APPENDIX A
BORING AND TEST PIT LOGS

Washington State Department of Transportation

Test Boring Legend

URS

Sampler Symbols

	Standard Penetration Test
	Oversized Penetration Test (Dames & Moore, California)
	Shelby Tube
P	Piston Sample
	Washington Undisturbed
	Vane Shear Test
	Core
	Becker Hammer
B	Bag Sample

Well Symbols

	Cement Surface Seal
	Piezometer Pipe in Granular Bentonite Seal
	Piezometer Pipe in Sand
	Well Screen in Sand
	Granular Bentonite Bottom Seal
	Inclinometer Casing in Concrete Bentonite Grout

Graphic Legend for Soil Strata

	Gravel with sand/cobbles/ boulders (primarily fill)
	Gravel/cobbles/boulders/sand/ silt (primarily colluvium)
	Organic soil
	Silt/fine sand
	Sand/gravel
	Clay with gravel
	Clayey silt
	Bedrock

33758606_01.cdr

Soil Density Modifiers

Gravel, Sand & Non-plastic Silt		Elastic Silts and Clay	
SPT Blows/ft	Density	SPT Blows/ft	Consistency
0-4	Very Loose	0-1	Very Soft
5-10	Loose	2-4	Soft
11-24	Medium Dense	5-8	Medium Stiff
25-50	Dense	9-15	Stiff
>50	Very Dense	16-30	Very Stiff
		31-60	Hard
		>60	Very Hard

Angularity of Gravel & Cobbles

Angular	Coarse particles have sharp edges and relatively plane sides with unpolished surfaces.
Subangular	Coarse grained particles are similar to angular but have rounded edges.
Subrounded	Coarse grained particles have nearly plane sides but have well rounded corners and edges.
Rounded	Coarse grained particles have smoothly curved sides and no edges.

Soil Moisture Modifiers

Dry	Absence of moisture; dusty, dry to touch
Moist	Damp but no visible water
Wet	Visible free water

Soil Structure

Stratified	Alternating layers of varying material or color at least 0.25 inch thick, note thickness and inclination.
Laminated	Alternating layers of varying material or color less than 0.25 inch thick, note thickness and inclination.
Fissured	Breaks along definite planes of fracture with little resistance to fracturing.
Slickensided	Fracture planes appear polished or glossy, somtimes striated.
Blocky	Cohesive soil that can be broken down into smaller angular lumps which resist further breakdown.
Disrupted	Soil structure is broken and mixed. Infers that material has moved substantially - landslide debris.
Homogeneous	Same color and appearance throughout.

HCL Reaction

No HCL Reaction	No visible reaction.
Weak HCL Reaction	Some reaction with bubbles forming slowly.
Strong HCL Reaction	Violent reaction with bubbles forming imediately.

Degree of Vesicularity of Pyroclastic Rocks

Slightly Vesicular	5 to 10 percent of total
Moderately Vesicular	10 to 25 percent of total
Highly Vesicular	25 to 50 percent of total
Scoriaceous	Greater than 50 percent of total

Note: This page was modified by URS to include graphic legend for soil strata and to show US standard units.

Washington State Department of Transportation

Test Boring Legend

URS

Grain Size

Fine Grained	<0.04 in	Few crystal boundaries/grains are distinguishable in the field or with hand lens.
Medium Grained	0.04 in to 0.2 in	Most crystal boundaries/grains are distinguishable with the aid of a hand lens.
Coarse Grained	>0.2 in	Most crystal boundaries/grains are distinguishable with the naked eye.

Weathered State

Term	Description	Grade
Fresh	No visible sign of rock material weathering; perhaps slight discoloration in major discontinuity surfaces.	I
Slightly Weathered	Discoloration indicates weathering of rock material and discontinuity surfaces. All the rock material may be discolored by weathering and may be somewhat weaker externally than its fresh condition.	II
Moderately Weathered	Less than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a continuous framework or as core stones.	III
Highly Weathered	More than half of the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as discontinuous framework or as core stone.	IV
Completely Weathered	All rock material is decomposed and/or disintegrated to soil. The original mass structure is still largely intact.	V
Residual Soil	All rock material is converted to soil. The mass structure and material fabric is destroyed. There is a large change in volume, but the soil has not been significantly transported.	VI

Relative Rock Strength

Grade	Description	Field Description	Unconfined Compressive Strength (Approximate)
R0	Extremely Weak Rock	Indented by thumbnail	0.04 to 0.15 ksi
R1	Very Weak Rock	Specimen crumbles under sharp blow with point of geological hammer, can be peeled by a pocket knife	0.15 to 3.6 ksi
R2	Moderately Weak Rock	Shallow cuts or scrapes can be made in a specimen with a pocket knife, geological hammer point indents deeply with a firm blow	3.6 to 7.3 ksi
R3	Moderately Strong Rock	Specimen cannot be scraped or cut with a pocket knife, shallow indentation can be made under firm blows from a hammer point	7.3 to 15 ksi
R4	Strong Rock	Specimen requires more than one blow of geological hammer to fracture it	15 to 29 ksi
R5	Very Strong Rock	Specimen requires many blows of geological hammer to fracture it	>29 ksi

Discontinuities

Spacing

Very Widely	Greater than 10 feet
Widely	3 feet to 10 feet
Moderately	1 foot to 3 feet
Closely	2 inches to 12 inches
Very Closely	Less than 2 inches

RQD (%)

$$\frac{100(\text{length of core in pieces} > 4 \text{ inches})}{\text{Length of core run}}$$

Condition

Excellent	Very rough surfaces, no separation, hard discontinuity wall
Good	Slightly rough surfaces, separation less than 0.05 inches, hard discontinuity wall.
Fair	Slightly rough surfaces, separation greater than 0.05 inches, soft discontinuity wall.
Poor	Slickensided surfaces, or soft gouge less than 0.2 inches thick, or open discontinuities 0.05 to 0.2 inches.
Very Poor	Soft gouge greater than 0.2 inches thick, or open discontinuities greater than 0.2 inches.

Fracture Frequency (FF) is the average number of fractures per unit length of core recovered.
Does not include mechanical breaks caused by drilling or handling.

Note: This page was modified by URS to include graphic legend for soil strata and to show US standard units.

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PHASE 1C BORING LOGS

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-26190

HOLE No. CUL-019-10

Sheet 1 of 3

Job No. XL-2779 SR I-90 Elevation ft

Project I-90 Snoqualmie Pass East Phase 2 Driller Wilson, Jamie Lic# 2941T

Site Address I-90 to snowquaimie pass Inspector Cooper, Kerry #2552

Start May 10, 2010 Completion May 11, 2010 Well ID# Equipment CME 45 (9C4-2) - AH

Station 0. Offset 0. Hole Dia (inches) 4 Method Mud Rotary

Northing 732547.00 Easting 1429443.00 Collected by Datum

County Kititas Subsection NE1/4 of NW1/4 Section 1 Range 11ewm Township 21

Field SPT (N) ◆ | Moisture Content ✚ | RQD ▨ | 20 40 60 80

Depth (ft)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material
	3 23 20 (43)		D-1		Silty GRAVEL, subangular, dense, Brown, dry, homogenous, HCl not tested. Length Recovered:0.5 ft. Length Retained:0.5 ft.
	>>◆ 50/5 (REF)		D-2		Silty GRAVEL, subangular, very dense, Brown, dry, homogenous, HCl not tested. Length Recovered:0.2 ft. Length Retained:0.2 ft.
5	10 8 15 (23)		D-3		Silty GRAVEL, subangular, medium dense, Brown, wet, homogenous, HCl not tested. Length Recovered:0.5 ft. Length Retained:0.5 ft.
			C-4		ANDESITE , Gray, fine grained, slightly weathered, strong rock. Discontinuities are moderately spaced and in good condition. Recovered:100% RQD:100 FF:1
10			C-5		ANDESITE , Gray, fine grained, slightly weathered, strong rock. Discontinuities are moderately spaced and in good condition. Recovered:70% RQD:70 FF:1
15	11 12 8 (20)		D-6		Silty GRAVEL, subangular, medium dense, Gray, wet, homogenous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.
			C-7		No Recovery
	8 10 12 (22)		D-8		Silty GRAVEL, subangular, medium dense, Gray, wet, homogenous, HCl not tested. Length Recovered:1.1 ft. Length Retained:1.1 ft.
20			C-9		Silty GRAVEL, subangular, Gray, wet, HCl not tested.

Groundwater | Instrument

SOILA XL-2779 I-90 SNOQUALMIE PASS EAST HYAH TO KEECHELUS DAM.GPJ SOIL.GDT 7/8/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S-26190

HOLE No. CUL-019-10

Job No. XL-2779 SR I-90 Elevation ft

Sheet 2 of 3

Project I-90 Snoqualmie Pass East Phase 2

Driller Wilson, Jamie Lic# 2941T

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
								Length Recovered:1 ft. Length Retained:1 ft.		
25			◆	13 12 24 (36)		D-10		Silty SAND, dense, Gray, wet, homogenous, HCl not tested. Length Recovered:1.5 ft. Length Retained:1.5 ft.		
30			>>◆	50/5 (REF)		D-11		Silty GRAVEL, subangular, very dense, Gray, wet, homogenous, HCl not tested. Length Recovered:0.5 ft. Length Retained:0.5 ft.		
35			>>◆	50/5 (REF)		D-12		No Recovery		
						C-13		ANDESITE , Gray, medium grained, slightly weathered, strong rock. Discontinuities are closely spaced and in good condition. Recovered:100% RQD:75 FF:2		
40						C-14		ANDESITE , Gray, medium grained, slightly weathered, strong rock. Discontinuities are closely spaced and in good condition. Recovered:100% RQD:89 FF:1		
45										

SOILA XL-2779 I-90 SNOQUALMIE PASS EAST HYAH TO KEECHELUS DAM.GPJ SOIL.GDT 7/8/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S-26190

HOLE No. CUL-019-10

Job No. XL-2779 SR I-90 Elevation ft

Sheet 3 of 3

Project I-90 Snoqualmie Pass East Phase 2

Driller Wilson, Jamie Lic# 2941T

Depth (ft)	Elevation (ft)	Profile	Field SPT (N) / Moisture Content / RQD (20 40 60 80)	Blows/6" (N) and/or RQD FF	Sample Type	Sample No. (Tube No.)	Lab Tests	Description of Material	Groundwater	Instrument
50						C-15		ANDESITE , Gray, medium grained, slightly weathered, strong rock. Discontinuities are closely spaced and in good condition. Recovered:97% RQD:88 FF:1		
55								The implied accuracy of the borehole location information displayed on this boring log is typically submeter in (X,Y) when collected by the HQ Geotech Division and subcentimeter in (X,Y,Z) when collected by the Region Survey Crew.		
60								End of test hole boring at 50 ft below ground elevation. This is a summary Log of Test Boring. Soil/Rock descriptions are derived from visual field identifications and laboratory test data. Note: REF = SPT Refusal		
65										
70										

SOILA XL-2779 I-90 SNOQUALMIE PASS EAST HYAH TO KEECHELUS DAM.GPJ SOIL.GDT 7/8/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. CUL-020-10

Job No. 33761951.00008 SR 90 Elevation 2530.5 ft (771.3 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Dennis Dunn

Start July 15, 2010 Completion July 16, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1060757.92 Easting 1757689.52 Latitude 47?0'20.61"N

Longitude 121?1'03.33"W

County Kittitas Subsection _____ Section _____ Range _____ Township_____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 21.0 feet: poorly to well graded GRAVEL with sand, occsasional silt, cobbles and boulders, occasionally silty SAND, subangular to angular, medium dense to very dense, brown, greenish gray or gray, wet, homogenous, no HCl reaction.		
5	1			50			D-1 / SM	2 1 50/5". (>50)	5 feet: Very dense, silty SAND.		
10	2										
	3			50			D-2 / GP	6 50/4" (>50)	grades to poorly graded GRAVEL with sand.		
15	4			50			D-3 / GP	7 50 (50)			
	5			100			C-4 / GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2530.5 ft (771.3 m)

HOLE No. CUL-020-10

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				22			C-5 GW		grades to well graded GRAVEL.		
	7										
25											
	8			80			D-6 GP	9 11 6 (17)	grades to medium dense, poorly graded GRAVEL with silt.		
				100			C-7 GP(C/B)		grades to very dense, poorly graded GRAVEL with cobbles and boulders.		
	9										
30											
				40			C-8 GW		grades to well graded GRAVEL.		
	10										
35											
	11			33			D-9 GP	50/3". (>50)	grades to poorly graded GRAVEL.		
				100/2			C-10		36.3 to 51.0 feet: Andesite, gray, fine grained, fresh, strong (R4). Discontinuities are closely to very closely spaced and in fair to good condition. No HCl reaction. (CR - 100%, RQD - 60 to 96%, FF - 1 to 3) 36.3 feet: Discontinuities are closely spaced to very closely spaced and in fair condition. 36.9 feet: PLT - Strong (R4) rock.		
	12										
40				100/3			C-11		Discontinuities are closely spaced and in good condition.		
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. CUL-020-10

Job No. 33761951.00008 SR 90 Elevation 2530.5 ft (771.3 m)

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			100 / 1			C-12		PLT - Moderately strong (R3) rock.		
									PLT - Moderately strong (R3) rock.		
									PLT - Moderately weak (R2) rock.		
	15										
50									PLT - Moderately strong (R3) rock.		
									Bottom of boring at 51.0 feet depth below the ground surface. Backfilled to ground surface with bentonite chips.		
	16										
55											
	17										
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. CUL-021-10

Job No. 33761951.00008 SR 90 Elevation 2524.7 ft (769.5 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start September 22, 2010 Completion September 22, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1061717.85 Easting 1756660.88 Latitude 47°20'29.97"N Longitude 121°21'18.42"W

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				77			C-2 GP(C)		0 to 42.0 feet: Poorly to well graded GRAVEL with cobbles, silty GRAVEL with sand, Silty SAND with gravel, poorly graded SAND with gravel, subangular to subrounded, loose to very dense, gray to brown, moist to wet, homogenous, no HCl reaction. 2.0 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 8 inches.		
	1										
5				20			D-3 GM	4 2 8 (10)	grades to loose, silty GRAVEL with sand.		
	2			89			C-4 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7.25 inches.		
10	3			72			C-5 GW(C)		Maximum size of the cobbles encountered is 4.5 inches.		
	4										
15				60			D-6 SW	13 38 29 (67)	grades to very dense, well graded SAND with gravel.		
	5			80			C-7 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9.5 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 2/11/11

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2524.7 ft (769.5 m)

HOLE No. CUL-021-10

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80	53			D-8 SM	48 19 38 (57)	grades to silty SAND with gravel.		
				91			C-9 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
	7										
25							D-10 SM	30 50/4" (>50)	grades to silty SAND with gravel.		
				57			C-11 GW(C)		25.8 feet: grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 8 inches. Note: Light gray, moist, hrad to very stiff sandy silt was encountered between 26.6 and 26.8 feet depth below the ground surface.		
	8										
	9										
30				67			D-12 SP	21 21 23 (44)	grades to poorly graded SAND with gravel.		
				37			C-13 GW		grades to well graded GRAVEL.		
	10										
35							D-14 SM	24 44 50/3" (>50)			
	11			58			C-15 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
	12										
40				100			D-16 SM / C-17A GW(C)	50/6" (>50)	grades to silty SAND. 40.5 feet: grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
	13			100 / 3			C-17B		42.0 to 50.0 feet: Andesite, gray to greenish gray, fine grained, fresh, moderately strong (R3). Discontinuities are closely to very closely spaced and in fair to poor condition. No HCl reaction. (CR - 100%, RQD - 30 to 57%, FF - 2.6 to 3) 42.0 feet: Gray rock.		
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 2/11/11

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. CUL-021-10

Job No. 33761951.00008 SR 90 Elevation 2524.7 ft (769.5 m)

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			100 / 2.6			C-18		grades to gray to greenish gray rock.		
	15										
50									Bottom of boring at 50.0 feet depth below the ground surface. Backfilled to ground surface with bentonite chips. No groundwater measurements were taken.		
	16										
55											
	17										
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 2/11/11

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. CUL-022-10

Job No. 33761951.00008 SR 90 Elevation 2525.2 ft (769.7 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start September 23, 2010 Completion September 24, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1061728.66 Easting 1756697.11 Latitude 47°20'30.08"N Longitude 121°21'17.90"W

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100			D-1 GM	10 12 11 (23)	0 to 43.0 feet: Silty GRAVEL with sand, well graded to poorly graded GRAVEL with sand and cobbles and occasional boulders, well graded to poorly graded SAND with gravel or silty SAND with gravel, angular to subangular, medium dense to very dense, gray, greenish gray or brownish gray, moist to wet, homogenous, no HCl reaction. 0 feet: Medium dense, silty GRAVEL with sand.		
	1										
5				67			D-2 GM	15 17 28 (45)	grades to dense.		
	2			74			C-3 GW(C/B)		grades to well graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 14 inches.		
10	3			50			D-4 GW	16 11 17 (28)			
				54			C-5 GW(C/B)		Maximum size of the boulders encountered is 12 inches.		
	4										
15				80			D-6 SW	24 21 25 (46)	grades to well graded SAND with gravel.		
	5			48			C-7 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 2/11/11

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2525.2 ft (769.7 m)

HOLE No. CUL-022-10

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				60			D-8 SP	20 15 40 (55)	grades to poorly graded SAND with gravel.		
	7			86			C-9 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 5 inches.		
25											
	8			33			D-10 SP	12 27 25 (52)	grades to poorly graded SAND with gravel.		
				100			C-11 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
	9										
30											
				0 / 60			D-12 C-13 GP(C)	50/4" (>50)	grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7.5 inches.		
	10										
35											
	11			52			C-14 GP(C)		Maximum size of the cobbles encountered is 7 inches.		
	12										
40											
				100 / 6			D-15 SM C-15A SP	50/4" (>50)	grades to silty SAND. grades to poorly graded SAND with gravel.		
	13										
				100 / 2.7			C-16B		43.0 to 51.0 feet: Andesite, fine to coarse grained, fresh, very weak (R1) to moderately strong (R3). Discontinuities are closely to very closely spaced and in very poor to fair condition. No HCl reaction. (CR - 100%, RQD - 27 to 66%, FF - 1.8 to 2.7)		
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 2/11/11

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2525.2 ft (769.7 m)

HOLE No. CUL-022-10

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
50	14			100 / 1.8			C-17		43.0 feet: Fine to medium grained, very weak (R1) to moderately weak (R2) rock. Discontinuities are closely to very closely spaced and in poor to very poor condition. 46.0 feet: grades to fine to coarse grained, moderately weak (R2) to moderately strong (R3) rock. Discontinuities are closely and in very poor to fair condition. Note: Gray, medium stiff, wet, low plasticity SILT was encountered between 46.3 and 46.6 feet depth below the ground surface.		
	15										
	16								Bottom of boring at 51.0 feet depth below the ground surface. Backfilled to ground surface with bentonite chips. Groundwater was measured at 22.6 feet below the groundsurface on 9/23/2010 at 10:00. This water level may be unstable.		
55	17										
	18										
60	19										
65	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 2/11/11

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. EMB-027-09

Job No. 33758654.00009 SR 90 Elevation 2479.2 ft (755.6 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor _____

Inspector Ken Yang

Start June 17, 2009 Completion June 17, 2009 Well ID# Not applicable

Equipment CME 45 (Barge rig) with auto hammer

Station _____ Offset _____ Casing HWT 10', HQ 51'

Method Wet Rotary

Northing 1059781.58 Easting 1758122.49 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 20 feet: Silty SAND or poorly graded SAND with gravel, subrounded to angular, medium dense to dense, brownish gray to gray, wet, homogenous, no HCl reaction.		
5	1			47			D-1 / SM	11 11 15 (25)	5 feet: Dense, silty SAND with fine gravel.		
10	2			40			D-2 / SP	5 5 6 (11)	grades to medium dense, poorly graded SAND with gravel.		
15	3			50			D-3 / SM	6 9 31 (40)	grades to dense, silty SAND with fine gravel.		
20	4										
	5										
	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/21/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2479.2 ft (755.6 m)

HOLE No. EMB-027-09

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				80			D-4 GW ~~C-5~~ GW (B)	50/3" (>50)	20.0 to 31.0 feet: Well graded GRAVEL with sand or silty GRAVEL with sand, occasional cobbles and boulders, occasional silty SAND with fine gravel, angular to subangular, dense to very dense, greenish gray to gray, wet, homogenous, no HCl reaction.		
				60			C-6 GM (C/B)		20.0 feet: Very dense, well graded GRAVEL with sand.		
	7								20.2 feet: grades to well graded GRAVEL with boulders. Maximum size of the boulder encountered is 1.8 feet long.		
25									21 feet: grades to silty GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 17 inches.		
	8			96			C-7 GM		grades to dense, silty SAND with fine gravel. grades to silty GRAVEL with sand (cemented).		
	9										
30				98 4.4			C-8		31.0 to 51.0 feet: Sandstone?, gray to dark gray, fine grained, fresh, very weak (R1) to strong (R4). Discontinuities are very closely to medium spaced and in very poor to fair condition. (CR = 70 to 100%, RQD = 18 to 56%, FF = 2.0 to 4.4)		
	10								31.0 feet: very weak (R1) to moderately weak (R2) rock. Discontinuities are very closely to closely spaced and in very poor to poor condition.		
35									32.5 feet: PLT: very weak (R1) rock.		
	11			94 3.0			C-9		grades to very weak (R1) to strong (R4) rock. Discontinuities are very closely to medium spaced and in very poor to fair condition. PLT: very weak (R1) rock.		
	12										
40									PLT: moderately strong (R3) rock.		
				100 2.4			C-10		grades to moderately strong (R3) to strong (R4) rock. Discontinuities are closely to medium spaced and in poor to fair condition.		
	13										
45									PLT: moderately strong (R3) rock.		

