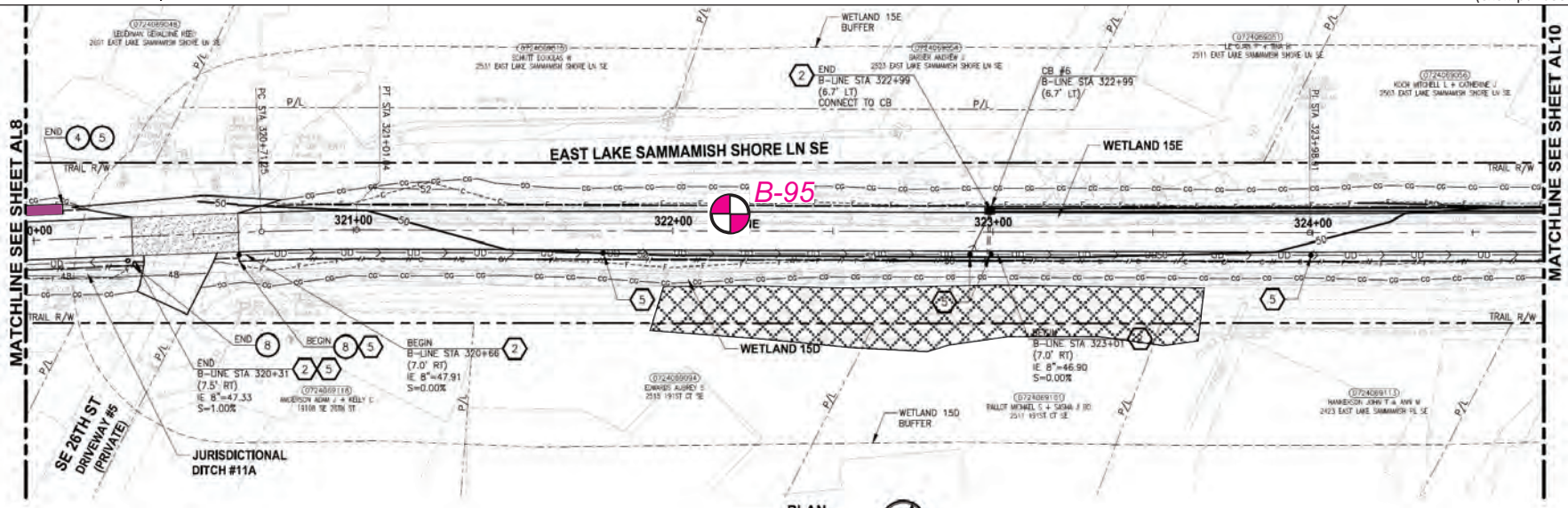
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



PLAN

SCALE IN FEET

0 20 40

Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

Notes:
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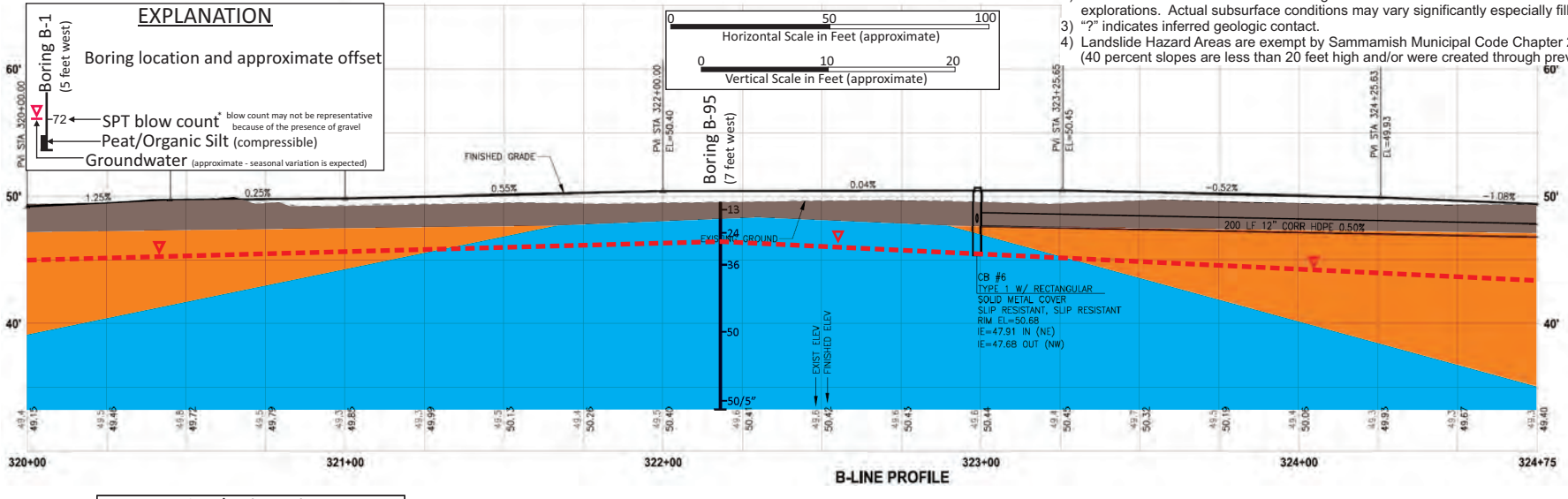

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

ICICLE CREEK ENGINEERS
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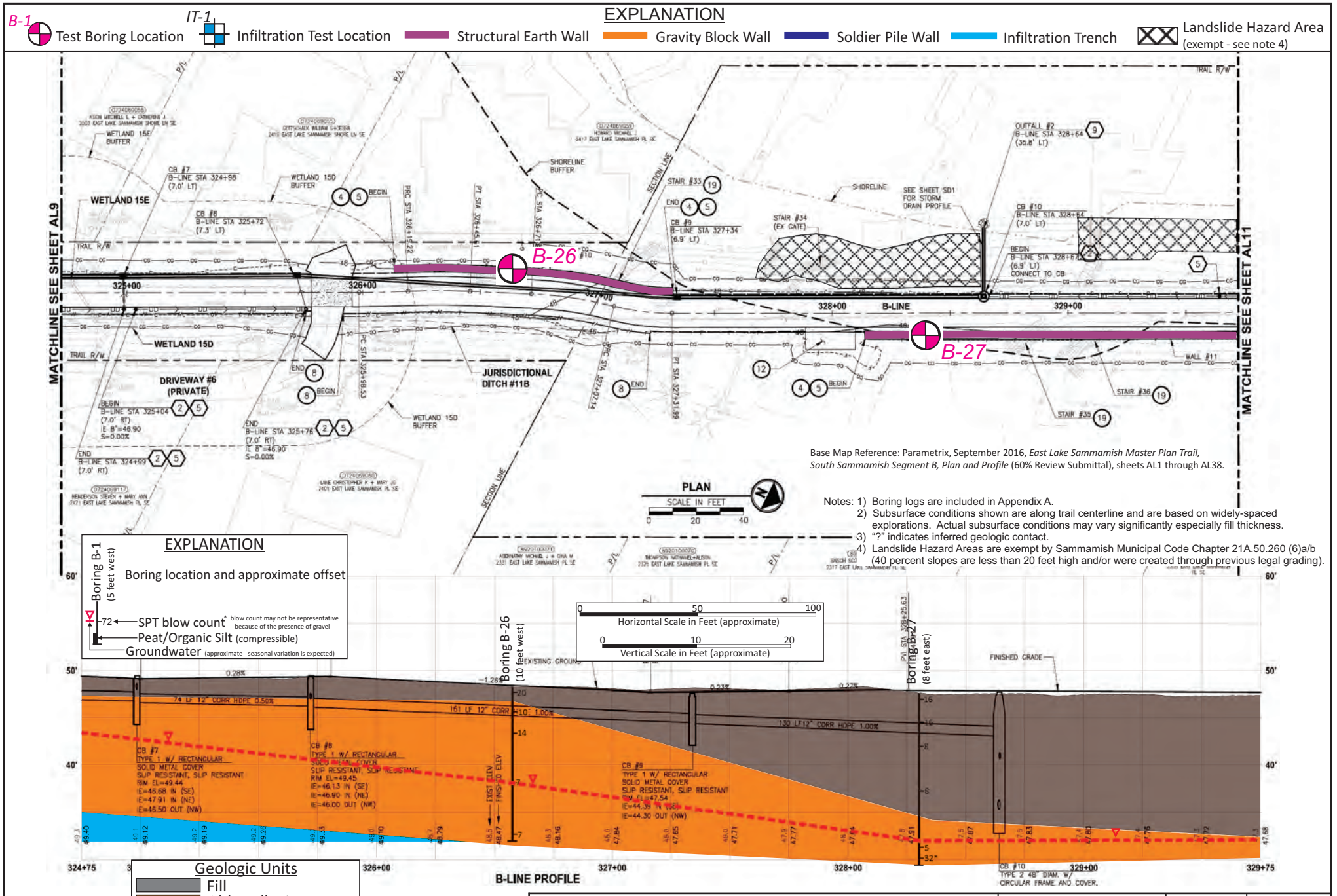
SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	10
DATE: 10/XX/16	

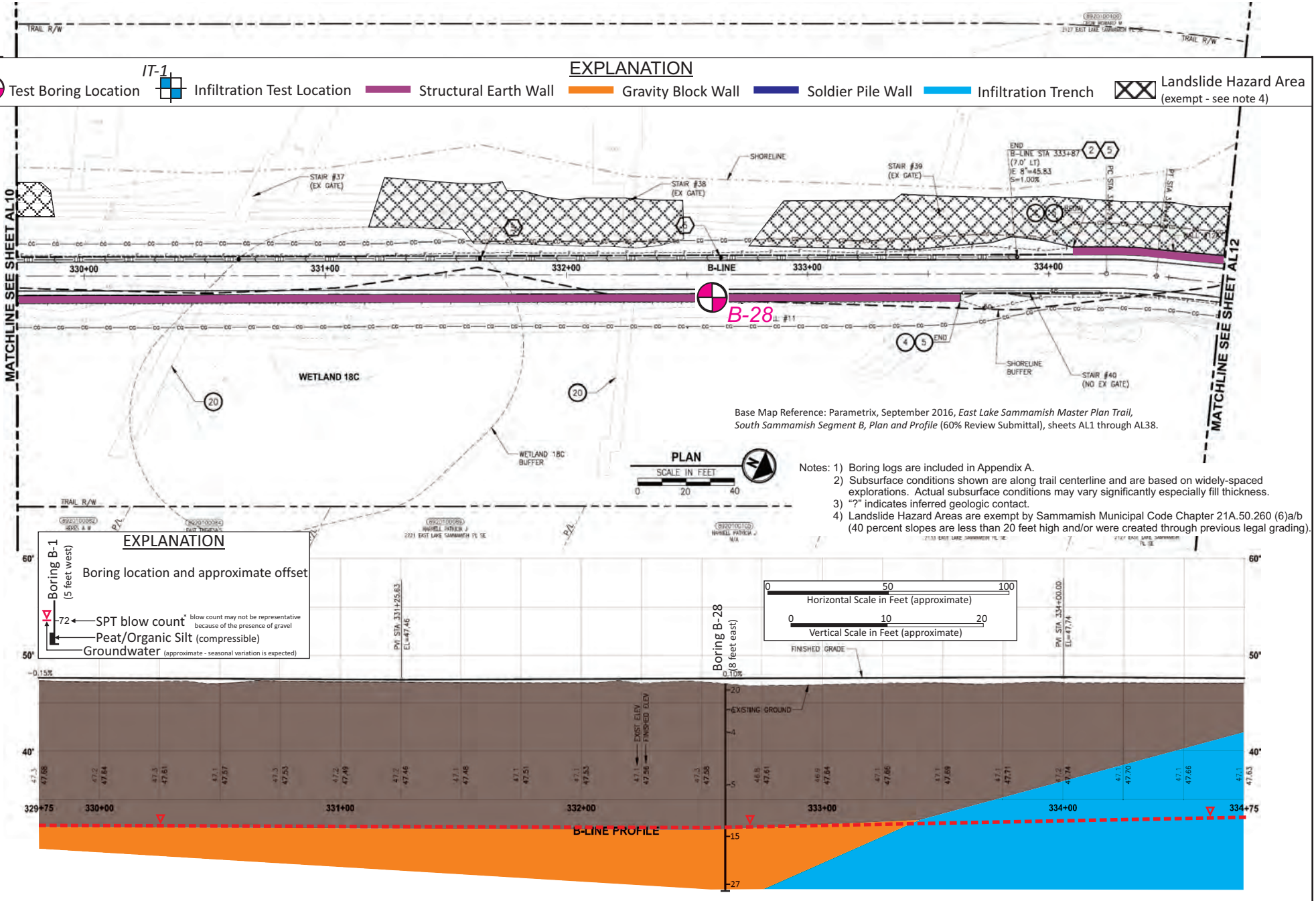


PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

ICICLECREEK ENGINEERS
29335 NE 20th Street
Carnation, Washington 98014
(425) 333-0093

SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	11
DATE: 10/XX/16	



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

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Geologic Units
- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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Carnation, Washington 98014
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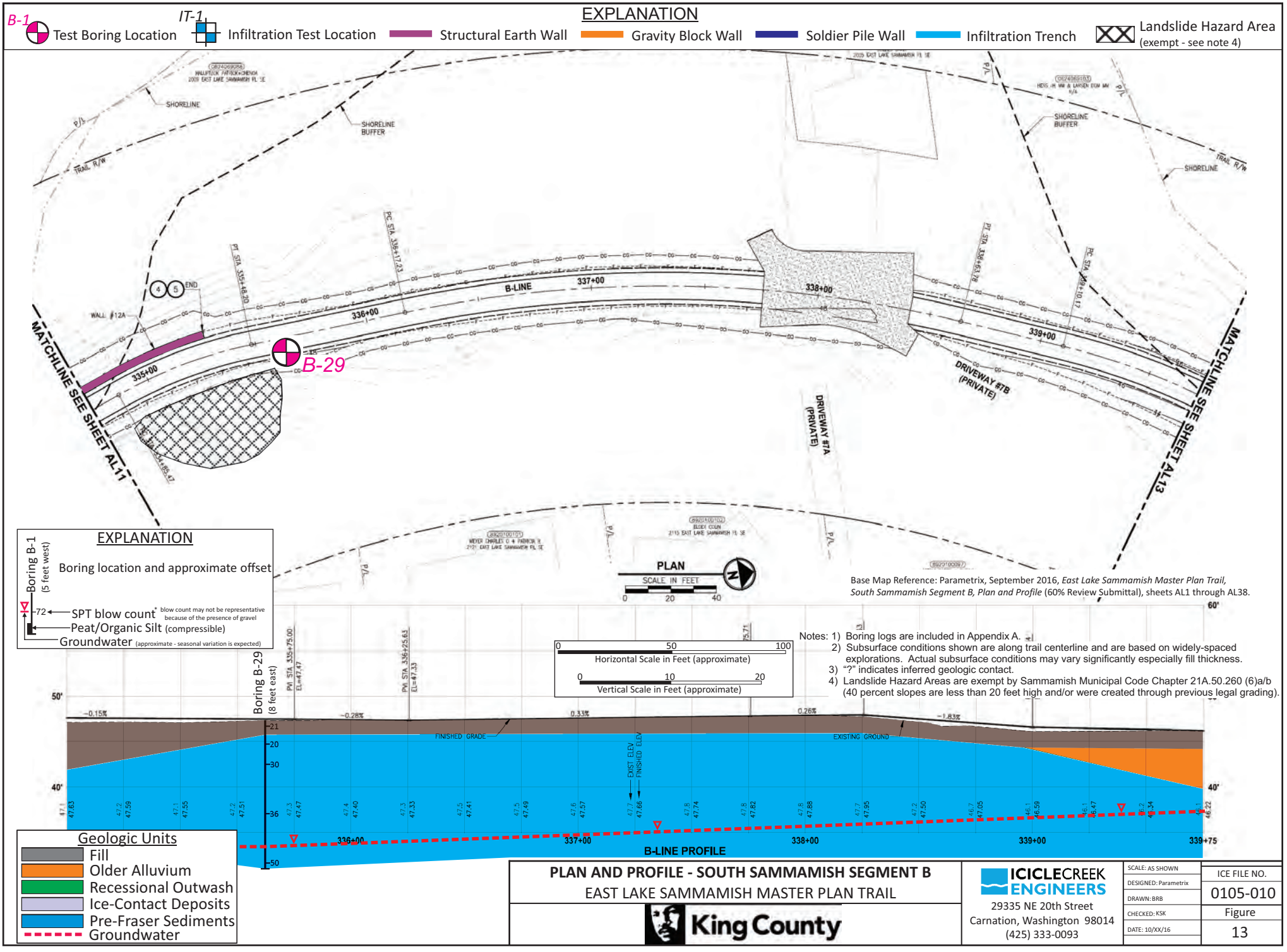
SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	12
DATE: 10/XX/16	



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

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PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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29335 NE 20th Street
Carnation, Washington 98014
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SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	13
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

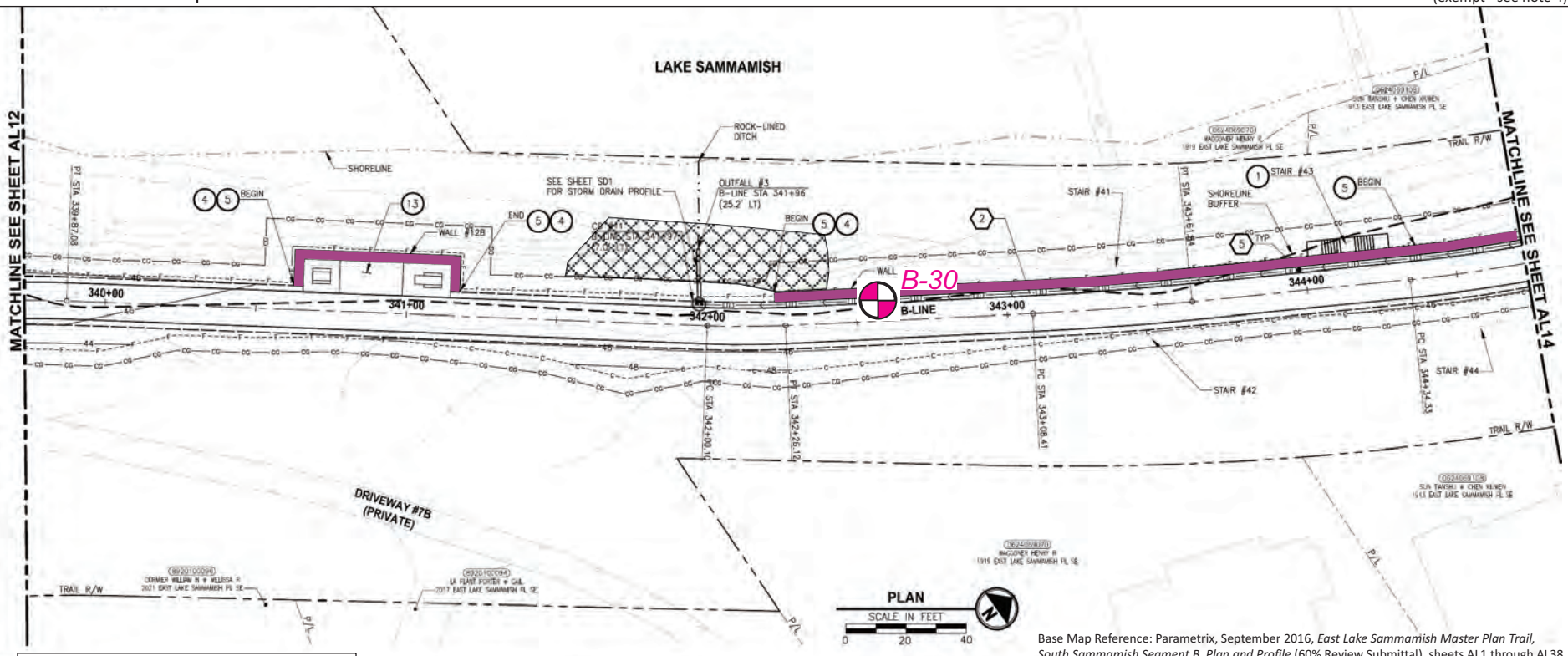
Structural Earth Wall

Gravity Block Wall

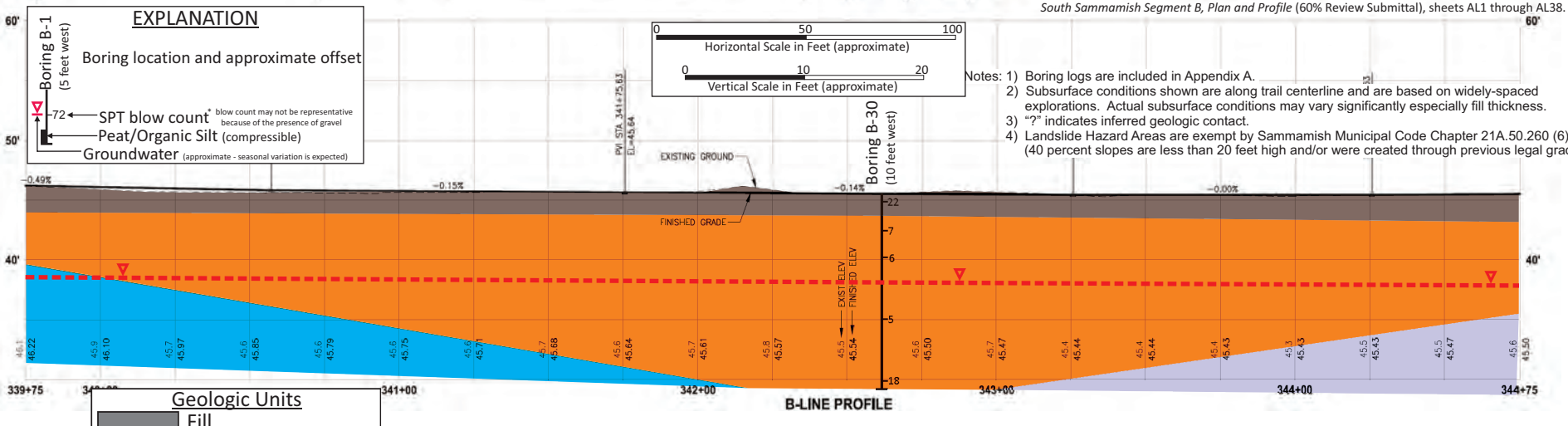
Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.



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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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CHECKED: KSK	14
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

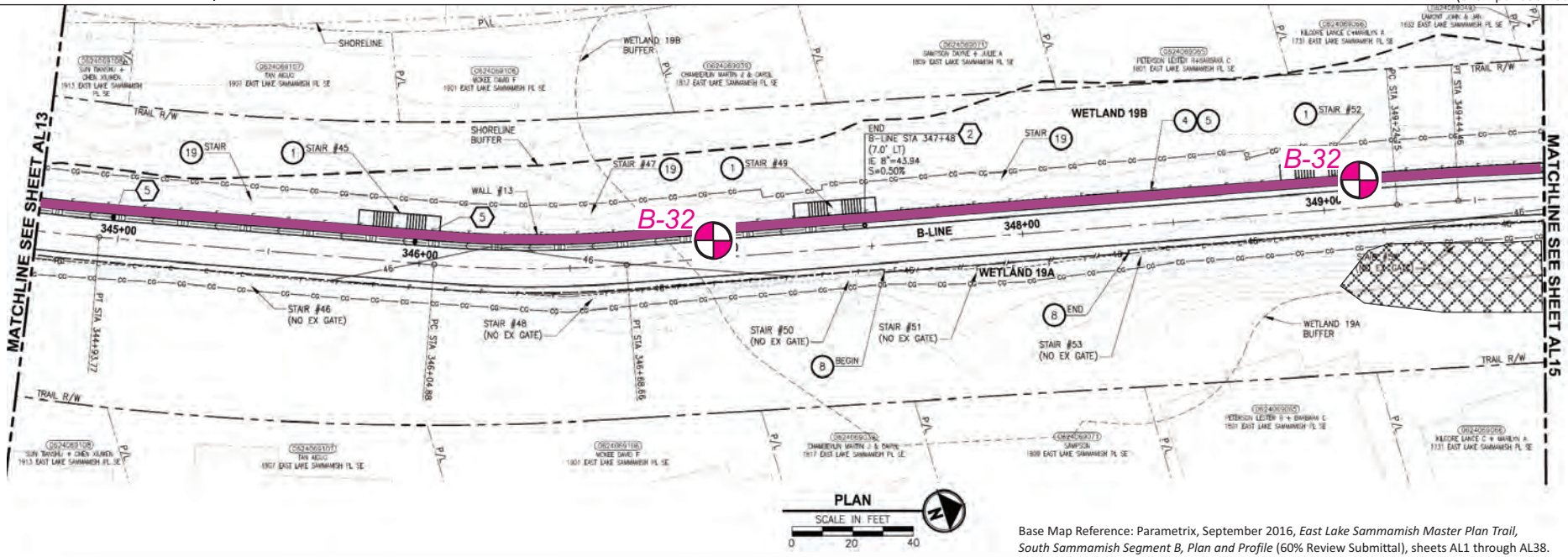
Structural Earth Wall

Gravity Block Wall

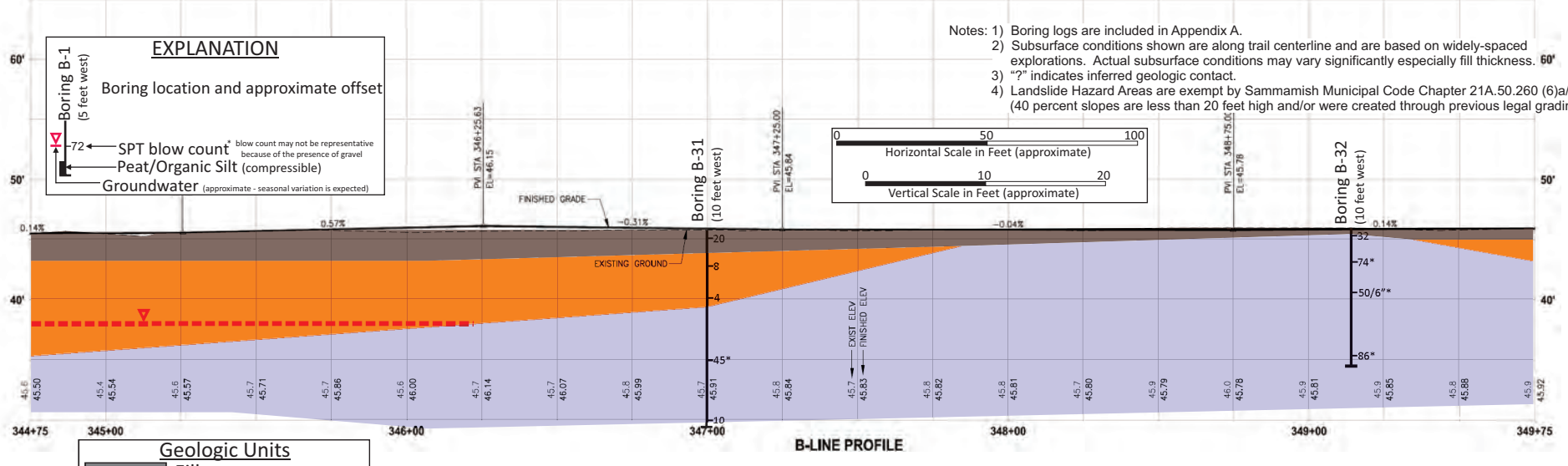
Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.



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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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CHECKED: KSK	15
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

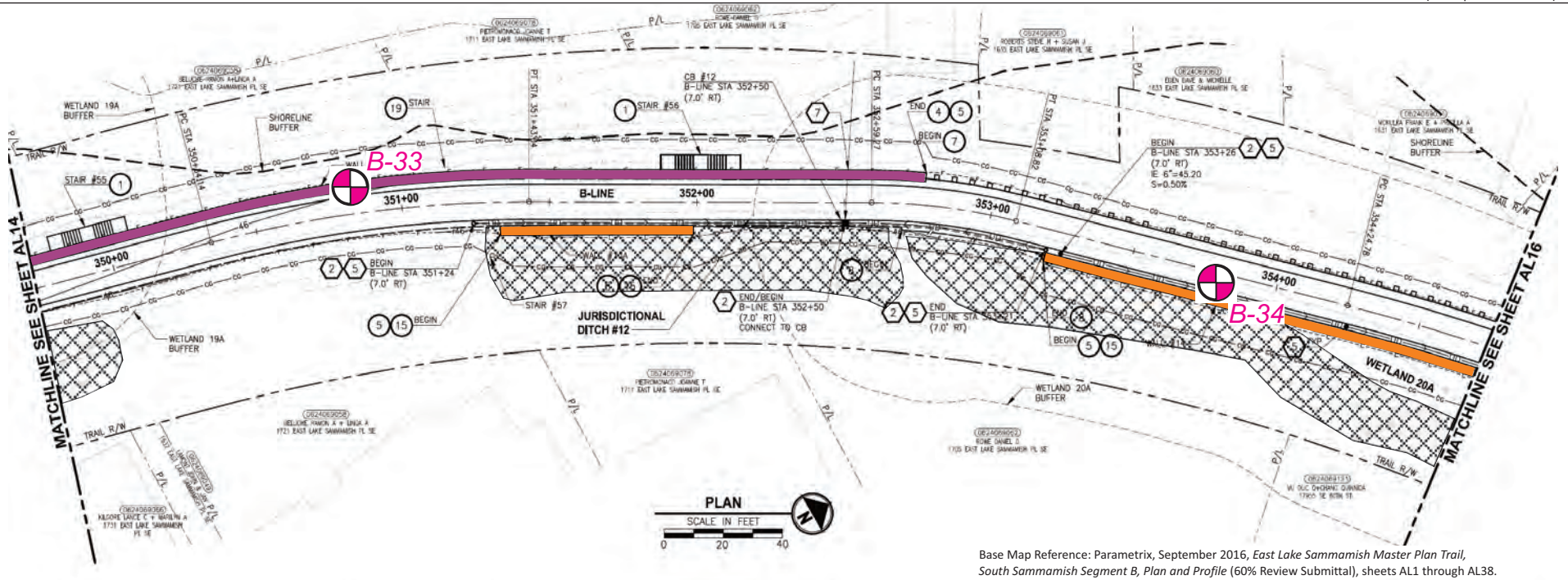
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

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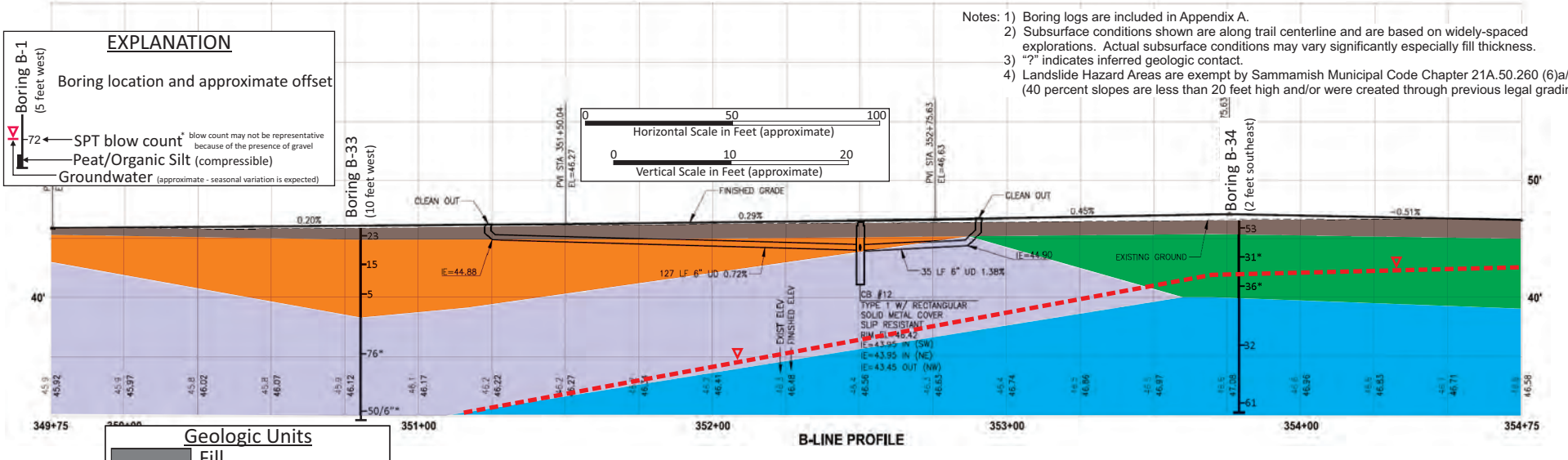

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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Carnation, Washington 98014
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SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
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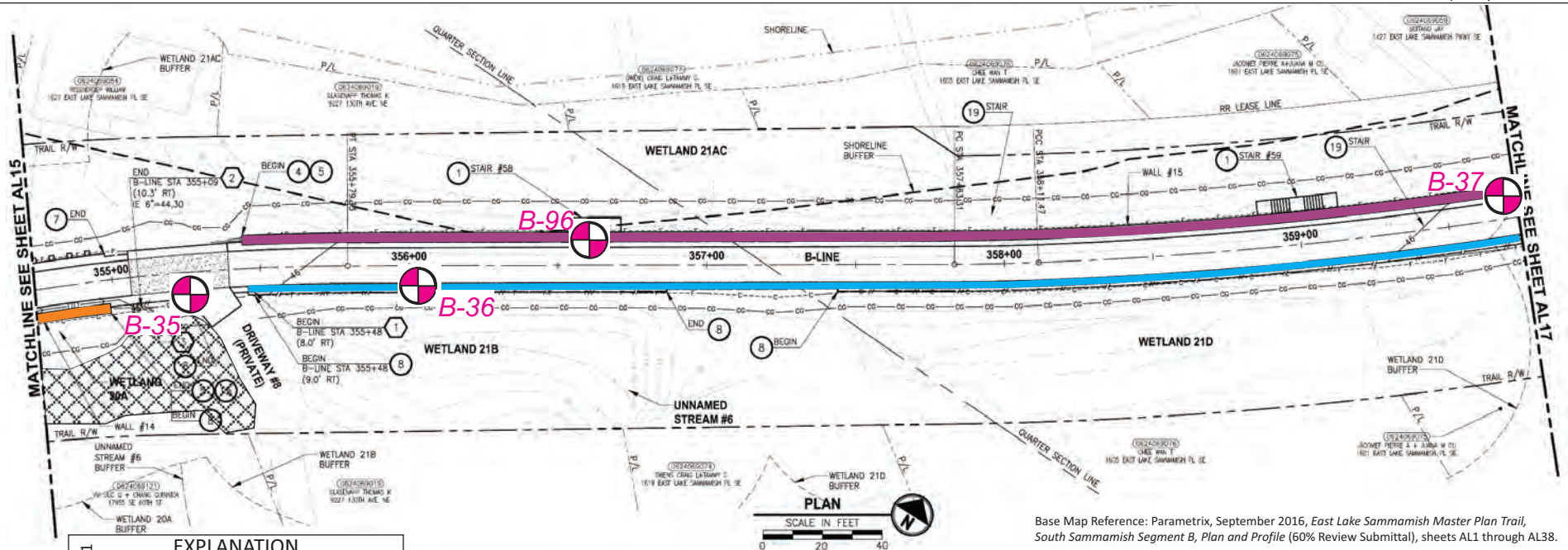
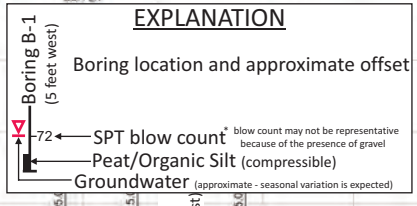
CHECKED: KSK	16
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location | IT-1 Infiltration Test Location | Structural Earth Wall | Gravity Block Wall | Soldier Pile Wall | Infiltration Trench | Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.