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/21/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. EMB-027-09

Job No. 33758654.00009 SR 90 Elevation 2479.2 ft (755.6 m)

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			70 / 2.0			C-11		grades to moderately weak (R2) to moderately strong (R3) rock. Discontinuities are very closely to closely spaced. PLT: moderately weak (R2) rock.		
50	15										
									Bottom of boring at 51.0 feet below the mudline. Backfilled to ground surface with bentonite chips. Lake level measurements: -06/17/2009 at 10:00: 37 feet above the mudline.		
55	16										
	17										
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/21/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-001-08

Job No. 33758632.13000 SR 90 Elevation 2525.5 ft (769.8 m)

Sheet 1 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 29, 2008 Completion June 4, 2008 Well ID# Not Applicable Equipment Skid-mounted 5500-1 w/ manual-hammer

Station 1425+96.22 Offset 13.79'L Casing HW, HQ Method Wet Rotary

Northing 1061276.34 Easting 1756357.86 Latitude 47°20'25.584"N Longitude 121°21'22.753"W

County Kittitas Subsection NW1/4 of NW1/4 Section 1 Range 11E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				36			C-1 GW		0 to 0.3 feet: Asphalt pavement. 0.3 to 28.6 feet: Poorly to well graded GRAVEL with sand, occasional silty GRAVEL with sand, occasional cobbles and boulders, subrounded to angular, medium dense to very dense, brown to gray, wet, homogenous, No HCl reaction. 0.3 feet: Well graded GRAVEL with sand.		
	1			50			D-2 GM	31 50 for 3"	grades to very dense, silty GRAVEL with sand.		
5				84			C-3 GM(C)	(>50)	grades to silty GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 9.5 inches.		
	2									▽	
				23			D-4 GM	9 7 11	grades to medium dense, silty GRAVEL with sand.		
10	3			80			C-5 GM	(18)			
	4			67			D-6 GW	31 20 28	grades to dense, well graded GRAVEL with sand.		
15				66			C-7 GP(C)	(48)	grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9 inches.		
	5										
				0 / 90			D-8 GM(C/B) C-9	50 for 1" (>50)	grades to silty GRAVEL with sand, cobbles and boulders. Maximum size of the boulders encountered is 16 inches.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2525.5 ft (769.8 m)

HOLE No. RCB-001-08

Sheet 2 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	7			0 / 86			D-10 GP(C)	50 for 1" (>50)	grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 14 inches.		
25	8										
				67			D-12 SM	4 10 5 (15)	28.6 to 35.1 feet: silty SAND (fine to medium) with fine gravel, occasional silty GRAVEL with sand, subangular to subrounded, loose to medium dense, brownish gray to reddish brown, wet, homogenous, no HCl reaction. 28.6 feet: Medium dense, silty SAND. 30.1 feet: grades to silty GRAVEL with sand. Finer material was washed away.		
30	9			26			C-13 GM				
	10			67			D-14 SM	4 5 2 (7)	grades to silty SAND with fine gravel.		
35				100			C-15 GP		35.1 to 47.0 feet: Poorly graded GRAVEL with sand, occasional silty SAND with gravel, occasional cobbles, subangular to angular, very dense, dark gray to reddish brown, wet, homogenous, no HCl reaction. 35.1 feet: Poorly graded GRAVEL.		
	11			60			C-16 GP				
				0			C-17 GP				
40	12										
				67			D-18 SM	21 32 50 for 5" (>50)	grades to silty SAND with gravel.		
	13			100			C-18 GP(C)		grades to poorly graded GRAVEL.		
				7			C-19 GP(C)				
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2525.5 ft (769.8 m)

HOLE No. RCB-001-08

Sheet 3 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
									47.0 to 71.3 feet: Silty SAND with or without gravel, occasional poorly graded GRAVEL, subrounded, loose to medium dense, reddish brown to gray, wet, homogenous, no HCl reaction.		
				87			D-20 SM	7 4 5 (9)	47.0 feet: Loose, silty SAND.		
	15			100			C-21 GP		grades to poorly graded GRAVEL with cobbles.		
50				100			D-22 SM	1 3 6 (9)	grades to silty SAND with gravel.		
				0			C-23 SM		No recovery. Material was probably washed away. Material is probably silty SAND.		
	16										
				0			C-24 SM		No recovery. Material was probably washed away. Material is probably silty SAND.		
55											
	17										
				80			D-25 SM	12 11 16 (27)	grades to meium dense, silty SAND with gravel.		
				0			C-26 SM		No recovery. Material was probably washed away. Material is probably silty SAND.		
	18										
60											
	19										
				60			D-27 SM	4 6 3 (9)	grades to loose, silty SAND with gravel.		
				40			C-28 GP		grades to poorly graded GRAVEL.		
65											
	20										
				75			D-29 SM	4 8 6 8 (14)	grades to medium dense, silty SAND (fine).		
				0			C-30 SM		No recovery. Material was probably washed away. Material is probably silty SAND.		
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2525.5 ft (769.8 m) HOLE No. RCB-001-08

Sheet 4 of 5

Project I-90 Snoqualmie Pass East Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100			D-31 CL	3 3 3 5 (6)	71.3 to 73.3 feet: Lean CLAY, medium stiff, light greenish gray, wet, homogenous, no HCl reaction.		
	22			83			C-32 SM		73.3 to 82.8 feet: Silty SAND, dense to very dense, brown to light gray, wet, homogenous, no HCl reaction. 73.3 feet: Silty SAND.		
75	23			100			D-33 SM	11 20 12 (32)	grades to dense.		
				100			C-34 SM				
	24			67			C-35 SM				
80				100			D-36 SM	11 12 50 for 5" (>50)	grades to very dense.		
	25			49			C-37 GP(B)		82.8 to 96.6 feet: Poorly graded GRAVEL with sand to silty GRAVEL with sand, occasionally silty SAND, occasional cobbles, subangular to angular, very dense, gray to greenish gray, wet, homogenous, no HCl reaction. 82.8 feet: Poorly graded GRAVEL with occasional boulders.		
85	26			75			D-38 SM	48 50 for 3" (>50)	grades to silty SAND with gravel.		
				0			C-39 GM(C)		grades to silty GRAVEL with sand and cobbles. Finer material may have been washed away.		
	27										
90											
	28			75			D-40 SM	>50	91.7 feet: grades to silty SAND.		
				0			C-41 GP		grades to poorly graded GRAVEL with sand.		
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-001-08

Job No. 33758632.13000 SR 90 Elevation 2525.5 ft (769.8 m)

Sheet 5 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29			100			D-42 SM	50 for 3" (>50)	grades to very dense, silty SAND (with trace gravel and clay).		
									Bottom of boring at 96.6 feet below ground surface (bgs). Backfilled with asphalt material from 0 to 0.8 ft bgs, with silty sand with gravel from 0.8 to 40 ft bgs and with bentonite chips from 40 to 96.6 ft bgs.		
	30										
100											
	31										
105	32										
	33										
110											
	34										
115	35										
	36										
120											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-002-08(OW)

Job No. 33758632.13000 SR 90 Elevation 2524.8 ft (769.5 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Danny Herdson Lic# 2742

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start September 4, 2008 Completion September 4, 2008 Well ID# Not Applicable

Equipment CME 55 Truck-mounted w/ auto-hammer

Station 1427+73.82 Offset 27.89' L Casing HWT, HQ

Method Wet Rotary

Northing 1061277.33 Easting 1756536.89 Latitude 47°20'25.613"N

Longitude 121°21'20.154"W

County Kittitas Subsection NW 1/4 of NW 1/4 Section 1 Range 11E Township 22

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 25 feet: Poorly to well graded GRAVEL with or without sand, occasionally silty GRAVEL with sand, occasional cobbles and boulders, subrounded to angular, loose to very dense, brown to gray, wet, homogenous, no HCl reaction. 0 feet: Asphalt concrete pavement. 0.3 feet: very dense, well graded GRAVEL with sand.		
	1			44			D-1 GW	34			
5				49			C-2 GP(C/B)	50 for 5" (>50)	grades to poorly graded GRAVEL with sand, cobbles and boulders. Maximum size of the boulder encountered is 14 inches.		
	2										
	3										
10				13			D-3 GP	3 3 2 (5)	grades to loose, poorly graded GRAVEL.		
				9			C-4 GP				
	4										
15				0			D-5 GP	6 6 7 (13)	No recovery. Material is probably poorly graded GRAVEL.	▽	
	5			63			C-6 GM		grades to silty GRAVEL with sand.		
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2524.8 ft (769.5 m)

HOLE No. RCB-002-08(OW)

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Danny Herdson Lic# 2742

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				33			D-7 GM	12 7 8 (15)	Note: Trace of organics were encountered.		
				14			C-8 GP		grades to poorly graded GRAVEL.		
	7										
25				50			D-9 GM/SM	18 9 18 (27)	25.0 to 76.3 feet: Silty fine to medium SAND with gravel, occasional poorly graded GRAVEL with sand, occasionally silty GRAVEL with sand and occasional cobbles, subrounded to subangular, dense to very dense, brown to reddish brown to gray, wet, homogenous, no HCl reaction. 25.0 feet: Dense, silty SAND with gravel. A piece of wood was encountered. 26.5 feet: grades to silty GRAVEL with sand.		
	8			71			C-10 GM				
	9										
30				100			D-11 GP	50 for 6" (>50)	grades to very dense, poorly graded GRAVEL with sand.		
				24			C-12 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 5 inches.		
	10										
35				93			D-13 GP	3 17 31 (48)	grades to dense, poorly graded GRAVEL with sand.		
	11			57			C-14 GP(C)		grades to poorly graded GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 3.5 inches.		
	12										
40				83			D-15 SM	13 19 15 (34)	40.0 to 71.3 feet: Silty SAND with or without gravel, occasional silty GRAVEL with sand, subrounded or subangular, medium dense to very dense, brown to gray, wet, homogenous, no HCl reaction. 40.0 feet: Dense, silty SAND with gravel. grades to silty GRAVEL with sand.		
				34			C-16 GM				
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2524.8 ft (769.5 m)

HOLE No. RCB-002-08(OW)

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Danny Herdson Lic# 2742

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				83			D-17 SM	1 8 11 (19)	grades to medium dense, silty SAND with gravel.		
	14			43			C-18 SM				
	15										
50				20			D-19 SM	12 18 11 (29)	grades to dense.		
				9			C-20 SM				
	16										
55				0			D-21 SM	14 17 20 (37)	No recovery. Material was probably washed away. Material is probably silty SAND with gravel.		
	17			9			C-22 SM				
	18										
60				83			D-23 SM	4 6 9 (15)	grades to medium dense, silty fine SAND.		
				0			C-24 SM		No recovery. Material was probably washed away. Material is probably silty fine SAND.		
	19										
65				83			D-25 SM	3 8 8 (16)	grades to silty fine SAND with trace of fine gravel.		
	20			17			C-26 SM				
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2524.8 ft (769.5 m)

HOLE No. RCB-002-08(OW)

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Danny Herdson Lic# 2742

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				23			D-27 SM	16 32 50 for 4" (>50)	grades to very dense.		
	22			34			C-28 GP(C)		71.3 to 76.3 feet: Poorly graded GRAVEL with sand to silty SAND with gravel, occasional cobbles, subangular, very dense, wet, homogenous, HCl not tested. 71.3 feet: poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.5 inches.		
75	23			83			D-19 SM	9 36 50 for 3" (>50)	grades to silty SAND with gravel.		
									Bottom of boring at 76.3 feet below ground surface (bgs). Installed 1-inch diameter PVC observation well: 1. Backfilled from 51.0 to 76.3 feet with bentonite chips. 2. Installed 1-inch diameter observation well: -PVC screen interval with 0.010 -inch slots: 30.0 to 50.0 feet. -PVC riser: 0.2 to 30.0 feet. -Sand filter pack: 25.0 to 51.0 feet. 3. Backfilled from 1.0 to 25.0 feet with bentonite chips. 4. Installed quickcrete surface seal from 0 to 1.0 feet and a flush-mount casing. Water level measurements (below existing ground surface): -9/24/08 at 14:30 : 15.5 feet		
80	24										
	25										
85	26										
	27										
90	28										
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-003-08(OW)

Job No. 33758632.13000 SR 90 Elevation 2527.5 ft (770.4 m)

Sheet 1 of 5

Project I-90 Snoqualmie Pass East

Driller Andy Gold Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 31, 2008 Completion June 2, 2008 Well ID# Not Applicable Equipment Skid-mounted 5500-1 w/ manual-hammer

Station 1425+89.54 Offset 102.19'L Casing HW, HQ Method Wet Rotary

Northing 1061364.99 Easting 1756357.16 Latitude 47°20'26.459"N Longitude 121°21'22.777"W

County Kittitas Subsection NW 1/4 of NW 1/4 Section 1 Range 11E Township 22

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 29.0 feet: Well graded to poorly graded GRAVEL with sand, occasional silty GRAVEL with sand and silty SAND with gravel, occasional cobbles and boulders, subrounded to angular, dense to very dense, brown to gray, wet, homogenous, no HCl reaction.		
5	1			33			D-1 GM	48 16 26 (42)	4.6 feet: Silty GRAVEL with sand.		
10	2			75 73			D-2 SM D-3 GW(C)	50 for 4" (>50)	grades to very dense, silty SAND with gravel. grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.	▼	
	3			49			C-4 GW(C)		Maximum size of the cobbles encountered is 5 inches.		
15	4			50 0			D-5 GM C-6 GM	13 50 for 1" (>50)	grades to silty fine GRAVEL with sand. No recovery. Material was probably washed. Material is probably is silty gravel (fine).		
	5			80 93			C-7 GW(C) C-8 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 5 inches.		
20	6			18			C-9 GM		grades to silty GRAVEL with sand.		

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2527.5 ft (770.4 m)

HOLE No. RCB-003-08(OW)

Sheet 2 of 5

Project I-90 Snoqualmie Pass East

Driller Andy Gold Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80								
				94			C-10 GM(B)		grades to silty GRAVEL with boulders. Maximum size of the boulders encountered is 14 inches.	▽	
25	7										
	8			0 / 89			D-11 GP(12)	50 for 1" (>50)	grades to silty GRAVEL. 26.2 feet: grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.25 inches.		
				40			D-13 GP	12 22 25 (47)	29.0 to 44.0 feet: Silty GRAVEL with sand or well graded to poorly graded GRAVEL with sand, occasional cobbles, trace of organic material, subrounded to angular, dense to very dense, brown to reddish brown to gray, wet, homogenous, no HCl reaction. 29.0 feet: Poorly graded GRAVEL with sand. 30.5 feet: grades to silty GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 6 inches.		
30	9			84			C-14 GM(C)				
	10										
				50			D-15 GW	28 24 24 (48)	grades to well graded GRAVEL with sand.		
35											
	11			100			C-16 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.5 inches.		
				82			C-17 GM(C)		grades to silty GRAVEL with cobbles. Maximum size of the cobbles encountered is 4 inches.		
	12										
40											
				55			D-18 GW	17 50 for 5" (>50)	grades to well graded GRAVEL with sand.		
	13			100			C-19 GM(C)		grades to silty GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 4 inches.		
									44.0 to 65.0 feet: Silty fine to medium SAND, occasionally with gravel, occasionally silty CLAY/clayey		
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2527.5 ft (770.4 m)

HOLE No. RCB-003-08(OW)

Sheet 3 of 5

Project I-90 Snoqualmie Pass East

Driller Andy Gold Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			80			D-20 SM	4 5 8 (13)	SILT, rounded to subrounded, medium dense, brown to dark brown, moist to wet, homogenous, no HCl reaction. 44.0 feet: Silty SAND.		
				0			C-21 SM		No recovery. Material was probably washed away. Material is probably silty SAND.		
	15										
50				100			D-22 CL-ML	7 5 8 (13)	grades to silty CLAY/clayey SILT.		
	16			77			C-23 SM		grades to silty SAND (fine).		
55											
	17			50			C-24 SM		grades to silty SAND with gravel.		
	18										
60				87			D-25 SM	6 5 6 (11)	grades to silty SAND (fine to medium).		
	19			0			C-26 SM		No recovery. Material was probably washed away. Material is probably silty SAND.		
65									65.0 to 68.3 feet: Lean CLAY, medium stiff to stiff, medium plasticity, light brown to gray, homogenous, no HCl reaction (PP=1.0 to 1.25 tsf).		
	20			100			D-27 CL	3 2 4 (6)			
				57			C-28 SM				
	21								68.3 to 86.3 feet: Silty fine to medium SAND, occasional SILT, occasional well graded GRAVEL with sand or silty GRAVEL with sand and cobbles, subrounded to angular, medium dense to very dense, reddish brown to greenish		
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2527.5 ft (770.4 m)

HOLE No. RCB-003-08(OW)

Sheet 4 of 5

Project I-90 Snoqualmie Pass East

Driller Andy Gold Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									gray, wet, homogenous, no HCl reaction. 68.3 feet: Medium dense, silty SAND (fine to medium) with fine gravel.		
				80			D-29 SM	9 12 6 (18)			
	22			26			C-30 GM		grades to silty GRAVEL with sand.		
75											
	23			87			D-31 SM	5 10 17 (27)	grades to dense, silty fine SAND.		
				83			C-32 SM/ML				
	24								grades to SILT.		
80									grades to silty SAND.		
	25										
				50			C-33 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 5.25 inches.		
85	26			67			D-34 GW	50 for 3.5"			
				100 / 0.4			C-35	(>50)	86.3 to 101.5 feet: Meta welded lapilli tuff, bluish gray, fine to medium grained, fresh, moderately weak (R2) to strong (R4) rock. Discontinuities are very closely to widely spaced, and in very poor to fair condition. none to weak HCl reaction. (CR=94% to 100%, RQD=0 to 100%, FF=0.4 to 3.0)		
	27			94 / 3			C-36		86.3 feet: Slightly weathered, strong (R4) rock, weak HCl reaction. Discontinuities are widely spaced and in fair condition.		
90									88.5 feet: grades to highly weathered, moderately weak (R2) rock, no HCl reaction. Discontinuities are very closely spaced and in very poor condition.		
	28			100 / 100 / 0.9			D-37 C-38	50 for 2" (>50)	grades to moderately weathered, strong (R4) rock. Discontinuities are widely spaced and in poor to fair condition.		
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2527.5 ft (770.4 m)

HOLE No. RCB-003-08(OW)

Sheet 5 of 5

Project I-90 Snoqualmie Pass East

Driller Andy Gold Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29										
				100 / 0.8			C-39		Discontinuities are in fair condition.		
	30										
100											
	31								Bottom of boring at 101.5 feet below ground surface (bgs). Installed 1-inch diameter PVC observation well: 1. -PVC screen interval with 0.010 -inch slots: 50.0 to 70.0 feet. -PVC riser: 2.2 to 50.0 feet. -Sand filter pack: 45.0 to 46.0 feet with pel plug. 2. Backfilled from 2.0 to 45.0 feet with bentonite chips. 4. Installed quickcrete surface seal from 0 to 2.0 feet and a stick-up monument casing (2.5-inch ID, approx. 3.0 feet long) Water level measurements (below existing ground surface): -6/1/08 to 10/29/08 between 10.7 and 36.7 feet in observation well.		
105	32										
	33										
110											
	34										
115	35										
	36										
120											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-004-10

Job No. 33761951.00008 SR 90 Elevation 2529.3 ft (770.9 m)

Sheet 1 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start May 4, 2010 Completion May 11, 2010 Well ID# Not Applicable

Equipment CME 45 with auto hammer

Station _____ Offset _____ Casing HWT, HQ

Method Wet Rotary

Northing 1061361.53 Easting 1756516.69 Latitude 47?0'26.44"N

Longitude 121?1'20.46"W

County Kittitas Subsection _____ Section _____ Range _____ Township_____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 41 feet: Samples were not collected from ground surface to 41 feet depth below ground surface. Refer to Boring CUL-013-07 for information in this depth interval.		
	1										
5											
	2										
10											
	3										
	4										
15											
	5										
	6										
20											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-004-10

Job No. 33761951.00008 SR 90 Elevation 2529.3 ft (770.9 m)

Sheet 2 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7										
	8										
30	9										
	10										
35	11										
	12										
40				13			D-1 GW	6 3 6 (9)	41 to 46 feet: Well graded GRAVEL with sand to silty GRAVEL with sand, occassional cobbles, subangular to subrounded, loose, gray to brown, wet, homogenous, no Hcl reaction.		
	13			71			C-2 GM(C)		41 feet: Well graded GRAVEL with sand. 42.5 feet: grades to silty GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 3.5 inches.		
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-004-10

Job No. 33761951.00008 SR 90 Elevation 2529.3 ft (770.9 m)

Sheet 3 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			20			D-3 SM	4 10 15 (25)	46 to 76 feet: Silty SAND with gravel to silty GRAVEL with sand, subangular to subrounded, loose to dense, reddish brown, wet, homogenous, no HCl reaction.		
				86			C-4		46 feet: Medium dense to dense, silty SAND with gravel (medium to fine gravel).		
	15										
50				80			D-5 SM	9 8 6 (14)			
	16			43			C-6 GW				
55											
	17			67			D-7 SM	8 9 10 (19)			
				0			C-8		No recovery. Material was probably washed away.		
	18										
60				50			D-9 SM	9 8 10 (18)			
	19			43			C-10 GM		62.5 feet: grades to silty GRAVEL with sand.		
65											
	20			13			D-11 GM	13 20 9 (29)			
				34			C-12		67.5 feet: grades to loose silty SAND.		
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-004-10

Job No. 33761951.00008 SR 90 Elevation 2529.3 ft (770.9 m)

Sheet 4 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80								
				100			D-13 SM	2 4 6 (10)			
	22			0			C-14				
75	23			33			D-15 GM	13 16 20 (36)	76 to 88.6 feet: Well graded GRAVEL with sand to Silty GRAVEL with sand, occasional cobbles and boulders, angular to subrounded, dense to very dense, gray, wet, homogeneous, no HCl reaction. 76 feet: Dense, silty GRAVEL with sand. 77.5 feet: grades to well graded GRAVEL.		
				14			C-16 GW				
	24										
80				0			D-17 GW(C/B)	50/2" (>50)	81 feet: grades to well graded GRAVEL with cobbles and boulders. Maximum diameter of the boulders encountered is 1.8 feet.		
	25			54			C-18				
85	26			83			D-19 SM(C/B)	32 32 18/3" (>50)			
				36			C-20A				
	27			100 1.7			C-20B		88.6 to 106.0 feet: Andesite, bluish gray, fine grained, fresh, very weak (R1) to moderately weak (R2). Discontinuities are very closely to closely spaced and in fair to good condition. None to weak HCl reaction. (CR = 80 to 100%, RQD = 40 to 83%, FF = 1.6 to 2.8) 88.6 feet: Moderately weak (R2) rock. Discontinuities are closely to very closely spaced and in fair condition. PLT - moderately strong (R3) rock		
90				100 2.0			C-21				
	28								PLT-moderately strong (R3) rock.		
				88 2.0			C-22		93.5 feet: Discontinuities are in fair to good condition.		
95											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2529.3 ft (770.9 m)

HOLE No. RCB-004-10

Sheet 5 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29			100 / 1.6			C-23		PLT - very weak (R1) rock. 96 feet: grades to moderately weak (R2) to very weak (R1) rock. Discontinuities are very closely to closely spaced.		
	30			80 / 2.4			C-24		98.5 feet: grades to fresh, moderately weak (R2) rock. Discontinuities are very closely to closely spaced and in fair condition. None to weak HCl reaction.		
100				100 / 2.8			C-25				
	31								PLT - moderately weak (R2) rock.		
									PLT - very weak (R1) rock.		
105	32										
									Bottom of the boring at 106 feet depth below the ground surface. Backfilled to ground surface with bentonite chips.		
	33										
110											
	34										
115	35										
	36										
120											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-005-10

Job No. 33761951.00008 SR 90 Elevation 2498.0 ft (761.4 m)

Sheet 1 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start April 20, 2010 Completion April 21, 2010 Well ID# Not Applicable Equipment CME 45 with auto hammer

Station _____ Offset _____ Casing HWT, HQ Method Wet Rotary

Northing 1061216.12 Easting 1756351.68 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 34 feet: Samples were not collected from ground surface to 34 feet depth below ground surface. Refer to Boring CUL-012-07 for information in this depth interval.		
	1										
5											
	2										
10	3										
	4										
15											
	5										
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2498.0 ft (761.4 m)

HOLE No. RCB-005-10

Sheet 2 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7										
	8										
30	9										
	10										
35	11			100				1 1 6 (7)	34 to 56.5 feet: Silty sand with or without gravel (fine to medium sand), occasionally sandy SILT with or without gravel, subrounded, loose to medium dense, reddish to grayish brown, wet, homogenous, no HCl reaction. 34 feet: Loose, Silty SAND with fine gravel.		
40	12										
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2498.0 ft (761.4 m)

HOLE No. RCB-005-10

Sheet 3 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
	15										
50											
				87				1 9 12	51 feet: grades to medium dense, silty SAND. 51.5 feet: grades to stiff, sandy SILT, PP= 0.5 tsf.		
	16								52.2 feet: grades to sandy SILT with fine gravel.		
55											
	17			67			SM	18/50/6" (>50)	56.0 feet: grades to dense, Silty SAND. 56.5 feet: Silty SAND with or without gravel, poorly to well graded GRAVEL with sand, angular to subrounded, very dense, occasionally loose, wet, homogenous, no HCl reaction. 56.5 feet: Very dense, silty SAND.		
	18										
60											
				80			SM	30 44 50/3" (>50)			
	19										
65											
	20			22			GW	25 50/5" (>50)	66 feet: Well graded GRAVEL with sand.		
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2498.0 ft (761.4 m)

HOLE No. RCB-005-10

Sheet 4 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100			SM	50/3" (>50)	71 feet: Sandy SILT or silty SAND with gravel.		
	22										
75	23			40			GP	50/5" (>50)	76 feet: Poorly graded GRAVEL with trace of sandy SILT.		
	24										
80				100				50/3" (>50)	81 feet: Silty SAND with gravel. 81.2 feet: Loose, silty SAND, stratified.		
	25			100 / 100 / 1.3 / 100					Andesite, light gray, fine to medium grained, fresh, moderately weak (R2) to strong (R4). Discontinuities are closely to medium spaced and in poor to fair condition. Weak HCl reaction. (CR = 96 to 100%, RQD = 70 to 88%, FF = 1.0 to 1.3) PLT - moderately weak (R2) rock		
85	26								PLT - moderately weak (R2) rock		
				98 / 1.0							
	27								PLT - moderately weak (R2) rock		
90									PLT - moderately weak (R2) rock.		
				96 / 1.0					PLT - very weak (R1) rock.		
	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-005-10

Job No. 33761951.00008 SR 90 Elevation 2498.0 ft (761.4 m)

Sheet 5 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29										
									Bottom of the boring at 96 feet depth below the ground surface. Backfilled to ground surface with bentonite chips.		
	30										
100											
	31										
105	32										
	33										
110											
	34										
115	35										
	36										
120											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-006-10

Job No. 33761951.00008 SR 90 Elevation 2497.0 ft (761.1 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Kranti Maturi

Start April 20, 2010 Completion April 21, 2010 Well ID# Not Applicable

Equipment CME 45 with auto hammer

Station _____ Offset _____ Casing HWT, HQ

Method Wet Rotary

Northing 1061198.71 Easting 1756514.09 Latitude _____

Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 40.5 feet: Samples were not collected from ground surface to 40.5 feet depth below ground surface. Refer to Boring CUL-014-07 for information in this depth interval.		
5	1										
	2										
10	3										
	4										
15	5										
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-006-10

Job No. 33761951.00008 SR 90 Elevation 2497.0 ft (761.1 m)

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7										
	8										
30	9										
	10										
35	11										
	12										
40				93			D-1 SP-ML	4 9 20 (29)	40.5 to 52.0 feet: SAND or sandy SILT with gravel, dense to very dense, subrounded to subangular, brown to grayish brown, moist, homogenous, no HCl reaction. 40.5 feet: Dense, SAND. 41.6 feet: grades to dense, sandy SILT.		
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2497.0 ft (761.1 m)

HOLE No. RCB-006-10

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			53			D-2 / ML	2 31 24 (55)	grades to very dense, sandy SILT with gravel.		
	15										
50				67			D-3	50/4" (>50)			
	16			100 4.0			C-4		52.0 to 70.5 feet: Lapilli Tuff or Basalt, medium gray to dark gray, fine to coarse grained, fresh to completely weathered, very weak (R1) to strong (R4). Discontinuities are closely to medium spaced and in fair to poor condition. weak HCl reaction. (CR = 100%, RQD = 40 to 75%, FF = 1.5 to 4.0)		
55				100 1.6			C-5		52.0 feet: Lapilli Tuff, highly to completely weathered, very weak to moderately weak rock. Discontinuities are very closely to closely spaced and in poor condition. PLT - very weak (R1) rock.		
	17								53.6 feet: grades to fresh, moderately strong (R3) rock. Discontinuities are closely spaced and in fair condition.		
	18								55 feet: grades to moderately strong (R3) to strong (R4) rock. Discontinuities are closely to medium spaced and in poor condition. PLT - very weak (R1) rock. PLT - very weak (R1) rock.		
60				100 3.8			C-6		grades to Lapilli Tuff/Basalt, fine grained, fresh, strong (R4) rock. Discontinuities are closely spaced and in fair condition. PLT - very weak (R1) rock. PLT - strong (R4) rock.		
	19										
65				100 2.0			C-7				
	20										
	21			100 1.5			C-8		grades to moderately strong (R3) rock. Discontinuities are closely spaced and in fair condition.		
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-006-10

Job No. 33761951.00008 SR 90 Elevation 2497.0 ft (761.1 m)

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									PLT - very weak (R1) rock.		
									Bottom of the boring at 70.5 feet depth below the ground surface. Backfilled to ground surface with bentonite chips.		
	22										
75	23										
	24										
80											
	25										
85	26										
	27										
90											
	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-007-10

Job No. 33761951.00008 SR 90 Elevation 2525.3 ft (769.7 m)

Sheet 1 of 6

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start April 22, 2010 Completion April 28, 2010 Well ID# Not Applicable

Equipment CME 45 with auto hammer

Station _____ Offset _____ Casing HWT, HQ

Method Wet Rotary

Northing 1061266.68 Easting 1756385.77 Latitude 47?0'25.49"N

Longitude 121?1'22.35"W

County Kittitas Subsection _____ Section _____ Range _____ Township_____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 101 feet: Samples were not collected from ground surface to 101 feet depth below ground surface. Refer to Boring RCB-001-08 for information in this depth interval.		
	1										
5											
	2										
10											
	3										
	4										
15											
	5										
	6										
20											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-007-10

Job No. 33761951.00008 SR 90 Elevation 2525.3 ft (769.7 m)

Sheet 2 of 6

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7										
	8										
30	9										
	10										
35	11										
	12										
40	13										
45											

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-007-10

Job No. 33761951.00008 SR 90 Elevation 2525.3 ft (769.7 m)

Sheet 3 of 6

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
	15										
50											
	16										
55											
	17										
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-007-10

Job No. 33761951.00008 SR 90 Elevation 2525.3 ft (769.7 m)

Sheet 4 of 6

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
75	22										
	23										
	24										
80	25										
	26										
85	27										
	28										
90											
95											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2525.3 ft (769.7 m)

HOLE No. RCB-007-10

Sheet 5 of 6

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29										
	30										
100											
				9			C-1A		101.0 to 103.2 feet: Silty GRAVEL with sand, angular, bluish gray, wet, stratified, no HCl reaction.		
	31										
				100 / 2.1			C-1B		103.2 to 121.0 feet: Andesite, bluish gray to dark gray, fine grained, fresh, very weak (R1) to moderately strong (R3). Discontinuities are very closely to medium spaced and in very poor to good condition. None to weak HCl reaction. (CR = 84% to 100%, RQD = 36 to 92%, FF = 0.8 to 2.1)		
105	32										
				84 / 1.2			C-2		103.2 feet: Very weak (R1) rock. Discontinuities are very closely to closely spaced and in very poor to fair condition. Weak HCl reaction. PLT - moderately weak (R2) rock 106 feet: grades to very weak (R1) to moderately stronf (R3) rock. None to weak HCl reaction. Note: Silty sand with gravel, angular to subrounded infilling was observed from 106.2 to 106.4 feet depth below ground surface and from 106.5 to 106.8 feet depth below ground surface. Gray silt, stiff to hard, infilling was encountered from 106.4 to 106.5 feet depth below ground surface. PLT - moderately weak (R2) rock		
	33										
110											
				98 / 1.2			C-3		grades to moderately weak (R2) to moderately strong (R3) rock. Discontinuities are closely to medium spaced and in fair to good condition.		
	34										
	35								PLT - very weak (R1) rock.		
115											
				100 / 0.8			C-4		PLT - moderately weak (R2) rock		
	36										
120											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-007-10

Job No. 33761951.00008 SR 90 Elevation 2525.3 ft (769.7 m)

Sheet 6 of 6

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									PLT - moderately weak (R2) rock.		
	37								Bottom of the boring at 121 feet depth below the ground surface. Backfilled to ground surface with bentonite chips.		
125	38										
	39										
130	40										
	41										
135	42										
	43										
140	44										
145											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-008-10

Job No. 33761951.00008 SR 90 Elevation 2524.4 ft (769.4 m)

Sheet 1 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start April 25, 2010 Completion April 27, 2010 Well ID# Not Applicable

Equipment CME 45 with auto hammer

Station _____ Offset _____ Casing HWT, HQ

Method Wet Rotary

Northing 1061264.92 Easting 1756510.77 Latitude 47?0'25.49"N

Longitude 121?1'20.53"W

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 93 feet: Samples were not collected from ground surface to 93 feet depth below ground surface. Refer to Boring RCB-002-08 for information in this depth interval.		
5	1										
	2										
10	3										
	4										
15	5										
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-008-10

Job No. 33761951.00008 SR 90 Elevation 2524.4 ft (769.4 m)

Sheet 2 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7										
	8										
30	9										
	10										
35	11										
	12										
40	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCB-008-10

Job No. 33761951.00008 SR 90 Elevation 2524.4 ft (769.4 m)

Sheet 3 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
	15										
50											
	16										
55											
	17										
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2524.4 ft (769.4 m)

HOLE No. RCB-008-10

Sheet 4 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
75	22										
	23										
	24										
80											
	25										
	26										
85											
	27										
90											
	28										
				0 / 100 / 2.9			C-1A C-1B		93.0 to 93.2 feet: Silty GRAVEL with sand, angular, bluish gray, wet, stratified, no HCl reaction. 93.2 to 109.2 feet: Andesite, bluish gray, fine grained, fresh, very weak (R1) to strong (R4). Discontinuities are very closely to medium spaced and in poor to fair		
95											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2524.4 ft (769.4 m)

HOLE No. RCB-008-10

Sheet 5 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29								condition. None to weak HCl reaction. (CR = 98% to 100%, RQD = 68 to 98%, FF = 0.6 to 2.3)		
				100 / 0.6			C-2		93.2 feet: Moderately strong (R3). Discontinuities are very closely to closely spaced and in poor to fair condition. No HCl reaction.		
									94 feet: PLT - very weak (R1) rock.		
	30								96 feet; grades to moderately strong (R3) to strong (R4) rock. Discontinuities are closely to medium spaced and in fair condition.		
									98.3 feet: PLT - very weak (R1) rock.		
100									PLT - very weak (R1) rock.		
				100 / 1.8			C-3		101.0 feet: Discontinuities are very closely to medium spaced. None to weak HCl reaction.		
	31										
105	32										
				98 / 1.6			C-4		PLT - very weak (R1) rock.		
	33								107.9 feet: PLT - very weak (R1) rock.		
110									Bottom of the boring at 109.2 feet depth below ground surface. Backfilled to ground surface with bentonite chips.		
	34										
115	35										
	36										
120											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. RCW-001-08

Job No. 33758632.13000 SR 90 Elevation 2523.4 ft (769.1 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Andy Gold Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 29, 2008 Completion May 30, 2008 Well ID# Not Applicable Equipment Burley 4000 RT w/ manual-hammer

Station 1420+68.37 Offset 81.2'L Casing HW, HQ Method Wet Rotary

Northing 1061379.19 Easting 1755835.76 Latitude 47°20'26.543"N Longitude 121°21'30.349"W

County Kittitas Subsection NW 1/4 of NW 1/4 Section 1 Range 11E Township 22

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 26.4 feet: Poorly graded GRAVEL, occasional cobbles and boulders, subrounded to subangular, dense to very dense, gray to brownish gray, moist to wet, homogenous, none to weak HCl reaction.		
	1										
5				0 / 66			D-1 C-2	50 for 1" (>50)	4.6 feet: Poorly graded GRAVEL with cobbles, weak HCl reaction.		
	2								loss of drilling water circulation.		
				100			C-3		No HCl reaction.		
10	3			60			C-4				
				85			C-5				
				100			C-6 GP(C/B)		grades to poorly graded GRAVEL with cobbles or boulders. Weak HCl reaction.		
	4										
15											
	5			83			C-7 GP		grades to poorly graded GRAVEL.		
				27			C-8				
				63			C-9			▽	
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2523.4 ft (769.1 m) HOLE No. RCW-001-08

Sheet 2 of 3

Project I-90 Snoqualmie Pass East Driller Andy Gold Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				91			C-10				
				77			C-11 GP(C)		grades to poorly graded GRAVEL with cobbles.		
25	7										
	8			71			C-12 GP		26.4 to 49.5 feet: Poorly graded GRAVEL with cobbles and boulders, subrounded to angular, wet, homogenous, none to strong HCl reaction. 26.4 feet: Poorly graded GRAVEL with sand, no HCl reaction.		
				82			C-13		Weak HCl reaction.		
30	9										
				50			C-14				
	10										
35											
	11			64			C-15		Strong HCl reaction.		
	12										
40											
				100			C-16 GP(B)		grades to poorly graded GRAVEL with boulders. No HCl reaction.		
	13			82			C-17				
				75			C-18				
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2523.4 ft (769.1 m)

HOLE No. RCW-001-08

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Andy Gold Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			100			C-19 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders.		
				32			C-20 GP(C)		grades to poorly graded GRAVEL with cobbles.		
				100			C-21A		grades to poorly graded GRAVEL.		
	15			100 / 1.6			C-21B		49.5 to 65 feet: Meta welded Lapilli Tuff, brownish to greenish gray, fine to medium grained, fresh, moderately strong (R3) to strong (R4) rock, none to weak HCl reaction. Discontinuities are closely spaced, and in poor to fair condition. (CR=89% - 100%, RQD=58% - 79%, FF=1.6 - 1.8)		
50				89 / 1.7			C-22		49.5 feet: Strong (R4) rock. Discontinuities are closely spaced and in poor to fair condition. No HCl reaction. 50.0 feet: PLT - Very strong (R5) rock. Discontinuities are in fair condition. 52.0 feet: PLT - Moderately weak (R2) rock. 52.4 feet: PLT - Moderately strong (R3) rock.		
	16										
55				100 / 1.8			C-23		grades to strong (R4) to moderately strong (R3) rock. Weak HCl reaction.		
	17										
	18										
60				100 / 1.6			C-24				
	19								63.1 feet: PLT - Strong (R4) rock.		
65									Bottom of boring at 65.0 feet depth below ground surface. Backfilled to ground surface with bentonite chips. Water level measurements (below existing ground surface): - 5/30/08 at 14:45: 20.0 feet.		
	20										
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-001-09

Job No. 33758654.00009 SR 90 Elevation 2497.1 ft (761.1 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start May 19, 2009 Completion May 21, 2009 Well ID# Not Applicable