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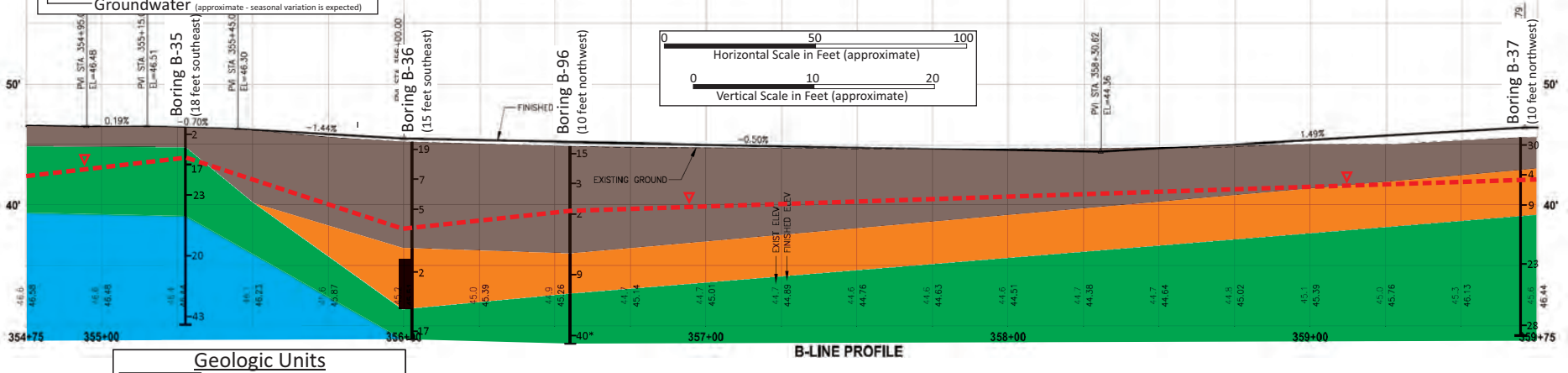

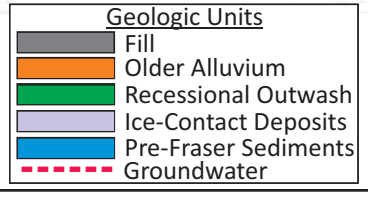

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

ICICLE CREEK ENGINEERS
29335 NE 20th Street
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SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	17
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

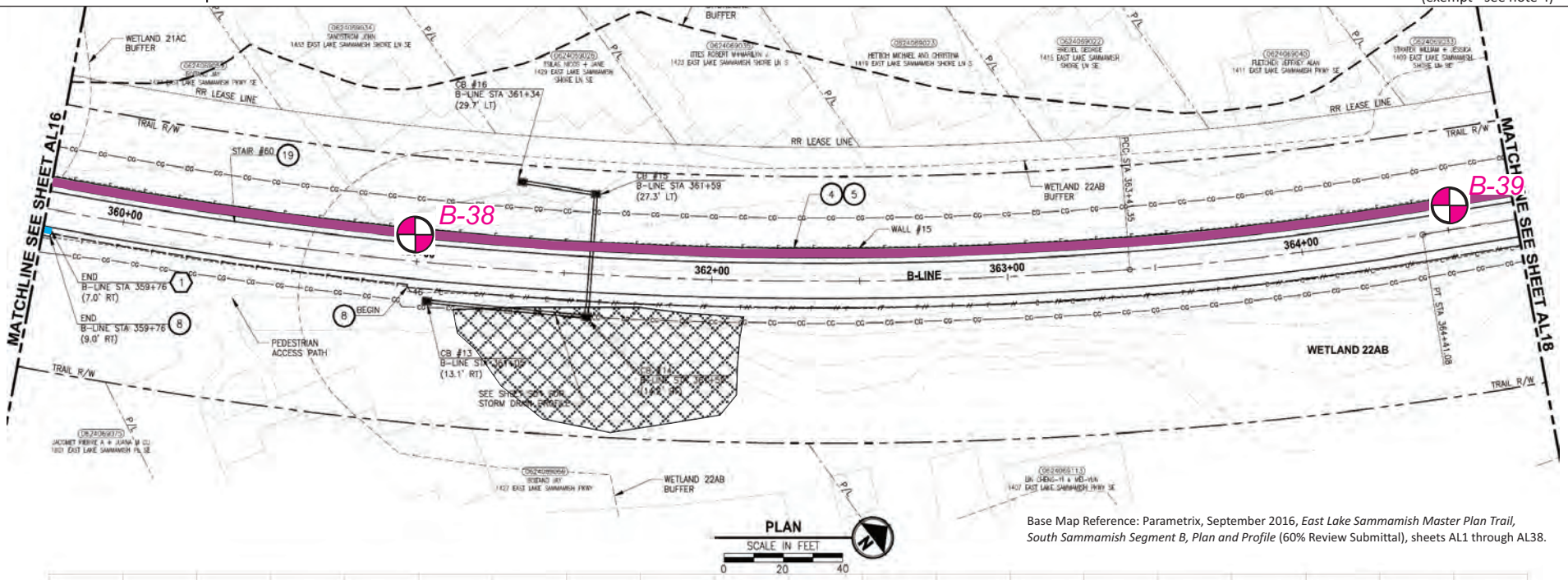
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



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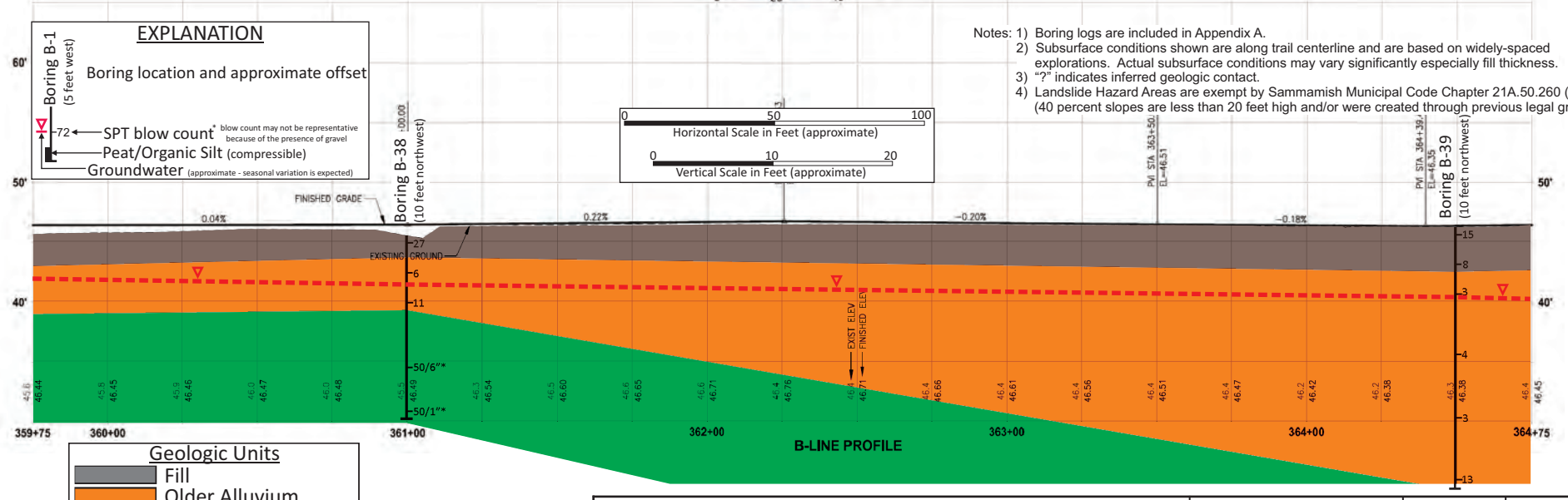

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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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SCALE: AS SHOWN	ICE FILE NO.
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DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

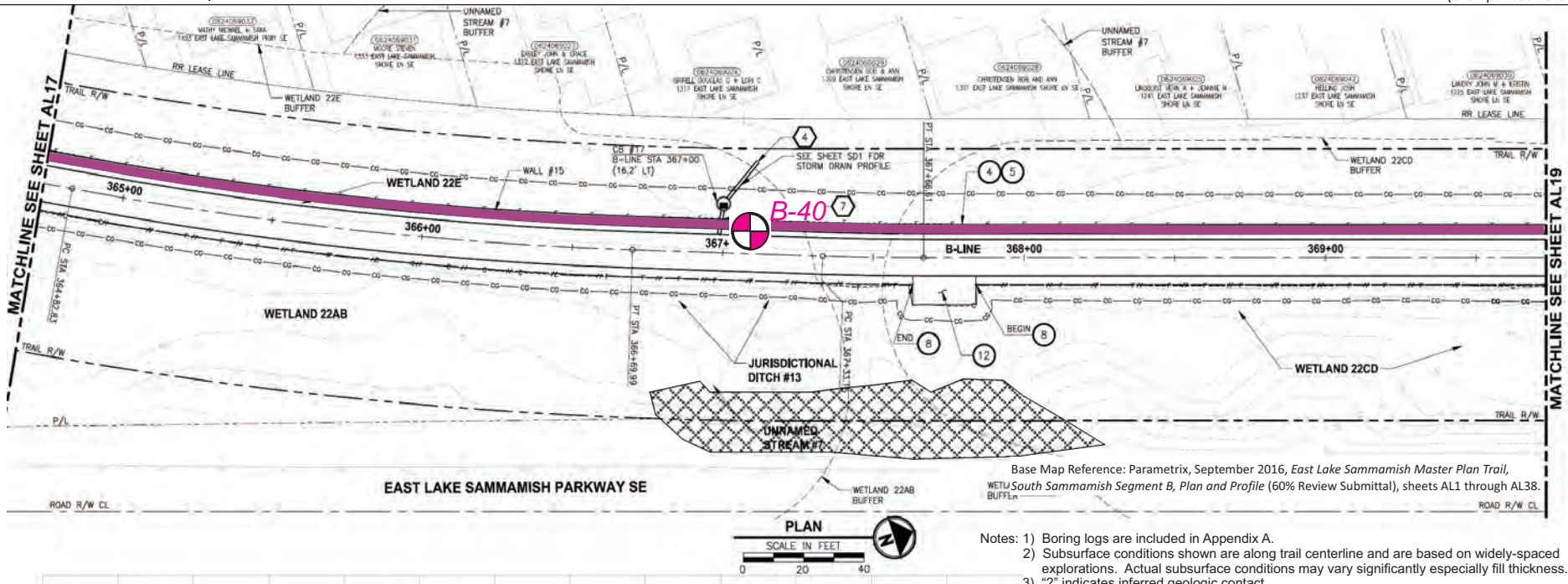
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



PLAN

SCALE IN FEET

0 20 40

Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

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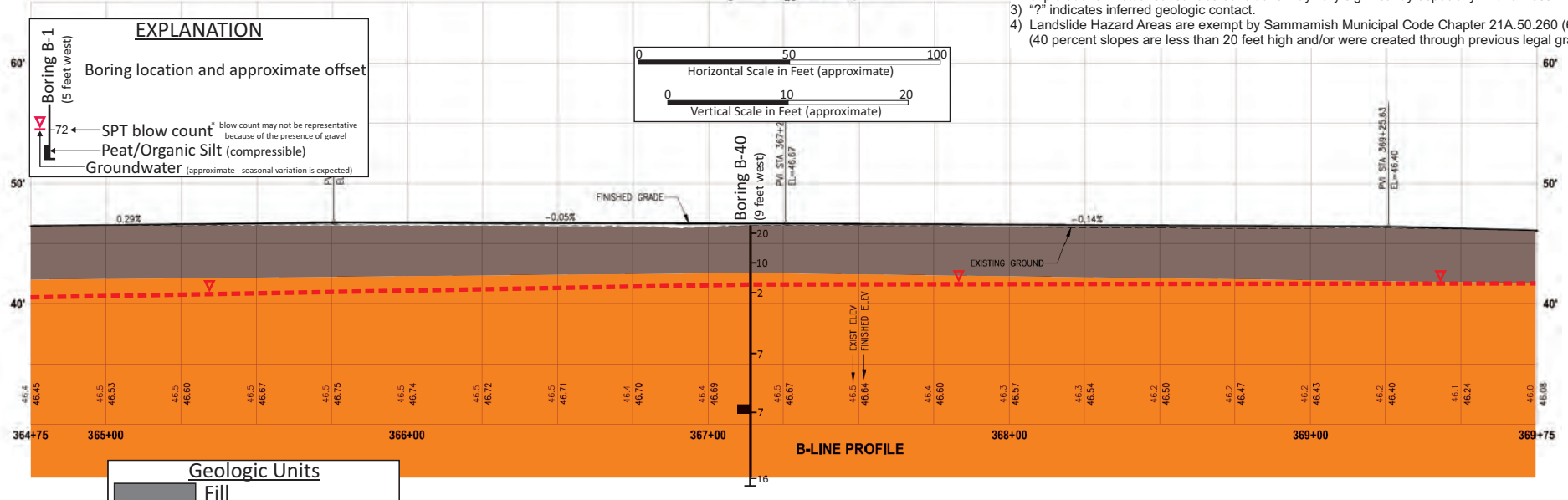

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

ICICLE CREEK ENGINEERS
29335 NE 20th Street
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(425) 333-0093

SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	19
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

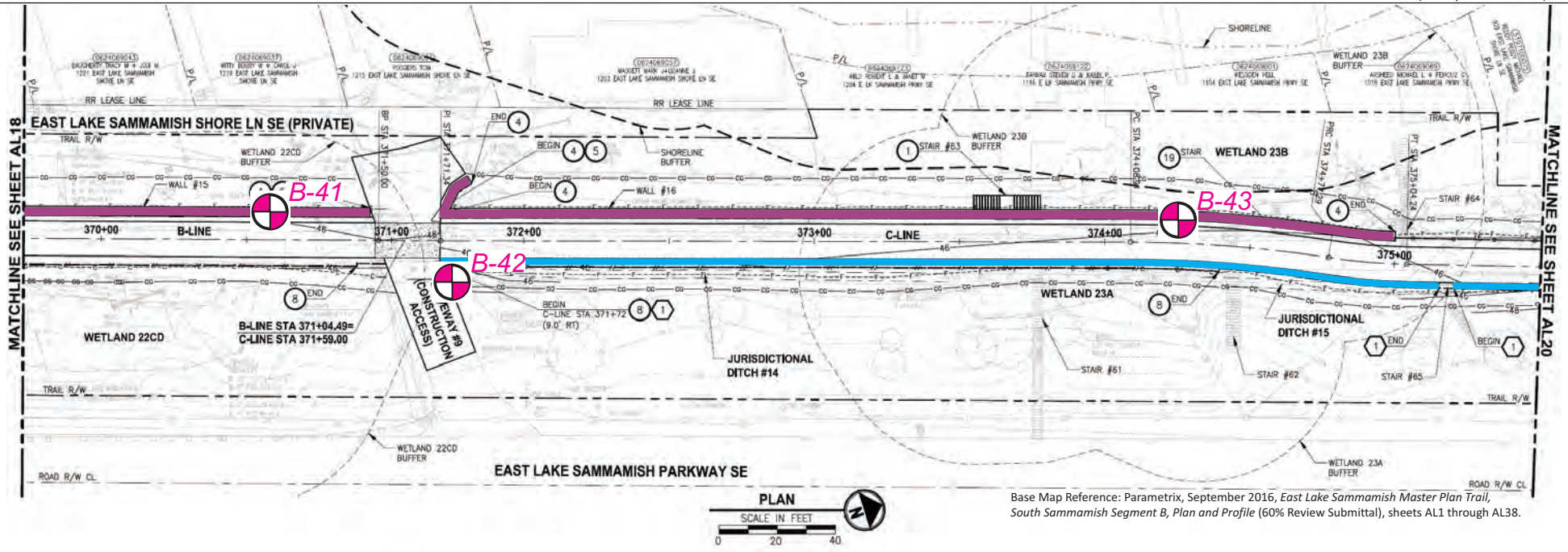
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

72 SPT blow count* (* blow count may not be representative because of the presence of gravel)

Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)

Notes:
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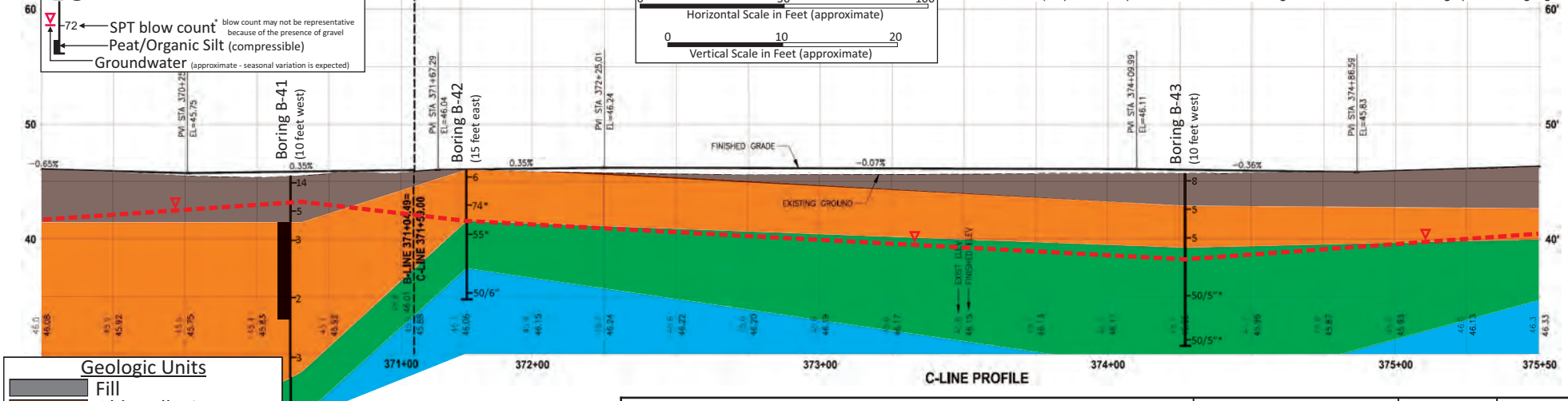

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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29335 NE 20th Street
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SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
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CHECKED: KSK	20
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

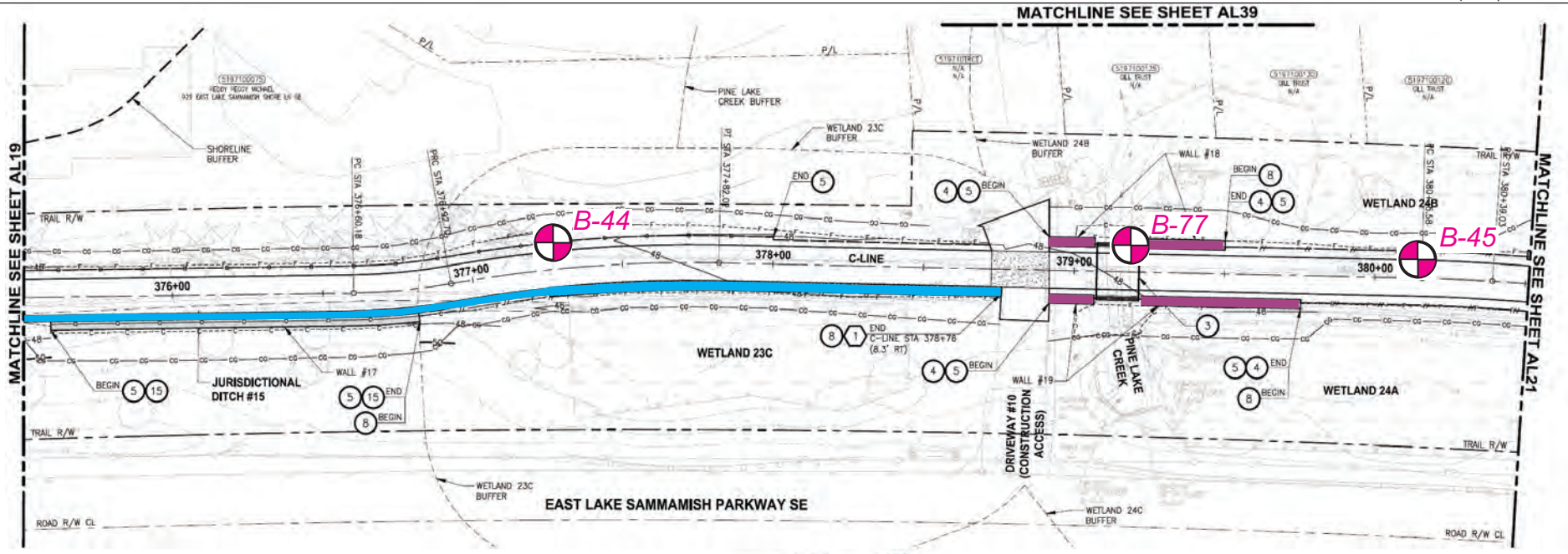
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



PLAN

SCALE IN FEET 0 20 40

Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

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EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

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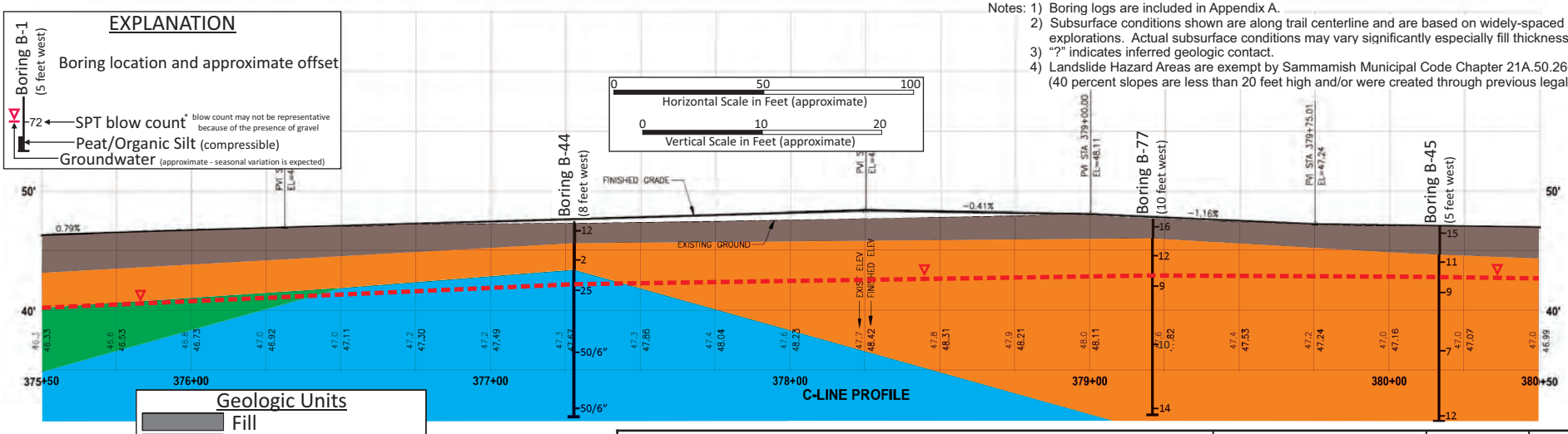
Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)



Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	21
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

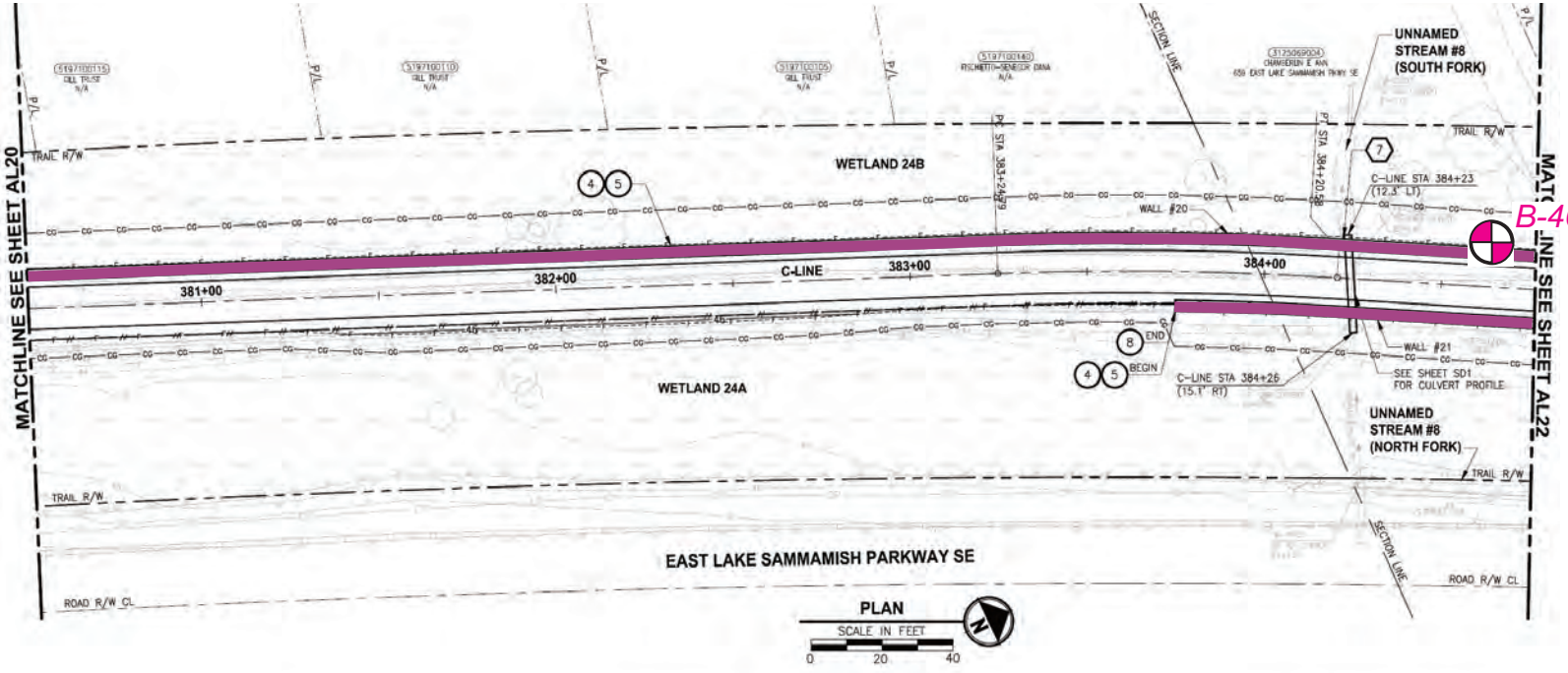
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

Notes:
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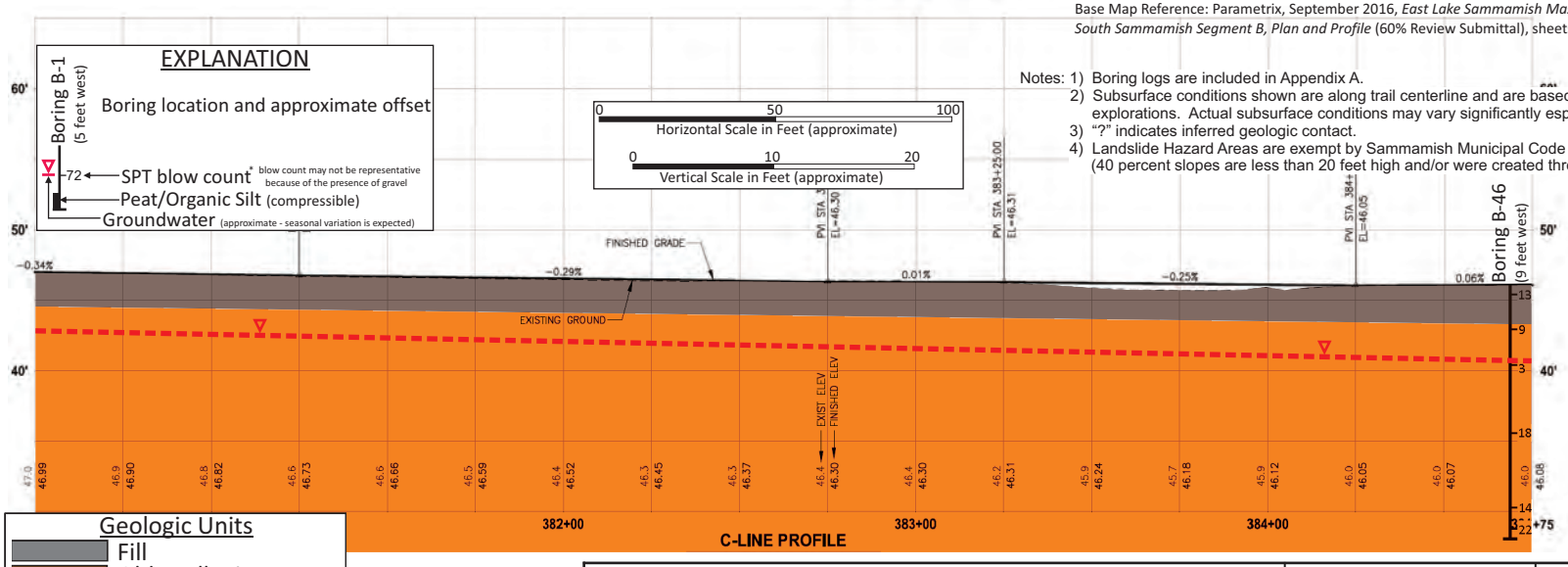

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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DESIGNED: Parametrix	ICE FILE NO. 0105-010
DRAWN: BRB	
CHECKED: KSK	Figure 22
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

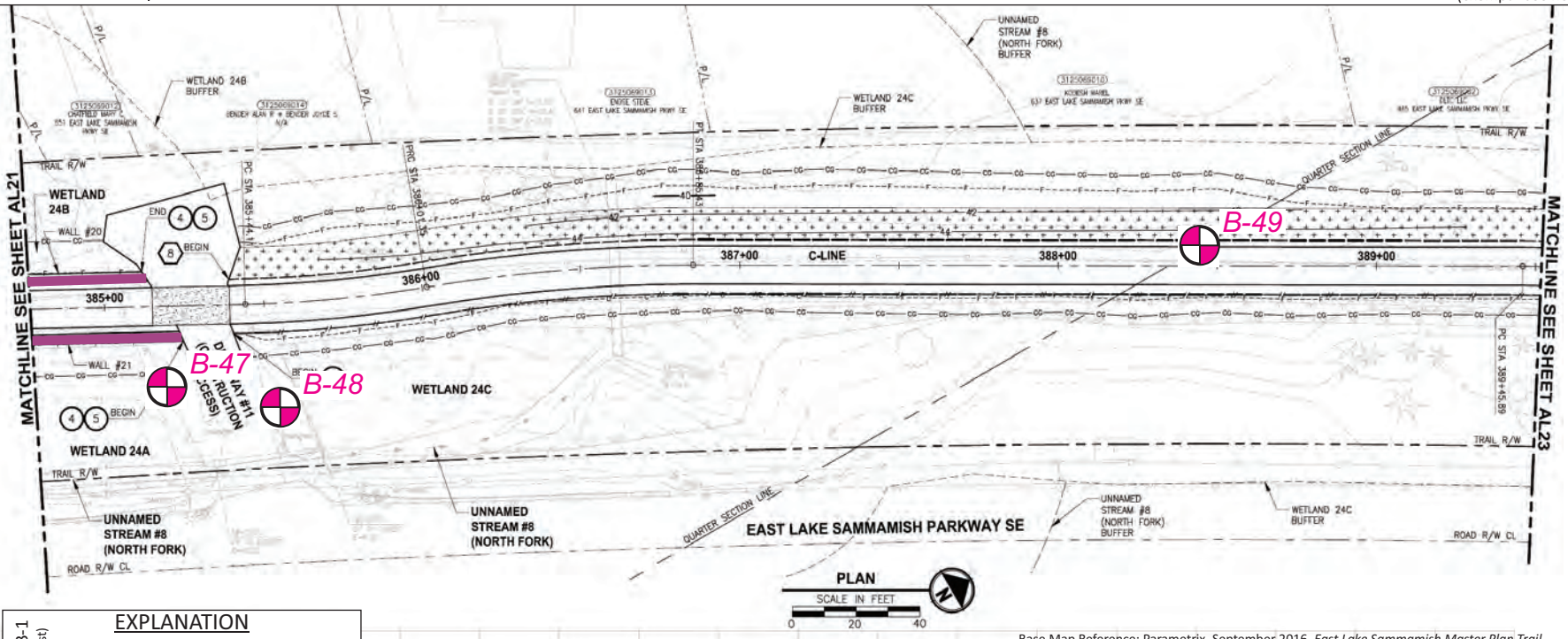
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