Equipment CME 45 (Barge rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1064889.78 Easting 1754426.93 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				36			R-4 GP(C/B)		0 to 26 feet: Poorly graded GRAVEL with cobbles and boulders, subangular, bluish gray, wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 17 inches.		
	1										
5											
	2										
10											
	3										
	4								Maximum size of the boulders encountered is 16 inches.		
				85			R-5 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
15											
	5			97			R-6 GP(C/B)		grades to poorly graded GRAVEL with boulders. Maximum size of the cobbles encountered is 22 inches.		
	6			90			R-7 GP(C)		grades to poorly graded GRAVEL with cobbles.		
20											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2497.1 ft (761.1 m)

HOLE No. SCB-001-09

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									Maximum size of the cobbles encountered is 11 inches.		
				70			R-8 GP(C)		Maximum size of the cobbles encountered is 7 inches.		
	7										
25											
	8			30			R-9 GW		26 to 37.3 feet: Well graded to poorly graded GRAVEL, subrounded to angular, bluish gray, wet, homogenous, no HCl reaction. 26 feet: Well graded GRAVEL.		
	9										
30				20			R-10 GP		grades to poorly graded GRAVEL.		
	10										
35											
	11			84			R-11A GP				
				84/2			R-11B		37.3 to 66.0 feet: Meta Welded Lapilli Tuff, greenish gray, fine to medium grained, fresh, very weak (R1) to moderately weak (R2). Discontinuities are very closely to closely spaced and in poor to fair condition. No HCl reaction. (CR = 80 to 100%, RQD = 0 to 90%, FF = 1.8 to 3.2) 37.3 feet: very weak (R1) rock. Discontinuities are very closely to closely spaced and in fair condition. PLT - very weak (R1) rock		
	12										
40				100/1.8			R-12				
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2497.1 ft (761.1 m)

HOLE No. SCB-001-09

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			80 / 3.2			R-13		PLT-moderately strong (R3) rock. grades to very weak (R1) to moderately weak (R2) rock. Discontinuities are very closely spaced and in fair condition.		
				96 / 2			R-14		Discontinuities are very closely to closely spaced and in fair condition.		
50	15								PLT - moderately strong (R3) rock.		
				100 / 3			R-15				
	16										
55											
	17			100 / 1.6			R-16		PLT - moderately strong (R3) rock.		
	18										
60											
				84 / 3.2			R-17		grades to very weak (R1) to moderately weak (R2) rock. Discontinuities are in poor to fair condition.		
	19										
65											
	20								PLT - moderately weak (R2) rock.		
									Bottom of the boring at 66 feet depth below the mudline. Backfilled to ground surface with bentonite chips.		
									Lake water level measurements (above the mudline):		
									5/19/09 at 12:45: 17.2 feet above the mudline. 5/20/09 at 10:00: 17.3 feet above the mudline. 5/20/09 at 18:45: 17.2 feet above the mudline. 5/21/09 at 08:30: 17.2 feet above the mudline.		
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-002-08

Job No. 33758632.13000 SR 90 Elevation 2535.0 ft (772.7 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Xiangdong Han

Start September 22, 2008 Completion September 25, 2008 Well ID# Not Applicable

Equipment CME 45 (skid rig) w/auto-hammer

Station 1376+15.10 Offset 28.83'L Casing HWT, HQ, NQ

Method Wet Rotary

Northing 1064896.776 Easting 1754476.111 Latitude 47°21'01.107"N

Longitude 121°21'50.647"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 13 feet: Well graded SAND with gravel, angular, medium dense, brownish gray, wet, homogenous, no HCl reaction.		
	1										
5				33			D-1 SW	5 6 6 (12)			
	2										
10	3			33			D-2 SW	5 7 10 (17)			
	4			86			C-3 GP(C)		13 to 37.3 feet: Poorly to well graded GRAVEL with or wihout cobbles, occasionally silty GRAVEL with sand, subangular to angular, loose to very dense, gray to brownish gray, wet, homogenous, no HCl reaction.		
15									13 feet: Medium dense, poorly graded GRAVEL with cobbles.		
	5			0			D-4 GP	3 7 11 (18)	No recovery. Material is probably poorly graded GRAVEL.		
				100			C-5 GP(C)		grades to poorly graded GRAVEL with cobbles.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2535.0 ft (772.7 m) HOLE No. SCB-002-08

Sheet 2 of 3

Project I-90 Snoqualmie Pass East Driller Jamie Wilson Lic# 2941T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100			C-6 GP(C)				
				10			D-7 GP	4 7 9 (16)	grades to poorly graded GRAVEL.		
	7			29			C-8 GP				
25											
	8			10			D-9 GP	3 8 12 (20)			
				71			C-10 GP				
	9										
30											
				10			D-11 GW	4 4 3 (7)	grades to loose, well graded GRAVEL.		
	10			29			C-12 GW				
35											
	11			100			D-13 GW	27 50 for 4" (>50)	grades to very dense.		
				100			C-14A GM		37.3 feet: grades to silty GRAVEL.		
				100 1.9			C-14B		38.6 to 61.5 feet: Metawelded lapilli tuff, bluish gray, fine to medium grained, fresh to slightly weathered, moderately strong (R3) to strong (R4) rock. Discontinuities are very closely to closely spaced and in poor to fair condition. No HCl reaction. (CR=100%, RQD=10 to 52%, FF=2.4 to 3.2) 38.6 feet: fresh, moderately strong (R3) to strong (R4) rock. 39.5 feet: PLT - Very strong (R5) rock. 41.5 feet: grades to slightly weathered, moderately strong (R3) rock.		
	12										
40											
				100 2.8			C-15				
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2535.0 ft (772.7 m)

HOLE No. SCB-002-08

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14								45.8 feet: PLT - Very strong (R5) rock.		
				100 / 3.2			C-16				
	15										
50											
				100 / 3.2			C-17		grades to fresh rock.		
	16										
									54.0 feet: PLT - Very strong (R5) rock.		
55											
	17										
				100 / 3.2			C-18		grades to fresh to slightly weathered rock.		
	18										
60											
									Bottom of boring at 61.5 feet depth below ground surface (bgs). Backfilled with bentonite chips from 2 to 61.5 feet bgs. Backfilled with on-site gravel from 0 to 2 feet bgs.		
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-004-08

Job No. 33758632.13000 SR 90 Elevation 2492.0 ft (759.6 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 26, 2008 Completion June 27, 2008 Well ID# Not Applicable

Equipment CME 45 (skid rig) w/auto-hammer

Station 1379+32.96 Offset 22.22'R Casing HWT 3', HQ 52'

Method Wet Rotary

Northing 1064582.428 Easting 1754479.153 Latitude _____ Longitude _____

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				16			C-1 GP		0 to 27.5 feet: Poorly to well graded GRAVEL with or without sand, occasional well graded SAND, occasional cobbles and boulders, subangular to angular, loose to dense, brown to gray, wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL.		
				80			D-2 SW	3 4 1 (5)	grades to loose, well graded SAND.		
	1			89			C-3 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 14 inches.		
5											
	2			0			D-4 SM/SP	8 12 9 (21)	grades to medium dense. No recovery. Material is probably washed away. Material is probably poorly graded SAND or silty SAND.		
				57			C-5 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6.5 inches.		
10	3										
				0			D-6 SM/SP	18 7 11 (18)	No recovery. Material is probably washed away. Material is probably poorly graded SAND or silty SAND.		
	4			37			C-7 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9.5 inches.		
15											
	5			50			D-8 GW	3 6 9 (15)	grades to well graded GRAVEL with sand.		
				66			C-9 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 10.5		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2492.0 ft (759.6 m) HOLE No. SCB-004-08

Sheet 2 of 3

Project I-90 Snoqualmie Pass East Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									inches.		
	7			50 / 58			D-10 GW C-11 GP(C/B)	50 for 4" (>50)	grades to very dense, well graded GRAVEL with sand. 22.9 feet: grades to poorly graded GRAVEL with cobbles and boulders.		
25	8										
				73			D-12 SM	6 7 19 (26)	27.5 to 35.4 feet: Poorly to well graded GRAVEL, occasional silty SAND with fine gravel and silty GRAVEL with sand, subangular to angular, dense to very dense, brown to gray to greenish gray, wet, homogenous, no HCl reaction. 27.5 feet: Dense, silty SAND with fine gravel. 29.0 feet: grades to well graded GRAVEL with sand.		
				34			C-13 GW				
30	9										
	10			67			D-14 SM-GM	18 35 24 (59)	grades to very dense, silty SAND with gravel or silty GRAVEL with sand.		
				36			C-15A GP		grades to poorly graded GRAVEL with sand.		
35											
	11			100 / 0.5			C-15B		35.4 to 51.8 feet: Meta welded Lapilli Tuff, greenish gray, fine to medium grained, fresh, strong to very strong rock. Discontinuities are closely to medium spaced and in fair condition. (CR = 98-100%, RQD = 90-100%, FF = 0 to 1.0)		
				98 / 1.0			C-16		35.4 feet: Discontinuities are closely to medium spaced. 37.1 feet: PLT - Strong (R4) rock.		
	12										
40											
	13			100 / 0			C-17		42.1 feet: PLT - Very strong (R5) rock. Discontinuities are medium spaced.		
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2492.0 ft (759.6 m)

HOLE No. SCB-004-08

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
50	14			100 / 0.5			C-18		49.4 feet: PLT - Very strong (R5) rock.		
	15										
	16								Bottom of boring at 51.8 feet below mud line. Backfilled the hole to mud line with bentonite chips. Water level measurements: 6/26/08 at 11:15: 27.0 feet above the mud line. 6/26/08 at 21:00: 25.0 feet above the mud line.		
55	17										
	18										
60	19										
	20										
65	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-005-08

Job No. 33758632.13000 SR 90 Elevation 2534.1 ft (772.4 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Pam Craig

Start September 26, 2008 Completion September 29, 2008 Well ID# Not Applicable

Equipment CME 45 (skid rig) w/auto-hammer

Station 1377+71.33 Offset 39.3'L Casing HWT, HQ 31.5', NQ 59.5'

Method Wet Rotary

Northing 1064743.64 Easting 1754516.54 Latitude 47°20'59.601"N

Longitude 121°21'50.035"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 31.5 feet: Poorly to well graded GRAVEL with sand, occasional cobbles and boulders, subangular to angular, loose to very dense, brown to dark gray, wet, homogenous, HCl not tested. 0 feet: Medium dense, poorly graded GRAVEL with sand.		
5	1			17			D-1 / GP	3 5 6 (11)			
	2										
10	3			11			D-2 / GP(C)	50 for 2" (>50)	grades to very dense, poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 3 feet.		
				55			C-3 / GP(C/B)				
	4										
15	5			28			D-4 / GW	3 3 5 (8)	grades to loose, well graded GRAVEL with sand.		
				29			C-5 / GW				
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2534.1 ft (772.4 m)

HOLE No. SCB-005-08

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80								
				0			D-6 GW	6 6 5 (11)	No recovery. Material is probably well graded GRAVEL with sand.		
	7			57			C-7 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.5 inches.		
25											
	8			5			D-8 GP	4 5 3 (8)	grades to loose, poorly graded GRAVEL.		
				54			C-8 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3 inches.		
	9										
30											
				56			D-9 GW	19 20 26 (46)	31.5 to 40.0 feet: Poorly to well graded GRAVEL with sand, occasionally silty SAND with gravel, occasional cobbles and boulders, subrounded to subangular, dense to very dense, brown to greenish gray, wet, homogenous, HCl not tested.		
	10			80			C-10 GW(B)		31.5 feet: Dense, well graded GRAVEL with sand. Note: Core barrel size was changed from HQ to NQ. 33.8 feet: grades to well graded GRAVEL with boulders. Maximum size of the boulders encountered is 1.6 feet.		
35											
	11			78			D-11 SM	19 24 31 (55)	grades to dense, silty SAND with gravel. Note: A 1-3/4" OD split spoon sampler was used.		
				36			C-12A GP		37.5 feet: grades to poorly graded GRAVEL with sand.		
	12										
40				100			C-12B		40.0 to 59.5 feet: Meta welded Lapilli Tuff, greenish gray, fine to medium grained, fresh, moderately strong (R3) to strong (R4) rock. Discontinuities are very closely to closely spaced and in poor to very poor condition, no HCl reaction. (CR=67-100%, RQD=0-88%, FF=1.3 ->6.5) 40.0 feet: moderately strong (R3) rock.		
				0 ~~100~~			D-13 C-14	50 for 2" (>50)			
	13										
				88 3.8			C-15				
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

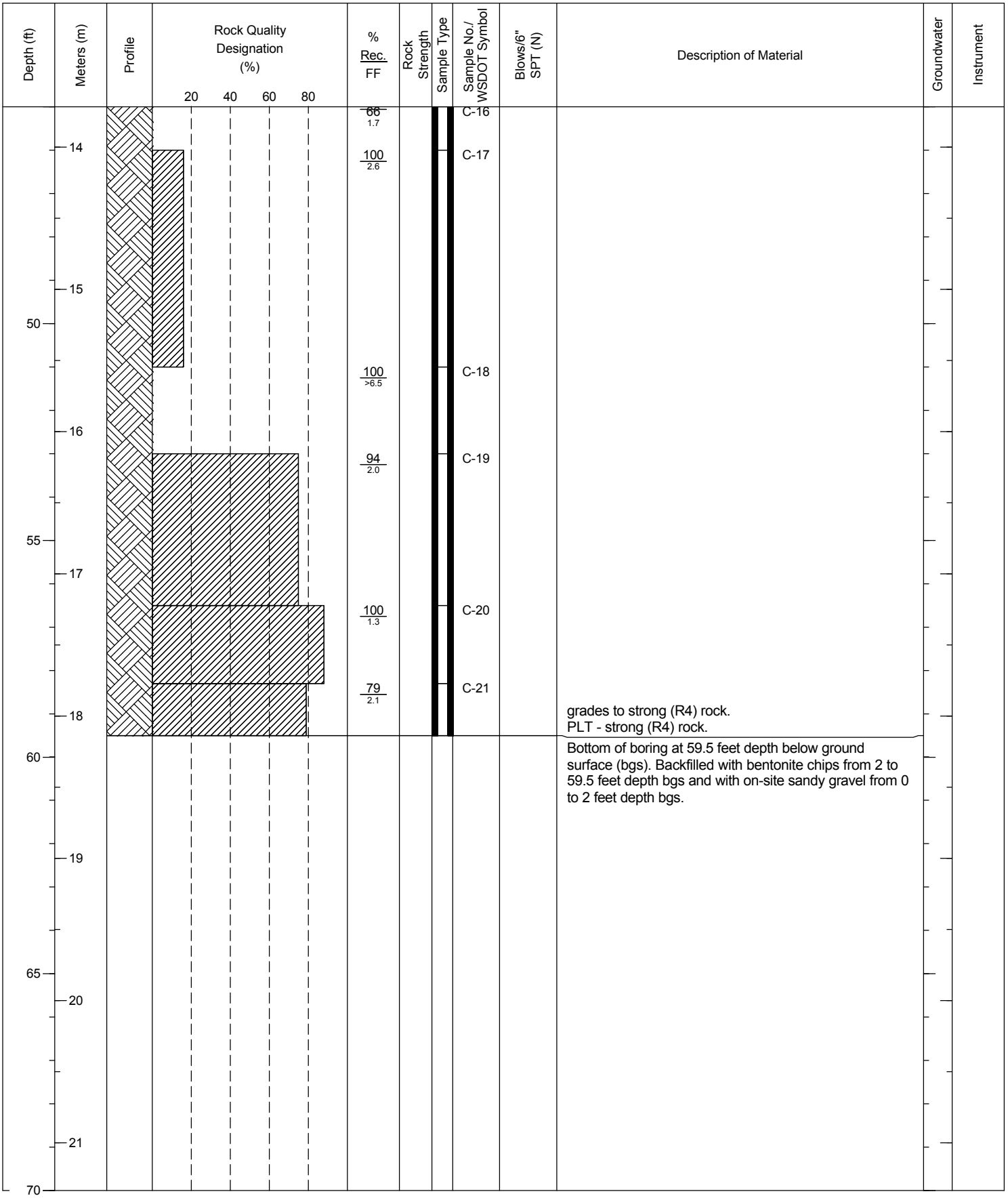
Job No. 33758632.13000 SR 90 Elevation 2534.1 ft (772.4 m)

HOLE No. SCB-005-08

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T



DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-006-08

Job No. 33758632.13000 SR 90 Elevation 2502.5 ft (762.8 m)

Sheet 1 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 24, 2008 Completion June 26, 2008 Well ID# Not Applicable

Equipment CME 45 (skid rig) w/auto-hammer

Station 1380+94.22 Offset 22.63'R Casing HWT 11.5', HQ 125'

Method Wet Rotary

Northing 1064424.286 Easting 1754499.777 Latitude _____ Longitude _____

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				27			C-1 GP		0 to 41.0 feet: Well graded to poorly graded GRAVEL, occasional well graded SAND with gravel, occasional cobbles and boulders, subrounded to angular, medium dense to very dense, brown to gray, wet, homogenous, no HCl reaction.		
				67			D-2 SW	4 5 14 (19)	0 feet: Poorly graded GRAVEL. 1.5 feet: grades to medium dense, well graded SAND with gravel.		
	1			40			C-3 GW		3.0 feet: grades to well graded GRAVEL.		
5											
				20			D-4 GP	12 14 9 (23)	grades to poorly graded GRAVEL.		
	2										
				35			C-5 GW		grades to well graded GRAVEL.		
10	3										
				75 63			D-6 ~~GP~~ C-7 GW(C/B)	50 for 2" (>50)	grades to very dense. grades to well graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 25 inches.		
	4										
15											
	5			52			C-8 GW		grades to well graded GRAVEL.		
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2502.5 ft (762.8 m)

HOLE No. SCB-006-08

Sheet 2 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				34			C-9 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 10 inches.		
25	7										
	8			0 / 40			D-10 C-11 GW(C)	50 for 2" (>50)	Maximum size of the cobbles encountered is 8 inches.		
30	9										
				30			C-12 GW(C)		Maximum size of the cobbles encountered is 3.25 inches.		
	10										
35											
	11			48			C-13 GW(C/B)		grades to well graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 13 inches.		
	12										
40											
				67			D-14 SW	5 12 16 (28)	41.0 to 53.2 feet: Poorly to well graded GRAVEL, occasional well graded SAND with gravel or silty SAND with gravel and silty GRAVEL with sand, subrounded to angular, dense to very dense, brown to gray to greenish gray, wet, homogenous, no HCl reaction. 41.0 feet: Dense, well graded SAND with gravel. 43.0 feet: grades to well graded GRAVEL with sand.		
	13			29			C-15 GW				
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

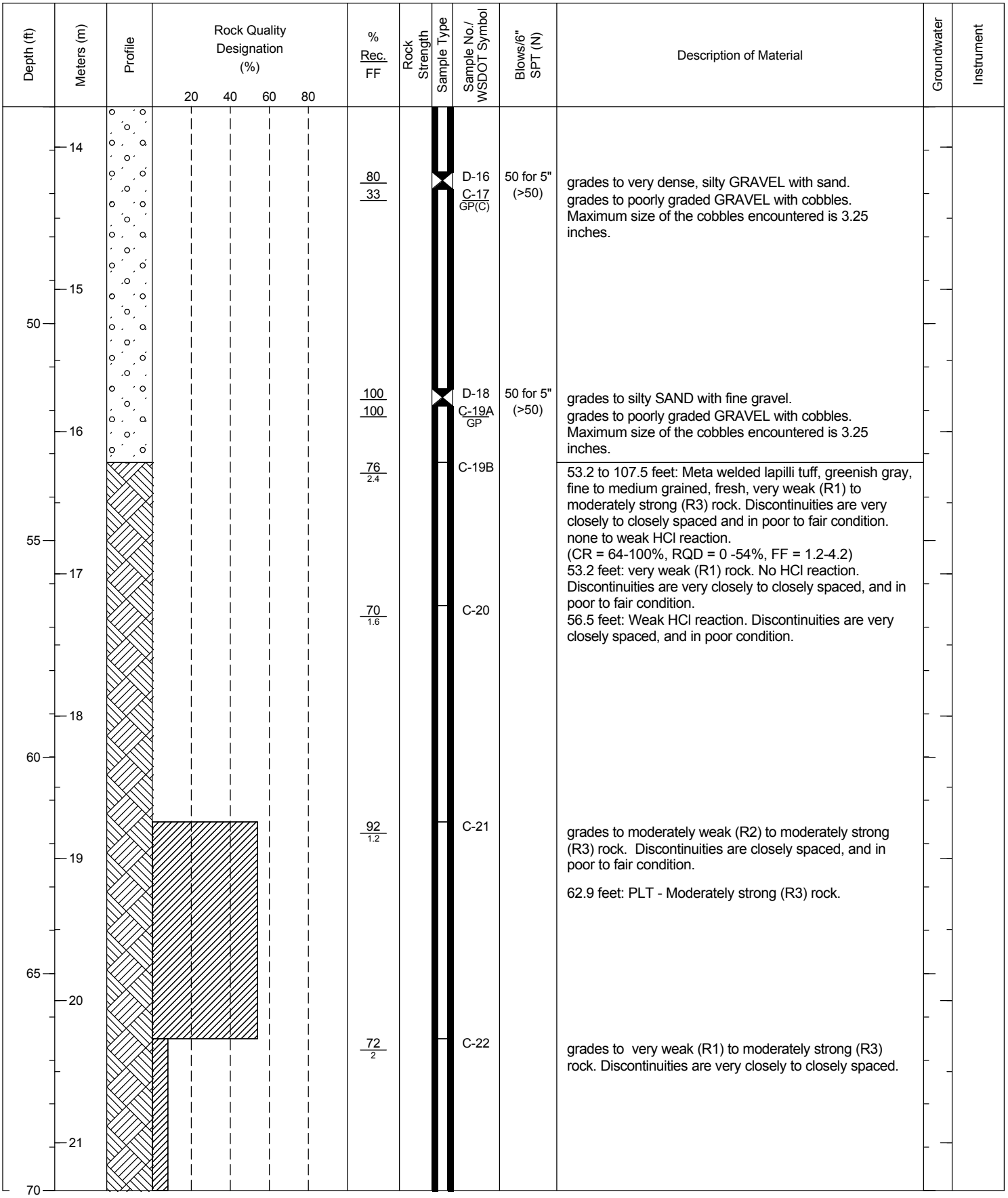
Job No. 33758632.13000 SR 90 Elevation 2502.5 ft (762.8 m)

HOLE No. SCB-006-08

Sheet 3 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779



Depth (ft)	Meters (m)	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14		80 / 33			D-16 / C-17 GP(C)	50 for 5" (>50)	grades to very dense, silty GRAVEL with sand. grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.25 inches.		
50	15									
			100 / 100			D-18 / C-19A GP	50 for 5" (>50)	grades to silty SAND with fine gravel. grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.25 inches.		
	16		76 / 2.4			C-19B		53.2 to 107.5 feet: Meta welded lapilli tuff, greenish gray, fine to medium grained, fresh, very weak (R1) to moderately strong (R3) rock. Discontinuities are very closely to closely spaced and in poor to fair condition. none to weak HCl reaction. (CR = 64-100%, RQD = 0 -54%, FF = 1.2-4.2) 53.2 feet: very weak (R1) rock. No HCl reaction. Discontinuities are very closely to closely spaced, and in poor to fair condition. 56.5 feet: Weak HCl reaction. Discontinuities are very closely spaced, and in poor condition.		
55	17		70 / 1.6			C-20				
	18									
60			92 / 1.2			C-21		grades to moderately weak (R2) to moderately strong (R3) rock. Discontinuities are closely spaced, and in poor to fair condition. 62.9 feet: PLT - Moderately strong (R3) rock.		
	19									
65	20		72 / 2			C-22		grades to very weak (R1) to moderately strong (R3) rock. Discontinuities are very closely to closely spaced.		
	21									
70										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

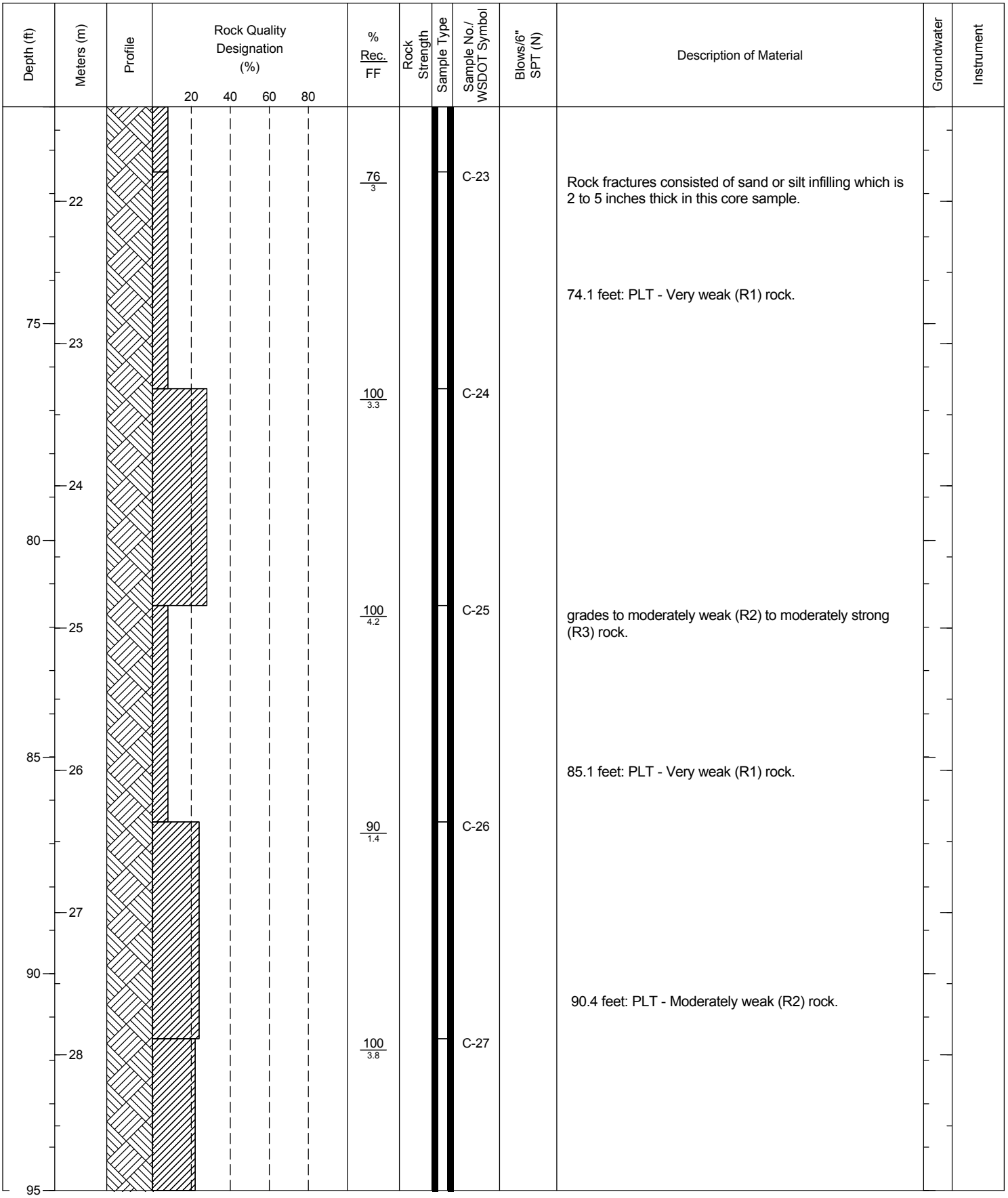
Job No. 33758632.13000 SR 90 Elevation 2502.5 ft (762.8 m)

HOLE No. SCB-006-08

Sheet 4 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779



DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2502.5 ft (762.8 m)

HOLE No. SCB-006-08

Sheet 5 of 5

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29										
				100 / 3			C-28				
				88 / 3			C-29				
	30										
100											
	31			64 / 2.2			C-30		grades to very weak (R1) to moderately weak (R2) rock. 103.1 feet: PLT - Very weak (R1) rock.		
105	32										
				0			C-31				
	33								Bottom of boring at 107.5 feet below the mud line. Backfilled the hole to mud line with bentonite chips. Water level measurements: 6/24/08 at 13:30: 12 feet above the mud line. 6/26/08 at 08:00: 14.5 feet above the mud line. 6/26/08 at 08:45: 14.5 feet above the mud line.		
110	34										
115	35										
	36										
120											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-007-08

Job No. 33758632.13000 SR 90 Elevation 2532.4 ft (771.9 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Pam Craig

Start September 30, 2008 Completion October 1, 2008 Well ID# Not Applicable

Equipment CME 45 (skid rig) w/auto-hammer

Station 1379+51.32 Offset 37.57'L Casing HWT 6', HQ 91.5'

Method Wet Rotary

Northing 1064562.7 Easting 1754539.2 Latitude 47°20'57.818"N

Longitude 121°21'49.678"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 51.5 feet: Poorly to well graded GRAVEL with sand, cobbles and boulders, subangular to angular, generally loose to very dense, brown to dark greenish gray, moist to wet, homogenous, HCl not tested.		
	1										
5				17			D-1 / GW	3 3 5 (8)	5 feet: Loose, well graded GRAVEL, with sand.		
	2			36			C-2 / GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of of the cobbles encountered is 5.25 inches.		
10	3										
				66			C-3 / GP(B)		grades to poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 16 inches.		
	4										
15											
	5			76			C-4 / GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 0.7 feet.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2532.4 ft (771.9 m)

HOLE No. SCB-007-08

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				66			C-5 GP(B)		grades to poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 2.2 feet.		
	7										
25											
	8			47			D-6 GW	4 6 10 (16)	grades to medium dense, well graded GRAVEL with sand.		
				83			C-7 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 0.9 feet.		
	9										
30											
				50			C-8 GP(C)		Maximum size of the cobbles encountered is 5 inches.		
	10										
35											
	11			74			C-9 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 1.5 feet.		
	12										
40											
				60			C-10 GP(C/B)		Maximum size of the boulders encountered is 1.2 feet.		
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2532.4 ft (771.9 m)

HOLE No. SCB-007-08

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			42			C-11 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4 inches.		
	15										
50											
				34			C-12 GW(C)		51.5 to 74.0 feet: Well graded to poorly graded GRAVEL with sand, occasional silty SAND with gravel, subangular to angular, very dense, brown to gray, wet, homogenous, HCl not tested. 51.5 feet: grades to well graded GRAVEL with cobbles, Maximum size of the cobbles encountered is 5 inches.		
	16										
55											
	17			100			D-13 SM	45 50 for 8" (>50)	grades to very dense, silty GRAVEL.		
				53			C-14 GP		grades to poorly graded GRAVEL with sand.		
	18										
60											
				78			D-15 SM	10 27 27 (54)	grades to silty SAND with gravel.		
	19										
				100			C-16a GW		grades to well graded GRAVEL.		
65											
				100			C-16b GP		grades to poorly graded GRAVEL.		
	20			100			C-16c GP				
				70			C-17 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9.6 inches.		
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

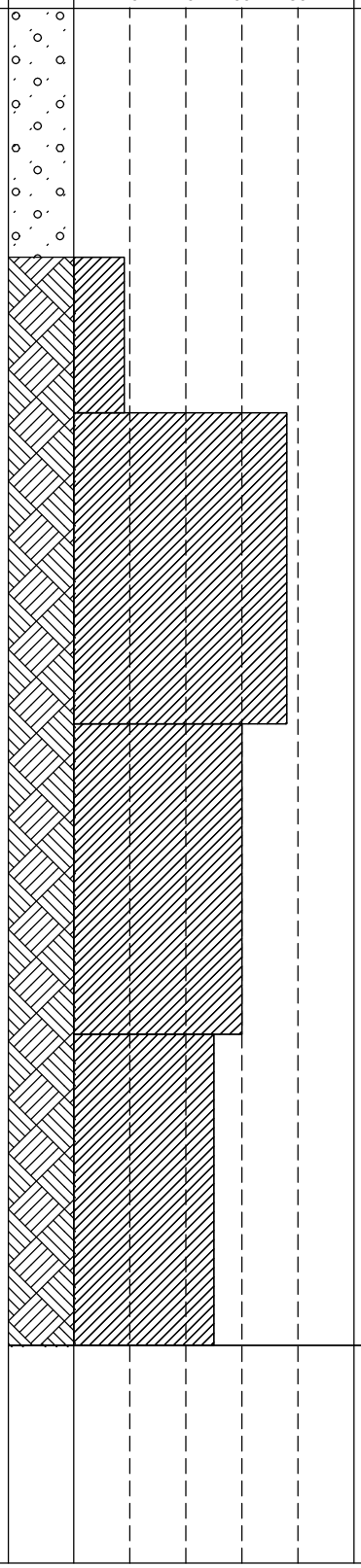
Job No. 33758632.13000 SR 90 Elevation 2532.4 ft (771.9 m)

HOLE No. SCB-007-08

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T



Depth (ft)	Meters (m)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	22	60			C-18a GP(C)		Maximum size of the cobbles encountered is 5 inches.		
		100 >10			C-18b		74.0 to 91.5 feet: Meta Welded lapilli tuff to ash tuff, greenish gray, fine to medium grained, moderately weathered to fresh, moderately strong (R3) to strong (R4) rock. Discontinuities are very closely to medium spaced and in poor to fair condition. HCl not tested. (CR = 96-100%, RQD =18-76%, FF =0.2 to >10.0).		
75	23	100 2.0			C-19		74 feet: highly to moderately weathered, moderately strong (R3) rock. Discontinuities are very closely to closely spaced and in poor to fair condition. grades to fresh, moderately strong (R3) to strong (R4) rock. Discontinuities are closely to medium spaced and in fair condition.		
	24								
80							79.75 feet: PLT - Moderately strong (R3) rock.		
		96 1.6			C-20		grades to meta welded ash Tuff. 81.75 feet: PLT - Strong (R4) rock.		
	25								
85	26								
		100 1.2			C-21		86.25 feet: PLT - Strong (R4) rock.		
	27						88.0 feet: grades to moderately weathered, moderately strong (R3) rock. Discontinuities are very closely to closely spaced and in poor to fair condition.		
90							90.5 feet: PLT - Moderately weak (R2) rock.		
	28						Bottom of boring at 91.5 feet depth below ground surface (bgs). Backfilled the hole from 0 to 91.5 feet depth bgs with bentonite chips and from 0 to 2 feet depth bgs with on-site gravel with sand.		
95									

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-009-08

Job No. 33758632.13000 SR 90 Elevation 2490.0 ft (759.0 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start July 22, 2008 Completion July 22, 2008 Well ID# Not Applicable

Equipment CME 45 (barge rig) w/ Auto-hammer

Station 1378+91.43 Offset 15'R Casing HQ 44'

Method Wet Rotary

Northing 1064606.525 Easting 1754471.138 Latitude _____ Longitude _____

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				0			C-1 SM/SP		0 to 24 feet: Poorly graded to well graded GRAVEL, occasional cobbles, subrounded to angular, brown to gray, wet, homogenous, no HCl reaction. 0 feet: No recovery. Material was washed away. Material is probably silty SAND or poorly graded SAND.		
	1			26			C-2 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4.5 inches.		
5											
	2										
				46			C-3 GW		grades to well graded GRAVEL.		
10	3										
	4			46			C-4 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 8.5 inches.		
15											
	5										
				44			C-5 GP(C)		Maximum size of the cobbles encountered is 7 inches.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2490.0 ft (759.0 m) HOLE No. SCB-009-08

Sheet 2 of 3

Project I-90 Snoqualmie Pass East Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	7										
				50			C-6A GW(C)		24 to 28 feet: Well graded GRAVEL with sand and cobbles, subrounded to angular, greenish gray, wet, homogenous, no HCl reaction. Maximum size of the cobbles encountered is 7 inches.		
25											
	8										
				50 / 2.0			C-6B		28 to 44 feet: Meta welded lapilli tuff, light greenish gray, fine to medium grained, fresh, moderately weak (R2) to strong (R4) rock. Discontinuities are very closely to medium spaced and in poor to fair condition. no HCl reaction. (CR=50-100%, RQD=0-88%, FF=1.2-2) 28 feet: Moderately weak (R2) rock. Discontinuities are closely spaced and in poor condition. 29 feet: Strong (R4) rock. Discontinuities are closely to medium spaced and in fair condition. PLT - Moderately weak (R2) rock.		
	9			100 / 1.8			C-7				
30											
	10								33.1 feet: PLT - Very strong (R5) rock.		
				100 / 1.2			C-8				
35											
	11										
									38.3 feet: PLT - Strong (R4) rock.		
	12			100 / 1.5			C-9				
40									40.1 feet: PLT - Very strong (R5) rock.		
	13										
									43.2 feet: PLT - Very strong (R5) rock.		
45									Bottom of boring at 44 feet below the mud line. Backfilled the hole to mud line with bentonite chips.		

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-009-08

Job No. 33758632.13000 SR 90 Elevation 2490.0 ft (759.0 m)

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14								Water level measurements: 7/22/08 at 08:00: 16.8 feet above the mud line. 7/22/08 at 13:25: 19 feet above the mud line.		
	15										
50											
	16										
55											
	17										
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-010-08

Job No. 33758632.13000 SR 90 Elevation 2497.0 ft (761.1 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start July 16, 2008 Completion July 17, 2008 Well ID# Not Applicable

Equipment CME 45 (barge rig) w/ Auto-hammer

Station 1381+31.43 Offset 15'R Casing HQ 72.5'

Method Wet Rotary

Northing 1064380.72 Easting 1754496.554 Latitude _____ Longitude _____

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				0			C-1 M/SP/SW		0 to 7.5 feet: Poorly graded GRAVEL with cobbles, angular to subrounded, brown to bluish gray, wet, homogenous, no HCl reaction. 0 feet: No recovery. Material was probably washed away. Material was probably silty SAND or poorly to well graded SAND.		
				16			C-2 GP(C)		Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.75 inches.		
	1										
5											
	2										
				10			C-3 SW		7.5 to 50 feet: Well graded SAND with gravel to poorly graded GRAVEL with sand, silty SAND/poorly graded SAND, occasional cobbles, subrounded to angular, gray to greenish gray, wet, homogenous, no HCl reaction. 7.5 feet: Well graded SAND with gravel.		
10	3										
				0			C-4 SP/SM?		No recovery. Material was probably washed away. Material is probably silty SAND or poorly graded to well graded SAND.		
	4										
15											
	5										
				0			C-5 SP/SM?		No recovery. Material was probably washed away. Material is probably silty SAND or poorly graded to well graded SAND.		
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2497.0 ft (761.1 m)

HOLE No. SCB-010-08

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	7			0			C-6 SP/SM?		No recovery. Material was probably washed away. Material is probably silty SAND or poorly graded to well graded SAND.		
25	8			50			C-7 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9 inches.		
30	9										
	10			28			C-8 GP(C)		Maximum size of the cobbles encountered is 10 inches.		
35	11										
				18			C-9 GP		grades to poorly graded GRAVEL with sand. There was a 0.5 inch thick, soft, medium plasticity lean clay in the sample.		
40	12										
	13			42			C-10 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2497.0 ft (761.1 m)

HOLE No. SCB-010-08

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			28			C-11A GP		grades to poorly graded GRAVEL.		
	15										
50				100 / 2.0			C-11B		50 to 72.5 feet: Meta welded Lapilli Tuff, greenish gray, fine to medium grained, fresh, very weak (R1) to strong (R4). Discontinuities are very closely to medium spaced and in poor to fair condition. None to weak HCl reaction. (CR=96-100%, RQD=20-80%, FF=1.4-3)		
	16			98 / 1.4			C-12		50 feet: Very weak (R1) to moderately weak (R2) rock. Discontinuities are closely spaced and in poor condition. no HCl reaction. 52.5 feet: grades to moderately strong (R3) rock. Discontinuities are closely to medium spaced and in fair condition. 53.2 feet: PLT - Very weak (R1) rock.		
55											
	17										
				96 / 3.0			C-13		57.1 feet: PLT - Strong (R4) rock. grades to moderately weak (R2) rock. Discontinuities are in fair to poor condition. There is a thin clay infilling in one of the fractures.		
	18								58.5 feet: PLT - Moderately strong (R3) rock.		
60											
	19			100 / 2.8			C-14		grades to strong (R4) to moderately strong (R3) rock. Discontinuities are closely to very closely spaced and in fair to poor condition. Weak HCl reaction. There is a thin clay infilling in some of the fractures. 62.9 feet: PLT - Very weak (R1) rock.		
65											
	20										
				90 / 1.4			C-15		grades to moderately strong (R3) rock. 68.1 feet: PLT - Moderately weak (R2) rock.		
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2497.0 ft (761.1 m)

HOLE No. SCB-010-08

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	22								72.2 feet: PLT - Very weak (R1) rock.		
									Bottom of boring at 72.5 feet below the mud line. Backfilled the hole to mud line with bentonite chips. Water level measurements: 7/16/08 at 15:12: 12 feet above the mud line. 7/16/08 at 17:30: 14 feet above the mud line. 7/17/08 at 08:30: 14.3 feet above the mud line. 7/17/08 at 15:00: 13 feet above the mud line.		
75	23										
	24										
80											
	25										
85	26										
	27										
90											
	28										
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-011-08

Job No. 33758632.13000 SR 90 Elevation 2532.1 ft (771.8 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Drilling Contractor WSDOT Field Exploration Unit