EXPLANATION

Boring location and approximate offset

Boring B-1 (5 feet west)

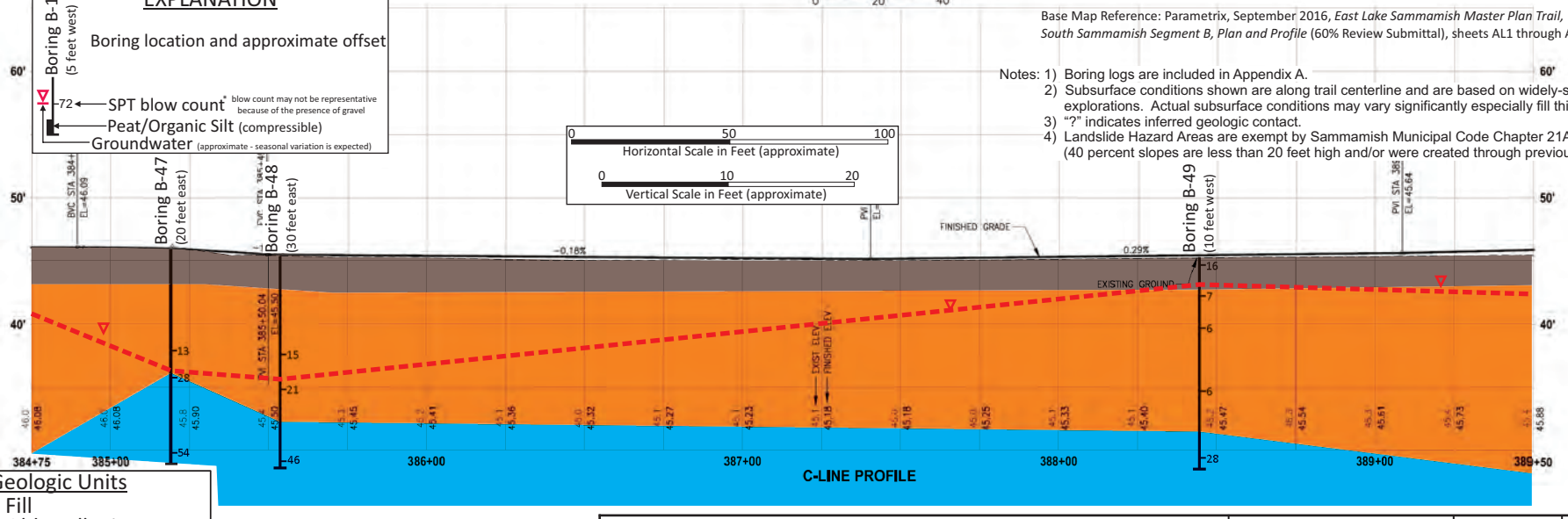
72 SPT blow count* (*blow count may not be representative because of the presence of gravel)

Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)

Horizontal Scale in Feet (approximate): 0, 50, 100

Vertical Scale in Feet (approximate): 0, 10, 20



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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CHECKED: KSK	23
DATE: 10/XX/16	

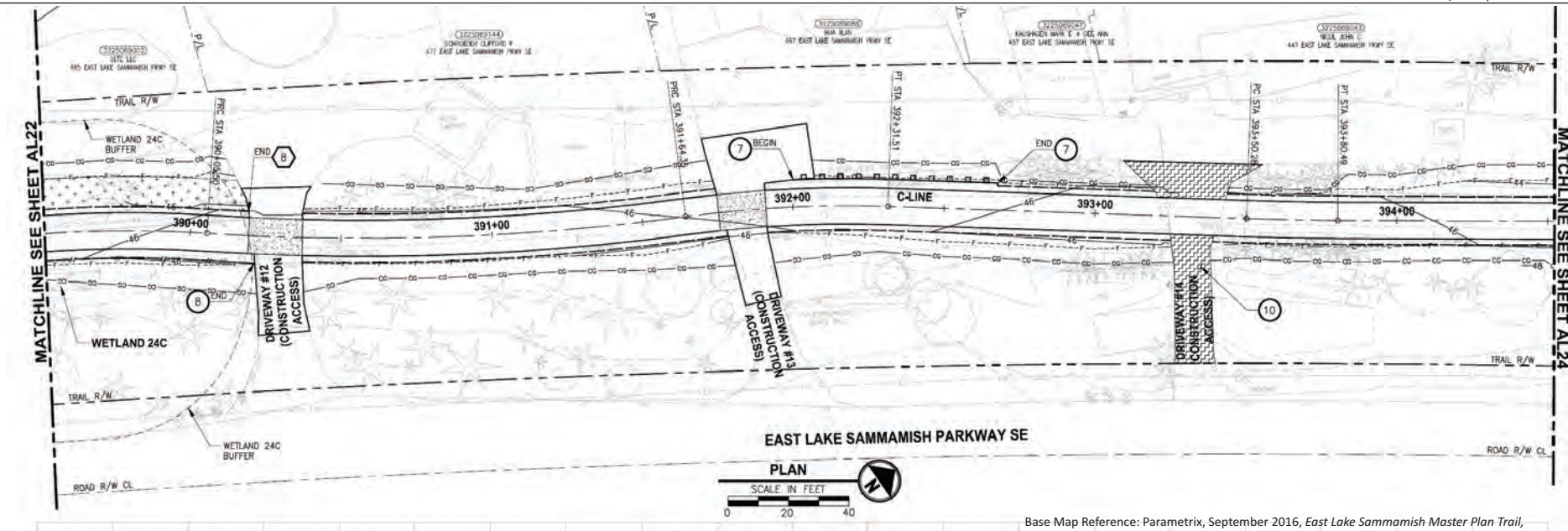
B-1 Test Boring Location

IT-1 Infiltration Test Location

EXPLANATION

Structural Earth Wall | Gravity Block Wall | Soldier Pile Wall | Infiltration Trench

XX Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

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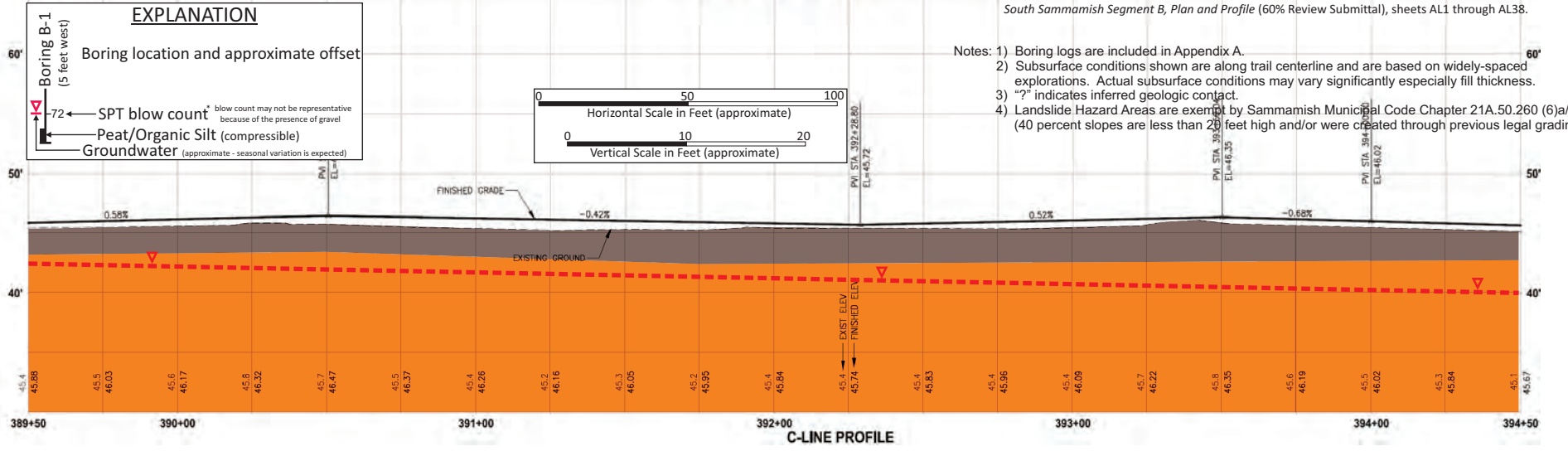

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

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DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

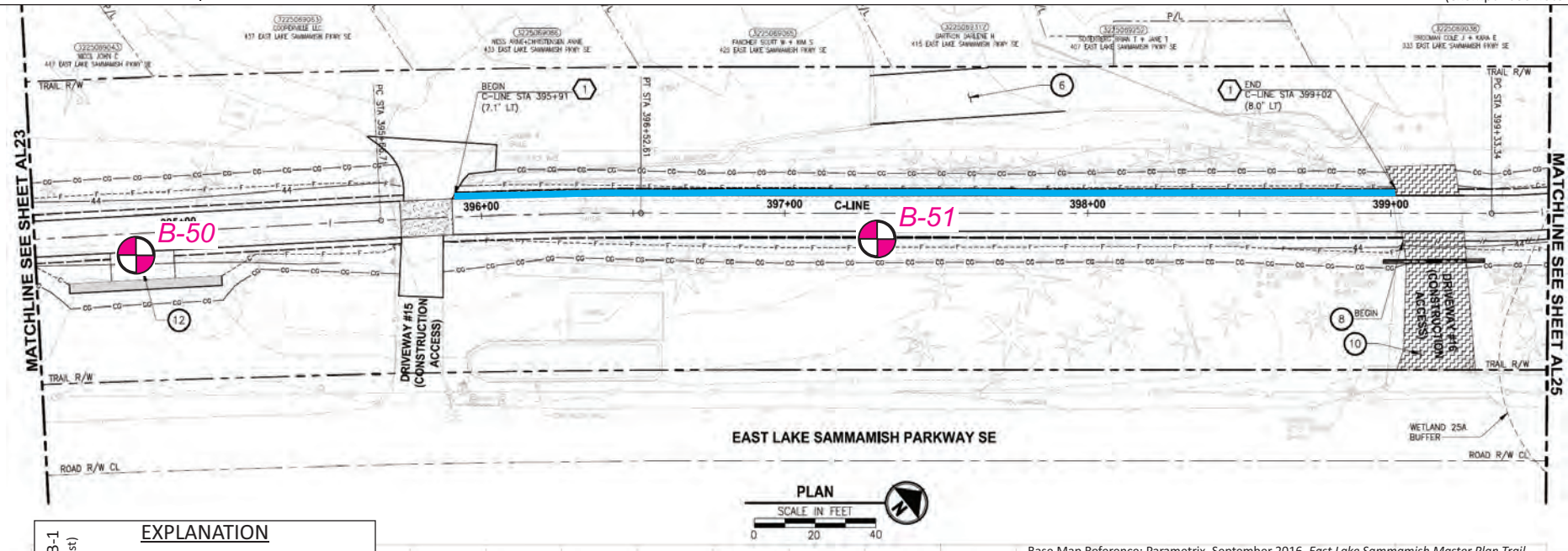
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



PLAN

SCALE IN FEET

0 20 40

Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

EXPLANATION

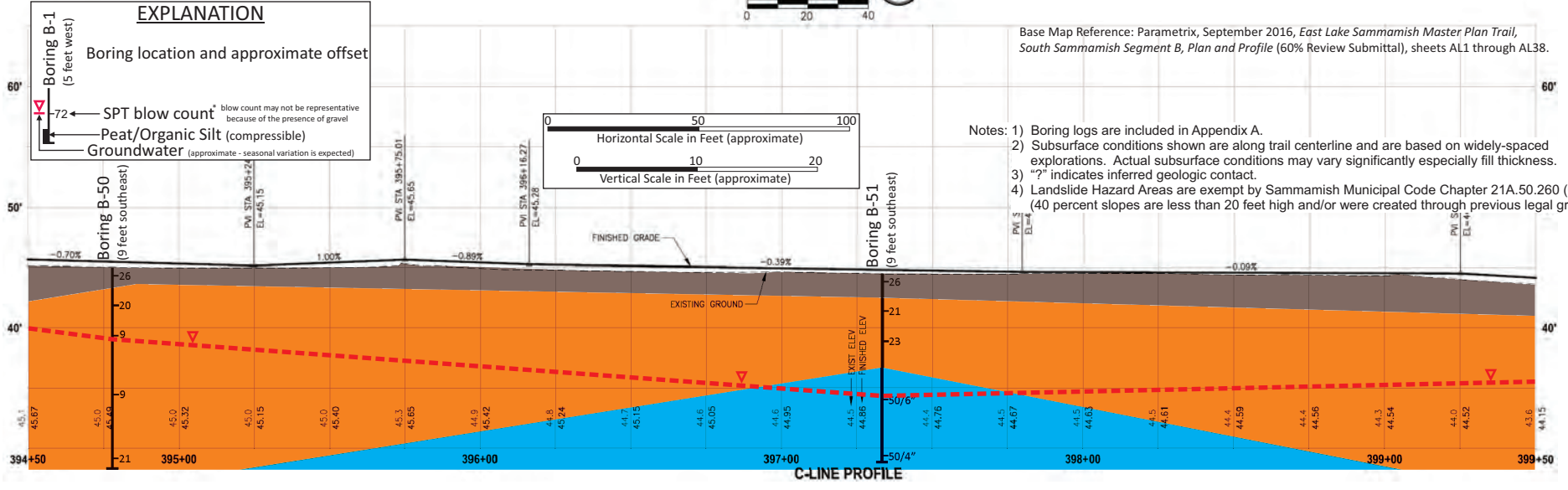
Boring B-1 (5 feet west)

Boring location and approximate offset

72 ← SPT blow count* (*blow count may not be representative because of the presence of gravel)

Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)



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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

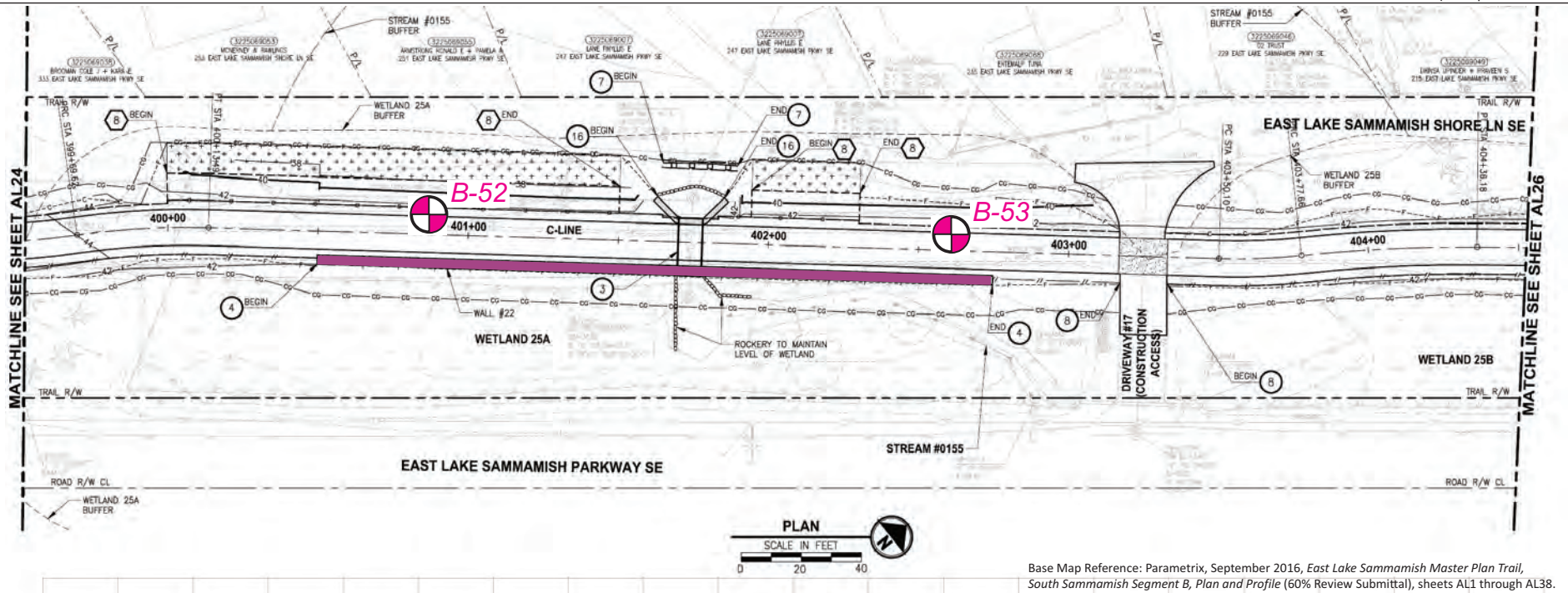
Structural Earth Wall

Gravity Block Wall

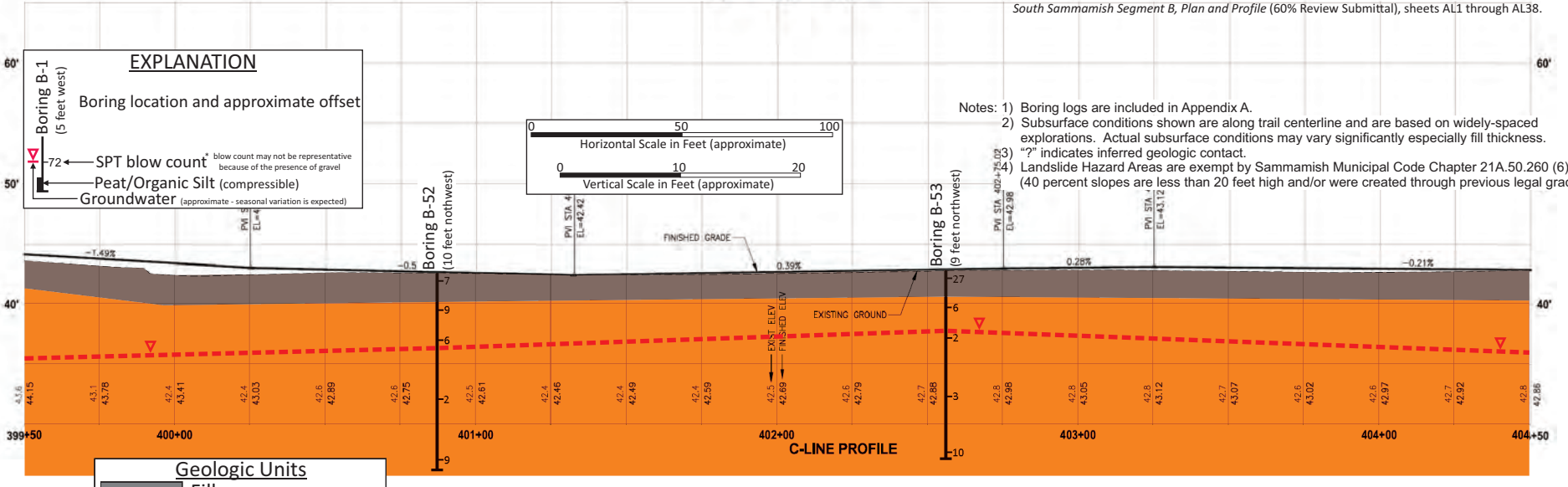
Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.



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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

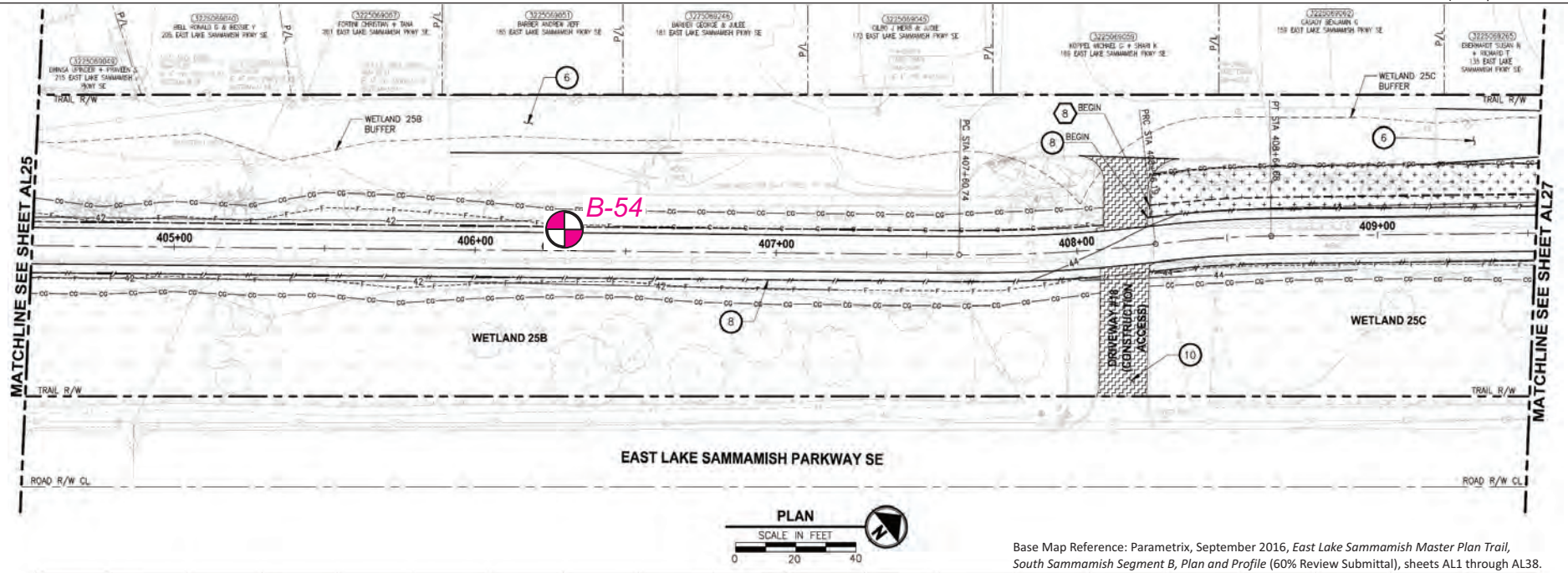
Structural Earth Wall

Gravity Block Wall

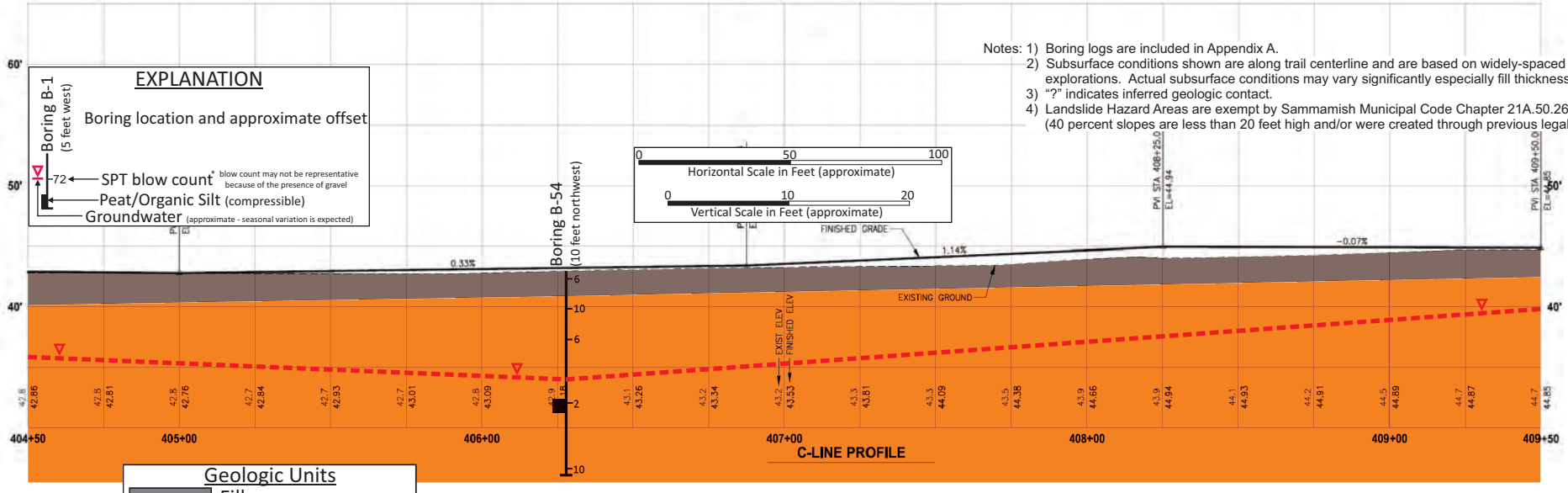
Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.



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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

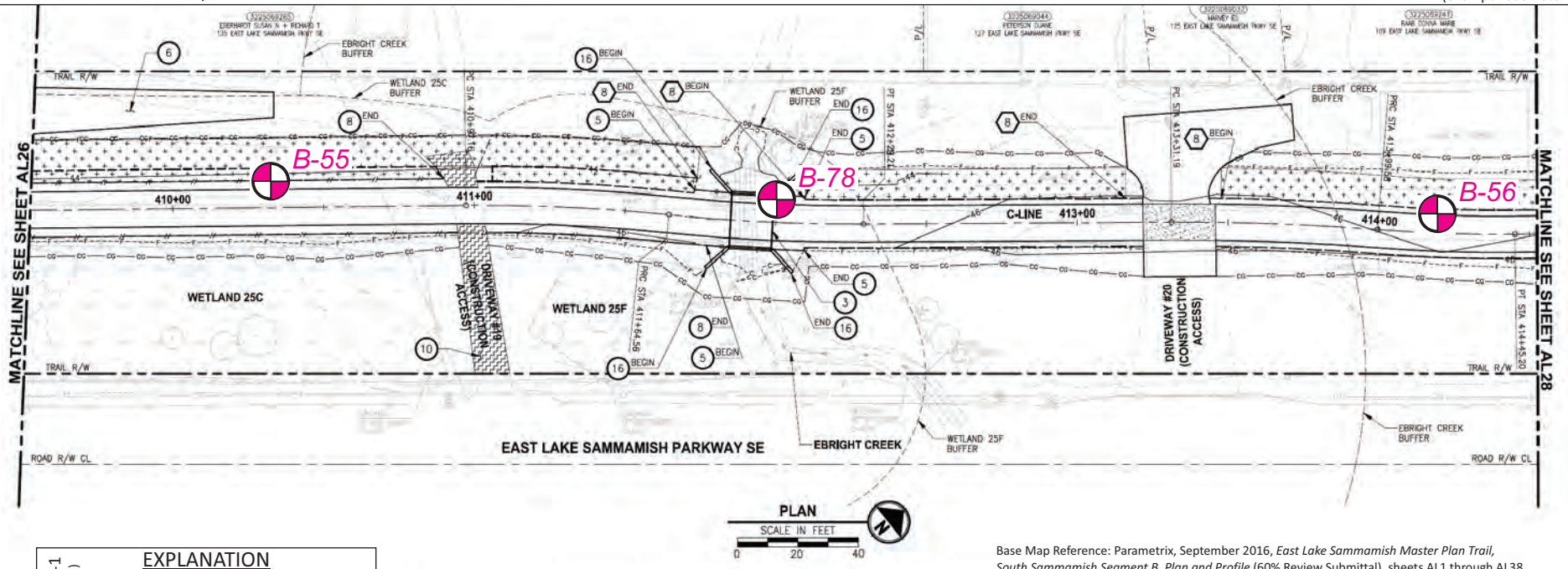
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

72 ← SPT blow count* (* blow count may not be representative because of the presence of gravel)

Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)

0 50 100
Horizontal Scale in Feet (approximate)

0 10 20
Vertical Scale in Feet (approximate)

Notes:
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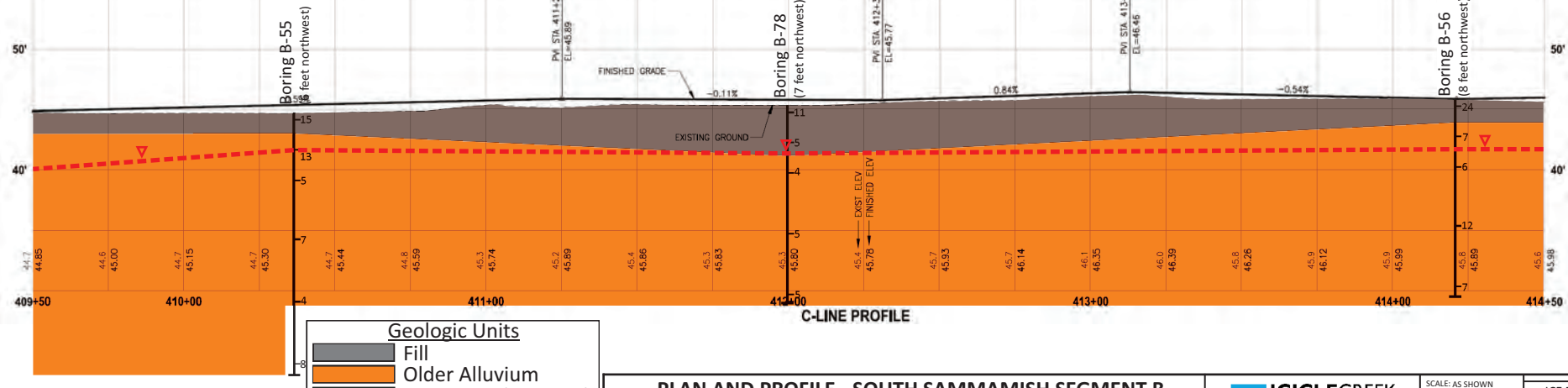

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

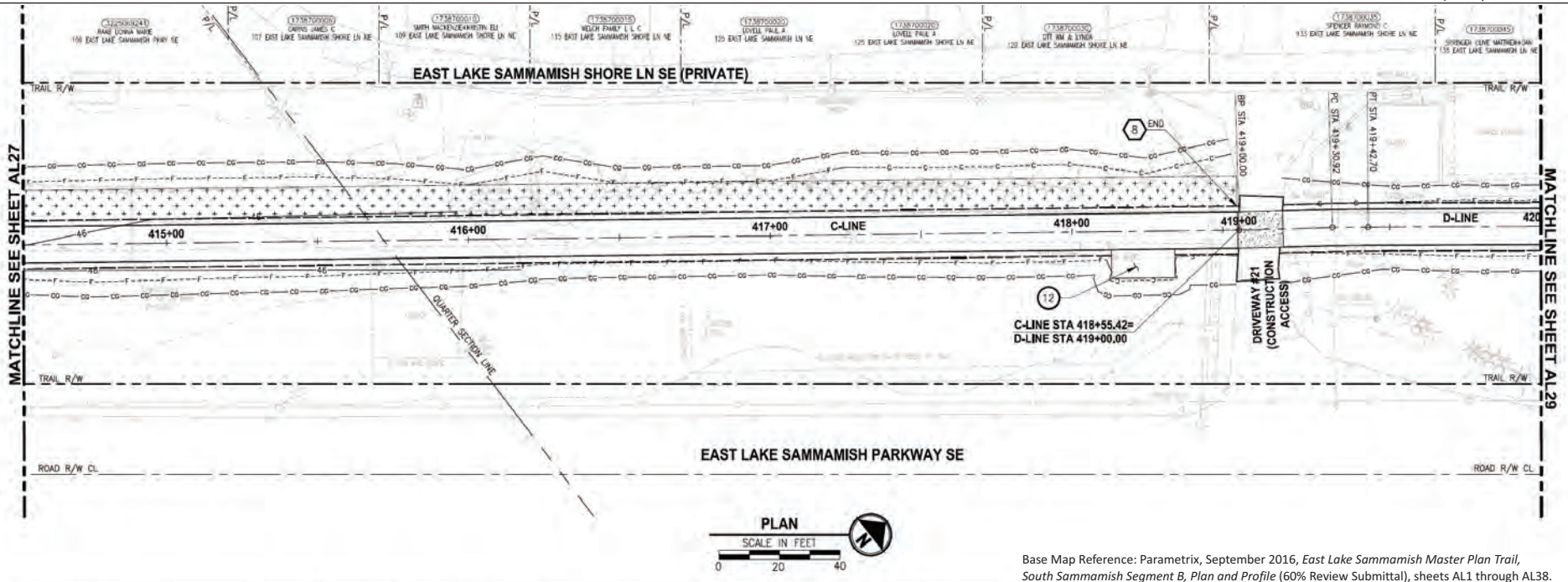
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



PLAN
SCALE IN FEET
0 20 40

Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

72 ← SPT blow count* blow count may not be representative because of the presence of gravel

Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)

0 50 100
Horizontal Scale in Feet (approximate)

0 10 20
Vertical Scale in Feet (approximate)