Inspector Xiangdong Han

Start October 1, 2008 Completion October 2, 2008 Well ID# Not Applicable

Equipment CME 45 (skid rig) w/auto-hammer

Station 1380+93.54 Offset 26.93'L Casing HWT, HQ

Method Wet Rotary

Northing 1064418.52 Easting 1754539.87 Latitude 47°20'56.395"N

Longitude 121°21'49.645"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				7			C-1 GM(C)		0 to 30 feet: Silty GRAVEL to poorly graded GRAVEL with sand, occasional cobbles and boulders, subangular, loose to very dense, gray to bluish gray, dry to wet, homogenous, no HCl reaction. 0 feet: Medium dense, silty GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 4 inches.		
	1										
5											
	2			33			D-2 GW	5 7 8 (15)	grades to well graded GRAVEL with sand.		
				5			C-3 GM(C)		grades to silty GRAVEL with cobbles. Maximum size of the cobbles encountered is 3 inches.		
10	3										
				0			D-4 GP	2 2 3 (5)	No recovery. Material is probably poorly graded fine GRAVEL.		
	4			56			C-5 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the cobbles encountered is 12 inches.		
15											
	5			0			D-6 GP	50 for 5" (>50)	grades to poorly graded GRAVEL.		
				54			C-7 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 18 inches.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2532.1 ft (771.8 m)

HOLE No. SCB-011-08

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80								
				33			D-8 GP	25 50 for 5" (>50)	grades to poorly graded GRAVEL.		
	7			61			C-9 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
25											
	8			55			D-10 GP	20 24 27 (>50)	grades to poorly graded GRAVEL.		
				86			C-11 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 12 inches.		
30	9								30.0 to 52.0 feet: Poorly graded GRAVEL with sand, occasional silty GRAVEL with sand, cobbles and boulders, subangular, loose to dense, brown to brownish gray, wet, homogenous, HCl not tested. 30.0 feet: Loose, poorly graded GRAVEL with sand.		
				50			D-12 GP	5 5 5 (10)			
	10			34			C-13 GM(C)		grades to silty GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 4 inches.		
35											
	11								Note: A 0.5-foot thick CLAY layer was encountered between gravel layers.		
				28			D-14 GP	2 3 4 (7)	grades to loose, poorly graded GRAVEL with sand.		
				43			C-15 GP(C/B)		grades to dense, poorly graded GRAVEL with sand, cobbles and boulders. Maximum size of the boulders encountered is 13 inches.		
40	12										
				40			C-16 GP(C/B)				
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2532.1 ft (771.8 m)

HOLE No. SCB-011-08

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
				40			C-17 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
	15										
50											
				80 >6.0			C-18		52 to 92 feet: Metawelded lapilli tuff, brown to greenish gray, fine to medium grained, highly to moderately weathered, very weak (R1) to strong rock (R4). Discontinuities are very closely spaced to closely spaced and in very poor to fair condition. Strong HCl reaction. (CR=20-100%, RQD=0-30%, FF=5->10)		
	16								52 feet: highly to moderately weathered, moderately weak (R2). Discontinuities are in poor condition.		
55									54.5 feet: PLT - Moderately weak (R2) rock.		
	17										
				100 5.0			C-19		grades to moderately weathered, very weak (R1) to moderately strong (R3) rock. Discontinuities are in poor to fair condition.		
	18								grades to slightly weathered.		
60									59.8 feet: PLT - Very weak (R1) rock.		
				60 5.0			C-20		grades to moderately strong (R3) rock.		
	19								62.5 feet: PLT - Strong (R4) rock.		
65											
	20										
				20 >10.0			C-21		grades to highly weathered, very weak (R1) rock. Discontinuities are very closely spaced and in very poor condition.		
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2532.1 ft (771.8 m)

HOLE No. SCB-011-08

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	22			40 / >10.0			C-22		grades to moderately weathered, moderately weak (R2) rock.		
75	23										
				40 / >10.0			C-23		grades to very weak (R1) to moderately weak (R2) rock.		
	24										
80									80.5 feet: PLT - Strong (R4) rock.		
	25			60 / >10.0			C-24		grades to slightly weathered to fresh, moderately strong (R3) rock.		
85	26										
				70 / >10.0			C-25				
	27								88.5 feet: PLT - Very weak (R1) rock.		
90											
	28								Bottom of boring at 92.0 feet depth below ground surface (bgs). Backfilled with bentonite chips from 2 to 92 feet depth bgs and with on-site gravel from 0 to 2 feet depth bgs.		
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-014-08

Job No. 33758632.13000 SR 90 Elevation 2349.2 ft (716.0 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start September 2, 2008 Completion September 3, 2008 Well ID# Not Applicable Equipment CME 45 (barge rig) w/ Auto-hammer

Station 1380+56.73 Offset 229.18' R Casing HWT 15', HQ 49' Method Wet rotary

Northing 1064448.052 Easting 1754291.371 Latitude _____ Longitude _____

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				1 / 6			D-1 GM / C-2 GP	50 for 6" (>50)	0 to 33 feet: Poorly graded to well graded GRAVEL, occasionally silty GRAVEL, occasional cobbles, subrounded to subabgular, loose to very dense, bluish black, brown to greenish gray, wet, homogenous, no HCl reaction. 0 feet: very dense, silty GRAVEL. 0.5 feet: grades to poorly graded GRAVEL.		
	1										
5											
	2										
				19			D-3 GW	7 4 4 (8)	grades to loose, well graded GRAVEL with sand.		
10	3			29			C-4 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 5 inches.		
	4										
15											
	5										
				20			D-5 GW	9	grades to medium dense, well graded GRAVEL with		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2349.2 ft (716.0 m)

HOLE No. SCB-014-08

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
								8 12 (20)	sand and trace silt.		
				35			C-6 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
	7										
25											
	8										
	9			50			D-7 GW	50 for 4"	grades to very dense, well graded GRAVEL with sand.		
30				43			C-8A GW	(>50)			
	10			43/2			C-8B		33.0 to 49.0 feet: Metawelded lapilli tuff, greenish gray, fine to coarse grained, fresh, very weak (R1) to moderately weak (R2) rock. Discontinuities are very closely spaced and in poor condition. No HCl reaction. (CR=22 to 98%, RQD=0 to 10%, FF=2 to 4.9)		
				100 ~~98~~			D-9 C-10	50 for 1"	33 feet: moderately weak (R2) rock.		
35	11								36.4 feet: PLT - Weak (R2) rock.		
	12			76/2			C-11		grades to very weak (R1) rock.		
40											
	13								41.9 feet: PLT - Very weak (R1) rock.		
				22/2			C-12				
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-014-08

Job No. 33758632.13000 SR 90 Elevation 2349.2 ft (716.0 m)

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
	15								Bottom of boring at 49 feet below the mudline. Lake level measurements (above mudline): -9/2/2008 at 16:30 : 118 feet above mudline -9/3/2008 at 09:25: 119 feet above mudline		
50	16										
55	17										
	18										
60	19										
65	20										
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-015-08

Job No. 33758632.13000 SR 90 Elevation 2237.0 ft (681.8 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Nathan Arneson Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Xiangdong Han

Start November 22, 2008 Completion November 25, 2008 Well ID# Not Applicable

Equipment Burley 5500-2 (Barge Rig) w/ manual hamme

Station 1381+58.51 Offset 557.49R Casing Conduct-254.5',HWT-303.7'

Method Wireline Advance

Northing 1064354.49 Easting 1753956.84 Latitude _____ Longitude _____

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 34 feet: Silty CLAY or clayey SILT, occasional boulders and gravel, very soft to soft, wet, homogenous, to laminated, HCl not tested.		
	1										
5											
	2			0			S-1 CL		6 feet: No recovery. Material is probably sandy, silty, soft CLAY, homogenous.		
									grades to poorly graded GRAVEL with boulders.		
10	3										
				100			C-2a GP(B)		Maximum size of the boulders encountered is 1.4 feet.		
				0			C-2b ML		No recovery. Material is probably soft, clayey SILT, laminated per field observations.		
	4										
15											
	5			100			S-3 ML		grades to very soft.		
				11			D-4 MH	33 5 5 (10)	grades to sandy, occasionally gravelly, elastic SILT, laminated. TV = 0.24 ksf		
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2237.0 ft (681.8 m)

HOLE No. SCB-015-08

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Nathan Arneson Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7										
	8			100			S-5 / MH		grades to soft, sandy, occasionally gravelly, elastic SILT, laminated. TV=0.39 ksf		
30	9										
	10										
35	11			100			D-6	50 for 1" (>50)	34.0 to 59.7 feet: Meta Welded Lapilli Tuff, bluish gray, fine to coarse grained, fresh, moderately weak (R2) to moderately strong (R3) rock. Discontinuities are closely to widely spaced and in fair condition. None to weak HCl reaction. (CR =100%, RQD = 85%-100%, FF =0.2 to 0.6). Note: Core samples were not collected between 34 and 41 feet.		
40	12										
	13			100 / 0.6			C-7				
45				100			C-8		44.2 feet: PLT - Very weak (R1) rock. 44.5 feet: very weak (R1) rock.		

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2237.0 ft (681.8 m)

HOLE No. SCB-015-08

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Nathan Arneson Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			0.2							
	15								48.7 feet: PLT - Moderately weak (R2) rock. grades to moderately weak (R2) rock.		
50				100 / 0.2			C-9				
	16								52.8 feet: PLT - Very weak (R1) rock. grades to very weak (R1) rock.		
55				100 / 0.2			C-10				
	17								57.1 feet: PLT - Very weak (R1) rock.		
	18										
60									Bottom of boring at 59.7 feet below the mudline. Backfilled with cement grout from bottom of the boring to the mudline.		
	19								Lake level measurements: -11/22/08 at 07:30: 246 feet above the mudline. -11/23/08 at 08:06: 246.6 feet above the mudline. -11/24/08 at 08:00: 246.8 feet above the mudline. -11/25/08 at 08:00: 246.9 feet above the mudline.		
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-016-08

Job No. 33758632.13000 SR 90 Elevation 2447.8 ft (746.1 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start August 26, 2008 Completion August 26, 2008 Well ID# Not Applicable Equipment CME 45 (barge rig) w/ Auto-hammer

Station _____ Offset _____ Casing HQ 65' Method _____

Northing 1064521.27 Easting 1754430.26 Latitude _____ Longitude _____

County Kittitas Subsection NE 1/4 of SE 1/4 Section 35 Range 11E Township 22

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				26			C-1 GP(C)		0 to 10.5 feet: Poorly to well graded GRAVEL with cobbles and boulders, subangular to subrounded, gray to greenish gray to brown, wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
	1										
5											
	2			36			C-2 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 14 inches.		
10	3										
									10.5 to 51.4 feet: Poorly to well graded GRAVEL, occasional cobbles and boulders, subangular to subrounded, gray to greenish gray to brown, wet, homogenous, no HCl reaction. 12.0 feet: poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
				48			C-3 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
	4										
15											
	5										
				46			C-4 GP(C)		Maximum size of the cobbles encountered is 8 inches.		
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2447.8 ft (746.1 m)

HOLE No. SCB-016-08

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				10			C-5 / GW		grades to well graded GRAVEL.		
	7										
25											
	8			10			C-6 / GW				
	9										
30											
				0			C-7 / GP?		No recovery. Material is probably washed away. Material is probably poorly graded GRAVEL (fine).		
	10										
35											
	11			25			C-8 / GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.5 inches.		
	12										
40											
	13										
45											

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2447.8 ft (746.1 m)

HOLE No. SCB-016-08

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				36			C-9 GW(C)		Maximum size of the cobbles encountered is 8 inches.		
	14										
	15										
50				82			C-10A GW		grades to well graded GRAVEL.		
				100 / 5			C-10B		51.4 to 65 feet: Metawelded lapilli tuff, greenish gray, fine to medium grained, fresh, very weak (R1). Discontinuities are very closely spaced and in poor to very poor condition. No HCl reaction. (CR=38 to 80%, RQD=0%, FF=1.6 to 5)		
	16										
55				38 / 1.6			C-11				
	17										
	18										
60				80 / 4			C-12				
	19										
65									Bottom of boring at 65 feet below the mudline.		
	20								Lake level measurements (above mudline):		
									-8/26/08 at 11:20: 22 feet above mudline -8/26/08 at 17:15: 22.5 feet above mudline		
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-017-08

Job No. 33758632.13000 SR 90 Elevation 2450.1 ft (746.8 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start August 27, 2008 Completion August 28, 2008 Well ID# Not Applicable Equipment CME 45 (barge rig) w/ Auto-hammer

Station _____ Offset _____ Casing HQ Method Wet rotary

Northing 1064470.984 Easting 1754424.239 Latitude _____ Longitude _____

County Kittitas Subsection NE 1/4 of SE 1/4 Section 35 Range 11E Township 22

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				44			C-1 GP(C/B)		0 to 48.8 feet: Poorly graded GRAVEL with or wihout cobbles and boulders, subrounded to subangular, greenish gray to light brown, wet, homogenous, no HCl reaction 0 feet: Poorly graded GRAVEL with cobbles and boulders. Maximum size of the cobbles encountered is 16 inches.		
	1										
5											
	2										
10	3			32			C-2 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 10 inches.		
	4										
15											
	5										
				38			C-3 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2450.1 ft (746.8 m) HOLE No. SCB-017-08

Sheet 2 of 4

Project I-90 Snoqualmie Pass East Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									17 inches.		
	7										
25											
	8										
	9										
30				25			C-4 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4 inches.		
	10										
35											
	11										
				28			C-5 GP		grades to poorly graded GRAVEL.		
	12										
40				40			C-6 GP		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 5 inches.		
	13										
				27			C-7A GP		grades to poorly graded GRAVEL.		
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2450.1 ft (746.8 m)

HOLE No. SCB-017-08

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
	15			80 / 6			C-7B		48.8 to 70.0 feet: Metawelded lapilli tuff, greenish gray, fine to coarse grained, fresh, extremely weak (R0) to moderately weak (R2) rock. Discontinuities are very closely to closely spaced and in poor to fair condition, no HCl reaction. (CR=30 to 80%, RQD=0 to 15%, FF= 1.4 to 6) 48.8 feet: Very weak (R1) rock. Discontinuities are very closely spaced and in poor to fair condition. 49.5 feet: Moderately weak (R2) rock. Discontinuities are very closely to closely spaced.		
50				62 / 1.8			C-8				
	16										
55				40 / 0.8			C-9		55 feet: Very weak (R1) to extremely weak (R0) rock.		
	17										
	18										
60				60 / 1.6			C-10		Discontinuities are very closely to closely spaced and in poor condition.		
	19										
65				30 / 1.4			C-11				
	20										
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2450.1 ft (746.8 m)

HOLE No. SCB-017-08

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									Bottom of boring at 70 feet below the mudline. Backfilled the hole with bentonite chips. Lake level measurements (above mudline): -8/27/08 at 12:05: 19 feet above mud line -8/28/08 at 09:30: 21.5 feet above mudline		
	22										
75	23										
	24										
80	25										
85	26										
	27										
90	28										
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-018-08

Job No. 33758632.13000 SR 90 Elevation 2536.5 ft (773.1 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Drilling Contractor WSDOT Field Exploration Unit

Inspector Xiangdong Han

Start September 30, 2008 Completion October 1, 2008 Well ID# Not Applicable

Equipment CME 45 (skid rig) w/auto-hammer

Station 1375+07.09 Offset 22.22'L Casing HWT, HQ

Method Wet Rotary

Northing 1065001.03 Easting 1754444.1 Latitude 47°21'02.133"N

Longitude 121°21'51.128"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				14			C-1 GP(C/B)		0 to 35.0 feet: Poorly graded GRAVEL with sand, occasional cobbles and boulders, subangular, loose to very dense, brown to gray, dry to wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL with sand, cobbles and boulders. Maximum size of the boulders encountered is 12 inches.		
5	1										
	2			0			D-2 GP	7 9 3 (12)	No recovery. Material is probably poorly graded GRAVEL.		
				0			C-3 GP		No recovery. Material is probably poorly graded GRAVEL (fine).		
10	3										
				0 / 34			D-4 GP(C/B)	50 for 1" (>50)	No recovery. Material is probably poorly graded GRAVEL with cobbles and boulders. 12.1 feet: Maximum size of the boulders encountered is 14 inches.		
	4										
15											
	5			0			D-6 GP	10 50 for 4" (>50)	No recovery. Material is probably poorly graded GRAVEL.		
				28			C-7 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 5 inches.		
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2536.5 ft (773.1 m) HOLE No. SCB-018-08

Sheet 2 of 3

Project I-90 Snoqualmie Pass East Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80								
				0			D-8 GP	7 5 5 (10)	No recovery. Material is probably poorly graded GRAVEL (fine).		
	7			100			C-9 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 12 inches.		
25											
	8			0 / 41			D-10 GP(C)	50 for 1" (>50)	No recovery. Material is probably poorly graded GRAVEL with cobbles. 27.1 feet: Maximum size of the cobbles encountered is 4 inches.		
	9										
30											
				11			D-12 GP	5 3 2 (5)	grades to loose, poorly graded GRAVEL with sand.		
	10			67			C-13A GP				
35				100 / 2.5			C-13B		35.0 to 52.0 feet: Metawelded lapilli tuff, brownish to greenish gray, fine to medium grained, highly weathered to fresh, very weak (R1) to very strong (R5) rock. Discontinuities are very closely to medium spaced and in fair condition, some HCl reaction. (CR=100%, RQD=30-90%, FF=1.6 to 3.0) 35.0 feet: Slightly weathered to fresh rock, strong (R4) to very strong (R5) rock. Discontinuities are closely spaced and in fair condition. PLT - Very strong (R5) rock.		
	11			100 / 3.0			C-14				
	12										
40									41.5 feet: PLT - Very strong (R5) rock.		
				100 / 2.4			C-15				
	13								grades to highly weathered, very weak (R1) rock. Discontinuities are very closely to medium spaced and in poor condition.		
									grades to fresh, strong (R4) rock. Discontinuities are closely to medium spaced and in fair condition. Note: A half-inch thick soft clay infilling was observed.		
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2536.5 ft (773.1 m)

HOLE No. SCB-018-08

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
50	14			100 / 1.6			C-16		grades to highly weathered, very weak (R1) rock. Discontinuities are medium spaced.		
	15								49.3 feet: PLT - Strong (R4) rock.		
	16								Bottom of boring at 52 feet depth below ground surface (bgs). Backfilled with bentonite chips from 2 to 52 feet depth bgs and with on-site gravel from 0 to 2 feet depth bgs.		
55	17										
	18										
60	19										
65	20										
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-019-09

Job No. 33758654.00009 SR 90 Elevation 2503.7 ft (763.1 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start May 27, 2009 Completion May 27, 2009 Well ID# Not applicable

Equipment CME 45 (Barge rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1065038.59 Easting 1754382.29 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				4			C-1 GP		0 to 15.0 feet: Poorly graded GRAVEL with cobbles and boulders, subangular, gray to brown, wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL.		
	1										
5											
	2			30			C-2 GP(C)		grades to porrly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
10	3										
				40			C-3 GP(C/B)		grades to poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 14 inches.		
	4										
15									15.0 to 33.0 feet: Poorly graded GRAVEL with cobbles, occasional boulders, subangular to angular, greenish gray, gray or brown, wet, homogenous, no HCl reaction. 15.0 feet: Poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 14 inches.		
	5			54			C-4 GP(C)		17 feet: grades to poorly graded GRAVEL with cobbles.		
	6										
20											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2503.7 ft (763.1 m)

HOLE No. SCB-019-09

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				60			C-5 GP(C)		Maximum size of the cobbles encountered is 5 inches.		
	7										
25											
	8			40			C-6 GP(C)		Maximum size of the cobbles encountered is 7 inches.		
	9										
30											
				98			C-7A GP(C)		Maximum size of the cobbles encountered is 3.5 inches.		
	10			98 / 2			C-7B		33.0 to 47.0 feet: Meta welded Lapilli Tuff, bluish gray, fine to medium grained, fresh, moderately strong (R3) to very strong (R5). Discontinuities are very closely to widely spaced and in poor to fair condition. Weak HCl reaction. (CR = 98 to 99%, RQD = 60 to 99%, FF=0 to 2) 33.0 feet: Moderately strong (R3) to strong (R4) rock. Discontinuities are very closely to closely spaced and in poor to fair condition. PLT - very strong (R5) rock.		
35											
	11			98 / 1.2			C-8		grades to strong (R4) rock. Discontinuities are closely to widely spaced and in fair condition. PLT - very strong (R5) rock.		
	12								PLT - strong (R4) rock.		
40											
	13			99 / 0			C-9		grades to strong (R4) to very strong (R5) rock. No discontinuities. PLT - strong (R4) rock. PLT - strong (R4) rock.		
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2503.7 ft (763.1 m)