Notes: 1) Boring logs are included in Appendix A.
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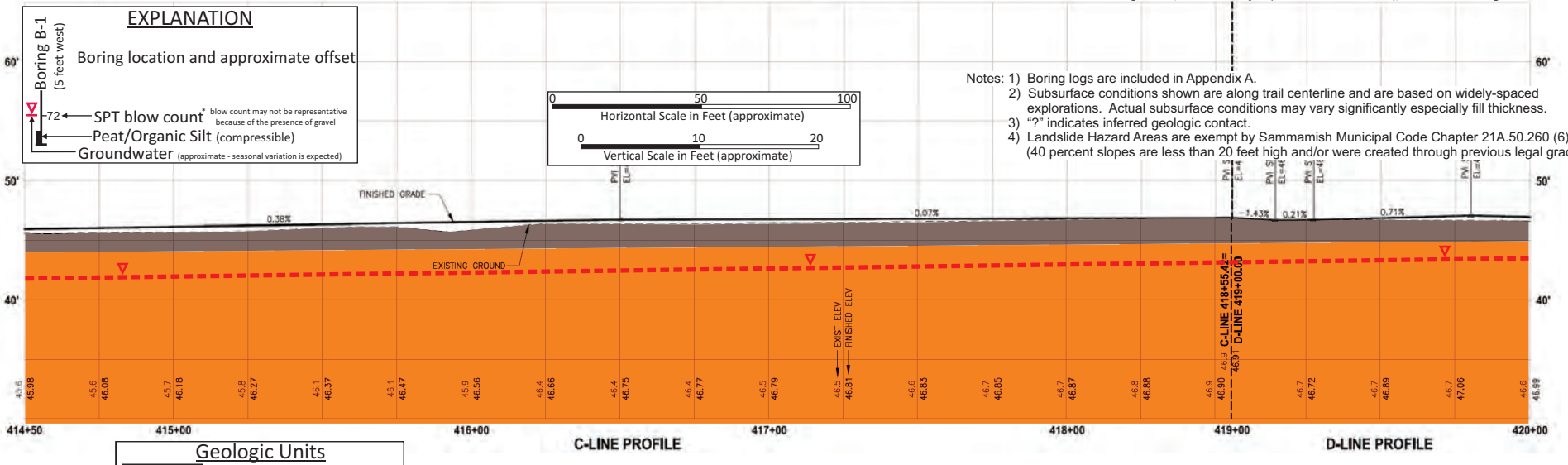

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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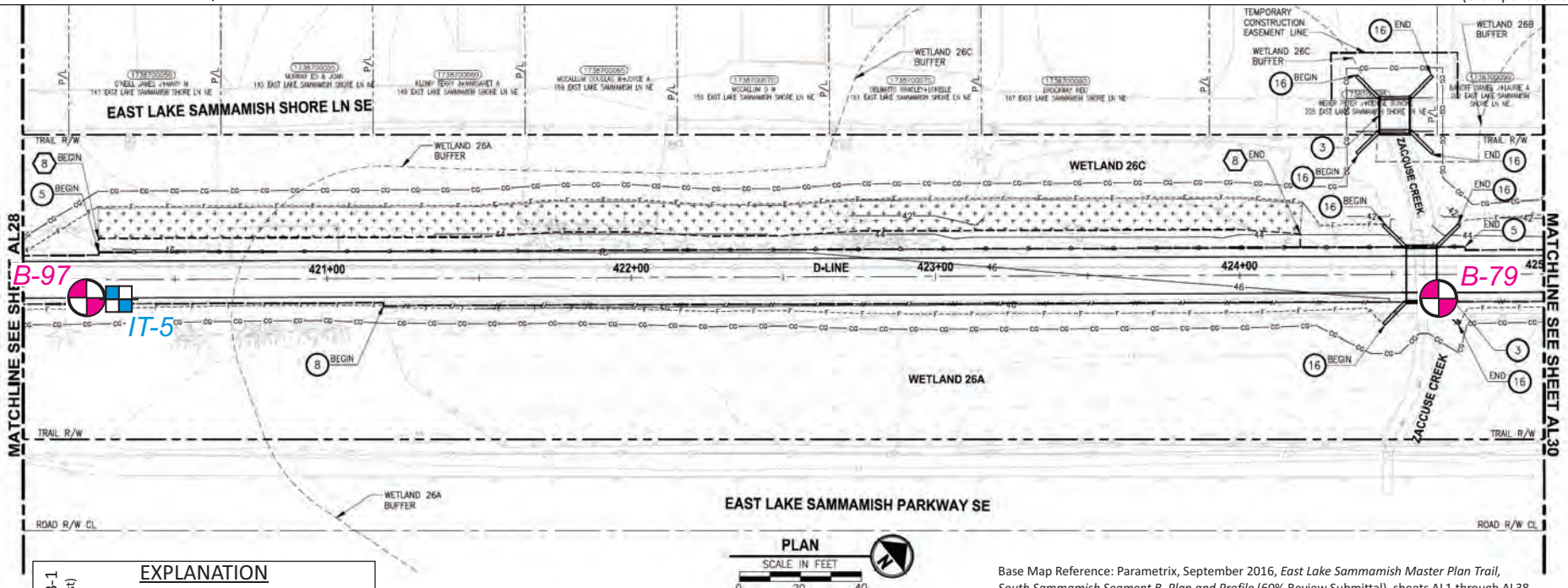
SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	29
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location | IT-1 Infiltration Test Location | Structural Earth Wall | Gravity Block Wall | Soldier Pile Wall | Infiltration Trench | Landslide Hazard Area (exempt - see note 4)



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EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

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Groundwater (approximate - seasonal variation is expected)

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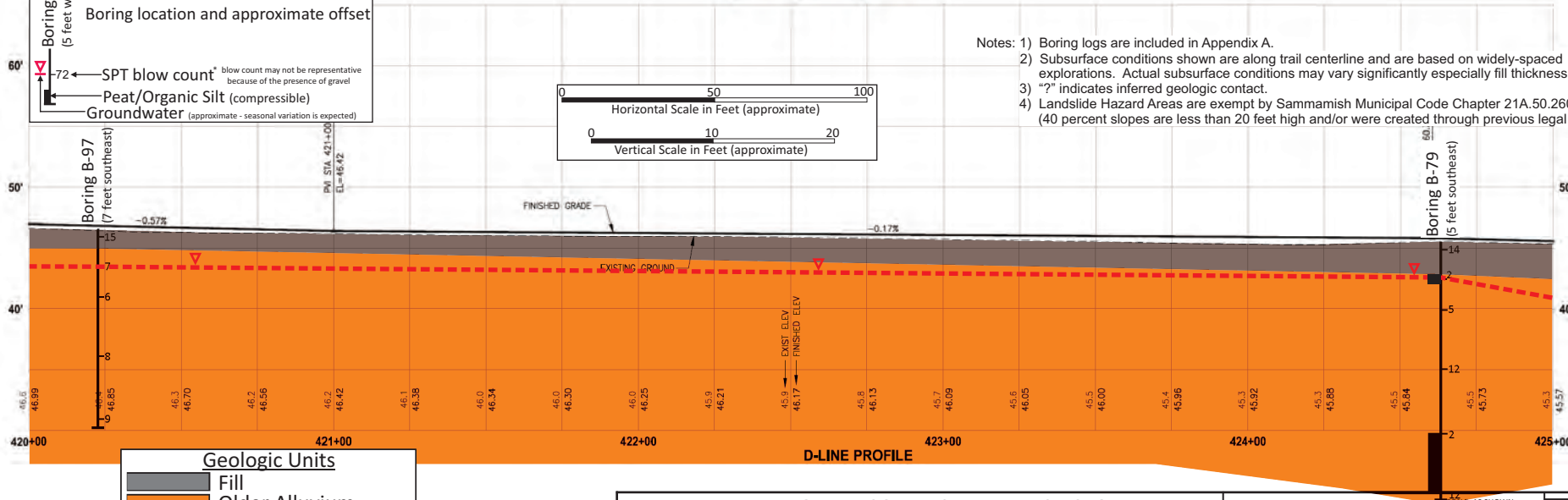

0 50 100 Horizontal Scale in Feet (approximate)

0 10 20 Vertical Scale in Feet (approximate)

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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SCALE: AS SHOWN	ICE FILE NO.
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DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

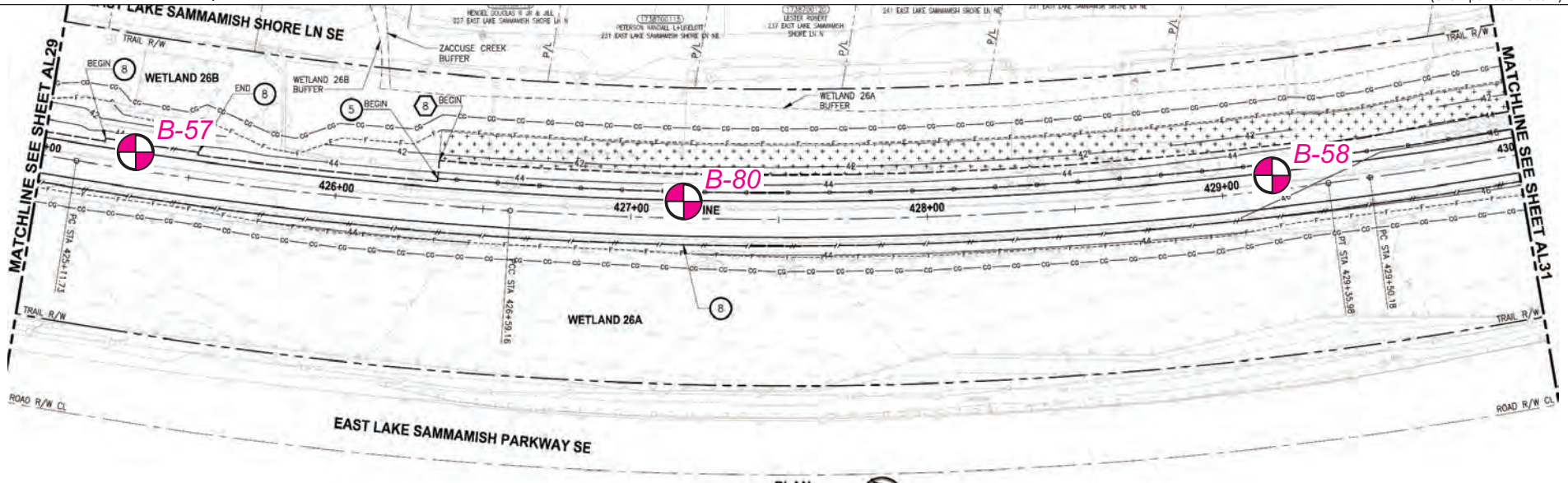
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



PLAN

SCALE IN FEET

0 20 40

Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

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Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)

0 50 100

Horizontal Scale in Feet (approximate)

0 10 20

Vertical Scale in Feet (approximate)

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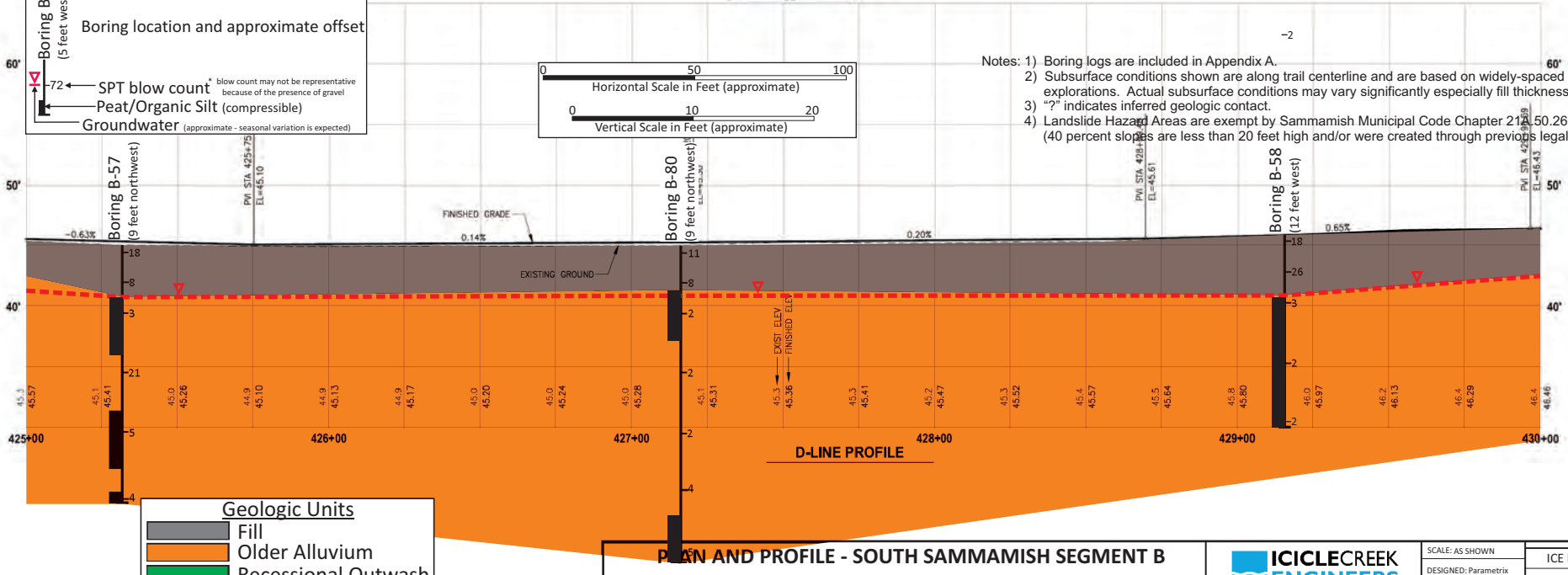

Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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SCALE: AS SHOWN	ICE FILE NO.
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DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

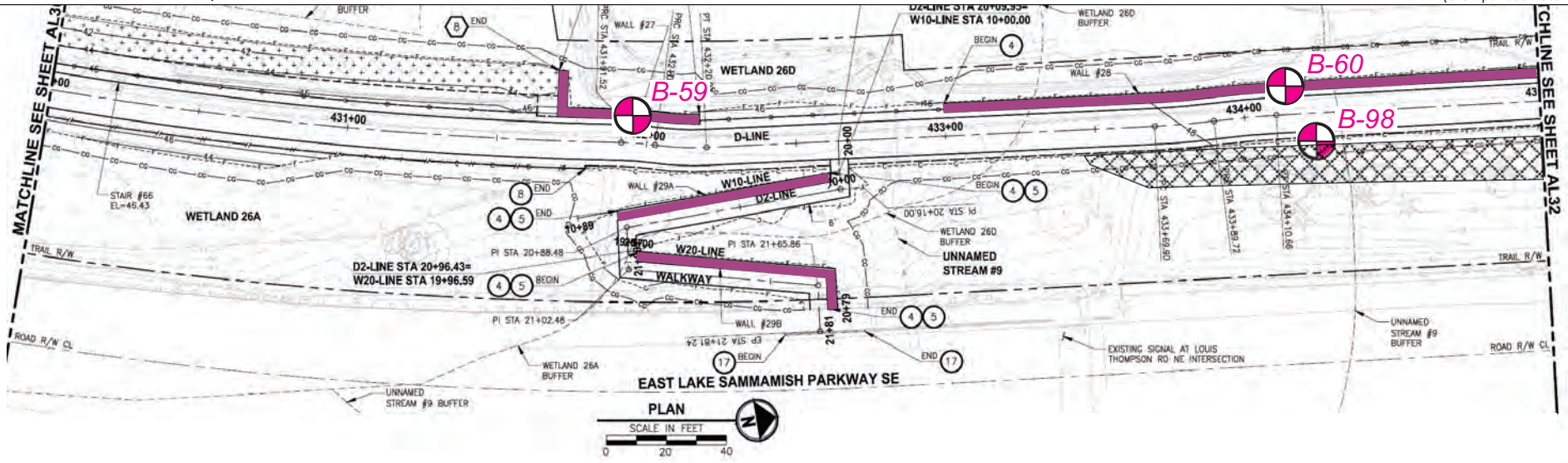
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

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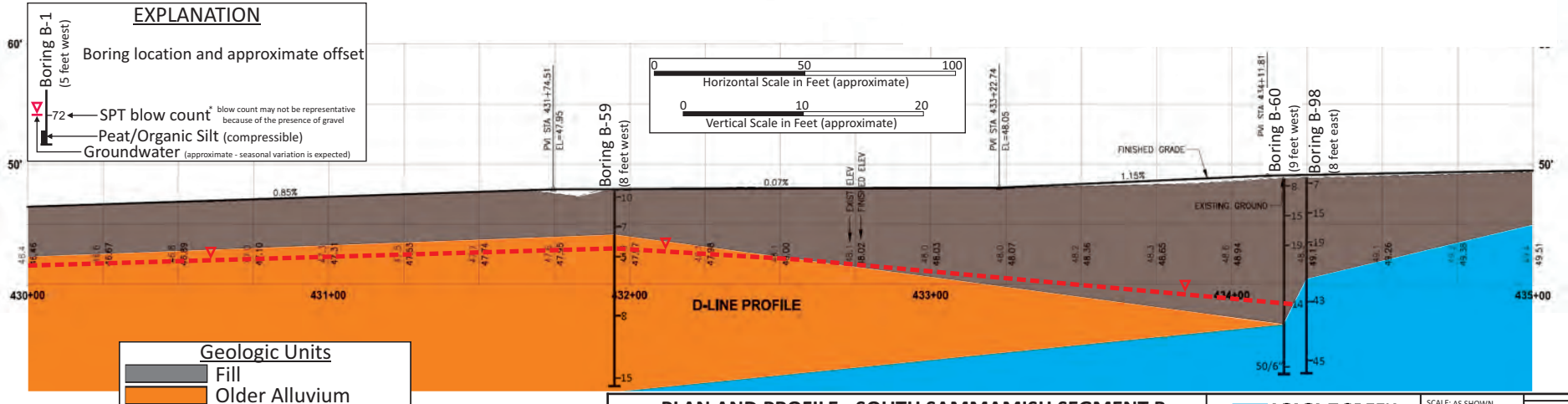

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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SCALE: AS SHOWN	ICE FILE NO.
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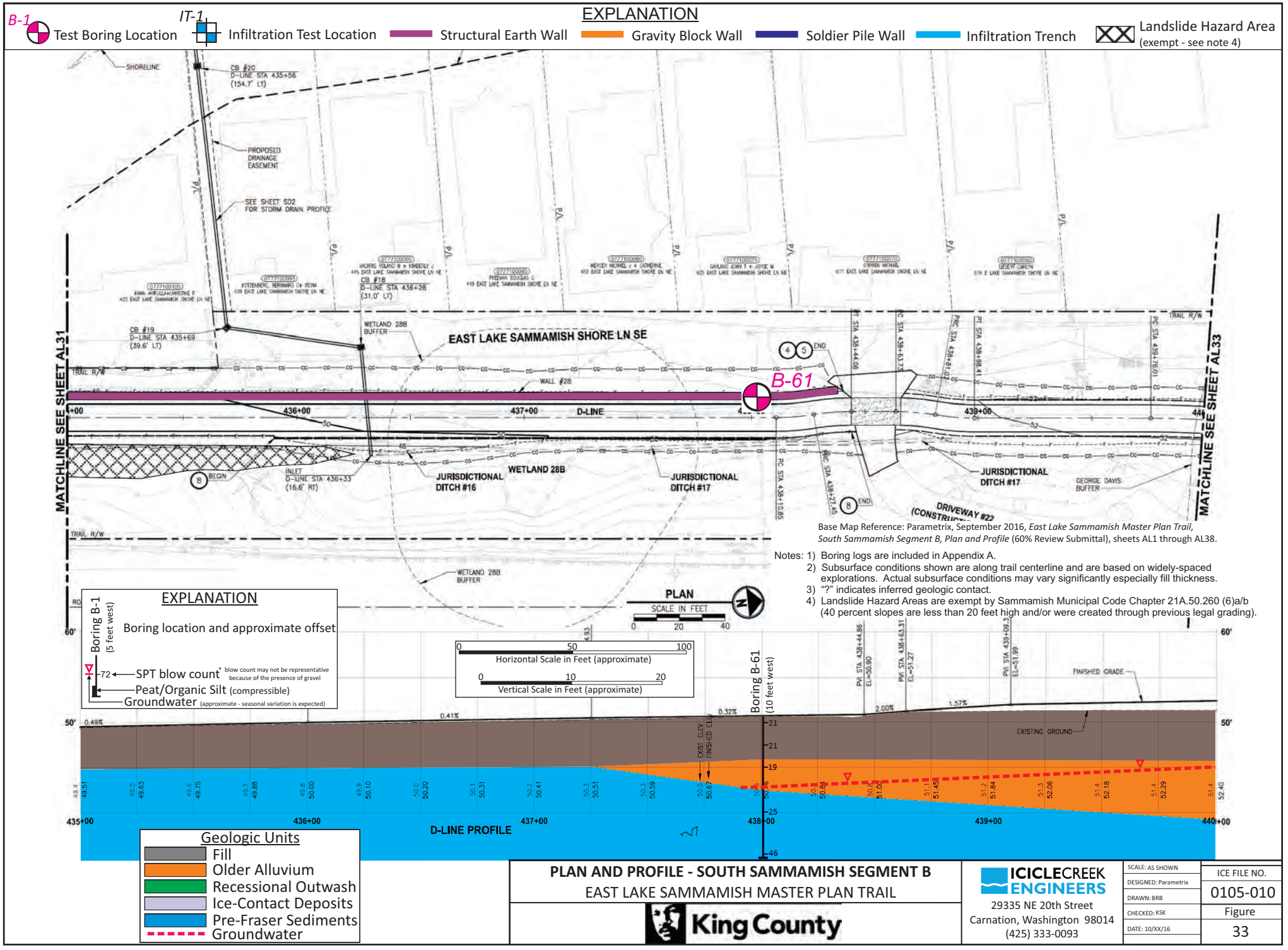

Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

Notes:
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2) Subsurface conditions shown are along trail centerline and are based on widely-spaced explorations. Actual subsurface conditions may vary significantly especially fill thickness.
3) "?" indicates inferred geologic contact.
4) Landslide Hazard Areas are exempt by Sammamish Municipal Code Chapter 21A.50.260 (6)a/b (40 percent slopes are less than 20 feet high and/or were created through previous legal grading).

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

ICICLE CREEK ENGINEERS
29335 NE 20th Street
Carnation, Washington 98014
(425) 333-0093

SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	33
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

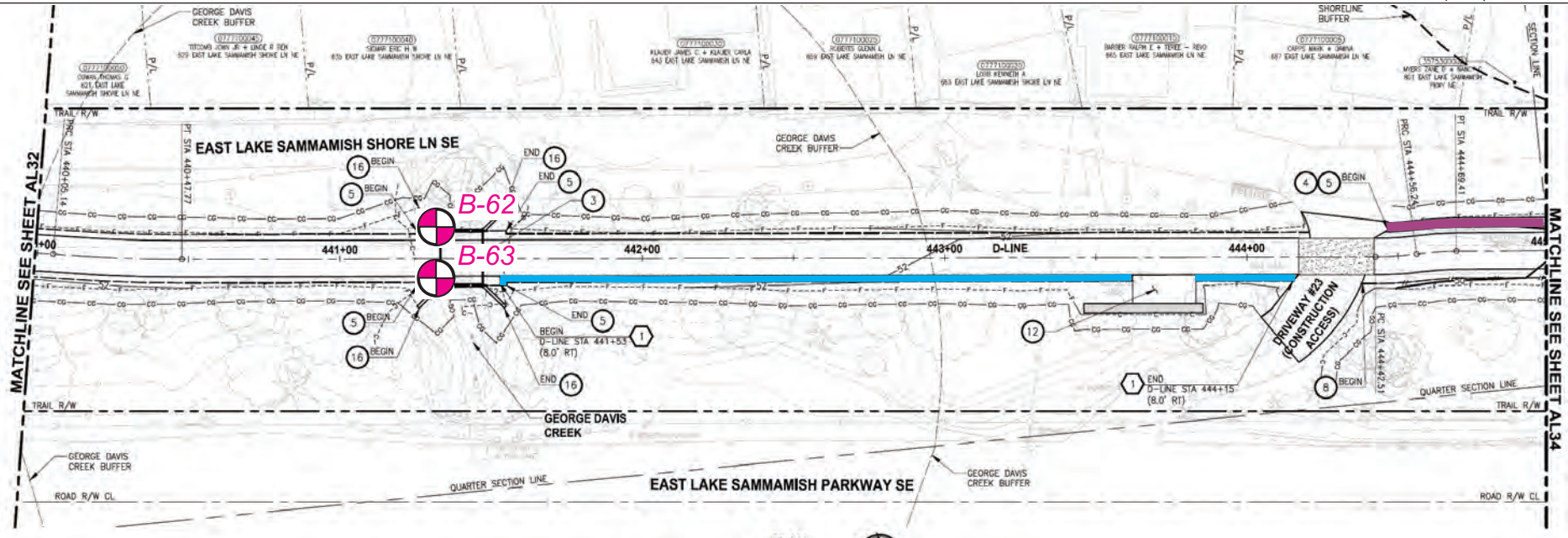
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)

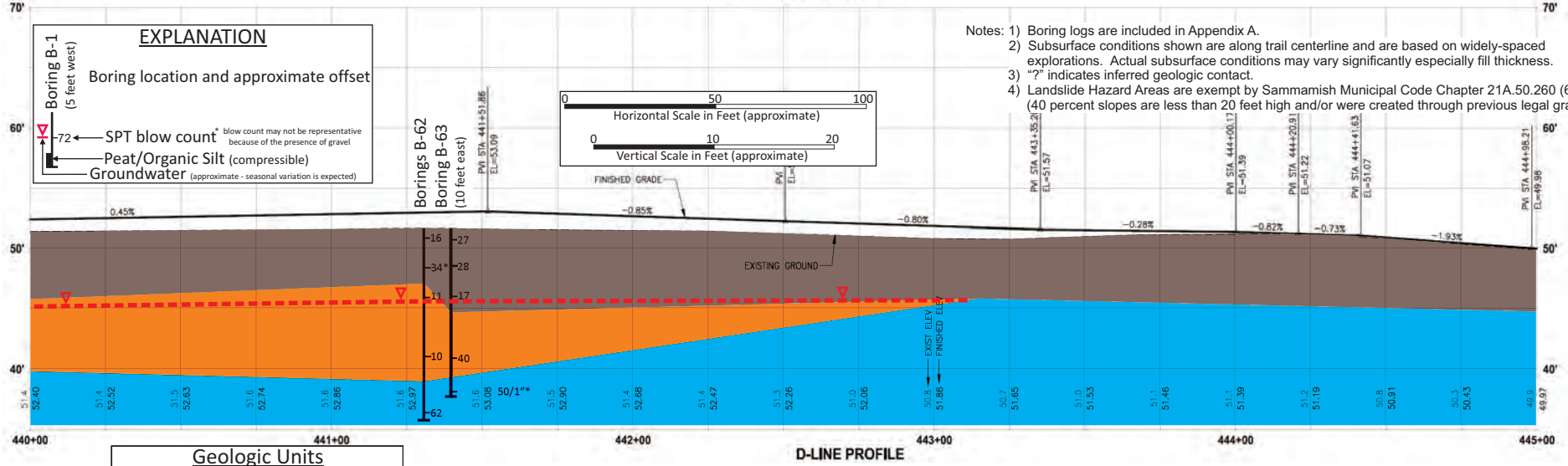


PLAN

SCALE IN FEET

0 20 40

Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.



Notes:
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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

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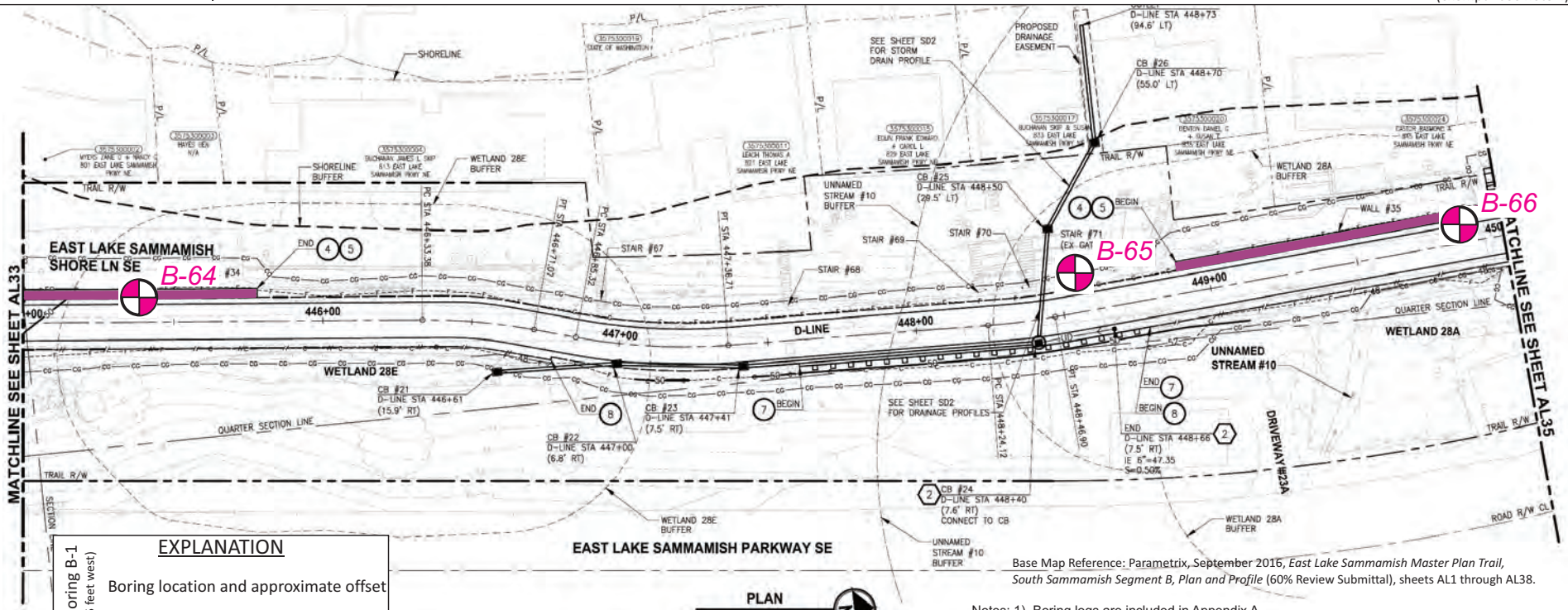
DRAWN: BRB	Figure
CHECKED: KSK	34
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location | IT-1 Infiltration Test Location | Structural Earth Wall | Gravity Block Wall | Soldier Pile Wall | Infiltration Trench | Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

Notes:
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EXPLANATION

Boring B-1 (5 feet west) — Boring location and approximate offset

72 — SPT blow count* (* blow count may not be representative because of the presence of gravel)

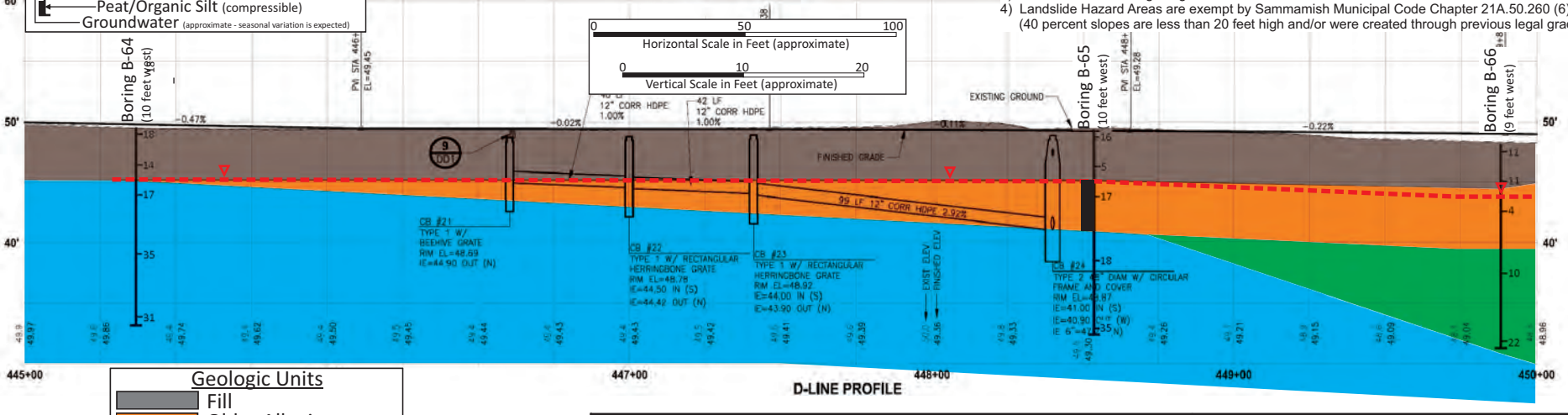
Peat/Organic Silt (compressible)

Groundwater (approximate - seasonal variation is expected)

PLAN
SCALE IN FEET
0 20 40

0 50 100 Horizontal Scale in Feet (approximate)

0 10 20 Vertical Scale in Feet (approximate)



Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

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DRAWN: BRB	Figure
CHECKED: KSK	35
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

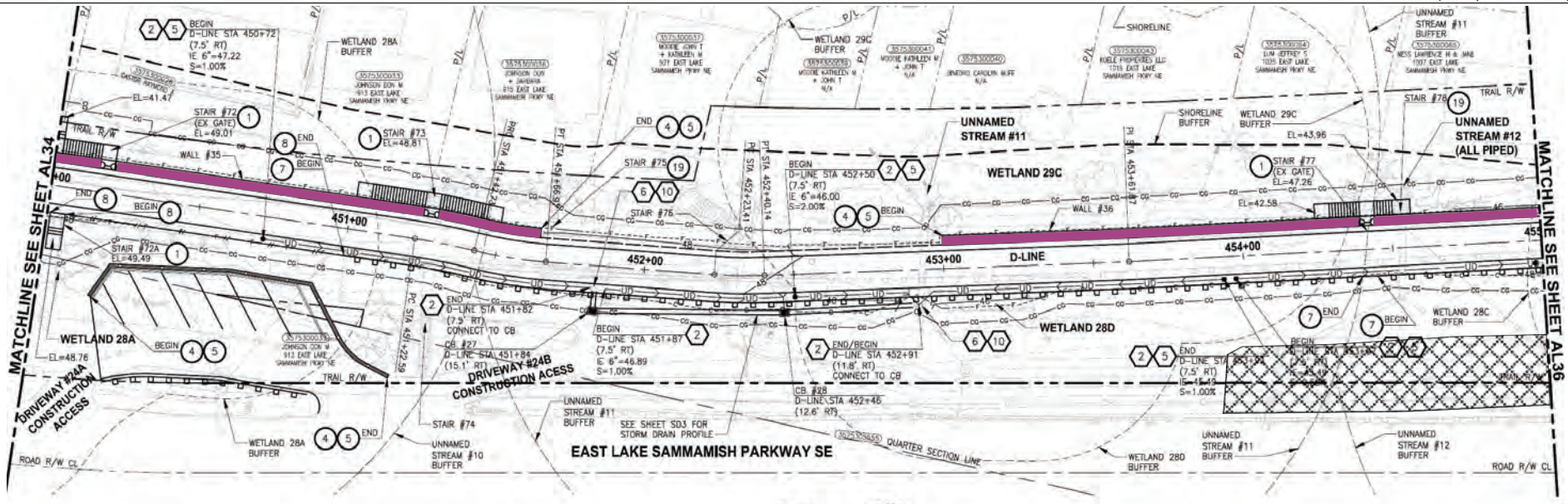
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)

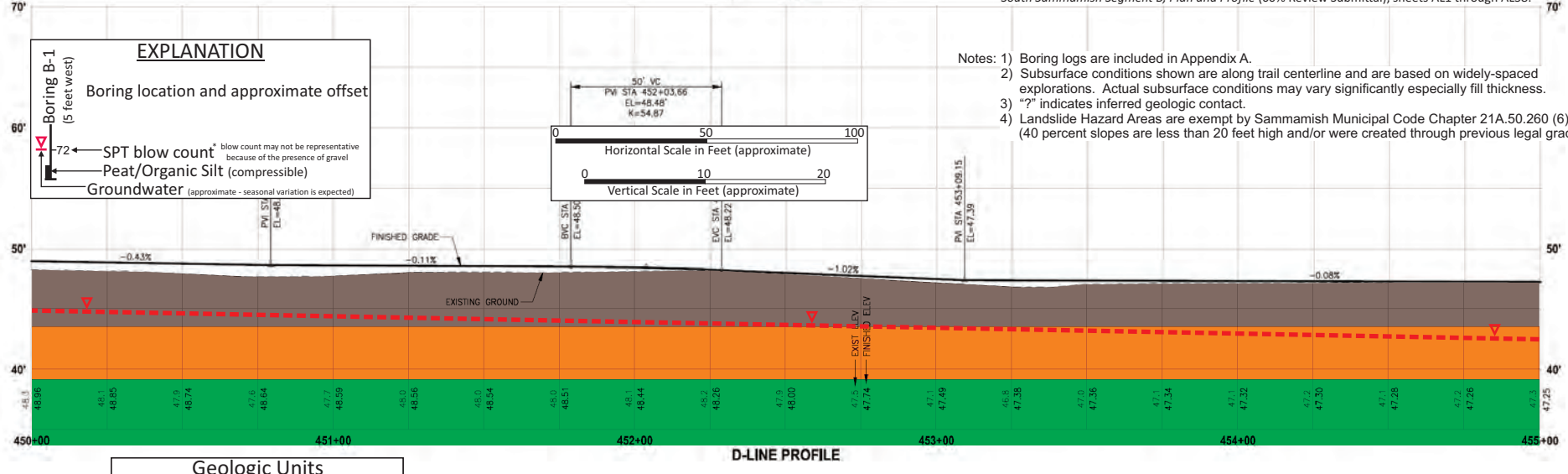


PLAN

SCALE IN FEET

0 20 40

Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.



Notes:
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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

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SCALE: AS SHOWN	ICE FILE NO.
DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	36
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

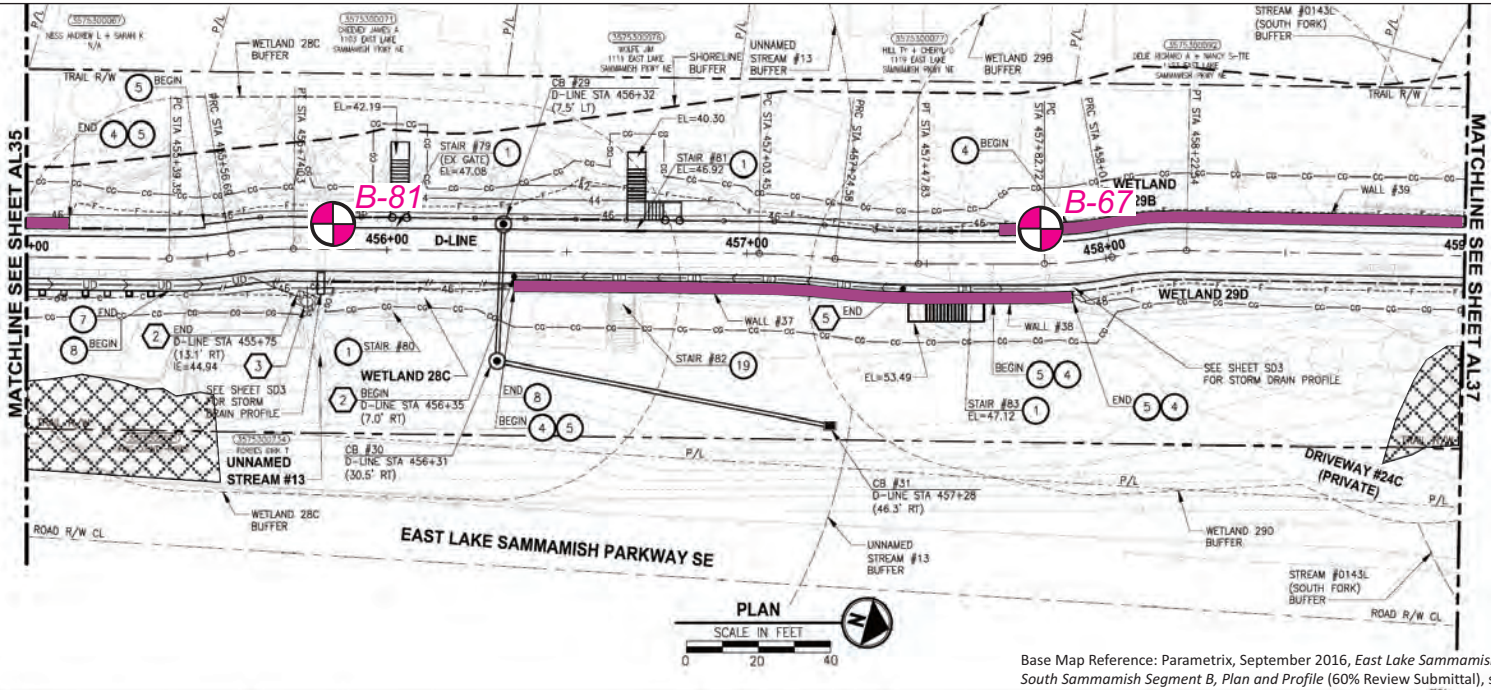
Structural Earth Wall

Gravity Block Wall

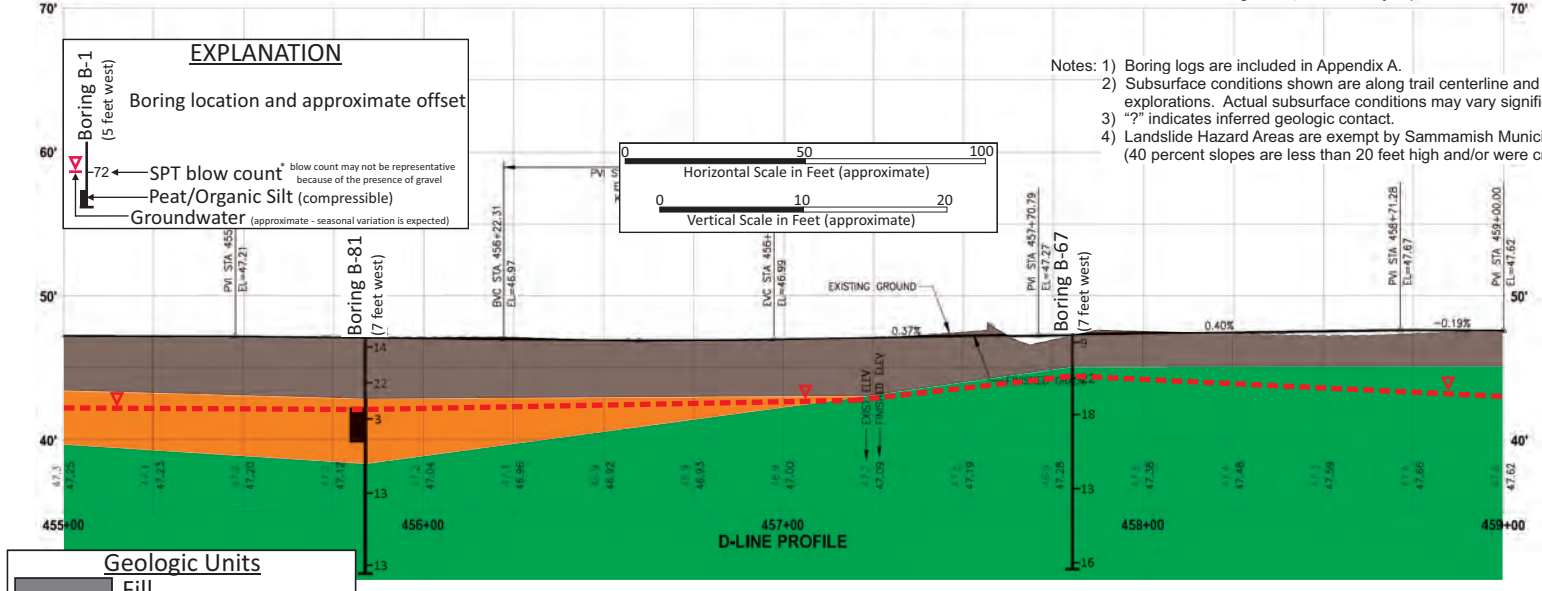
Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.



Notes:
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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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CHECKED: KSK	37
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

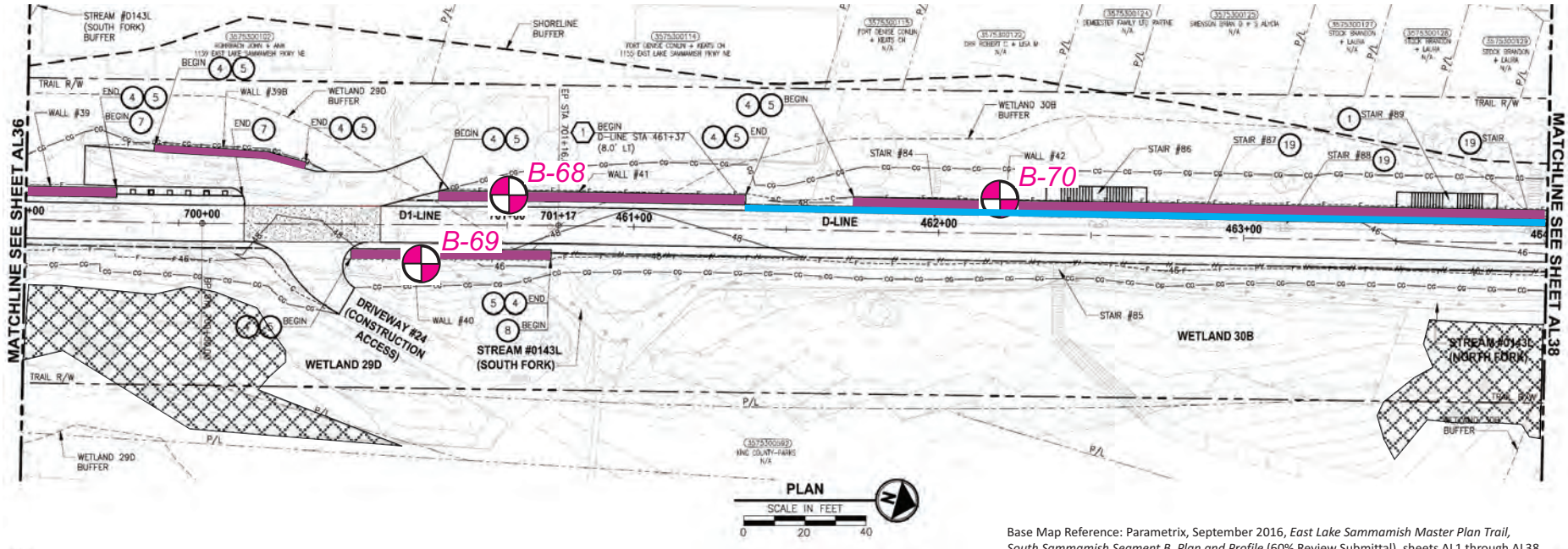
Structural Earth Wall

Gravity Block Wall

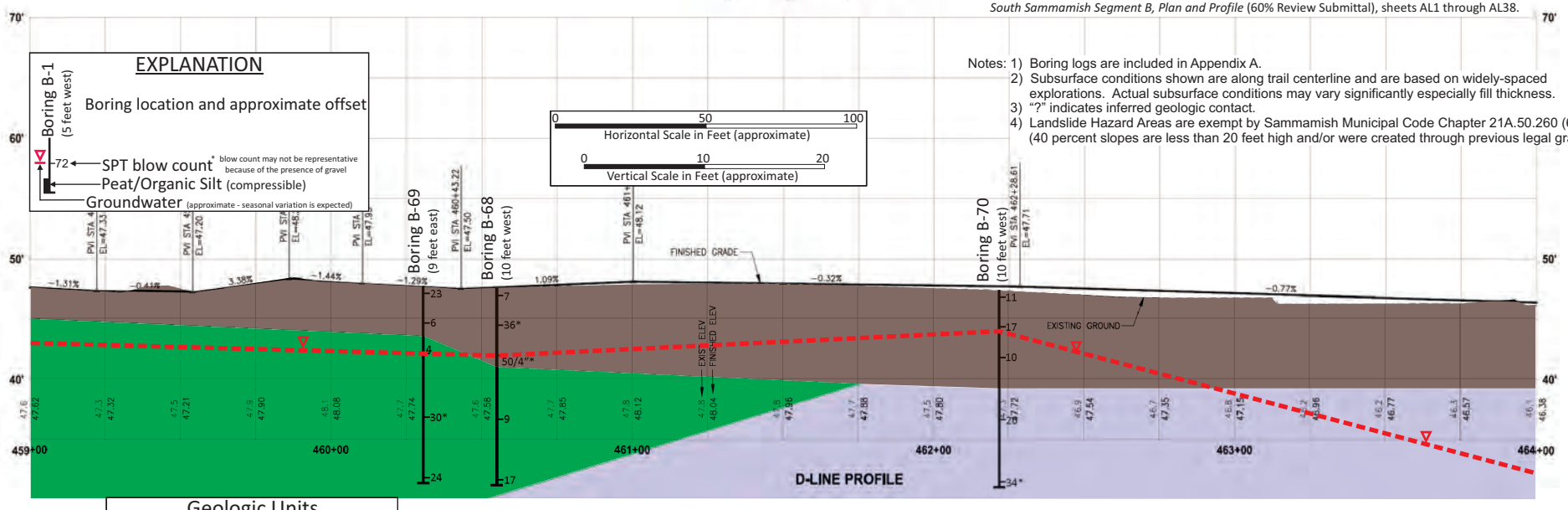
Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.



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Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
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- Groundwater

PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

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DESIGNED: Parametrix	0105-010
DRAWN: BRB	Figure
CHECKED: KSK	38
DATE: 10/XX/16	

EXPLANATION

B-1 Test Boring Location

IT-1 Infiltration Test Location

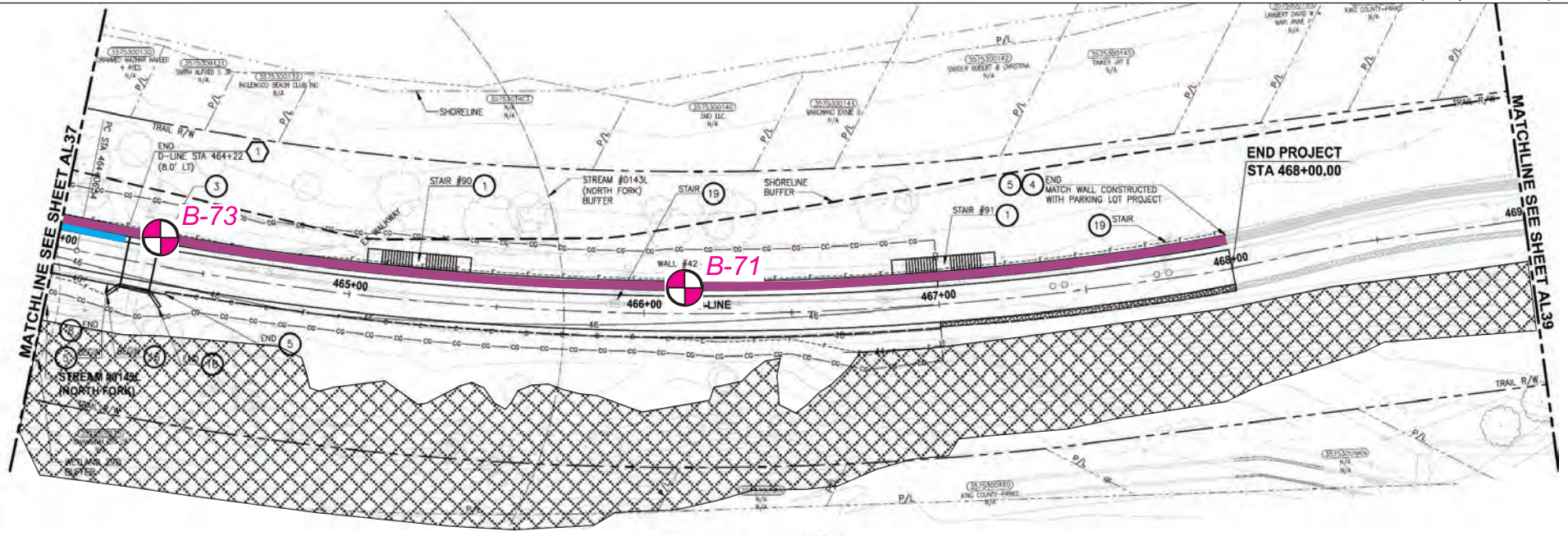
Structural Earth Wall

Gravity Block Wall

Soldier Pile Wall

Infiltration Trench

Landslide Hazard Area (exempt - see note 4)



PLAN

SCALE IN FEET

0 20 40

EXPLANATION

Boring B-1 (5 feet west)

Boring location and approximate offset

72 ← SPT blow count* blow count may not be representative because of the presence of gravel

Peat/Organic Silt (compressible)

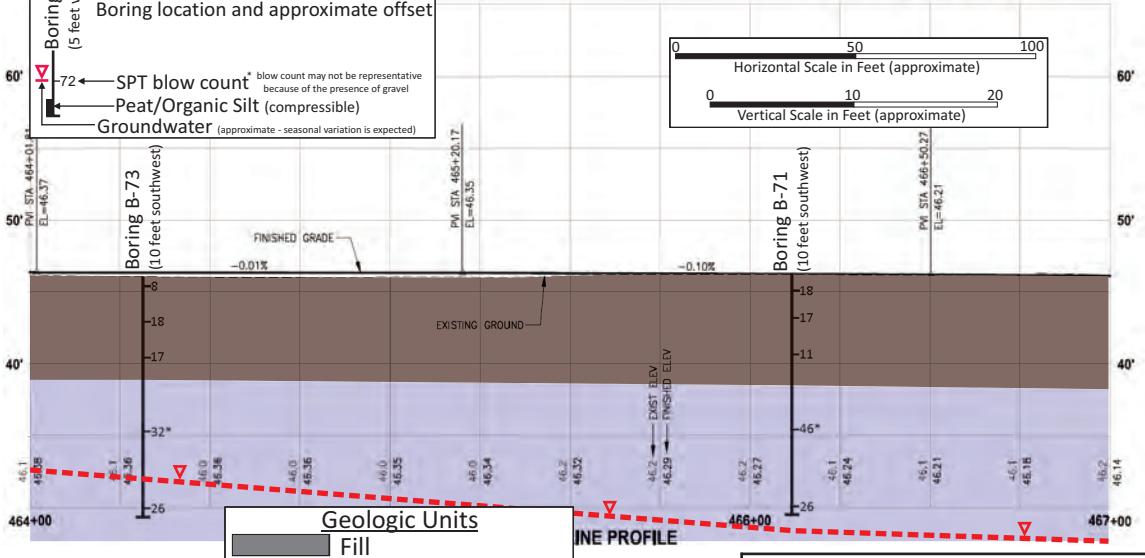
Groundwater (approximate - seasonal variation is expected)

0 50 100

Horizontal Scale in Feet (approximate)

0 10 20

Vertical Scale in Feet (approximate)



Geologic Units

- Fill
- Older Alluvium
- Recessional Outwash
- Ice-Contact Deposits
- Pre-Fraser Sediments
- Groundwater

Base Map Reference: Parametrix, September 2016, *East Lake Sammamish Master Plan Trail, South Sammamish Segment B, Plan and Profile* (60% Review Submittal), sheets AL1 through AL38.

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PLAN AND PROFILE - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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SCALE: AS SHOWN	ICE FILE NO.
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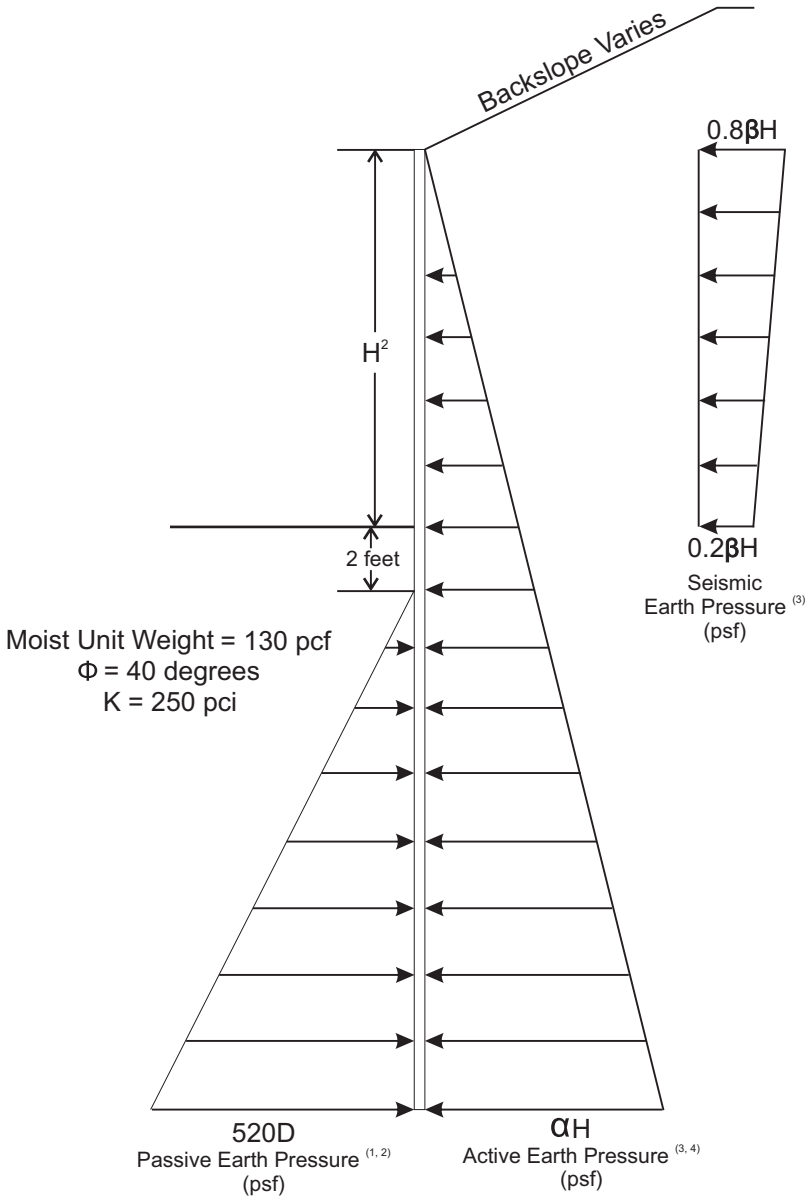
DRAWN: BRB	Figure
CHECKED: KSK	39
DATE: 10/XX/16	



Backslope Condition	α	β
Level	35	18
5H:1V	40	20
2H:1V	52	26
1.5H:1V	77	38

(H:V - horizontal to vertical)

Limit State	Passive Resistance Factor
Strength	0.75
Service	1.0
Extreme	1.0

NOTES
1) Passive earth pressure shown in an ultimate (unfactored) value and should be applied over 2½ times the soldier pile diameter using the appropriate resistance factor.
2) Passive earth pressure and wall height should start 2 feet below the ground surface. No ground water is assumed.
3) Active and seismic earth pressures act over the pile spacing above the base of the wall.
4) Active earth pressures act over one pile diameter below the base of the wall.

psf = pounds per square foot; pcf = pounds per cubic foot; pci = pounds per cubic inch

SOLDIER PILE WALL EARTH PRESSURE DIAGRAM - SOUTH SAMMAMISH SEGMENT B

EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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SCALE: AS SHOWN
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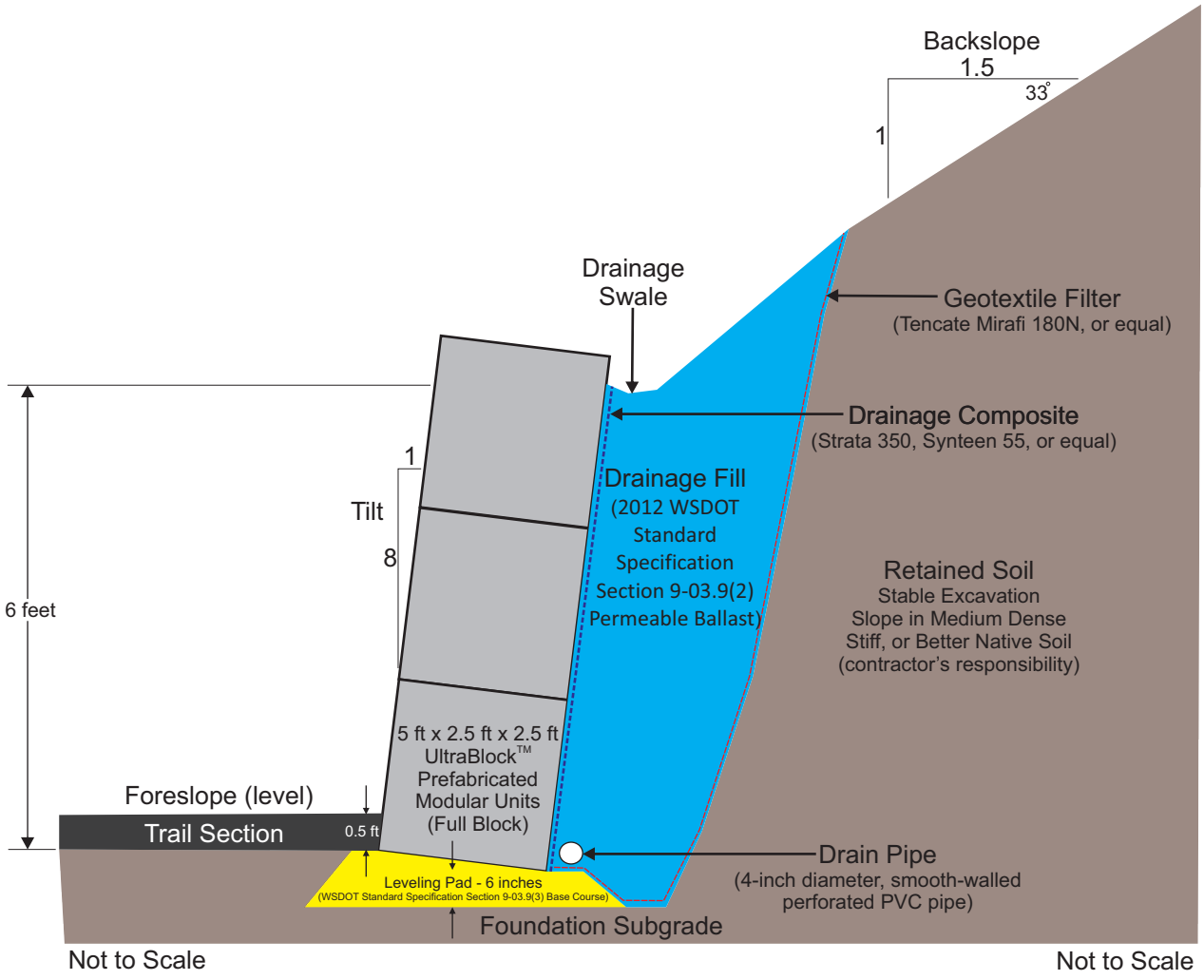
CHECKED: KSK
DATE: 10/XX/16

ICE FILE NO. 0105-010

Figure 40



Notes: 1) Maximum wall height for this design is 6 feet.
2) A Cap Block that measures 5 feet by 1.25 feet by 2.5 feet can be used as a substitute to the top Full Block depending on wall height.

ULTRABLOCK™ WALL DIAGRAM - SOUTH SAMMAMISH SEGMENT B
EAST LAKE SAMMAMISH MASTER PLAN TRAIL

King County

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CHECKED: KSK	41
DATE: 10/XX/16	

APPENDIX A

FIELD EXPLORATION PROGRAM

APPENDIX A

A.0 FIELD EXPLORATION PROGRAM

A.1 GEOLOGICAL RECONNAISSANCE

Surface conditions were evaluated based on field reconnaissance completed by personnel from ICE on September 9 and 10, October 7, 8, 12, 14 through 19, 21 and 25, 2013. The weather during this time period was seasonably cool (40s) in the morning and warm (50s and low 60s) in the afternoon, though was unseasonably dry (rain occurred only on October 8, 2013). The weather preceding our field reconnaissance was relatively normal. Jeff Schwartz of ICE completed a field reconnaissance of the ELST SSS-B on October 17, 2016 as an update to the earlier reconnaissance efforts. The reconnaissance and mapping included the following:

- Observation and preliminary evaluation of man-made features including road and trail embankments (cuts and fills), ditchlines, oversteepened areas and overall existing trail conditions.
- Reconnaissance and mapping included photograph documentation of the existing trail conditions and test boring locations.

A.2 TEST BORINGS

Subsurface conditions were evaluated based on published and unpublished geologic information for the area, including an on-line database of test borings maintained by the Washington State Department of Natural Resources (https://fortress.wa.gov/dnr/geology/?Site=subsurf).

ICE completed 72 test borings (Borings B-13 to B-71, B-73, B-76 to B-81, B-93 to B-98) along the ELST SSS-B ranging from about 6½- to 26½-feet deep. The test borings were drilled between October 7 and October 25, 2013 using track-mounted, hollow-stem auger drilling equipment owned and operated by Boretec, Inc. of Valleyford, Washington. The locations of the test borings are shown on Figures 2 through 39.

Piezometers were installed in five of the test borings (Borings B-93, B-94, B-95, B-97 and B-98). Details of the piezometers are presented in **Section A.3**.

The explorations were continuously observed by an engineering geologist from ICE who classified the soils, obtained representative soil samples, observed groundwater conditions and prepared a detailed log of each exploration. After completion, the test borings were either backfilled in general accordance with Washington State Department of Ecology (Ecology) guidelines, or piezometers were installed as described in **Section A.3**. Soil cuttings from the test borings were hauled off-site by Boretec. The ground surface, typically along the edge of the existing trail, was restored and protected from erosion by smoothing the surface and spreading crushed rock in the disturbed area of each test boring.

The soil consistencies noted on the boring logs are based on the conditions observed, our experience and judgement, and blow count data obtained during drilling. Representative samples were obtained from the test borings by collecting soil samples at 2½- or 5-foot depth intervals using a 1.5-inch inside diameter split barrel (SPT – Standard Penetration Test) sampler. The sampler was driven 18 inches, if possible, by a 140-pound weight falling a minimum vertical distance of 30 inches. The number of blows required to drive the sampler the last 12 inches, or other indicated distance, was recorded on the boring log.

Soils encountered were classified in general accordance with the classification system described in Figure A-1. The boring logs are presented in Figures A-2 through A-73. The boring logs are based on our interpretation of the field and laboratory data and indicate the various types of soil encountered. They

also indicate the depths at which the soil characteristics change, although the change might actually be gradual. If the change occurred between samples in the boring, it was interpreted. The laboratory testing program for soil samples obtained from the test borings is described in Appendix B.

Elevations of the test borings as shown on the boring logs are based on plans and profiles provided by Parametrix (NAVD88 vertical datum, Parametrix, September 2016, sheets AL1 to AL39).

A.3 GROUNDWATER MONITORING – PIEZOMETERS

Groundwater observations as noted on the boring logs (for test borings where no piezometer was installed) are based on our observations of the soil samples and drilling equipment, or by direct observation or measurement through the auger during drilling.

Piezometers (for measuring groundwater) were installed in five of the test borings including Borings B-93, B-94, B-95, B-97 and B-98. Piezometer installation was completed in general accordance with Ecology requirements; installation details are shown on the respective boring logs in this appendix.