HOLE No. SCB-019-09

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14								PLT - very strong (R5) rock.		
									Bottom of boring at 47.0 feet below the mudline. Backfilled to ground surface with bentonite chips. Lake water level mesaurements: 05/27/09 at 15:15: 11 feet above the mudline. 05/28/09 at 09:45: 11.2 feet above the mudline.		
50	15										
	16										
55	17										
	18										
60	19										
65	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-020-09

Job No. 33758654.00009 SR 90 Elevation 2505.3 ft (763.6 m)

Sheet 1 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start May 26, 2009 Completion May 27, 2009 Well ID# Not applicable

Equipment CME 45 (Barge rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1064254.07 Easting 1754488.52 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				18			C-1 GP(C)		0 to 11.5 feet: Poorly graded GRAVEL with cobbles and boulders, angular to subangular, gray, brown or greenish blue, wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4.25 inches.		
	1										
5											
	2										
				90			C-2 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 3.8 feet.		
10	3										
									11.5 to 18.5 feet: Poorly graded GRAVEL?, occasional cobbles and boulders, subrounded to angular, greenish blue, wet, homogenous, no HCl reaction. 11.5 feet: Poorly graded GRAVEL with cobbles and boulders. Maximum size of th boulders encountered is 3.8 feet. grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9 inches.		
	4			56			C-3 GP(C)				
15											
	5										
				0			C-4 GP?		18.5 to 43.5 feet: No recovery. Material was washed away. Material is probably poorly graded fine gravel?.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-020-09

Job No. 33758654.00009 SR 90 Elevation 2505.3 ft (763.6 m)

Sheet 2 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7			3			C-5 GP?				
	8										
30	9			0			C-6 GP?				
	10										
35	11			0			C-7 GP?				
	12										
40	13			0			C-8 GP?				
45				80 / 1.7			C-9		43.5 to 93.5 feet: Meta welded Lapilli Tuff, greenish to bluish gray, fine to medium grained, fresh, very weak (R1) to moderately strong (R3). Discontinuities are very closely to closely spaced and in poor to fair condition. No		

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

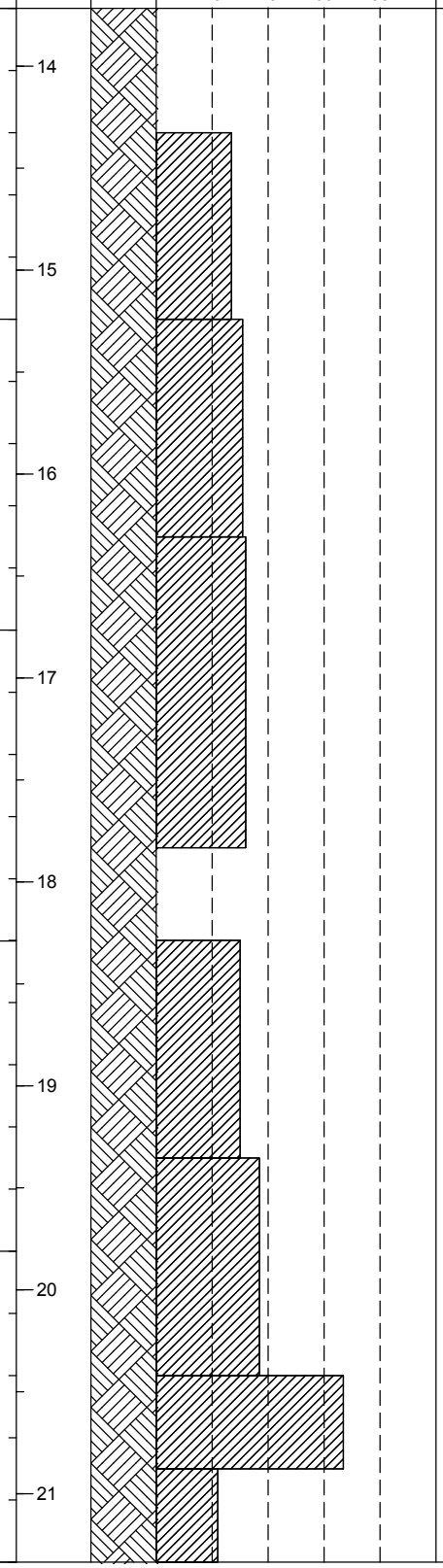
Job No. 33758654.00009 SR 90 Elevation 2505.3 ft (763.6 m)

HOLE No. SCB-020-09

Sheet 3 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T



Depth (ft)	Meters (m)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
							HCl reaction. (CR=43 to 200%, RQD=0 to 100%, FF=0.6 to 6.0) 43.5 feet: Moderately strong (R3) rock.		
	14	117 / 3.7			C-10		grades to moderately weak (R2) rock. Discontinuities are very closely spaced and in poor condition.		
	15								
50		43 / 0.6			C-11		grades to moderately strong (R3) rock. Discontinuities are very closely to closely spaced and in fair condition.		
	16								
		84 / 2.6			C-12		PLT - moderately strong (R3) rock. grades to moderately weak (R2) to moderately strong (R3) rock. Discontinuities are in poor to fair condition.		
55									
	17								
							PLT - strong (R4) rock.		
		73 / 4.7			C-13		grades ro very weak (R1) rock. Discontinuities are very closely spaced.		
	18								
60		50 / 1.8			C-14		grades to moderately weak (R2) to moderately strong (R3) rock. Discontinuities are very closely spaced and in poor to fair condition.		
	19								
		100 / 3.1			C-15		Discontinuities are in fair condition.		
							PLT - very strong (R5) rock.		
65									
	20								
		87 / 1.3			C-16		grades to moderately strong (R3) rock. Discontinuities are closely spaced and in fair condition.		
		62 / 2.2			C-17		Discontinuities are very closely spaced.		
	21								
70									

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2505.3 ft (763.6 m)

HOLE No. SCB-020-09

Sheet 4 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	22			240/6			C-18		PLT - moderately strong (R3) rock.		
				64/2.8			C-19				
75	23								PLT - moderately weak (R2) rock.		
	24			90/4.4			C-20		grades to moderately weak (R2) ro moderately strong (R3) rock. Discontinuities are very closely spaced and in poor to fair condition.		
80											
	25										
				50/2.2			C-21		PLT - strong (R4) rock.		
85	26										
	27			50/1.4			C-22		Discontinuities are very closely to closely spaced.		
90									PLT - moderately strong (R3) rock.		
	28										
									Bottom of boring at 93.5 feet below the mudline. Backfilled to ground surface with bentonite chips.		
95									Lake water level measurements:		

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-020-09

Job No. 33758654.00009 SR 90 Elevation 2505.3 ft (763.6 m)

Sheet 5 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29								-05/26/09 at 15:40: 9.5 feet above the mudline. -05/27/09 at 08:00: 10.0 feet above the mudline. -05/27/09 at 13:45: 10.0 feet above the mudline.		
	30										
100											
	31										
105	32										
	33										
110											
	34										
115	35										
	36										
120											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-021-08

Job No. 33758632.13000 SR 90 Elevation 2533.0 ft (772.1 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Drilling Contractor WSDOT Field Exploration Unit

Inspector Pam Craig

Start October 2, 2008 Completion October 3, 2008 Well ID# Not Applicable

Equipment CME 45 (skid rig) w/auto-hammer

Station 1382+41.74 Offset 10.61'L Casing HQ

Method Wet Rotary

Northing 1064268.97 Easting 1754527.79 Latitude 47°20'54.918"N

Longitude 121°21'49.796"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				24			C-1 GP(C)		0 to 17 feet: Poorly to well graded GRAVEL with sand, occasional cobbles, boulders and silt, subrounded to subangular, loose, brownish gray to greenish gray, homogenous, moist to wet, HCl not tested. 0 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4 inches. Note: Fines are probably washed away.		
	1										
5											
	2			22			D-2 GW	4 5 5 (10)	grades to well graded GRAVEL with sand, trace of silt.		
				34			C-3 GP(B)		grades to poorly graded GRAVEL with boulders.		
10	3								A boulder was encountered. Maximum size of the boulder is 2.7 feet.		
							C-4 GP(B)				
	4										
15											
	5			47			D-5 GP	2 3 3 (6)	17 to 25 feet: Poorly graded GRAVEL or silty GRAVEL with sand, subrounded to subangular, loose to very dense, greenish gray to brownish gray, wet, homogenous, HCl not tested. 17 feet: Poorly graded GRAVEL with sand, trace of silt. 18.5 feet: grades to poorly graded GRAVEL with cobbles.		
							C-6 GP(C)				
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2533.0 ft (772.1 m)

HOLE No. SCB-021-08

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80								
				50			D-7 GM	2 2 50 for 5" (>50)	grades to silty GRAVEL with sand.		
	7			83			C-8A GM				
25				83 / 2.5			C-8B		25.0 to 69.5 feet: Metawelded lapilli tuff, brownish to greenish gray, fine to medium grained, fresh to moderately weathered, very weak (R1) to strong (R4) rock. Discontinuities are very closely to closely spaced and in very poor to fair condition, HCl not tested.		
	8			90 / >3.0			C-9		25 feet: Moderately weathered, moderately weak (R2) to moderately strong (R3) rock. Discontinuities are very closely to closely spaced and in poor to fair condition.		
	9										
30									30.2 feet: PLT - Moderately weak (R2) rock.		
				30 / >5.0			C-10				
	10										
35											
	11										
				68 / >3.0			C-11		grades to moderately strong (R3) to strong (R4) rock.		
	12										
40									39.5 feet: PLT - Moderately strong (R3) rock.		
				90 / >3.0			C-12				
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

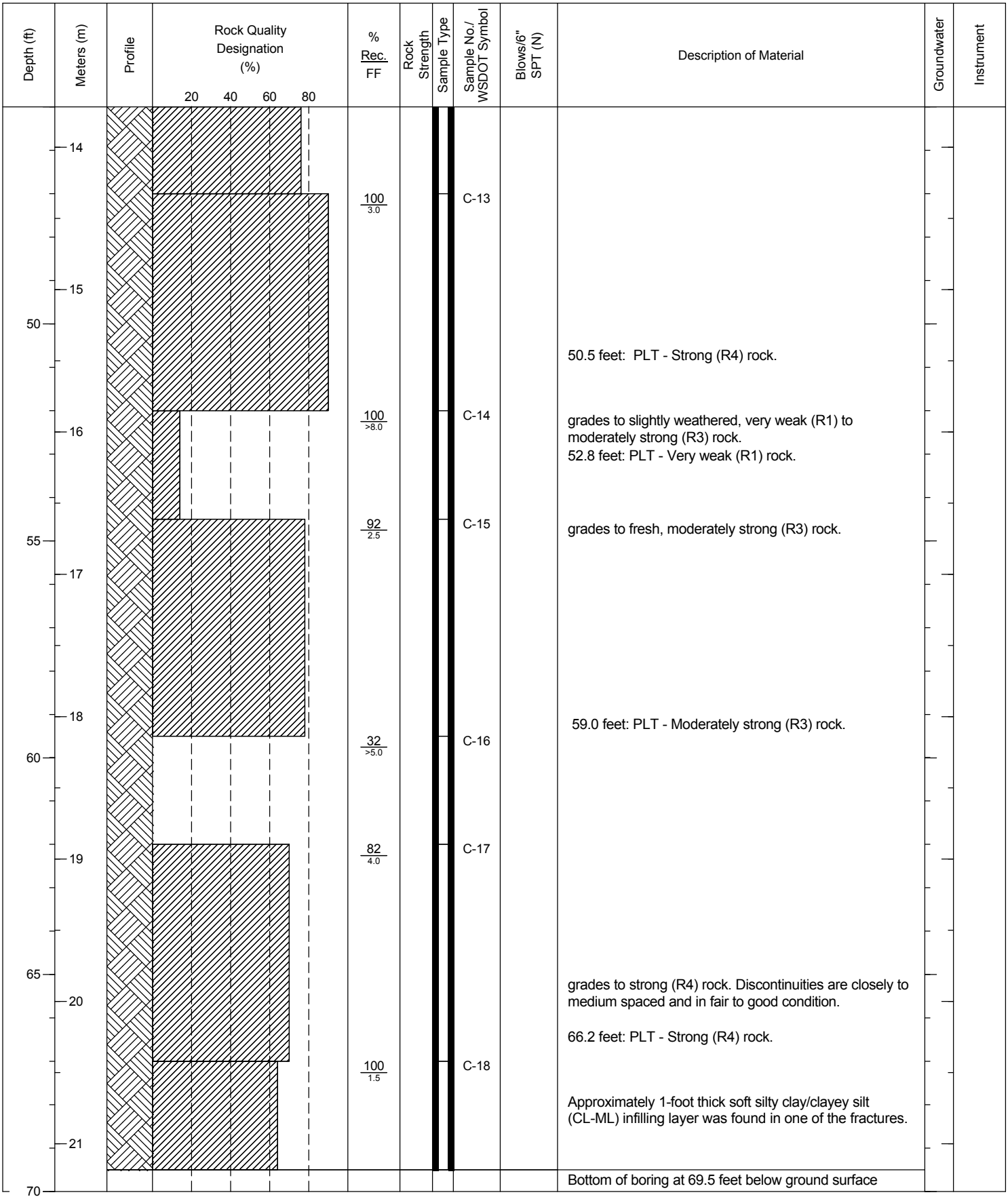
Job No. 33758632.13000 SR 90 Elevation 2533.0 ft (772.1 m)

HOLE No. SCB-021-08

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552



DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-021-08

Job No. 33758632.13000 SR 90 Elevation 2533.0 ft (772.1 m)

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									(bgs). Backfilled with bentonite chips from the bottom of the hole to 2 feet depth bgs and with gravel from ground surface to 2 feet depth bgs.		
	22										
75	23										
	24										
80											
	25										
85	26										
	27										
90											
	28										
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-022-09

Job No. 33758654.00009 SR 90 Elevation 2537.7 ft (773.5 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Pam Craig

Start June 12, 2009 Completion June 15, 2009 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1065148.34 Easting 1754391.7 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				67			D-1 GP	2 1 1 (2)	0 to 22.0 feet: Poorly to well graded GRAVEL with sand, cobbles and boulders, very loose to very dense, subrounded to angular, brown, moist to wet, homogenous, HCl not tested. 0 feet: Very loose, poorly graded GRAVEL with sand.		
	1										
5				33			D-2 GW	8 11 8 (19)	grades to medium dense, well graded GRAVEL with sand.		
				100			C-3 GW(C/B)		grades to well graded GRAVEL with sand, cobbles and boulders.		
	2										
10	3										
				70			C-4 GW(C/B)		grades to very dense, well graded GRAVEL with boulders. Maximum size of the boulders encountered is 1.8 feet.		
	4										
15											
	5			44			D-5 GW	4 10 26 (36)	grades to dense, well graded GRAVEL with sand.		
				57			C-6 GW(C)		grades to well graded GRAVEL with cobbles, Maximum size of the cobbles encountered is 0.4 feet. Note: Woody debris was encountered at the bottom of the core.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2537.7 ft (773.5 m)

HOLE No. SCB-022-09

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				28			D-7 GW	2 4 5 (9)	22.0 to 51.7 feet: Well graded GRAVEL with sand, cobbles and boulders, occasional poorly to well graded medium SAND with or without gravel , loose to very dense, subrounded to angular, brown, brownish gray or gray, wet, homogenous, no HCl reaction. 22.0 feet: Loose, well graded GRAVEL with sand. Note: Woody debris was observed in the sample. 23.5 feet: grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 0.7 feet.		
	7			100			C-8A GW(C)				
25				75			C-8B GW(C)				
	8			60			C-9 GW(C/B)		grades to well graded GRAVEL with boulders. Maximum size of the boulders encountered is 1.3 feet.		
	9										
30				24			C-10 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 0.5 feet.		
	10										
35											
	11			33			D-11 SP	2 5 8 (13)	grades to loose to medium dense, poorly graded medium SAND.		
				86			C-12 GW		grades to well graded GRAVEL.		
	12										
40											
				44			D-13 GW	11 23 18 (41)	grades to dense, well graded GRAVEL with sand.		
	13										
				100			C-14 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 0.6 feet.		
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2537.7 ft (773.5 m)

HOLE No. SCB-022-09

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			100			D-15 GW	27 50 for 4" (>50)	grades to well graded GRAVEL with sand.		
				57			C-16 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 0.5 feet.		
50	15										
				100			D-17 SW	32 50 for 5" (>50)	grades to very dense, well graded SAND with gravel. grades to silty SAND (fine). grades to well graded SAND with gravel.		
	16			100 / 1			C-18		51.7 to 71.9 feet: Meta welded Lapilli Tuff, greenish gray, reddish gray or brownish gray, medium grained, fresh, moderately strong (R3) to strong (R4) rock. Discontinuities are medium to widely spaced and in very poor to fair condition. None to strong HCl reaction. (CR =100%, RQD=100%, FF=0.2 to 2 51.7 feet: Strong (R3) rock. Discontinuities are medium spaced and in very poor condition. No HCl reaction. Note: Brown fine sand infilling in fractures. PLT - strong (R4) rock.		
55											
	17			100 / 0.2			C-19		Discontinuities are widely spaced and in fair condition. No HCl reaction.		
	18										
60				100 / 1.2			C-20		PLT - strong (R4) rock. 61.25 to 62.1 feet: Light gray to white, moist, Silty CLAY layer was encountered within bedrock. Strong HCl reaction. Pocket penetrometer readings were 3.75, 2.75, 3.5 and 4.5 tsf. Discontinuities are medium spaced and in very poor condition.		
	19										
65											
	20			100 / 2			C-21		PLT - strong (R4) rock.		
				100 / 1			C-22				
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2537.7 ft (773.5 m)

HOLE No. SCB-022-09

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									grades to moderately strong (R3) rock. (PLT - moderately strong (R3) rock.)		
	22								Bottom of boring at 71.9 feet below the ground surface. Backfilled to ground surface with bentonite chips.		
75	23										
	24										
80											
	25										
85	26										
	27										
90											
	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-023-09

Job No. 33758654.00009 SR 90 Elevation 2502.7 ft (762.8 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start May 28, 2009 Completion May 29, 2009 Well ID# Not applicable

Equipment CME 45 (Barge rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1065146.27 Easting 1754346.56 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				42			C-1 GP(C)		0 to 37.2 feet: Poorly to well graded GRAVEL with or without cobbles and boulders, subrounded to angular, brown to gray, wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4.5 inches.		
	1										
5				40			C-2 GP(C)		Maximum size of the cobbles encountered is 8.5 inches.		
	2										
10	3			96			C-3 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 13 inches.		
	4										
15				30			C-4 GW		grades to well graded GRAVEL.		
	5										
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2502.7 ft (762.8 m) HOLE No. SCB-023-09

Sheet 2 of 3

Project I-90 Snoqualmie Pass East Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				25			C-5 GW				
	7										
25				0			C-6 GP?		No recovery. Material was washed away. Material probably is poorly graded GRAVEL.		
	8										
	9										
30				0			C-7 GP?		No recovery. Material was washed away. Material probably is poorly graded GRAVEL.		
	10										
35											
	11			90			C-8A GW		grades to well graded GRAVEL.		
				90 / 2.1			C-8B		37.2 to 56.0 feet: Meta welded Lapilli Tuff, brown to light gray, fine to medium grained, fresh to slightly weathered, moderately weak (R2) to strong (R4). Discontinuities are very closely to widely spaced and in poor to fair condition. No HCl reaction. (CR=67 to 100%, RQD=30 to 90%, FF=0.6 to 2.2) 37.2 feet: Brown, slightly weathered, moderately weak (R2) to moderately strong (R3) rock. Discontinuities are very closely to closely spaced and in poor condition. PLT - strong (R4) rock. 40.2 feet: grades to light gray, fresh, moderately strong (R3) rock. 41.0 feet: grades to brown to light gray, fresh to slightly weathered rock, moderately strong (R3) to strong (R4) rock. Discontinuities are very closely to closely spaced and in poor condition. PLT - very strong (R5) rock.		
40	12										
				93 / 1.3			C-9				
	13			67 / 2.0			C-10				
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2502.7 ft (762.8 m)

HOLE No. SCB-023-09

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			92 / 0.6			C-11		grades to fresh (slightly weathered near joints) rock. Discontinuities are widely spaced and in fair condition.		
	15										
50				100 / 2.2			C-12		grades to fresh to slightly weathered rock. Discontinuities are closely to medium spaced.		
	16								PLT - moderately strong (R3) rock.		
55											
	17								Bottom of boring at 56.0 feet below the mudline. Backfilled to ground surface with bentonite chips.		
									Lake level measurements:		
									-05/28/09 at 14:30: 12.0 feet above the mudline.		
									-05/29/09 at 09:15: 12.7 feet above the mudline.		
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-024-09