The depth to groundwater was measured in the five piezometers using an electric water level indicator (manual readings) on November 13 and December 18, 2013, February 13, April 24 and October 23, 2014. These manual groundwater measurements summarized in this Appendix, with selected measurements shown on the applicable boring logs in this appendix.

A.4 INFILTRATION TESTING

We completed a Single Ring Infiltration Tests (SRITs) adjacent to the proposed location of the Infiltration Chamber (SRIT-4 and SRIT-5; Figures 3 and 30, respectively). SRIT-4 was completed at a depth of 2 feet adjacent to Boring B-93. SRIT-5 was completed at a depth of 2 feet adjacent to Boring B-97. The test holes for the SRITs were excavated using a Deere 310 backhoe owned and operated by Bill Wheeler Construction Company. A 2,200-gallon water truck was also provided by Bill Wheeler Construction Company for the SRIT. Representative soil samples were collected at the SRIT-4 location that was used to complete grain size analysis based on methods described in the 2009 King County SWDM (SRITs – Method 1); the laboratory testing program for soil samples obtained from the SRIT sites is described in Appendix B. The SRIT trenches were backfilled with the excavated soil following test completion. The disturbed ground surface in the backfilled trench areas was covered with a straw mulch.

Unified Soil Classification System

MAJOR DIVISIONS			Soil Classification and Generalized Group Description	
Coarse-Grained Soils	GRAVEL More than 50% of coarse fraction retained on the No. 4 sieve	CLEAN GRAVEL	GW	Well-graded gravels
			GP	Poorly-graded gravels
		GRAVEL WITH FINES	GM	Gravel and silt mixtures
			GC	Gravel and clay mixtures
	SAND More than 50% of coarse fraction passes the No. 4 sieve	CLEAN SAND	SW	Well-graded sand
			SP	Poorly-graded sand
More than 50% retained on the No. 200 sieve		SAND WITH FINES	SM	Sand and silt mixtures
			SC	Sand and clay mixtures
Fine-Grained Soils	SILT AND CLAY Liquid Limit less than 50	INORGANIC	ML	Low-plasticity silts
			CL	Low-plasticity clays
		ORGANIC	OL	Low plasicity organic silts and organic clays
	SILT AND CLAY Liquid Limit greater than 50	INORGANIC	MH	High-plasticity silts
			CH	High-plasticity clays
More than 50% passing the No. 200 sieve		ORGANIC	OH	High-plasticity organic silts and organic clays
Highly Organic Soils	Primarily organic matter with organic odor		PT	Peat

Notes: 1) Soil classification based on visual classification of soil is based on ASTM D 2488.
2) Soil classification using laboratory tests is based on ASTM D 2487.
3) Description of soil density or consistency is based on interpretation of blow count data and/or test data.

Soil Particle Size Definitions

Component	Size Range
Boulders	Coarser than 12 inch
Cobbles	3 inch to 12 inch
Gravel	3 inch to No. 4 (4.78 mm)
Coarse	3 inch to 3/4 inch
Fine	3/4 inch to No. 4 (4.78 mm)
Sand	No. 4 (4.78 mm) to No. 200 (0.074mm)
Coarse	No. 4 (4.78 mm) to No. 10 (2.0 mm)
Medium	No. 10 (2.0 mm) to No. 40 (0.42 mm)
Fine	No. 40 (0.42 mm) to No. 200 (0.074 mm)
Silt and Clay	Finer than No. 200 (0.074 mm)

Soil Moisture Modifiers

Soil Moisture	Description
Dry	Absence of moisture
Moist	Damp, but no visible water
Wet	Visible water

Key to Boring Log Symbols

Sampling Method	Boring Log Symbol	Description
Blows required to drive a 2.4 inch I.D. split-barrel sampler 12-inches or other indicated distance using a 300-pound hammer falling 30 inches.	34	Location of relatively undisturbed sample
	12	Location of disturbed sample
	21	Location of sample attempt with no recovery
Blows required to drive a 1.5-inch I.D. split barrel sampler (SPT - Standard Penetration Test) 12-inches or other indicated distance using a 140-pound hammer falling 30 inches.	14	Location of sample obtained in general accordance with Standard Penetration Test (ASTM D-1586) test procedures.
	30	Location of SPT sampling attempt with no recovery.
Pushed Sampler	P	Sampler pushed with the weight of the hammer or against weight of the drilling rig.
Grab Sample	G	Sample obtained from drill cuttings.

Note: The lines separating soil types on the logs represents approximate boundaries only. The actual boundaries may vary or be gradual.

Laboratory Tests

Test	Symbol
Moisture Content	MC
Density	DN
Grain Size	GS
Percent Fines	PF
Atterberg Limits	AL
Hydrometer Analysis	HA
Consolidation	CN
Compaction	CP
Permeability	PM
Unconfined Compression	UC
Unconsolidated Undrained TX	UU
Consolidated Undrained TX	CU
Consolidated Drained TX	CD
Chemical Analysis	CA

SOIL CLASSIFICATION SYSTEM

King County

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29335 NE 20th Street
Carnation, Washington 98014
(425) 333-0093

SCALE: As Shown
DESIGNED: --
DRAWN: BRB
CHECKED: KSK
DATE: 10/XX/16

ICE FILE NO. 0105-010
Figure A-1

SAB:10/10/16

Boring B-13

Station 291+55, 10 feet south; 47.581214, -122.078474

Approximate Elevation: 50 feet

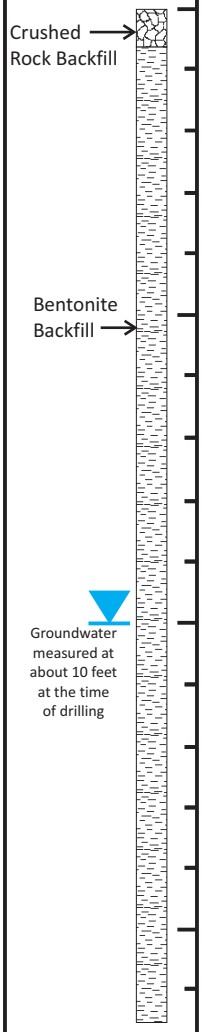
Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing
0	Gray and black fine GRAVEL with sand (medium dense, moist) (Fill)		GP				
	Brown fine to coarse SAND with gravel (medium dense, moist) (Fill)		SP/SW	21			MC
			SP/SW	15			MC
5	Light gray fine SAND with silt (loose, moist) (Fill)		SP-SM	8			MC
	Gray fine SAND with silt and a trace of gravel (dense*, wet) (Recessional Outwash)		SP-SM	40*			MC
10	Light brown to gray silty fine to medium SAND with fine gravel (medium dense, wet) (Recessional Outwash)		SM	17			MC
15	Boring completed at about 16.5 feet on October 21, 2013 *Blow count and density may not be representative because of the presence of gravel						
20							
25							

Comments/ Groundwater Observations



See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-14

Station 290+50, 10 feet north; 47.581183, -122.078033

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	24		■ ●	MC	Crushed Rock Backfill →
	Brown fine to coarse SAND with silt and fine gravel (medium dense, moist) (Fill)		SP-SM	12		● ■	MC,GS	
5	Brown fine to coarse GRAVEL with sand and a trace of silt and organic material (very loose, moist) (Older Alluvium)		GP/GW	2		● ■	MC,GS	Bentonite Backfill →
	Gray fine to coarse GRAVEL with sand (medium dense, wet) (Recessional Outwash)		GP/GW	20		■ ●	MC	Groundwater measured at about 10 feet at the time of drilling
15	Brown fine to coarse GRAVEL with sand (medium dense, wet) (Recessional Outwash)		GP/GW	18		● ■	MC	
	Boring completed at about 16.5 feet on October 21, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-15

Station 295+15, 10 feet south; 47.581481, -122.079921

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Soil Profile: Graphic Log	Sample Data: Group Symbol	Sample Data: Blow Count	Sample Data: Sample Location	Penetration Resistance (Blows/foot - ●) / Moisture Content (Percent - ■)	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray to dark brown fine to coarse GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	18		20 40 60 80	MC	Crushed Rock Backfill →
	Light brown silty fine to medium SAND with gravel and a trace of organic material (loose, moist) (Fill)		SM	9			MC,GS	
5	Light brown silty fine to medium SAND with gravel (very dense*, moist) (Recessional Outwash)		SM	50/5”*			MC,GS	Bentonite Backfill →
10			SP-SM	50/6”*			MC	No groundwater observed at the time of drilling
	Boring completed at about 10.5 feet because of drilling refusal on October 21, 2013 *Blow count and density may not be representative because of the presence of gravel							
15								
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-16

Station 296+70, 9 feet north; 47.581627, -122.080473

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray to dark brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	28		■ ●	MC	Crushed Rock Backfill →
	Brown fine to coarse GRAVEL with sand (very dense*, moist) (Recessional Outwash)		GW	50/5”*		■ ●	MC	Bentonite Backfill →
5	grades to wet		GW	55*		■ ●	MC	Groundwater measured at about 4 feet at the time of drilling
	Boring completed at about 6.5 feet because of drilling refusal on October 19, 2013							
	* Blow count and density may not be representative because of the presence of gravel							
10								
15								
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-17

Station 301+80, 10 feet south; 47.58224, -122.082284

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine to coarse GRAVEL with sand with a trace of silt (medium dense, moist) (Fill)		GP	18		■ ●	MC	Crushed Rock Backfill →
	Brown fine to coarse GRAVEL with sand (medium dense, moist) (Recessional Outwash)		GP/GW	16		■ ●	MC	
5			GP/GW	14		■ ●	MC	Bentonite Backfill →
10	grades to very dense*		GP/GW	50/6”*		■ ●	MC	
			GP/GW	50/1”*		■ ●	MC	No groundwater observed at the time of drilling
15	Boring completed at about 12.7 feet because of drilling refusal on October 19, 2013							
	* Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-18

Station 600+38, 10 feet north; 47.582529, -122.082581

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray to dark brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	24			MC	Crushed Rock Backfill →
	Brown fine to coarse GRAVEL with sand (very dense*) (Recessional Outwash)		GP	58*			MC	
5			GP	50/6"*			MC	Bentonite Backfill →
10			GP	50/6"*			MC	No groundwater observed at the time of drilling
15	Boring completed at about 11.5 feet because of drilling refusal on October 19, 2013							
20	*Blow count and density may not be representative because of the presence of gravel							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-19

Station 601+58, 20 feet west; 47.582929, -122.083175

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray to dark brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	24			MC	Crushed Rock Backfill →
	Brown fine to coarse GRAVEL with sand (very dense*, moist) (Recessional Outwash)		GP	49*			MC	
5			GP	50/6"*			MC	
								Bentonite Backfill →
10			GP	59*			MC	
								Groundwater measured at about 14 feet at the time of drilling
15	grades to wet		GP	59*			MC	
	Boring completed at about 16.5 feet on October 25, 2013							
	*Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-20

Station 603+35, 15 feet east; 47.583183, -122.083127

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray to dark brown fine to coarse GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	17		■ ●	MC	Crushed Rock Backfill →
	Gray and brown fine to coarse SAND with gravel and a trace of silt (very dense*, moist) (Recessional Outwash)		SP/SW	75*		■ ●	MC	
5	Light brown fine to medium SAND (very dense*, moist) (Recessional Outwash)		SP	50/6”*		■ ●	MC	Bentonite Backfill →
	Dark brown fine to coarse GRAVEL with sand (very dense*, wet) (Recessional Outwash)		GP/GW	69*		■ ●	MC	Groundwater measured at about 10 feet at the time of drilling
10	Boring completed at about 11.5 feet because of drilling refusal on October 25, 2013							
	*Blow count and density may not be representative because of the presence of gravel)							
15								
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-21

Station 307+69,10 feet west; 47.583638, -122.083602

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand (medium dense, moist) (Fill)		GP	21		■ ●	MC	Crushed Rock Backfill →
	Brown fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM	8		● ■	MC	
5	Gray sandy SILT (medium stiff, moist) (Older Alluvium)		ML	7		● ■	MC	Groundwater measured at about 6 feet at the time of drilling
	Gray sandy SILT (very stiff to hard, moist) (pre-Fraser Sediments)		ML	30		■ ●	MC	Bentonite Backfill →
15	Gray fine to medium SAND (medium dense, wet) (pre-Fraser Sediments)		SP	22		■ ●	MC	
20	Boring completed at about 16.5 feet on October 19, 2013							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-22

Station 311+31, 10 feet west; 47.584555, -122.084149

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand (dense, moist) (Fill)		GP	34		● ■	MC	Crushed Rock Backfill →
	Light brown clayey SILT (stiff, moist) (Older Alluvium)		ML	10		● ■	MC	
5	Light brown SILT (very stiff to hard, moist) (pre-Fraser Sediments)		ML	29		■ ●	MC	
	Light brown and gray silty fine to coarse SAND with gravel (medium dense to dense) (pre-Fraser Sediments)		SM					
10	Gray SILT with occasional thin layers of fine sand (very stiff, moist) (pre-Fraser Sediments)		ML	19		● ■	MC	Bentonite Backfill →
15	grades to hard		ML	30		● ■	MC	
	Boring completed at about 16.5 feet on October 19, 2013							No groundwater observed at the time of drilling
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-23

Station 313+25, 10 feet west; 47.585072, -122.08428

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand (dense, moist) (Fill)		GP	33			MC	Crushed Rock Backfill →
	Light brown to gray sandy SILT (very stiff, moist) (pre-Fraser Sediments)		ML	29			MC	
5			ML	27			MC	
10	grades to gray and hard		ML	32			MC	Bentonite Backfill →
15			ML	42			MC	
	Boring completed at about 16.5 feet on October 19, 2013							No groundwater observed at the time of drilling
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-24

Station 315+97, 10 feet west; 47.585807, -122.084156

Approximate Elevation: 48 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand, trace of silt and occasional organic material and roots (medium dense, moist) (Fill)		GP	15			MC	Crushed Rock Backfill →
	Light brown silty fine SAND with a trace of gravel (loose, moist) (Fill)		SM	8			MC	
5	Light brown sandy SILT with a trace of gravel and organic material (medium stiff, moist) (Older Alluvium)		ML	6			MC	
	Light brown sandy SILT (medium stiff, moist) (Older Alluvium)		ML					Groundwater measured at about 6.5 feet at the time of drilling
10	Dark brown PEAT and organic SILT (medium stiff, wet) (Older Alluvium)		PT/OL	14			MC	
	Light brown sandy SILT with occasional thin layers of sand (very stiff, wet) (pre-Fraser Sediments)		ML	23			MC	Bentonite Backfill →
15	Boring completed at about 16.5 feet on October 19, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-25

Station 319+10, 10 feet west; 47.586579, -122.084606

Approximate Elevation: 48 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand and a trace of silt (dense, moist) (Fill)		GP	16			MC	Crushed Rock Backfill
	Dark gray silty fine to medium SAND with a trace of gravel and thin layers of organic silt (loose, wet) (Older Alluvium)		SM	5			MC,GS	Groundwater measured at about 4 feet at the time of drilling
5	Dark brown silty SAND with a trace of gravel and organic material and thin layers of fine sand (loose, wet) (Older Alluvium)		SM	5			MC,GS	
10	Light brown fine to medium SAND with a trace of silt and gravel (medium dense, wet) (Older Alluvium)		SP	17			MC	Bentonite Backfill
15	Brown fine to coarse GRAVEL with sand (very dense wet) (pre-Fraser Sediments)		GP/GW	59			MC	
	Boring completed at about 16.5 feet on October 18, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-26

Station 326+65, 10 feet west; 47.588449, -122.086036

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	20			MC	Crushed Rock Backfill →
	Light brown sandy SILT with a trace of fine gravel (stiff, moist) (Older Alluvium)		ML	10			MC	
5			ML	14			MC	
10	Light brown to gray fine to medium SAND with a trace of silt (loose, wet) (Older Alluvium)		SP	7			MC	Groundwater measured at about 10 feet at the time of drilling
15	Light brown to gray fine to medium SAND with a trace of silt and gravel (loose, wet) (Older Alluvium)		SP	7			MC	Bentonite Backfill →
20	Boring completed at about 16.5 feet on October 18, 2013							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-27

Station 328+40, 8 feet east; 47.588909, -122.086317

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray to dark brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	16			MC	Crushed Rock Backfill →
	Light brown fine to medium SAND with silt and fine gravel (medium dense, moist) (Fill)		SP-SM	16			MC	
	Cobbles and boulders (Fill)		GP					
5	Brown fine to coarse GRAVEL with sand and a trace of silt (loose, moist) (Fill)		GP	8			MC	
	Brown fine to medium SAND with gravel and a trace of silt (loose, moist) (Fill)		SP	8			MC	Bentonite Backfill →
15	Gray fine to coarse SAND with thin layer of organic silt (loose, wet) (Older Alluvium)		SP/SW	5			MC	Groundwater measured at about 15 feet at the time of drilling
	Brown and dark gray fine to coarse GRAVEL with sand and a trace of silt (dense*, wet) (Older Alluvium)		GP	32*			MC	
	Boring completed at about 18 feet on October 18, 2013 *Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-28

Station 332+60, 8 feet east; 47.589942, -122.087103

Approximate Elevation: 48 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	20			MC	Crushed Rock Backfill →
	Light brown fine to medium SAND with a trace of fine gravel (loose, moist) (Fill)		SP	6			MC	
5	grades to very loose to loose		SP	4			MC	
								Bentonite Backfill →
10	grades to loose		SP	5			MC	
15	grades to medium dense and wet		SP					Groundwater measured at about 15 feet at the time of drilling
	Dark gray fine SAND with silt and fine gravel (medium dense, wet) (Older Alluvium)		SP-SM	15			MC	
	Light brown to gray fine to medium SAND with silt and gravel (medium dense, wet) (Older Alluvium)		SP-SM	27			MC	
20	Boring completed at about 21.5 feet on October 18, 2013							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-29

Station 335+62, 8 feet east; 47.590701, -122.087487

Approximate Elevation: 49 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	21			MC	Crushed Rock Backfill →
	Light brown fine SAND (medium dense, moist) (pre-Fraser Sediments)		SP	20			MC	
5	grades to dense		SP	30			MC	
								Bentonite Backfill →
10	grades to fine to medium SAND		SP	36			MC	
								Groundwater measured at about 15 feet at the time of drilling
15	grades to very dense and wet		SP	50			MC	
	Boring completed at about 16.5 feet on October 18, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-30

Station 342+57, 10 feet west; 47.592415, -122.086593

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	22		● ■	MC	Crushed Rock Backfill →
	Light brown fine SAND with silt and trace of fine gravel and organic material (loose, moist) (Older Alluvium)		SP-SM	7		● ■	MC	
5	Light brown fine to medium SAND with a trace of gravel (loose, moist) (Older Alluvium)		SP	6		● ■	MC	▼ Groundwater measured at about 7 feet at the time of drilling
	Dark gray fine to medium SAND with fine gravel and a trace of silt and organic material (loose, wet) (Older Alluvium)		SP	5		● ■	MC	
10								Bentonite Backfill →
15	grades to medium dense		SP	18		● ■	MC	
	Boring completed at about 16.5 feet on October 18, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-31

Station 346+05, 10 feet west; 47.593255, -122.085933

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	20		■ ●	MC	Crushed Rock Backfill →
	Light grayish-brown fine SAND with silt (very loose to loose, moist) (Older Alluvium)		SP-SM	8		● ■	MC	
5			SP-SM	4		● ■	MC	
	Gray clayey SILT with sand (soft, moist to wet) (Older Alluvium)		ML					
	Gray silty fine to medium SAND with a trace of gravel (dense*, moist to wet) (Ice-Contact Deposits)		SM	45*		■ ●	MC	Bentonite Backfill →
15	Gray silty fine to medium SAND with a trace of gravel (dense*, moist to wet) (Ice-Contact Deposits)		SM?	10		●		No groundwater observed at the time of drilling
	Boring completed at about 16.5 feet on October 18, 2013 *Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-32

Station 349+12, 10 feet west; 47.594029, -122.085648

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP			■ ●	MC	Crushed Rock Backfill →
	Light brown and gray silty fine to medium SAND with fine to coarse gravel (dense*, moist) (Ice-Contact Deposits)		SM	32				
	grades to gray and very dense		SM	74*		■ ●	MC	
5			SM	50/6"*		■ ●	MC	Bentonite Backfill →
10			SM	86*		■ ●	MC	
	Boring completed at about 11.5 feet because of drilling refusal on October 17, 2013							No groundwater observed at the time of drilling
	*Blow count and density may not be representative because of the presence of gravel							
15								
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-33

Station 350+82, 10 feet west; 47.594492, -122.085481

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	23		■ ●	MC	Crushed Rock Backfill →
	Brown fine to medium SAND with silt and fine gravel (medium dense, moist) (Older Alluvium)		SP-SM					
	grades to light brown to gray		SP-SM	15		■ ●	MC	
5	grades to loose		SP-SM	5		● ■	MC	
	Gray silty fine to medium SAND with gravel (very dense, moist) (Ice-Contact Deposits)							Bentonite Backfill →
10			SM	76*		■ ●	MC	
15			SM	50/6"*		■ ●	MC	
	Boring completed at about 16 feet on October 17, 2013							No groundwater observed at the time of drilling
	*Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-34

Station 353+80, 2 feet south; 47.595205, -122.08471

Approximate Elevation: 48 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand (dense, moist) (Fill)		GP	53		■ ●	MC	Crushed Rock Backfill →
	Light brown and gray fine to coarse SAND with silt and gravel (dense*, wet) (Recessional Outwash)		SP-SM	31*		■ ●	MC	
5	Brown fine to coarse SAND with occasional gravel and cobbles and a trace of silt (dense*, wet) (Recessional Outwash)		SP/SW	36*		■ ●	MC	Groundwater measured at about 4 feet at the time of drilling
	Gray fine to medium SAND with silt (dense, wet) (pre-Fraser Sediments)		SP-SM	32		■ ●	MC	Bentonite Backfill →
15			SP-SM	61		■ ●	MC	
	Boring completed at about 16.5 feet on October 17, 2013 *Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-35

Station 355+27, 18 feet east; 47.59471, -122.084358

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand and a trace of silt (very loose, moist) (Fill)		GP	2			MC	Crushed Rock Backfill →
	Brown fine to coarse GRAVEL with fine sand and a trace of silt (medium dense, wet) (Recessional Outwash)		GP/GW	17			MC	Groundwater measured at about 3 feet at the time of drilling
5			GP/GW	23			MC	
	Gray fine to medium SAND with silt and gravel (medium dense, wet) (pre-Fraser Sediments)		SP-SM	20			MC	Bentonite Backfill →
	Gray fine to coarse SAND with silt and fine gravel (dense, wet) (pre-Fraser Sediments)		SP-SM	43			MC	
10								
15								
	Boring completed at about 16.5 feet on October 17, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-36

Station 356+05, 15 feet east; 47.595572, -122.084117

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	19			MC	Crushed Rock Backfill →
	Light brown and gray silty fine to medium SAND with fine gravel (loose, moist) (Fill)		SM	7			MC	
5	grades to light brown with fine to coarse gravel, wet		SM	5			MC	Groundwater measured at about 7 feet at the time of drilling
	Brown organic SILT with a thin layer of fine sand (very soft, wet) (Older Alluvium)		OL	2			MC	
10								
	Gray fine to medium SAND with fine gravel and a trace of silt (medium dense, wet) (Recessional Outwash)		SP	17			MC	Bentonite Backfill →
15	Boring completed at about 16.5 feet on October 17, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-37

Station 359+71, 10 feet west; 47.59621, -122.082975

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray to dark brown fine GRAVEL with sand and a trace of silt (dense, moist) (Fill)		GP	30			MC	Crushed Rock Backfill →
	Gray fine to coarse SAND with a trace of silt, gravel and organic material (loose, wet) (Older Alluvium)		SP/SW	4			MC	Groundwater measured at about 3 feet at the time of drilling
5	Gray silty fine to coarse SAND with gravel and a trace of organic material (loose, wet) (Older Alluvium)		SM	9			MC	
	Gray fine to coarse GRAVEL with sand (medium dense, wet) (Recessional Outwash)		GP/GW	23			MC	
10								
15			GP/GW	28			MC	Bentonite Backfill →
	Boring completed at about 16.5 feet on October 17, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-38

Station 361+00, 10 feet west; 47.596461, -122.082573

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	27		■ ●	MC	Crushed Rock Backfill →
	Gray fine to medium SAND with a thin layer of silt (loose, moist) (Older Alluvium)		SP	6		● ■	MC	
5	Gray silty fine to medium SAND with a trace of organic material (loose, wet) (Older Alluvium)		SM	11		● ■	MC	Groundwater measured at about 4 feet at the time of drilling
	Light gray silty fine SAND with gravel (very dense, moist) (Recessional Outwash)		SM	50/6”*		■ ●	MC	Bentonite Backfill →
10			SM	50/1”*		■ ●	MC	
	Boring completed at about 13.7 feet because of drilling refusal on October 17, 2013							
15	*Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-39

Station 364+50, 10 feet west; 47.597261, -122.08175

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brownish gray fine GRAVEL with sand (medium dense, moist) (Fill)		GP	15		● ■	MC	Crushed Rock Backfill →
	Light brown fine to coarse SAND with silt, gravel and a trace of charcoal (loose, moist) (Fill)		SP-SM	8		● ■	MC	
5	Gray silty fine to medium SAND with thin layers of organic silt (very loose, moist to wet) (Older Alluvium)		SM	3		● ■	MC	Groundwater measured at about 6 feet at the time of drilling
10	Gray silty fine SAND with thin layers of organic silt (very loose to loose, wet) (Older Alluvium)		SM	4		● ■	MC	
15	Gray and brown silty fine to coarse SAND with a trace of gravel (very loose, wet) (Older Alluvium)		SM	3		● ■	MC	Bentonite Backfill →
20	Gray fine to medium SAND with a trace of gravel and organic material (medium dense, wet) (Older Alluvium)		SP	13		● ■	MC	
	Boring completed at about 21.5 feet on October 16, 2013							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-40

Station 367+15, 9 feet west; 47.597932, -122.081448

Approximate Elevation: 46 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	20			MC	Crushed Rock Backfill →
	Gray to black-brown, silty fine to medium SAND with gravel and scattered organic material (medium dense, moist) (Fill)		SM	10			MC	
5	Gray silty fine to medium SAND with thin layers of organic silt (very loose, wet) (Older Alluvium)		SM	2			MC	Groundwater measured at about 5 feet at the time of drilling
10	Gray silty fine to medium SAND with gravel (loose, wet) (Older Alluvium)		SM	7			MC	
15	Reddish-brown organic SILT (medium stiff, wet) (Older Alluvium)		OL	7			MC	Bentonite Backfill →
	Gray fine to medium SAND with silt and thin layers of silt (loose, wet) (Older Alluvium)		SP-SM					
20	Gray and brown silty fine to medium SAND with gravel with thin layers of silt (medium dense, wet) (Older Alluvium)		SM	16			MC	
	Boring completed at about 21.5 feet on October 16, 2013							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-41

Station 370+61, 10 feet west; 47.5988, -122.080982

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray to dark brown fine GRAVEL with sand (medium dense, moist) (Fill)		GP	14		● ■	MC	Crushed Rock Backfill →
	Brown fine to coarse SAND with silt and gravel (loose, moist) (Fill)		SP-SM	5		● ■	MC	Groundwater measured at about 2.5 feet at the time of drilling
5	Dark brown PEAT with thin layers of silt (very soft, wet) (Older Alluvium)		PT	3		● ■	MC	
10			PT	2		● ■	MC	
15	Gray silty fine to medium SAND with gravel (very loose, wet) (Older Alluvium)		SM	3		● ■	MC	Bentonite Backfill →
20	Gray fine to coarse GRAVEL with fine sand (very dense, wet) (Recessional Outwash)		GP	55*		■ ●	MC	
25	Boring completed at about 21.5 feet on October 16, 2013							

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-42

Station 371+25, 16 feet east; 47.599025, -122.080761

Approximate Elevation: 48 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Sod and Topsoil							Crushed Rock Backfill →
	Light brown silty fine to medium SAND with gravel (loose, wet) (Older Alluvium)		SM	6		■ ●	MC	
	Gray silty fine SAND with gravel and a trace of organic material (very dense*, moist) (Older Alluvium)		SM	74*		■ ●	MC	Groundwater measured at about 4 feet at the time of drilling
5	Gray fine to coarse GRAVEL with sand and a trace of silt (very dense*, moist) (Recessional Outwash)		GP/GW	55*		■ ●	MC	Bentonite Backfill →
	Gray silty fine SAND with gravel (very dense, moist) (pre-Fraser Sediments)		SM	50/6"		■ ●	MC	
10	Boring completed at about 11 feet because of drilling refusal on October 16, 2013							
	*Blow count and density may not be representative because of the presence of gravel							
15								
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-43

Station 374+27, 10 feet west; 47.599648, -122.080585

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Soil Profile: Graphic Log	Sample Data: Group Symbol	Sample Data: Blow Count	Sample Data: Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and dark brown fine GRAVEL with sand and a trace of silt (loose, moist) (Fill)		GP	8			MC	Crushed Rock Backfill →
	Light brown silty fine to medium SAND with gravel and a trace of organic material (loose, moist) (Older Alluvium)		SM	5			MC	
5			SM	5			MC	
	Gray fine to coarse GRAVEL with silt and sand (very dense*, wet) (Recessional Outwash)							Groundwater measured at about 7 feet at the time of drilling
10			GP-GM	50/5”*			MC	
			GP-GM	50/5”*				Bentonite Backfill →
15	Boring completed at about 14.5 feet on October 16, 2013 *Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-44

Station 377+27, 8 feet west; 47.600425, -122.080242

Approximate Elevation: 47 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Light brown and gray to dark brown fine GRAVEL with silt, sand and a trace of organic material (medium dense, moist) (Fill)		GP-GM	12		● ■	MC	Crushed Rock Backfill →
	Gray and brown SILT with fine sand and gravel (very soft, wet) (Older Alluvium)		ML	2		● ■	MC	
5	Gray fine to coarse SAND with gravel and a trace of silt (medium dense, wet) (pre-Fraser Sediments)		SP	25		■ ●	MC	Groundwater measured at about 5 feet at the time of drilling
	Gray fine SAND with a trace of gravel (dense, wet) (pre-Fraser Sediments)		SP	50/6"		■	MC	Bentonite Backfill →
15	Gray silty fine SAND with gravel (dense, moist) (pre-Fraser Sediments)		SM	50/6"		■	MC	
	Boring completed at about 16 feet on October 16, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-45

Station 380+17, 5 feet west; 47.601181, -122.079868

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Light brown and gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	15			MC	Crushed Rock Backfill →
	Gray fine SAND with silt and scattered organic material (charcoal and wood debris) (medium dense, moist to wet) (Older Alluvium)		SP-SM	11			MC	
5	grades to loose		SP-SM	9			MC	Groundwater measured at about 4 feet at the time of drilling
	Gray silty fine to coarse SAND with gravel and thin layers of organic silt and scattered wood fragments (loose, wet) (Older Alluvium)		SM	7			MC	Bentonite Backfill →
15	Gray fine SAND with silt and a trace of organic material (medium dense, moist) (Older Alluvium)		SP-SM	12			MC	
	Boring completed at about 16 feet on October 16, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-46

Station 384+67, 9 feet west; 47.602294, -122.079144

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Light brown and gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	13		■ ●	MC	Crushed Rock Backfill →
	Light brown silty fine to medium SAND (loose, moist) (Older Alluvium)		SM	9		● ■	MC	
5	Brown silty fine SAND with gravel (very loose, wet) (Older Alluvium)		SM					Groundwater measured at about 5 feet at the time of drilling
	Gray silty fine to medium SAND with gravel (very loose, wet) (Older Alluvium)		SM	3		● ■	MC	
10	grades to medium dense		SM	18		● ■	MC	Bentonite Backfill →
	Gray silty fine SAND with gravel (medium dense, wet) (Older Alluvium)		SM	14		●		
15			SM	22		■ ●	MC	
	Boring completed at about 18 feet on October 15, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-47

Station 385+18, 20 feet east; 47.602364, -122.078937

Approximate Elevation: 47 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Dark brown fine GRAVEL with sand, occasional cobbles and a trace of silt (loose to medium dense, moist) (Fill)		GP					Crushed Rock Backfill →
	grades to brown							
5	Gray silty fine to medium SAND with occasional gravel (medium dense, moist) (Older Alluvium)		SM					
	Gray silty fine to medium SAND with a trace of gravel and organic material (medium dense, wet) (Older Alluvium)		SM	13		● ■	MC	
10	Gray fine to medium SAND with a trace of silt (medium dense, wet) (pre-Fraser Sediments)		SP	28		■ ●	MC	Groundwater measured at about 10 feet at the time of drilling
	Gray silty fine to medium SAND with gravel (very dense, moist) (pre-Fraser Sediments)		SM	54		■ ●	MC	Bentonite Backfill →
15	Boring completed at about 16.5 on October 25, 2013							
	NOTE: A vactor truck was used to remove soils to a depth of about 6 feet because of possible underground utilities. ICE used a ½-inch diameter extendable steel rod to probe the base of the hole at 1 foot intervals for density evaluation. Grab soil samples were obtained at 0.5, 3.0 and 5.0 feet for visual classification.							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-48

Station 385+52, 30 feet east; 47.602488, -122.078829

Approximate Elevation: 48 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Dark brown fine GRAVEL with sand, occasional cobbles and a trace of silt (loose to medium dense, moist) (Fill)		GP			■	MC	Crushed Rock Backfill →
5	Bluish-gray silty fine to medium SAND with occasional fine gravel (medium dense, moist) (Older Alluvium)		SM			■	MC	
	Bluish-gray silty fine to medium SAND with fine gravel (medium dense, wet) (Older Alluvium)		SM	15		● ■	MC	
10			SM	21		■ ●	MC	Groundwater measured at about 10 feet at the time of drilling
	Gray silty fine to medium SAND with gravel (dense, wet) (pre-Fraser Sediments)							
15			SM	46		■ ●	MC	Bentonite Backfill →
	Boring completed at about 16.5 feet on October 25, 2013							
20	NOTE: A vactor truck was used to remove soils to a depth of about 7 feet because of possible underground utilities. ICE used a ½-inch diameter extendable steel rod to probe the base of the hole at 1 foot intervals for density evaluation. Grab soil samples were obtained at 1.5 and 5.5 feet for visual classification.							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-49

Station 388+42, 10 feet west; 47.603222, -122.07839

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Light brown and gray to dark brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	16		● ■	MC	Crushed Rock Backfill →
	Gray silty fine to medium SAND with gravel and scattered organic material (loose, wet) (Older Alluvium)		SM	7		● ■	MC	Groundwater measured at about 2 feet at the time of drilling
5	grades to no organic material		SM	6		● ■	MC	
10			SM	6		● ■	MC	Bentonite Backfill →
15	Gray silty SAND with gravel (medium dense, wet) (pre-Fraser Sediments)		SM?	28		●		
	Boring completed at about 16.5 feet on October 15, 2013							
20								
25								

See Figures A-1 or explanation of symbols

SAB:10/10/16

Boring B-50

Station 394+78, 9 feet east; 47.604581, -122.076829

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Sod and Topsoil							Crushed Rock Backfill →
	Brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	26		■ ●	MC	
	Light brown silty fine to medium SAND (medium dense, moist) (Older Alluvium)		SM	20		■ ●	MC	
5	Gray silty fine to medium SAND with gravel (loose, moist to wet) (Older Alluvium)		SM	9		● ■	MC	Groundwater measured at about 6 feet at the time of drilling
10	grades to a trace of gravel		SM	9		● ■	MC	Bentonite Backfill →
15			SM	21		●		
	Boring completed at about 16.5 feet on October 15, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-51

Station 397+32, 9 feet east; 47.605201, -122.07628

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Gray and brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	26		■ ●	MC	Crushed Rock Backfill →
	Gray silty fine to medium SAND with gravel (medium dense, moist) (Older Alluvium)		SM	21		■ ●	MC	
5			SM	23		■ ●	MC	Bentonite Backfill →
	Gray silty fine to medium SAND with gravel (very dense, moist) (pre-Fraser Sediments)							
10	grades to wet		SM	50/6"		■ ●	MC	Groundwater measured at about 10 feet at the time of drilling
15			SM	50/4"		■ ●	MC	
	Boring completed at about 15.3 feet on October 15, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-52

Station 400+88, 10 feet west; 47.606076, -122.075526

Approximate Elevation: 43 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray to dark brown fine GRAVEL with sand and a trace of silt (loose, moist) (Fill)		GP	7		● ■	MC	Crushed Rock Backfill →
	Light brown silty fine SAND with a trace of gravel (loose, moist) (Older Alluvium)		SM	9		● ■	MC	
5	Light brown silty fine to medium SAND with a trace of gravel and organic material (loose, moist to wet) (Older Alluvium)		SM	6		● ■	MC	Groundwater measured at about 6 feet at the time of drilling
10	Light gray sandy SILT with a trace of organic material (very soft, wet) (Older Alluvium)		ML	2		● ■	MC	Bentonite Backfill →
15	grades to dark brown and stiff		ML			●	MC	
	Gray silty fine to medium SAND with a trace of gravel (loose, wet) (Older Alluvium)		SM	9		■		
	Boring completed at about 16.5 feet on October 15, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-53

Station 402+58, 9 feet west; 47.606409, -122.075206

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Brown and gray fine GRAVEL with sand (loose, moist) (Fill)		GP	27		■ ●	MC	Crushed Rock Backfill →
	Light brown silty fine SAND with gravel (loose, moist) (Older Alluvium)		SM	6		● ■	MC	
5	Light brown to gray silty fine to medium SAND (very loose, wet) (Older Alluvium)		SM	2		● ■	MC	Groundwater measured at about 5 feet at the time of drilling
10	Dark gray sandy SILT with a trace of organic material and thin layers of medium sand (soft, wet) (Older Alluvium)		ML	3		● ■	MC	Bentonite Backfill →
15	grades to brown and stiff		ML	10		● ■	MC	
	Gray fine to medium SAND with silt and a trace of gravel (medium dense, wet) (Older Alluvium)		SP-SM					
	Boring completed at about 16.5 feet on October 15, 2013							
20								
25								

See Figures A-1 and A-2 for explanation of symbols

SAB:10/10/16

Boring B-54

Station 406+30, 10 feet west; 47.607263, -122.074182

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Groundwater Observations
0	Gray and brown fine GRAVEL with sand and a trace of silt (loose, moist) (Fill)		GP					Crushed Rock Backfill →
	Light brown and brown silty fine SAND with scattered organic material (loose, moist) (Fill)		SM	6		● ■	MC	
	Tan and gray silty fine SAND with a trace of gravel and organic material (loose, moist) (Older Alluvium)		SM	10		● ■	MC	
5			SM	6		● ■	MC	
								Groundwater measured at about 9 feet at the time of drilling
10	Gray sandy SILT (very soft, wet) (Older Alluvium)		ML			■		
	Dark brown PEAT (very stiff, wet) (Older Alluvium)		PT	2		● ■	MC	
	Dark gray sandy SILT with a trace of organic material (medium stiff, wet) (Older Alluvium)							
15			ML	10		● ■	MC	Bentonite Backfill →
	Boring completed at about 16.5 feet on October 15, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-55

Station 410+34, 6 feet west; 47.608063, -122.073232

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Light brown and gray fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM	15			MC	Crushed Rock Backfill →
	Black and brown SILT (stiff, moist) (Older Alluvium)		ML					Ground water measured at about 3 feet at the time of drilling
	Light brown fine to coarse SAND with silt and gravel (medium dense, wet) (Older Alluvium)		SP-SM	13			MC	
5	Gray fine SAND with silt and a trace of organic material (loose, wet) (Older Alluvium)		SP-SM	5			MC	
10	Gray silty fine SAND and sandy SILT with thin layers of peat (loose/medium stiff, wet) (Older Alluvium)		SM/ML	7			MC	
15	Gray sandy SILT with thin layers of peat (soft to medium stiff, wet) (Older Alluvium)		ML	4			MC	Bentonite Backfill →
	Gray silty fine SAND with scattered organic material (loose, wet) (Older Alluvium)		SM	8			MC	
20	Boring completed at about 21.5 feet on October 15, 2013							
25								

ICE File No. 0105-010

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-56

Station 414+20, 8 feet west; 47.608917, -122.07223

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown fine GRAVEL with sand (medium dense, moist) (Fill)		GP	24		● ■	MC	Crushed Rock Backfill →
	Light brown silty fine SAND with a trace of organic material (loose, wet) (Older Alluvium)		SM	7		● ■	MC	
5	Gray sandy SILT (medium stiff, wet) (Older Alluvium)		ML	6		● ■	MC	Ground water measured at about 4 feet at the time of drilling
10	Gray fine to coarse GRAVEL with sand (medium dense, wet) (Older Alluvium)		GP/GW	12		● ■	MC	Bentonite Backfill →
	Gray fine to coarse SAND with silt and a trace of gravel (loose, wet) (Older Alluvium)		SP-SM	7		● ■	MC	
15	Boring completed at about 16.5 feet on October 14, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-57

Station 425+30, 9 feet west; 47.611251, -122.069678

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) / Moisture Content (Percent - ■)	Laboratory Testing	Comments/ Ground Water Observations
0	Light brown fine GRAVEL with sand (medium dense, moist) (Fill)		GP	18			MC	Crushed Rock Backfill
	Light brown to black fine to coarse SAND with gravel (loose, moist) (Fill)		SP/SW	8			MC	
5	Dark brown PEAT (soft, wet) (Older Alluvium)		PT	3			MC	Ground water measured at about 4.5 feet at the time of drilling
10	Gray fine to coarse GRAVEL with sand and a trace of silt (medium dense, wet)(Older Alluvium)		GP	21			MC	Bentonite Backfill
15	Brown organic SILT with gravel (medium stiff, wet) (Older Alluvium)		OL	5			MC	
20	Gray fine to coarse GRAVEL with sand (very loose to loose, wet) (Older Alluvium)		GP					
	Dark brown organic SILT/PEAT (soft to medium stiff, wet) (Older Alluvium)		OL/PT	4			MC	
	Boring completed at about 21.5 feet on October 14, 2013							
25								

Penetration Resistance (Blows/foot - ●): 20 40 60 80

Moisture Content (Percent - ■): 20 40 60 80

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-58

Station 429+16, 12 feet west; 47.612149, -122.068922

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown and gray to black-dark brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	18		● ■	MC	Crushed Rock Backfill →
	Light brown fine to coarse SAND with silt and gravel (medium dense, moist) (Fill)		SP-SM	26		● ■	MC	
	Light brown fine to coarse GRAVEL with silt and sand (loose to medium dense, wet) (Fill)		GP-GM					
5	Dark brown organic SILT and PEAT (very soft, wet) (Older Alluvium)		OL/PT	3		● ■	MC	Ground water measured at about 5 feet at the time of drilling
10			OL/PT	2		● ■	MC	Bentonite Backfill →
15			OL/PT	2		● ■	MC	
	Boring completed at about 16.5 feet on October 14, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-59

Station 431+96, 8 feet west; 47.612896, -122.068528

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Black and gray to light brown fine GRAVEL with silt and sand (loose to medium dense, moist) (Fill)		GP-GM	10			MC	Crushed Rock Backfill →
	Light brown fine to medium SAND with silt and gravel (loose, moist) (Fill)		SP-SM	7			MC	
5	Light brown fine to medium SAND with silt and a trace of gravel and organic material (loose, moist) (Older Alluvium)		SP-SM	5			MC	
	Light brown fine to medium SAND with a trace of silt (loose, moist) (Older Alluvium)							Ground water measured at about 5 feet at the time of drilling
10	Light brown and gray silty fine SAND (loose, moist) (Older Alluvium)		SP SM	8			MC	
	Gray and light brown fine SAND with a trace of silt (medium dense, wet) (Older Alluvium)		SP	15			MC	Bentonite Backfill →
15	Boring completed at about 16.5 feet on October 14, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-60

Station 434+16, 9 feet west; 47.61351, -122.068503

Approximate Elevation: 48 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown and gray fine GRAVEL with sand and a trace of silt (loose, moist) (Fill)		GP	8		● ■	MC	Crushed Rock Backfill →
	Light brown fine to coarse SAND with a trace of silt and gravel (medium dense, moist) (Fill)		SP/SW	15		● ■	MC	
5	Light brown silty fine to coarse SAND with gravel (medium dense, moist) (Fill)		SM	19		● ■	MC	Bentonite Backfill →
	Light brown fine to coarse SAND with gravel and a trace of silt (medium dense, moist to wet) (Fill)		SP	14		● ■	MC	Ground water measured at about 11.5 feet at the time of drilling
10	Brown and gray fine to coarse GRAVEL with sand and a trace of silt (dense, wet) (pre-Fraser Sediments)		GP	50/6"		■ ●	MC	
15	Boring completed at about 16 feet on October 12, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-61

Station 438+01, 10 feet west; 47.614503, -122.06833

Approximate Elevation: 48 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Gray and brown fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM	21			MC	Crushed Rock Backfill →
	Light brown and gray silty fine to medium SAND with gravel (medium dense, moist) (Fill)		SM	21			MC,GS	
5	Gray and brown gray fine to coarse GRAVEL with silt and sand (loose to medium dense, moist) (Fill)		GP-GM					
	Light brown and gray silty fine to medium SAND (loose to medium dense, moist to wet) (Older Alluvium)		SM	19			MC,GS	Ground water measured at about 8 feet at the time of drilling
	Light brown fine to medium SAND with a trace of silt (medium dense, wet) (pre-Fraser Sediments)							
10			SP	25			MC	
15	grades to dense		SP	46			MC	Bentonite Backfill →
	Gray silty fine SAND with gravel (dense, wet) (pre-Fraser Sediments)		SM					
	Boring completed at about 16.5 feet on October 12, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-62

Station 441+31, 10 feet west; 47.615463, -122.068257

Approximate Elevation: 50 feet

Logged by:BRB

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Sample Data: Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM	16			MC	Crushed Rock Backfill →
	Brown silty fine to coarse GRAVEL with sand (dense*, moist) (Older Alluvium)		GM	34*			MC	
5	Brown silty fine SAND with fine gravel (medium dense, wet) (Older Alluvium)		SM	11			MC	Ground water measured at about 6.5 feet at the time of drilling
10			SM	10			MC	
	Brown silty fine to coarse GRAVEL with sand (very dense, wet) (pre-Fraser Sediments)		GM	62			MC	Bentonite Backfill →
15	Boring completed at about 16.5 feet on October 8, 2013 *Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-63

Station 441+31, 10 feet east; 47.61538, -122.068011

Approximate Elevation: 50 feet

Logged by:BRB

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments / Ground Water Observations
0	Brown fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM					Crushed Rock Backfill →
	Brown fine to medium SAND with silt and gravel (medium dense, moist) (Fill)		SP-SM	27		■ ●	MC	
	Brown silty fine to coarse SAND with gravel (medium dense, moist to wet) (Fill)		SM	28		■ ●	MC	
5	Brown silty fine to coarse GRAVEL with sand (medium dense, moist to wet) (Fill)		GM	17		■ ●	MC	Ground water measured at about 6.5 feet at the time of drilling
	Brown silty fine to coarse GRAVEL with sand (dense, moist to wet) (pre-Fraser Sediments)		GM	40		■ ●	MC	
10	grades to very dense*		GM	50/1"*		■ ●	MC	Bentonite Backfill →
	Boring completed at about 13.6 feet because of drilling refusal on October 8, 2013							
15	*Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-64

Station 445+38, 10 feet west; 47.616565, -122.068094

Approximate Elevation: 50 feet

Logged by:BRB

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Grayish-brown fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM	18		■ ●	MC	Crushed Rock Backfill →
	Mottled brown and dark brown silty fine to medium SAND with occasional gravel (medium dense, moist) (Fill)		SM	14		● ■	MC	
5	Brown silty fine to coarse GRAVEL (medium dense, moist to wet) (pre-Fraser Sediments)		GM	17		■ ●	MC	Ground water measured at about 6 feet at the time of drilling
10	Brown silty fine to medium SAND with gravel (dense, wet) (pre-Fraser Sediments)		SM	35		■ ●	MC	Bentonite Backfill →
15	Brown silty fine to coarse GRAVEL with sand (dense, wet) (pre-Fraser Sediments)		GM	31		■ ●	MC	
	Boring completed at about 16.5 feet on October 8, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-65

Station 448+56, 10 feet west; 47.61738, -122.06799

Approximate Elevation: 50 feet

Logged by:BRB

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Grayish-brown fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM					Crushed Rock Backfill →
	Brown fine to coarse GRAVEL with sand (medium dense, moist) (Fill)		GP	16		● ■	MC	
	Brown fine to medium SAND with silt and a trace of gravel (loose, moist) (Fill)		SP-SM	5		● ■	MC	
5	Dark brown organic SILT/PEAT with occasional wood fragments and thin layers of fine sand (very stiff, wet) (Older Alluvium)		OL/PT	17		● ■	MC	Ground water measured at about 5 feet at the time of drilling
10	Gray silty fine to coarse GRAVEL with sand (medium dense, wet) (pre-Fraser Sediments)		GM	18		● ■	MC	Bentonite Backfill →
15	Gray silty fine to medium SAND with fine gravel (dense, moist) (pre-Fraser Sediments)		SM	35		■ ●	MC	
	Boring completed at about 16.5 feet on October 8, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-66

Station 449+86, 9 feet west; 47.617745, -122.067993

Approximate Elevation: 50 feet

Logged by:BRB

Project Name: King County Parks, ELST South Sammamish Segment B

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brownish-gray fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM	11			MC	Crushed Rock Backfill →
	Gray fine to coarse SAND with fine gravel and a trace of silt (medium dense, moist to wet) (Fill)		SP/SW	11			MC	Ground water measured at about 3 feet at the time of drilling
5	Gray silty medium SAND with a trace of fine gravel (very loose to loose, wet) (Older Alluvium)		SM	4			MC	
10	Gray silty GRAVEL with fine sand (loose to medium dense, wet) (Recessional Outwash)		GM	10			MC	Bentonite Backfill →
15			GM	22			MC	
	Boring completed at about 16.5 feet on October 8, 2013							
20								
25								

See Figure A-1 for explanation of symbols

ICE File No. 0105-010

SAB:10/10/16

Boring B-67

Station 457+81, 7 feet west; 47.61993, -122.068792

Approximate Elevation: 50 feet

Logged by:BRB

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Grayish-brown fine GRAVEL with silt and sand (loose, moist to wet) (Fill)		GP-GM	9			MC	Crushed Rock Backfill →
	Thin Buried Topsoil layer ~2" thick							
	Brown fine to coarse SAND with fine gravel (medium dense, moist to wet) (Recessional Outwash)		SP/SW	22			MC	Ground water measured at about 4 feet at the time of drilling
5	Brown fine to coarse SAND with fine gravel and a trace of silt (medium dense, wet) (Recessional Outwash)		SP/SW	18			MC	
	Brown fine GRAVEL with sand (medium dense, wet) (Recessional Outwash)		GP	13			MC	
10								Bentonite Backfill →
15			GP	16			MC	
	Boring completed at about 16.5 feet on October 8, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-68

Station 460+61, 10 feet west; 47.620651, -122.069073

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Gray to black-brown fine GRAVEL with silt and sand (loose, moist) (Fill)		GP-GM	7		● ■	MC	Crushed Rock Backfill →
	Light brown fine to coarse GRAVEL with sand and a trace of silt (dense*, moist) (Fill)		GP	36*		■ ●	MC	
5			GP	50/4"*		■	MC	Ground water measured at about 5 feet at the time of drilling
	Brown fine to coarse GRAVEL with sand and a trace of (loose, wet) (Recessional Outwash)							
10			GP	9		● ■	MC	Bentonite Backfill →
15	grades to medium dense		GP	17		● ■	MC	
	Boring completed at about 16.5 feet on October 7, 2013 *Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-69

Station 460+30, 9 feet west; 47.620568, -122.068877

Approximate Elevation: 45 feet

Logged by:BRB

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown and gray fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM	23			MC	Crushed Rock Backfill →
	Dark brown silty fine to medium SAND with a trace of fine gravel (loose, moist) (Buried Topsoil)		SM	6			MC	
5	Brown fine to medium SAND with occasional fine gravel (very loose to loose, wet) (Recessional Outwash)		SP	4			MC	Ground water measured at about 7 feet at the time of drilling
10	Brown fine to coarse SAND with silt and occasional fine to coarse gravel (medium dense to dense*, wet) (Recessional Outwash)		SP-SM	30*			MC	Bentonite Backfill →
15	Brown fine to coarse SAND with fine gravel and a trace of silt (medium dense, wet) (Recessional Outwash)		SP	24			MC	
	Boring completed at about 16.5 feet on October 8, 2013 *Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-70

Station 462+21, 10 feet west; 47.62103, -122.069213

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown and gray fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM	11			MC	Crushed Rock Backfill →
	Light brown fine to coarse GRAVEL with silt and sand (medium dense, wet) (Fill)		GP-GM	17			MC	Ground water measured at about 3 feet at the time of drilling
5	Light brown fine to coarse GRAVEL with sand and a trace of silt (loose to medium dense, wet) (Fill)		GP	10			MC	
	Light brown silty fine to medium SAND with gravel (medium dense, wet) (Ice-Contact Deposits)		SM	20			MC	Bentonite Backfill →
15	Light brown and gray fine to coarse GRAVEL with silt and sand (dense, wet) (Ice-Contact Deposits)		GP-GM	34*			MC	
20	Boring completed at about 16.5 feet because of drilling refusal on October 7, 2013 *Blow count and density may not be representative because of the presence of gravel							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-71

Station 466+12, 10 feet west; 47.622094, -122.069736

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown and gray fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM	18			MC	Crushed Rock Backfill →
	Light brown and gray fine to coarse SAND with silt and gravel (medium dense, dry) (Fill)		SP-SM	17			MC	
5	grades to light brown		SP-SM	11			MC	
	Light brown fine to coarse GRAVEL with silt and sand (dense*, moist) (Ice-Contact Deposits)							Bentonite Backfill →
10			GP-GM	46*			MC	
15	grades to medium dense		GP-GM	26			MC	
	Boring completed at about 16.5 feet on October 7, 2013							No ground water observed at the time of drilling
	*Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-73

Station 464+32, 10 feet west; 47.621577, -122.069472

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Gray fine GRAVEL with sand and a trace of silt and organic material (loose, moist) (Fill)		GP	8			MC	Crushed Rock Backfill →
	Light brown fine to coarse GRAVEL with silt and sand (medium dense, dry) (Fill)		GP-GM	18			MC	
5			GP-GM	17			MC	
	Light brown fine to coarse GRAVEL with silt and sand (dense*, moist) (Ice-Contact Deposits)							Bentonite Backfill →
10			GP-GM	32*			MC	
								Ground water measured at about 13 feet at the time of drilling
15	grades to medium dense and wet		GP-GM	26			MC	
	Boring completed at about 16.5 feet on October 7, 2013 *Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-76

Station 289+65, 10 feet south; 47.581011, -122.077818

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown and gray fine to coarse GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	14		■ ●	MC	Crushed Rock Backfill →
	Brown fine to medium SAND with gravel and a trace of silt (very loose to loose, moist) (Fill)		SP	4		● ■	MC	
5			SP	4		● ■	MC	Bentonite Backfill →
	Brown and gray fine to coarse GRAVEL with sand and a trace of silt (dense*, moist) (Recessional Outwash)		GP/GW	38*		■ ●	MC	
10								
	Brown and gray fine to coarse SAND with gravel (loose, wet) (Recessional Outwash)		SP/SW	8		● ■	MC	Ground water measured at about 15 feet at the time of drilling
15								
	Boring completed at about 16.5 feet on October 21, 2013							
	*Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-77

Station 379+20, 10 feet west; 47.6009, -122.080012

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown and gray to brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP					Crushed Rock Backfill →
	Light brown fine to medium SAND with a trace of silt and organic material (medium dense, moist) (Fill)		SP	16		● ■	MC	
	Light brown to brown fine to medium SAND with silt (medium dense, moist) (Older Alluvium)		SP-SM	12		● ■	MC	
5	Light brown fine to medium SAND with a trace of silt and gravel (loose, wet) (Older Alluvium)		SP	9		● ■	MC	Ground water measured at about 5 feet at the time of drilling
	Gray fine to coarse SAND with silt and gravel (medium dense, wet) (Older Alluvium)		SP-SM	10		● ■	MC	
10	Gray silty fine to coarse SAND with gravel (medium dense, wet) (Older Alluvium)		SM	14		● ■	MC	Bentonite Backfill →
15	Boring completed at about 16.5 feet on October 16, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-78

Station 412+00, 7 feet west; 47.608475, -122.072811

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Graphic Log	Sample Data: Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	11		● ■	MC	Crushed Rock Backfill →
	Brown fine to coarse GRAVEL with sand (loose, moist) (Fill)		GP	5		● ■	MC	
5	Gray silty fine SAND with a trace of organic material (very loose, wet) (Older Alluvium)		SM	4		● ■	MC	Ground water measured at about 4 feet at the time of drilling
10	Dark gray silty fine SAND with a trace of organic material (loose, wet) (Older Alluvium)		SM	5		● ■	MC	
15			SM	5		● ■	MC	Bentonite Backfill →
	Boring completed at about 16.5 feet on October 14, 2013							
20								
25								

See Figure A-1for explanation of symbols

SAB:10/10/16

Boring B-79

Station 424+65, 5 feet east; 47.61106, -122.069697

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown fine GRAVEL with sand (medium dense, moist) (Fill)		GP	14		● ■	MC	Crushed Rock Backfill →
	Dark brown PEAT (very soft, wet) (Older Alluvium)		PT	2		● ■	MC	▼ Ground water measured at about 3 feet at the time of drilling
5	Gray fine SAND with scattered organic material (loose, wet) (Older Alluvium)		SP	5		● ■	MC	
10	Gray fine SAND with silt and scattered organic material (medium dense, wet) (Older Alluvium)		SP-SM	12		● ■	MC	
15	Gray fine to medium SAND and organic SILT/PEAT (very loose to very soft, wet) (Older Alluvium)		SP/OL/PT	2		● ■	MC	Bentonite Backfill →
	Dark brown organic SILT and PEAT (soft, wet) (Older Alluvium)		OL/PT					
20	Gray fine to coarse SAND with thin layers of silt and a trace of gravel (medium dense, wet) (Older Alluvium)		SP	12		● ■	MC	
	Boring completed at about 21.5 feet on October 14, 2013							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-80

Station 427+18, 9 feet west; 47.611685, -122.069236

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Gray and brown fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	11			MC	Crushed Rock Backfill
	Light brown to dark brown fine to coarse SAND with gravel and a trace of silt (loose, moist) (Fill)		SP	8			MC	
5	Dark brown PEAT (very soft, wet) (Older Alluvium)		PT	2			MC	Ground water measured at about 4 feet at the time of drilling
10	Gray silty fine SAND with thin layers of peat (very loose, wet) (Older Alluvium)		SM	2			MC	
15	Gray silty fine SAND and sandy SILT with thin layers of organic silt and scattered organic material (very loose/soft, wet) (Older Alluvium)		SM/ML	2			MC	Bentonite Backfill
20	Gray silty fine SAND with thin layers of peat (very loose to loose, wet) (Older Alluvium)		SM	4			MC	
25	Brown to dark brown organic SILT with thin layers of fine sand and scattered wood fragments (medium stiff, wet) (Older Alluvium)		OL					

See Figures A-1 for explanation of symbols

SAB:10/10/16

Boring B-80

Station 425+95, 9 feet west; 47.611685, -122.069236

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Soil Profile: Description	Sample Data: Graphic Log	Sample Data: Group Symbol	Sample Data: Blow Count	Sample Data: Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
25	Brown to dark brown organic SILT with thin layers of fine sand and scattered wood fragments (medium stiff, wet) (Older Alluvium)		OL	5		● ■	MC	Bentonite Backfill →
	Boring completed at about 26.5 feet on October 14, 2013							
30								
35								
40								
45								
50								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-81

Station 455+86, 7 feet west; 47.619388, -122.0685

Approximate Elevation: 50 feet

Logged by:BRB

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown silty fine GRAVEL with sand (medium dense, moist) (Fill)		GM	14		■ ●	MC	Crushed Rock Backfill →
	Dark brown silty fine SAND with a trace of fine gravel (medium dense, moist) (Buried Topsoil-Fill)		SM					
	Grayish-brown fine to coarse SAND with silt and fine gravel (medium dense, moist) (Fill)		SP-SM	22		■ ●	MC	
5	Dark brown organic SILT/fine SAND with thin layers of fibrous peat and scattered organic material (soft, wet) (Older Alluvium)		OL/SP	3		● ■	MC	Ground water measured at about 5 feet at the time of drilling
10	Brown fine to coarse SAND with fine gravel and a trace of silt (medium dense, wet) (Recessional Outwash)		SP/SW	13		● ■	MC	
15	Brown fine GRAVEL with fine to coarse SAND and a trace of silt (medium dense, wet) (Recessional Outwash)		GP	13		● ■	MC	Bentonite Backfill →
20	Boring completed at about 16.5 feet on October 8, 2013							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-93

Station 288+25, 8 feet east; 47.580847, -122.077225

Approximate Elevation: 48 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown and black to dark brown fine GRAVEL with sand and a trace of silt and organic material (loose, moist) (Fill)		GP	17			MC	Flush Grade Steel Monument; Concrete Plug
	Light brown fine to coarse SAND with silt and fine gravel (loose, moist) (Recessional Outwash)		SP-SM	6			MC	
5	Light brown fine to coarse GRAVEL with sand (medium dense, moist) (Recessional Outwash)		GP/GW	23			MC	Bentonite Backfill; 1¼-inch PVC Solid Pipe
10	grades to dense*		GP/GW	41*			MC	Sand Backfill; 1¼-inch PVC Slotted Pipe
15	grades to medium dense		GP/GW?	20			MC	Ground water measured at 14.4 feet (2/13/14)
	Boring completed at about 16.5 feet on October 21, 2013							No ground water measured on 11/13/13
20	*Blow count and density may not be representative because of the presence of gravel							
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-94

Station 293+42, 7 feet south; 47.581373, -122.079231

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Gray and black fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP	23			MC	Flush Grade Steel Monument; Concrete Plug
	Light brown silty fine to coarse SAND with gravel (medium dense, moist) (Fill)		SM	14			MC,GS	Bentonite Backfill; 1¼-inch PVC Solid Pipe
5	grades to loose		SM	8			MC,GS	Sand Backfill; 1¼-inch PVC Slotted Pipe
	Light brown to gray fine to medium SAND with silt and a trace of gravel (medium dense, wet) (Recessional Outwash)		SP-SM	29			MC	Ground water measured at 9.85 feet (2/13/14)
10								Ground water measured at 11.8 feet (11/13/13)
15	grades to dense*		SP-SM	40*			MC	
	Boring completed at about 16.5 feet on October 21, 2013							
	*Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-95

Station 322+18, 7 feet west; 47.587348, -122.0853

Approximate Elevation: 50 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown and gray fine GRAVEL with sand and a trace of silt (medium dense, moist) (Fill)		GP					Flush Grade Steel Monument
	Black-brown to dark gray fine to coarse GRAVEL with sand and a trace of silt (medium dense, wet) (Fill)		GW	13		● ■	MC	Concrete Plug; Bentonite Backfill; 1¼-inch PVC Solid Pipe
	Light brown to gray SILT with a trace of sand (very stiff, moist) (pre-Fraser Sediments)		ML	24		● ■	MC	Ground water measured at 3.45 feet (2/13/14); Ground water measured at 3.45 feet (11/13/13)
5	Light brown fine SAND (dense, wet) (pre-Fraser Sediments)		SP	36		■ ●	MC	Sand Backfill
	Gray sandy SILT (hard, moist) (pre-Fraser Sediments)		ML	50		■ ●	MC	1¼-inch PVC Slotted Pipe
15	grades to light brown to gray		ML	50/5”		■ ●	MC	
	Boring completed at about 16.5 feet on October 19, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-96

Station 356+60, 10 feet west; 47.595704, -122.083893

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown fine GRAVEL with sand (medium dense, moist) (Fill)		GP	15		● ■	MC	Crushed Rock Backfill →
	Light brown silty fine to medium SAND with gravel and a trace of organic material (very loose to loose, moist to wet) (Fill)		SM	3		● ■	MC	
5	grades to gray with a trace of gravel		SM	2		● ■	MC	Ground water measured at about 5 feet at the time of drilling
	Gray fine to medium SAND with a trace of fine gravel and thin layers of peat (loose, wet) (Older Alluvium)		SP	9		● ■	MC	
10	Gray fine to coarse GRAVEL with sand and a trace of silt (dense*, wet) (Recessional Outwash)		GP/GW	40*		■ ●	MC	Bentonite Backfill →
15	Boring completed at about 16.5 feet on October 17, 2013							
	*Blow count and density may not be representative because of the presence of gravel							
20								
25								

See Figure A-1 for explanation of symbols

ICE File No. 0105-010

SAB:10/10/16

Boring B-97

Station 420+23, 7 feet east; 47.610088, -122.070823

Approximate Elevation: 45 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown fine GRAVEL with silt and sand (medium dense, moist) (Fill)		GP-GM	15			MC	Flush Grade Steel Monument; Concrete Plug
	Brown and gray sandy SILT with scattered organic material (medium stiff, wet) (Older Alluvium)		ML	7			MC	Ground water measured at 3.12 feet (2/13/14); Ground water measured at 3.75 feet (11/13/13)
5	Gray and blue-gray silty fine SAND with a trace of organic material (loose, wet) (Older Alluvium)		SM	6			MC	Bentonite Backfill; 1¼-inch PVC Solid Pipe
10	grades to gray		SM	8			MC	Sand Backfill; 1¼-inch PVC Slotted Pipe
15	Gray fine to medium SAND (loose, wet) (Older Alluvium)		SP	9			MC	
	Boring completed at about 16.5 feet on October 14, 2013							
20								
25								

See Figure A-1 for explanation of symbols

SAB:10/10/16

Boring B-98

Station 434+25, 8 feet east; 47.613481, -122.068417

Approximate Elevation: 48 feet

Logged by:ALG

Project Name: King County Parks, ELST South Sammamish Segment B

ICE File No. 0105-010

Depth in Feet	Description	Graphic Log	Group Symbol	Blow Count	Sample Location	Penetration Resistance (Blows/foot - ●) 20 40 60 80 / Moisture Content (Percent - ■) 20 40 60 80	Laboratory Testing	Comments/ Ground Water Observations
0	Brown and gray fine GRAVEL with silt and sand (loose, moist) (Fill)		GP-GM	7				Flush Grade Steel Monument in Concrete Plug
	Light brown fine to coarse SAND (medium dense, moist) (Older Alluvium)		SP	15				Ground Water measured at 3 feet (11/13/13)
5	Light brown silty fine SAND with a trace of wood debris (medium dense, moist) (Older Alluvium)		SM	19			MC,GS	Bentonite Backfill; 1¼-inch PVC Solid Pipe
10	Light brown fine to medium SAND with a trace of silt (dense, wet) (pre-Fraser Sediments)		SP	43			MC	Sand Backfill; Ground water measured at 10.98 feet (2/13/14); Ground water measured at 11.2 feet (11/13/13)
15	Light brown fine to coarse SAND with gravel and a trace of silt (dense, wet) (pre-Fraser Sediments)		SP-SW	45			MC	1¼-inch PVC Slotted Pipe
	Boring completed at about 16.5 feet on October 12, 2013							
20								
25								

See Figure A-1 for explanation of symbols

APPENDIX B

LABORATORY TESTING PROGRAM

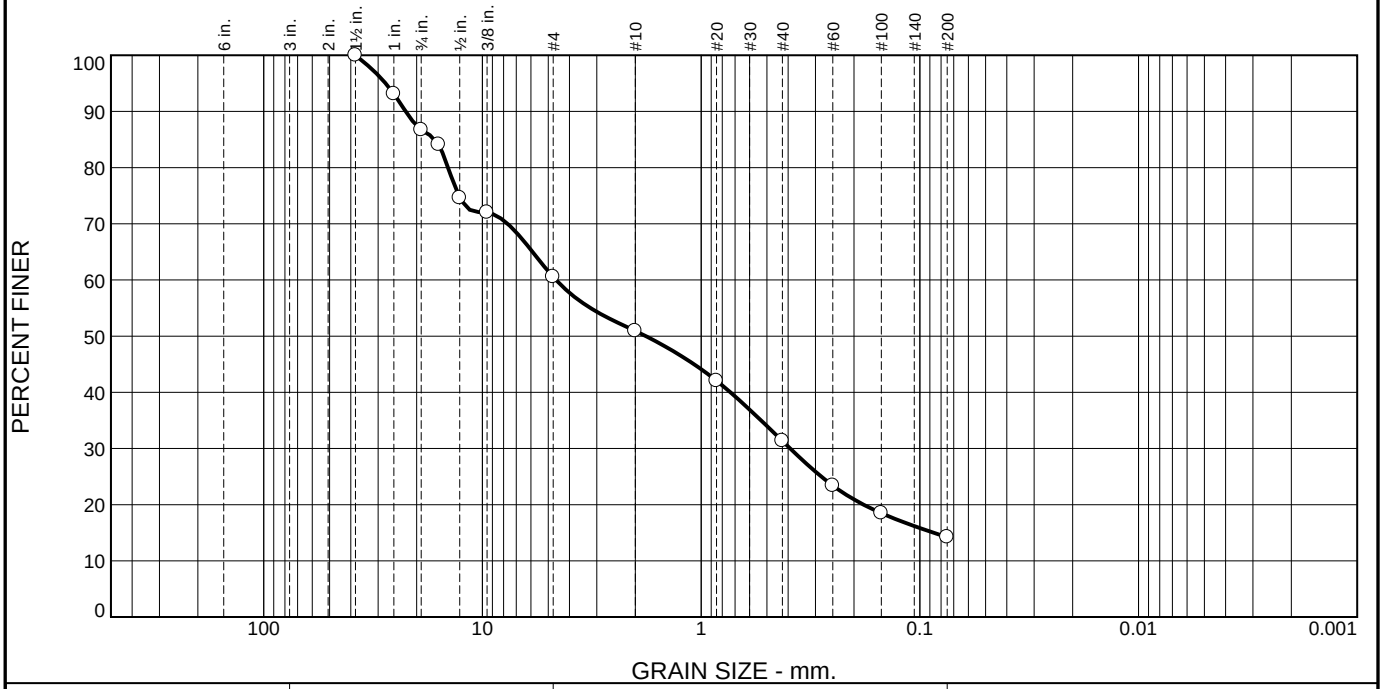
APPENDIX B

B.0 LABORATORY TESTING PROGRAM

The soil samples obtained from the test borings were returned to ICE's laboratory for further visual examination and laboratory testing. Selected samples were tested to determine moisture content in general accordance with ASTM Test Method D 2216. The results of the moisture content tests are presented on the boring logs in Appendix A.

The laboratory testing program included particle size distribution (grain size analysis) by ASTM Test Methods C 117 (modified) and C 136 on selected samples obtained from the test borings. The test results are presented on Figures B-1 through B-8 (Particle Size Distribution Reports).

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.3	26.1	9.7	19.6	17.1	14.2	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1.0	93.1		
3/4	86.7		
5/8	84.1		
1/2	74.6		
3/8	72.0		
#4	60.6		
#10	50.9		
#20	42.0		
#40	31.3		
#60	23.4		
#100	18.5		
#200	14.2		

* (no specification provided)

Material Description

Brown silty fine to medium SAND with gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 22.4422 D_{85}= 16.4759 D_{60}= 4.6089
D_{50}= 1.7909 D_{30}= 0.3913 D_{15}= 0.0863
D_{10}= C_u= C_c=

Remarks

Sampled by ALG 10/21/13

Date Received: 10/21/13 **Date Tested:** 11/11-11/13/13

Tested By: SAB

Checked By: KSK 11/14/13

Title: Principal Eng Geologist

Source of Sample: Test Borings **Depth:** 2.5-6.5 feet **Date Sampled:** 10/21/13

Sample Number: Boring B-14, S-2,S-3

ICICLE CREEK ENGINEERS, INC.

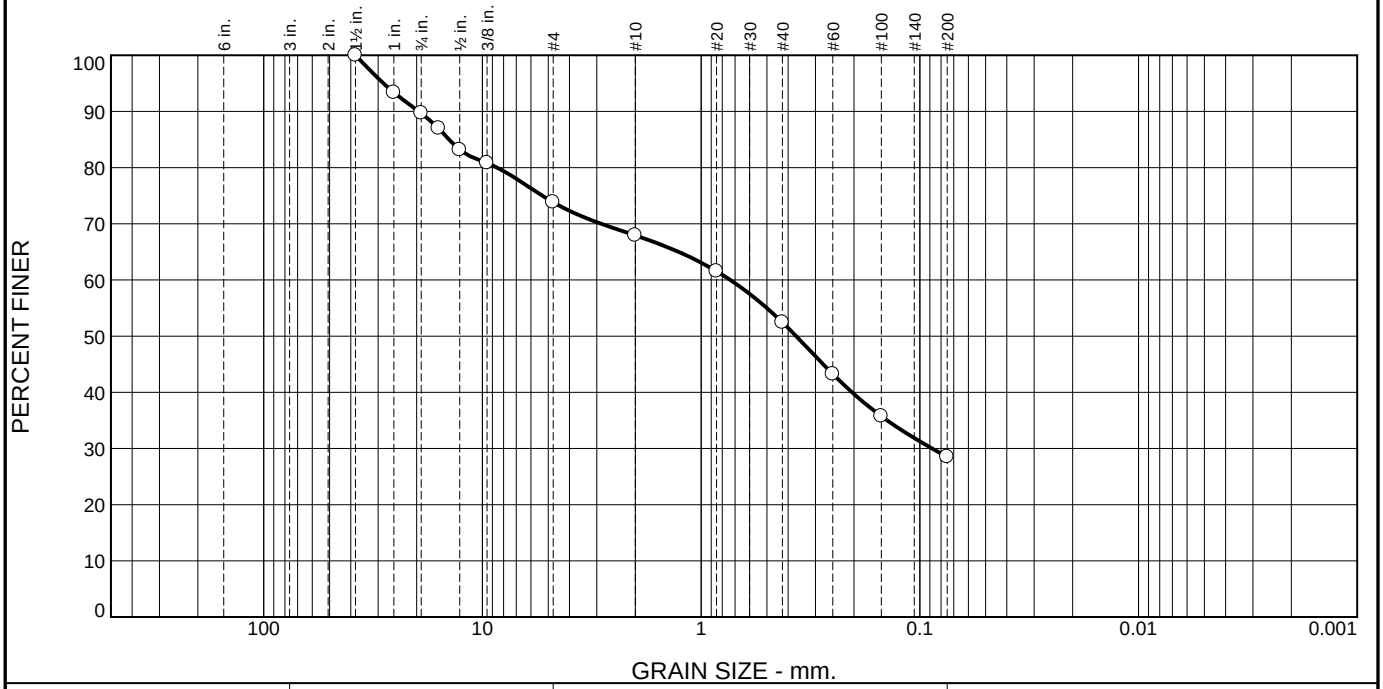
Carnation, WA

Client: King County / Parametrix

Project: King County South Sammamish Segment East Lake Sammamish Trail

Project No: 0105-010 **Figure** B-1

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.3	15.9	5.9	15.4	24.0	28.5	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.5	100.0		
1.0	93.4		
3/4	89.7		
5/8	87.0		
1/2	83.2		
3/8	80.8		
#4	73.8		
#10	67.9		
#20	61.5		
#40	52.5		
#60	43.2		
#100	35.7		
#200	28.5		

* (no specification provided)

Material Description

Light brown silty fine to medium SAND with gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 19.5246 D_{85}= 14.2225 D_{60}= 0.7353
D_{50}= 0.3676 D_{30}= 0.0878 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sampled by ALG 10/21/13

Date Received: 10/21/13 **Date Tested:** 11/11-11/13/13

Tested By: SAB

Checked By: KSK 11/14/13

Title: Principal Eng Geologist

Source of Sample: Test Borings **Depth:** 2.5-6 feet **Date Sampled:** 10/21/13

Sample Number: Boring B-15, S-2,S-3

ICICLE CREEK ENGINEERS, INC.

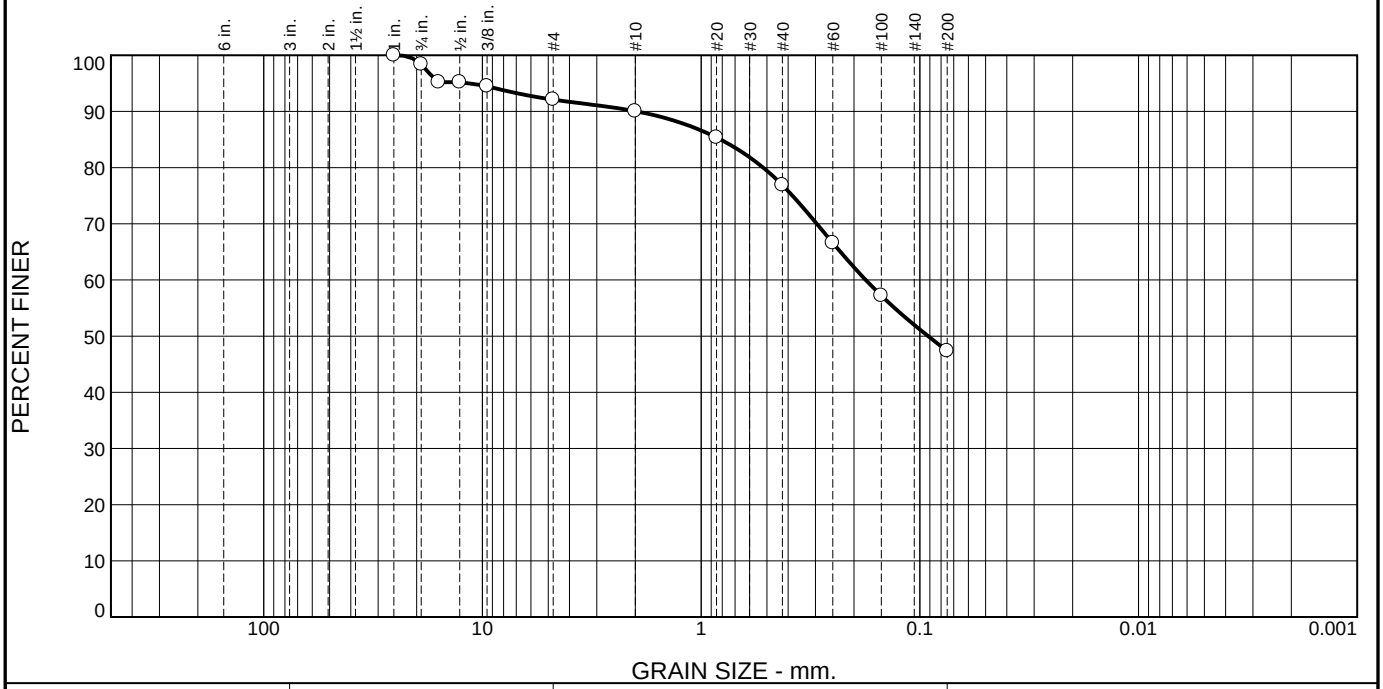
Carnation, WA

Client: King County / Parametrix

Project: King County South Sammamish Segment East Lake Sammamish Trail

Project No: 0105-010 **Figure** B-2

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.6	6.3	2.1	13.1	29.5	47.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.0	100.0		
3/4	98.4		
5/8	95.2		
1/2	95.2		
3/8	94.5		
#4	92.1		
#10	90.0		
#20	85.4		
#40	76.9		
#60	66.6		
#100	57.2		
#200	47.4		

* (no specification provided)

Material Description

Dark grey and brown silty fine to medium SAND with a trace of gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 1.9716 D_{85}= 0.8156 D_{60}= 0.1766
D_{50}= 0.0915 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sampled by ALG 10/18/13

Date Received: 10/18/13 **Date Tested:** 11/11-11/13/13

Tested By: SAB

Checked By: KSK 11/14/13

Title: Principal Eng Geologist

Source of Sample: Test Borings **Depth:** 2.5-6.5 feet **Date Sampled:** 10/18/13
Sample Number: Boring B-25, S-2,S-3

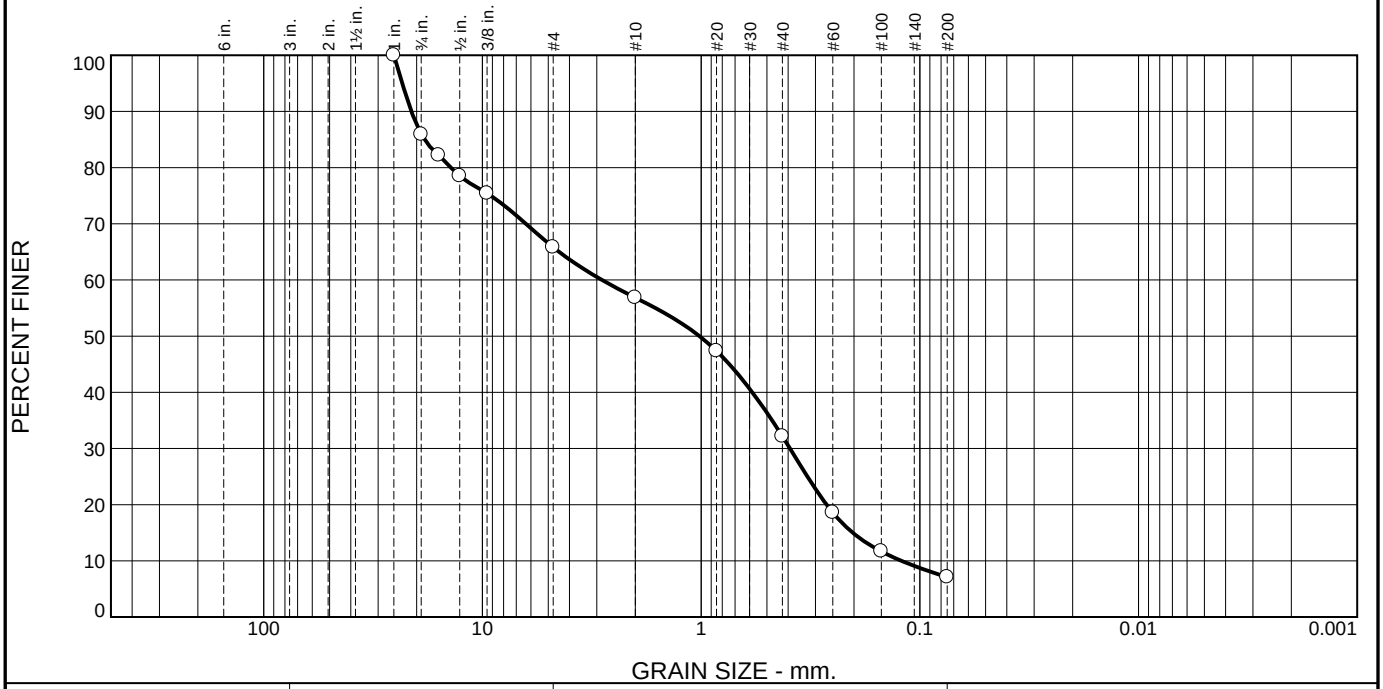
ICICLE CREEK ENGINEERS, INC.

Carnation, WA

Client: King County / Parametrix
Project: King County South Sammamish Segment East Lake Sammamish Trail

Project No: 0105-010 **Figure** B-3

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	14.1	20.1	9.0	24.6	25.1	7.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.0	100.0		
3/4	85.9		
5/8	82.2		
1/2	78.5		
3/8	75.4		
#4	65.8		
#10	56.8		
#20	47.4		
#40	32.2		
#60	18.6		
#100	11.7		
#200	7.1		

* (no specification provided)

Material Description

Brown fine to medium SAND with silt and gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 21.1274 D_{85}= 18.4388 D_{60}= 2.8395
D_{50}= 1.0172 D_{30}= 0.3923 D_{15}= 0.2025
D_{10}= 0.1212 C_u= 23.42 C_c= 0.45

Remarks

Sampled by ALG 10/23/13

Date Received: 10/23/13 **Date Tested:** 11/11-11/13/13

Tested By: SAB

Checked By: KSK 11/14/13

Title: Principal Eng Geologist

Source of Sample: Test Borings **Depth:** 2.5-6.5 feet **Date Sampled:** 10/23/13

Sample Number: Boring B-84, S-2,S-3

ICICLE CREEK ENGINEERS, INC.

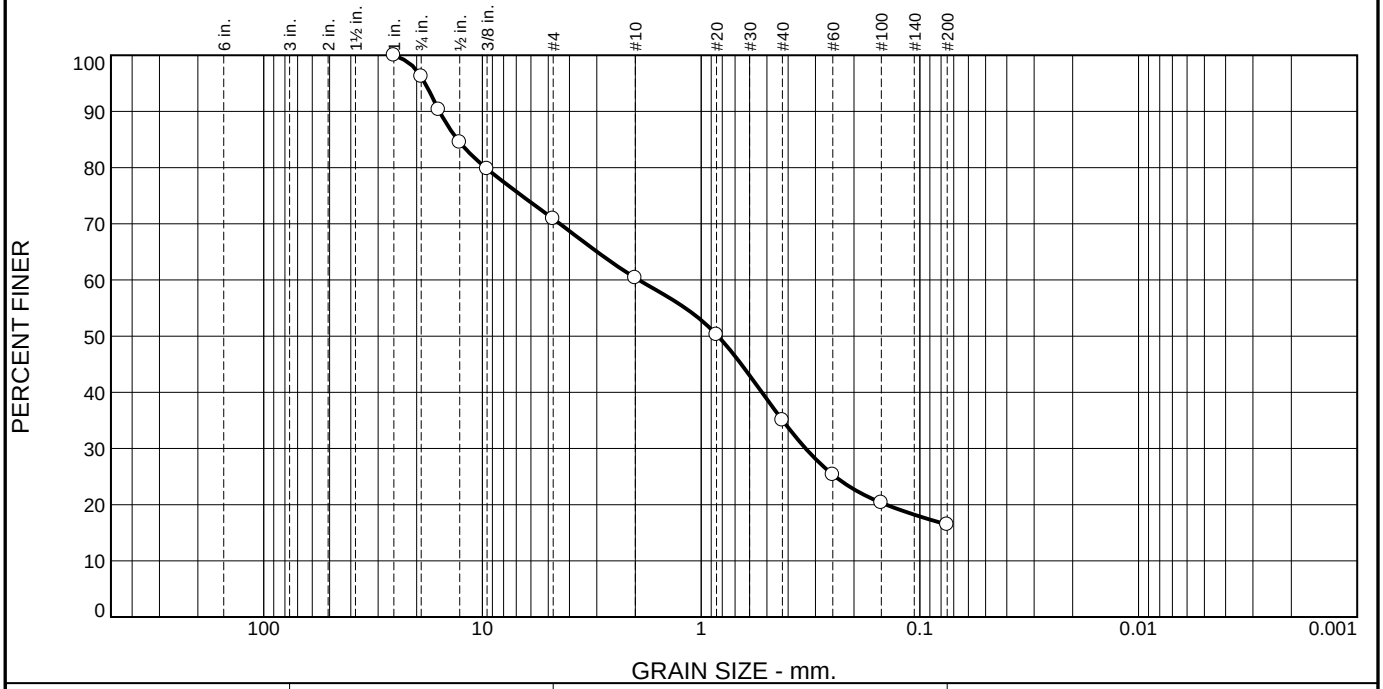
Carnation, WA

Client: King County / Parametrix

Project: King County South Sammamish Segment East Lake Sammamish Trail

Project No: 0105-010 **Figure** B-4

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.8	25.3	10.5	25.4	18.6	16.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
1.0	100.0		
3/4	96.2		
5/8	90.3		
1/2	84.5		
3/8	79.8		
#4	70.9		
#10	60.4		
#20	50.3		
#40	35.0		
#60	25.3		
#100	20.4		
#200	16.4		

* (no specification provided)

Material Description

Light brown silty fine to coarse SAND with gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 15.7296 D_{85}= 13.0057 D_{60}= 1.9279
D_{50}= 0.8373 D_{30}= 0.3325 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sampled by ALG 10/21/13

Date Received: 10/21/13 **Date Tested:** 11/11-11/14/13

Tested By: SAB

Checked By: KSK 11/14/13

Title: Principal Eng Geologist

Source of Sample: Test Borings **Depth:** 2.5-6.5 feet **Date Sampled:** 10/21/13
Sample Number: Boring B-94, S-2,S-3

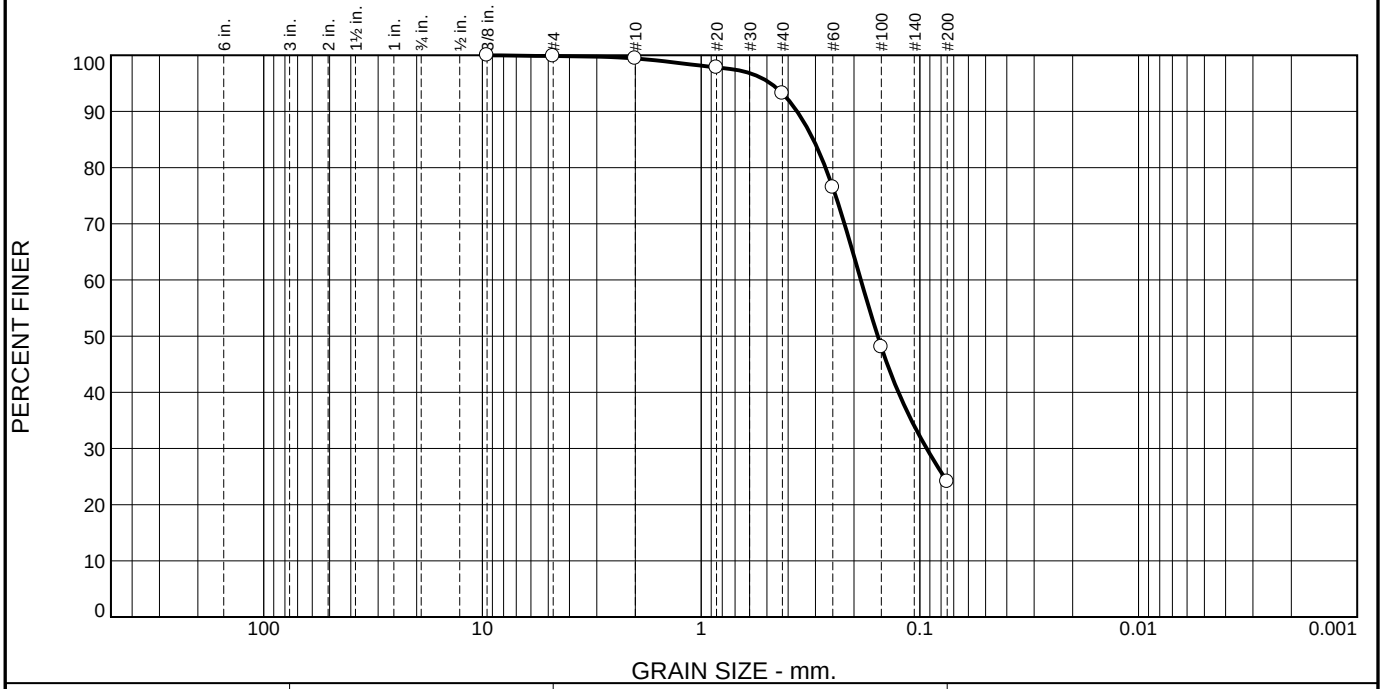
ICICLE CREEK ENGINEERS, INC.

Carnation, WA

Client: King County / Parametrix
Project: King County South Sammamish Segment East Lake Sammamish Trail

Project No: 0105-010 **Figure** B-5

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.1	0.5	6.2	69.1	24.1	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
3/8	100.0		
#4	99.9		
#10	99.4		
#20	97.8		
#40	93.2		
#60	76.5		
#100	48.1		
#200	24.1		

* (no specification provided)

Material Description

Light brown silty fine SAND

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.3638 D_{85}= 0.3070 D_{60}= 0.1860
D_{50}= 0.1558 D_{30}= 0.0930 D_{15}=
D_{10}= C_u= C_c=

Remarks

Sampled by ALG 10/12/13

Date Received: 10/12/13 **Date Tested:** 11/11-11/14/13

Tested By: SAB

Checked By: KSK 11/14/13

Title: Principal Eng Geologist

Source of Sample: Test Borings **Depth:** 5-6.5 feet **Date Sampled:** 10/12/13

Sample Number: Boring B-98, S-3

ICICLE CREEK ENGINEERS, INC.

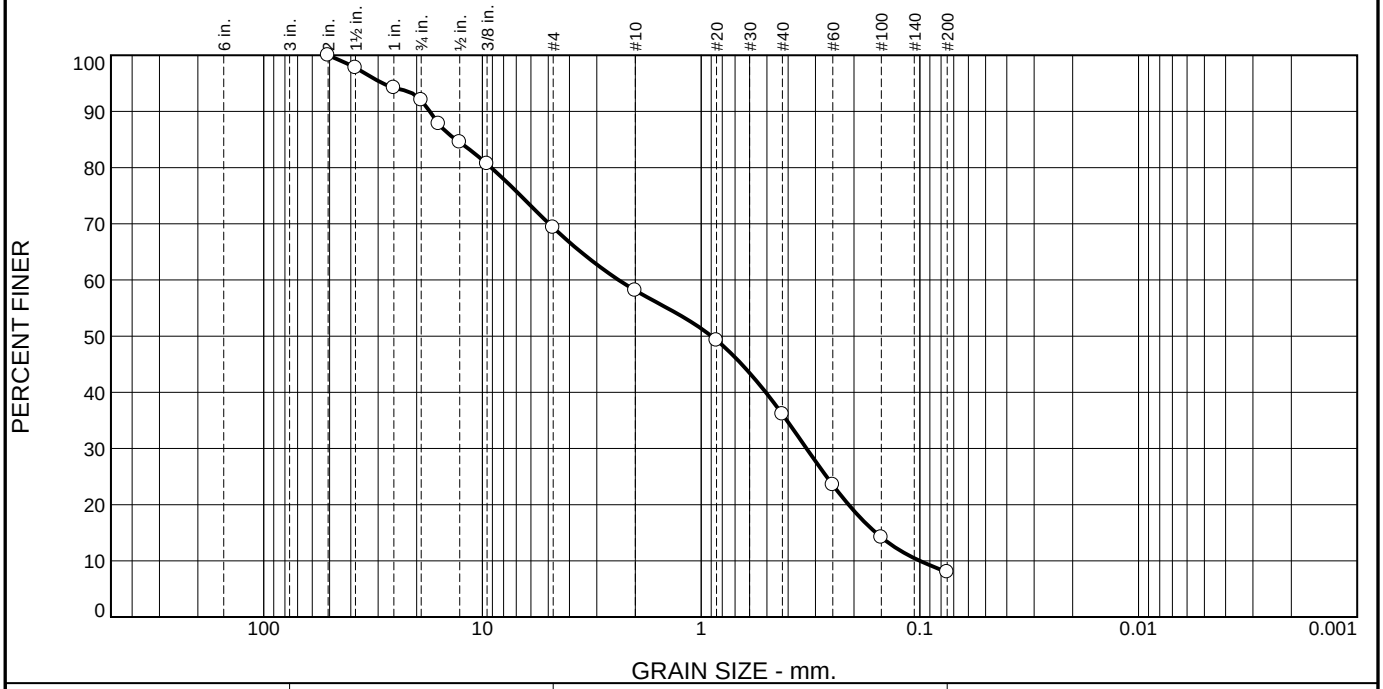
Carnation, WA

Client: King County / Parametrix

Project: King County South Sammamish Segment East Lake Sammamish Trail

Project No: 0105-010 **Figure** B-6

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.0	22.7	11.2	22.0	28.1	8.0	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
2.0	100.0		
1.5	97.8		
1.0	94.2		
3/4	92.0		
5/8	87.8		
1/2	84.5		
3/8	80.7		
#4	69.3		
#10	58.1		
#20	49.3		
#40	36.1		
#60	23.5		
#100	14.2		
#200	8.0		

* (no specification provided)

Material Description

Brown fine to medium SAND with silt and gravel

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-1-b

Coefficients

D_{90}= 17.4036 D_{85}= 13.2267 D_{60}= 2.3844
D_{50}= 0.8966 D_{30}= 0.3295 D_{15}= 0.1588
D_{10}= 0.1000 C_u= 23.86 C_c= 0.46

Remarks

Sampled by JMS 10/30/13

Date Received: 10/30/13 **Date Tested:** 11/15-11/21/13

Tested By: SAB

Checked By: KSK 11/21/13

Title: Principal Eng Geologist

Source of Sample: Infiltration Test Holes **Depth:** 2.0 feet **Date Sampled:** 10/30/13

Sample Number: IT-4

ICICLE CREEK ENGINEERS, INC.

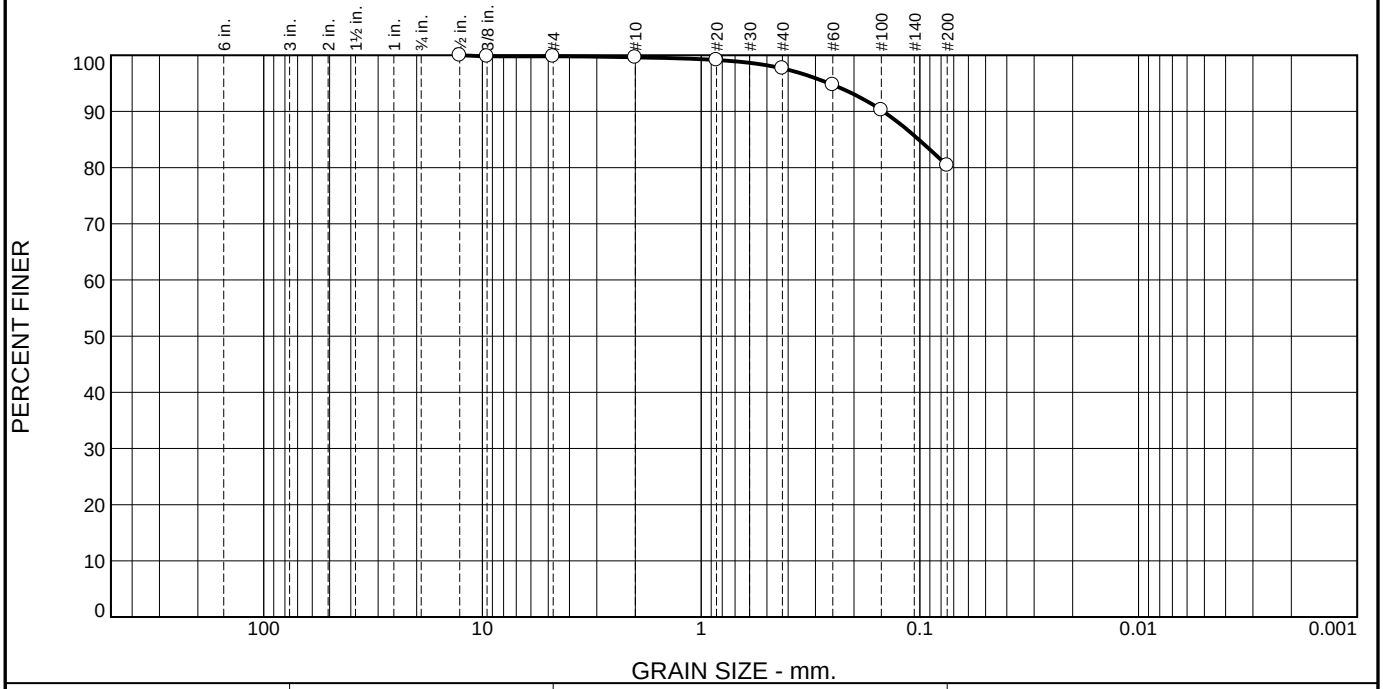
Carnation, WA

Client: King County / Parametrix

Project: King County South Sammamish Segment East Lake Sammamish Trail

Project No: 0105-010 **Figure** B-7

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.2	0.2	1.9	17.3	80.4	

TEST RESULTS

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
0.5	100.0		
0.375	99.8		
#4	99.8		
#10	99.6		
#20	99.2		
#40	97.7		
#60	94.7		
#100	90.2		
#200	80.4		

* (no specification provided)

Material Description

Brown SILT with fine sand

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= ML **AASHTO (M 145)=** A-4(0)

Coefficients

D_{90}= 0.1468 D_{85}= 0.1012 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Remarks

Sampled by JMS 10/31/13

Date Received: 10/31/13 **Date Tested:** 11/19/13

Tested By: SAB

Checked By: KSK 11/19/13

Title: Principal Eng Geologist

Source of Sample: Infiltration Test Holes **Depth:** 3.0 feet **Date Sampled:** 10/31/13

Sample Number: IT-5

ICICLE CREEK ENGINEERS, INC.

Carnation, WA

Client: King County / Parametrix

Project: King County South Sammamish Segment East Lake Sammamish Trail

Project No: 0105-010 **Figure** B-8