Job No. 33758654.00009 SR 90 Elevation 2523.4 ft (769.1 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Pam Craig

Start June 9, 2009 Completion June 11, 2009 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1064159.8 Easting 1754490.89 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 36.5 feet: Well graded GRAVEL with sand with or without cobbles and boulders, occasional silty GRAVEL with sand, subangular to angular, medium dense to very dense, light brown, ligh gray or brownish gray, wet, homogenous, no HCl reaction.		
5	1			22			D-1 GM	5 15 5 (20)	4.5 feet: Medium dense, silty GRAVEL with sand.		
10	2 3			30			D-2 GW	24 50 for 4" (>50)	grades to very dense, well graded GRAVEL with sand.		
				100 80			C-3 GW(B) C-4		grades to well graded GRAVEL with boulders. Maximum size of the boulders encountered is 2.5 feet.		
15	4 5			56			C-5 GW(C/B)		Note: 0.5-feet thick Silt bedding was encountered between 15.5 and 16.0 feet. grades to well graded GRAVEL with boulders. Maximum size of the boulders encountered is 1.4 feet.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2523.4 ft (769.1 m)

HOLE No. SCB-024-09

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				17			D-6 GW	3 5 6 (11)	grades to well graded GRAVEL.		
				29			C-7 GW				
25	7			33			D-8 GW	3 4 7 (11)			
	8			29			C-9 GW				
30	9			39			D-10 GW	3 4 7 (11)			
	10			29			C-11 GW				
				70			D-12 GW	35 50 for 4" (>50)			
35	11			100 ~~100~~			C-13A GW(G) C-13B		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3 inches.		
									36.5 to 85.5 feet: Meta welded Lapilli Tuff, greenish gray, fine to medium grained, fresh to slightly weathered, very weak (R1) to moderately strong (R3) rock. Discontinuities are very closely to medium spaced and in very poor to good condition. None to strong HCl reaction. (CR= 74 to 100%, RQD = 0 to 100%, FF = 0.2 to >10)		
	12								36.5 feet: Slightly weathered, moderately weak (R2) rock. Discontinuities are medium spaced and in very poor condition. No HCl reaction. PLT - moderately weak (R2) rock.		
40				100 0.2			C-14		40.5 feet: grades to fresh rock. PLT - moderately weak (R2) rock.		
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2523.4 ft (769.1 m)

HOLE No. SCB-024-09

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			74 / >10			C-15		grades to fresh, very weak (R1) rock. Discontinuities are very closely spaced and in very poor condition. PLT - very weak (R1) rock.		
	15										
50				94 / 1			C-16				
	16								PLT - very weak (R1) rock.		
55											
	17			98			C-17		Note: Calcite infilling in joints. PLT - very weak (R1) rock.		
	18										
60				100 / >5			C-18		grades to moderately strong (R3) rock. Calcite infilling in joints. PLT - moderately strong (R3) rock.		
	19										
65											
	20			90 / >5			C-19		grades to very weak (R1) rock. Calcite infilling in joints. PLT - very weak (R1) rock.		
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2523.4 ft (769.1 m)

HOLE No. SCB-024-09

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100 / <0.2			C-20		grades to moderately weak (R2) rock. Discontinuities are closely spaced and in very poor to good condition. Calcite infilling in joints. Strong HCl reaction. PLT - moderately weak (R2) rock. PLT - very weak (R1) rock.		
	22										
75	23			100 / 1			C-21		PLT - very weak (R1) rock. grades to very weak (R1) rock. Discontinuities are in very poor to poor condition. Calcite infilling in joints. Strong HCl reaction.		
	24								PLT - very weak (R1) rock.		
80				100 / 5			C-22		grades to very weak (R1) to moderately weak (R2) rock. Calcium infilling in joints. Strong HCl reaction.		
	25										
									PLT - moderately weak (R2) rock.		
85	26								Bottom of boring at 85.5 feet below the ground surface. Backfilled to ground surface with bentonite chips.		
	27										
90	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-025-09

Job No. 33758654.00009 SR 90 Elevation 2536.8 ft (773.2 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Pam Craig

Start June 2, 2009 Completion June 4, 2009 Well ID# Not Appicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1065031.01 Easting 1754435.55 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				50			D-1 SW	3 3 3 (6)	0 to 27.5 feet: Poorly graded to well graded GRAVEL with sand, with occasional cobbles and boulders, occasional well graded SAND and silty GRAVEL with sand, subangular to angular, loose to very dense, brown, brownish gray or dark gray, moist to wet, homogenous, no HCl reaction. 0 feet: Loose, well graded SAND.		
	1										
				22			D-2 GP	2 4 8 (12)	grades to medium dense, poorly graded GRAVEL with sand.		
5											
	2										
				0			D-3 GP(B)	20 50 for 2" (>50)	No recovery. Material probably is a cobble or a boulder.		
10	3			77			C-4		Boulder. Maximum size of the boulder encountered is 1 foot.		
				28			D-5 GW	5 8 7 (15)	grades to medium dense, well graded GRAVEL with sand.		
				29			C-6 GW				
	4										
15											
				17			D-7 GM	4 3 2 (5)	grades to loose, silty GRAVEL with sand.		
	5										
				79			C-8 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulder encountered is 1 feet.	▽	
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2536.8 ft (773.2 m) HOLE No. SCB-025-09

Sheet 2 of 3

Project I-90 Snoqualmie Pass East Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				90			C-9 GP(C/B)				
	7			77			C-10 GW(C/B)		grades to well graded GRAVEL with boulders and cobbles. Maximum size of the boulders encountered is 1.6 feet.		
25											
	8			98			C-11 GW(C/B)		Maximum size of the boulders encountered is 1.1 feet.		
									27.5 to 37.5 feet: Well graded GRAVEL with or without boulders, angular, dark gray, wet, homogenous, no HCl reaction. 27.5 feet: Well graded GRAVEL with boulders. Maximum size of the boulders encountered is 1.1 feet.		
	9										
30											
				20			C-12 GW		grades to well graded GRAVEL.		
	10										
35											
	11			100			D-13 GW	16 37 26 (63)	grades to well graded GRAVEL with sand.		
				80			C-14A CL-ML		37.5 to 38.7 feet: Clayey GRAVEL with sand, subangular, very dense, light brown, wet.		
				80 0.6			C-14B		38.7 to 55.6 feet: Meta Welded Lapilli Tuff, dark greenish gray to orangish brown, medium grained, fresh to slightly weathered, moderately weak (R2) to strong (R4) rock. Discontinuities are closely spaced to medium spaced and in fair to poor condition. (CR = 80 to 100%, RQD = 62 to 100%, FF = 0 to >4) 38.7 feet: fresh, strong (R4), rock.		
	12										
40				100 >1.5			C-15				
	13										
45									PLT - strong (R4) rock.		

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2536.8 ft (773.2 m)

HOLE No. SCB-025-09

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			100 / >1.5			C-16				
	15								PLT - strong (R4) rock.		
50				100 / 0			C-17				
				100 / >4			C-18		grades to slightly weathered, moderately weak (R2) to moderately strong (R3) rock.		
	16										
55									PLT - moderately weak (R2)/moderately strong (R3) rock.		
	17								Bottom of boring at 55.6 feet depth below ground surface (bgs). Backfilled to ground surface with bentonite chips. Water level measurements (below existing ground surface): -06/04/09 at 08:00: 18.5 feet.		
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/22/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-026-09

Job No. 33758654.00009 SR 90 Elevation 2525.4 ft (769.7 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Drilling Contractor CRUX subsurface Inc.

Inspector Ken Yang

Start October 9, 2009 Completion October 10, 2009 Well ID# Not applicable

Equipment Burley 5500-1 (Skid rig) with autohammer

Station 1372+81 (Oct. 2008) Offset 19.0 R Casing HW, HQ

Method Wet Rotary

Northing 1065198.47 Easting 1754348.01 Latitude 47°21'03.41"N

Longitude 121°21'54.95"W

County Kittitas Subsection SW1/4 of NE1/4 Section 1 Range 11E Township 21

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 17.1 feet: No samples were collected from 0 to 17.1 feet below the ground surface.		
5	1										
	2										
10	3										
	4									▽	
15	5			65			C-1 GP(B)		17.1 to 26.4 feet: Poorly to well graded GRAVEL with occasional boulders, angular to subangular, bluish gray to greenish gray, wet, homogenous, no HCl reaction. 17.1 feet: Poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 12 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-026-09

Job No. 33758654.00009 SR 90 Elevation 2525.4 ft (769.7 m)

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				26			C-2 GW		grades to well graded GRAVEL.		
25	7										
	8			24			C-3 GM		26.4 to 39.0 feet: Poorly to well graded GRAVEL with sand or silty GRAVEL with sand and cobbles, angular, greenish gray to gray or brown, wet, homogenous to stratified, no HCl reaction. 26.4 feet: Silty GRAVEL with sand, stratified.		
30	9										
				33			C-4 GP(C)		grades to poorly graded GRAVEL with cobbles, homogenous. Maximum size of the cobbles encountered is 4.5 inches.		
	10										
35				89			C-5 GW(C)		grades to well graded GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 4 inches.		
	11										
	12			0			C-6 ML		39.0 to 41.4 feet: No recovery. Material is washed away. Material is probably sandy SILT.		
40				100			C-7A C-7B		grades to poorly graded GRAVEL. 41.6 to 66.4 feet: Metawelded Lapilli Tuff, fine to coarse grained, fresh to slightly weathered, very weak (R1) to strong (R4). Discontinuities are closely to medium spaced and in very poor to good condition. None to weak HCl reaction. (CR= 94 to 104%, RQD = 60 to 90%, FF= 0.8 to 1.9) 41.6 feet: Slightly weathered, moderately weak (R2) rock. Discontinuities are closely spaced and in poor		
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-026-09

Job No. 33758654.00009 SR 90 Elevation 2525.4 ft (769.7 m)

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									condition. No HCl reaction. 42.6 feet: grades to fresh, strong (R4) rock. Discontinuities are medium spaced and in fair to good condition. 46.4 feet: grades to fresh to slightly weathered, moderately strong (R3) to strong (R4) rock. Discontinuities are closely to medium spaced and in poor to fair condition. No HCl reaction.		
	14			100 / 1.4			C-8				
	15										
50				94 / 1.8			C-9		grades to fresh rock. No HCl reaction.		
	16										
55									grades to slightly weathered, very weak (R1) to moderately weak (R2) rock. Discontinuities are closely spaced and in very poor to poor condition. No HCl reaction. 54.3 feet: A 2.5-inch thick silty sand, angular to subangular, dense infilling was encountered. 56.4 feet: grades to fresh, strong (R4) rock. Discontinuities are medium spaced and in good condition. None to weak HCl reaction.		
	17			104 / 0.8			C-10				
	18										
60				99 / 1.9			C-11		grades to moderately strong (R3) to strong (R4) rock. Discontinuities are closely to medium spaced and in poor to fair condition. None to weak HCl reaction.		
	19										
65											
	20										
									Bottom of boring at 66.4 feet depth below the ground surface. Performed oriented optical and acoustic borehole logging from 37.0 to 66.4 feet depth. Backfilled to ground surface with bentonite chips. Water Level Mesaurements: 10/10/2009 at 07:20: 14 feet depth below the ground surface.		
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-027-09

Job No. 33758654.00009 SR 90 Elevation 2523.3 ft (769.1 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Drilling Contractor CRUX subsurface Inc.

Inspector Ken Yang

Start October 12, 2009 Completion October 14, 2009 Well ID# Not applicable

Equipment Burley 5500-1 (Skid rig) with autohammer

Station 1373+88 (OCt. 2008) Offset 2.9 R Casing HW, HQ

Method Wet Rotary

Northing 1065098.73 Easting 1754390.09 Latitude 47°21'02.43"N

Longitude 121°21'54.34"W

County Kittitas Subsection SW1/4 of NE1/4 Section 1 Range 11E Township 21

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									Note: No samples were collected from 0 to 18.0 feet depth below ground surface.		
5	1										
	2										
10	3										
	4										
15	5			79			C-1 GP(C)		18.0 to 27.4 feet: Poorly graded GRAVEL with cobbles, angular, dark gray to bluish gray, wet, homogenous, no HCl reaction. 18.0 feet: Maximum size of the cobbles encountered is 3.5 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-027-09

Job No. 33758654.00009 SR 90 Elevation 2523.3 ft (769.1 m)

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80								
				100			C-2 GP(C)		Maximum size of the cobbles encountered is 5 inches.		
				78			C-3 GP(C)		Maximum size of the cobbles encountered is 10 inches.		
	7										
25											
	8										
				61			C-4 GM(C)		27.4 to 36.4 feet: Silty GRAVEL with sand and cobbles or poorly graded GRAVEL, angular to subangular, brown to bluish gray, wet, homogenous to stratified, no HCl reaction. 27.4 feet: Silty GRAVEL with sand, stratified.		
	9										
30											
				67			C-5 GP		grades to poorly graded GRAVEL, homogenous.		
				75			C-6 GM(C)		gades to silty GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 8.5 inches.		
	10										
35											
	11										
				0			C-7 ML		36.4 to 40.8 feet: No recovery. Material is probably sandy silt.		
				0			C-8				
	12										
				0			C-9A				
40											
				100 1.7			C-9B		40.8 to 72.4 feet: Metawelded Lapilli Tuff, bluish gray to brown, fine to coarse grained, fresh to slightly weathered, moderately weak (R2) to strong (R4). Discontinuities are very closely to medium spaced and in very poor to fair condition. None to weak HCl reaction. (CR- 98 to 100%, RQD - 44 to 92%, FF - 0.8 to 2.0) 40.8 feet: Fresh to slightly weathered, moderately strong (R3) rock. Discontinuities are closely spaced and in very poor condition. No HCl reaction. Note: 41.4 feet: A 0.6-foot stiff, brown, sandy SILT infilling was encountered within bedrock. PP = 1.5 to 3		
	13			0			D-10	50/2"			
				~~100~~ 0.0			C-11	(>50)			
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-027-09

Job No. 33758654.00009 SR 90 Elevation 2523.3 ft (769.1 m)

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									tsf. 42.0 feet: grades to fresh to slightly weathered, moderately strong (R3) rock. Discontinuities are closely to medium spaced and in very poor condition, no HCl reaction.		
	14			100 / 1.4			C-12		47.4 feet: grades to slightly weathered, strong (R4) to moderately strong (R3) rock. None to weak HCl reaction.		
	15										
50											
	16			100 / 1.2			C-13		grades to moderately weak (R2) to moderately strong (R3) rock. Discontinuities are very closely to closely spaced. No HCl reaction. 53.6 feet: grades to strong (R4) rock. Discontinuities are medium spaced and in poor to fair condition.		
55									54.8 feet: grades to moderately weak (R2) to moderately strong (R3) rock. Discontinuities are very closely to closely spaced.		
	17										
				98 / 1.2			C-14		grades to fresh to slightly weathered, strong (R4) rock.		
	18										
60											
	19			98 / 0.6			C-15				
65											
	20								grades to slightly weathered, moderately weak (R2) to moderately strong (R3) rock. Discontinuities are closely to medium spaced and in poor to fair condition. 66.3 feet: A 1 mm to 2 mm thick, brown, soft, clay infilling was encountered within bedrock.		
				100 / 2.0			C-16		66.9 feet: A 1 mm to 2 mm thick, brown, soft, clay infilling was encountered within bedrock. grades to fresh to slightly weathered, moderately strong (R3) to strong (R4) rock. Discontinuities are closely to medium spaced and in poor to fair condition. None to weak HCl reaction.		
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-027-09

Job No. 33758654.00009 SR 90 Elevation 2523.3 ft (769.1 m)

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	22										
									Bottom of boring at 72.4 feet depth below ground surface. Performed oriented optical and acoustic borehole logging from 42.1 to 72.4 feet depth. Backfilled to ground surface with bentonite chips.		
75	23										
	24										
80											
	25										
85	26										
	27										
90											
	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-028-09

Job No. 33758654.00009 SR 90 Elevation 2499.1 ft (761.7 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Drilling Contractor CRUX subsurface Inc.

Inspector Ken Yang

Start October 16, 2009 Completion October 21, 2009 Well ID# Not applicable

Equipment Burley 5500-1 (Skid rig) with autohammer

Station 1382+52 (Oct. 2008) Offset 33.7 R Casing HW, HQ

Method Wet Rotary

Northing 1064244.65 Easting 1754473.42 Latitude 47°20'54.00"N

Longitude 121°21'53.13"W

County Kittitas Subsection SW1/4 of NE1/4 Section 1 Range 11E Township 21

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 13.1 feet: Samples were not collected from 0 to 13.1 feet. Material is poorly graded GRAVEL with cobbles, boulders based on the drilling observations. Maximum size of the cobbles encountered is 3.5 feet.		
	1										
5											
	2										
10	3										
	4			55			C-1 GP(C)		13.1 to 31.5 feet: Poorly graded GRAVEL or silty GRAVEL with sand and cobbles and occasional silty SAND with gravel, angular to subangular, medium dense to dense, bluish gray to brown, wet, homogenous, no HCl reaction. 13.1 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
15											
	5										
				36			C-2 GP(C)				
	6								grades to silty GRAVEL with sand.		
20											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-028-09

Job No. 33758654.00009 SR 90 Elevation 2499.1 ft (761.7 m)

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				40			D-3 SM	3 8 7 (15)	grades to medium dense, silty SAND with gravel.		
	7			71			C-4 SM				
25							GM(C)		grades to silty GRAVEL with sand		
	8										
				88			C-5A ML		27.5 to 31.5 feet: Sandy SILT with gravel, soft, brown, wet, no HCl reaction.		
30	9										
				100 4.0			C-5B		31.5 to 82.5 feet: Metawelded Lapilli Tuff, greenish gray to bluish gray, fine to medium grained, slightly weathered to fresh, very weak (R1) to strong (R4). Discontinuities are very closely to closely spaced and in very poor to fair condition. (CR - 96 to 100%, RQD - 0 to 60%, FF - 0.8 to 4.0) 31.5 feet: greenish gray, slightly weathered to fresh, moderately weak (R2) to strong (R4) rock. Discontinuities are closely spaced and in poor to fair condition. 31.5 feet: Discontinuities are very closely spaced to closely spaced and in very poor to fair condition. 33.5 feet: Note: A 2-inch thick silty sand infilling was encountered within bedrock. 36.5 feet: A 1-inch thick, soft, sandy clay infilling was encountered within bedrock. 37.0 feet: A 0.5-inch thick, soft, clay infilling was encountered within bedrock. 37.5 feet: grades to bluish gray, fresh, strong (R4) rock. Discontinuities are closely spaced and in poor to fair condition. 39.6 feet: A 0.1 to 0.2-inch thick, soft, clay infillings were encountered within bedrock. 40.1 feet: A 0.1 to 0.2-inch thick, soft, clay infillings were encountered within bedrock.		
	10			98 3.8			C-6				
35											
	11										
				100 3.0			C-7				
	12										
40											
	13			100 3.4			C-8		43.7 feet: A 0.1 to 0.2-inch thick clay infillings were encountered within bedrock.		
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-028-09

Job No. 33758654.00009 SR 90 Elevation 2499.1 ft (761.7 m)

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14								45.5 feet: A 0.1 to 0.2-inch thick clay infillings were encountered within bedrock.		
				96 / 0.8			C-9		grades to moderately strong (R3) to strong (R4) rock. Discontinuities are very closely to closely spaced and in very poor to poor condition.		
	15										
50									50.1 feet: A 2-inch thick, very loose, sandy silt infilling was encountered within bedrock. 50.5 feet: A 3-inch thick, loose, silty sand infilling was encountered within bedrock.		
	16			100 / 2.5			C-10		Discontinuities are in poor condition.		
55									54.8 feet: A 2-3mm thick, soft, clay infilling was encountered within bedrock.		
	17			98 / 4.0			C-11		grades to fresh, very weak (R1) to moderately weak (R2) rock. Discontinuities are very closely to closely spaced and in poor to fair condition. 56.3 feet: A 2-inch thick silty sand infilling was encountered within bedrock.		
	18								59.2 and 59.7 feet: A 0.4 to 0.6 mm thick soft gray clay infilling was encountered within bedrock.		
60				100 / 1.8			C-12		grades to moderately weak (R2) rock. Discontinuities are very closely to closely spaced and in poor condition. 61.2 feet: A 2mm thick, soft clay infilling was encountered within bedrock.		
	19			98 / 2.2			C-13		grades to moderately strong (R3) to strong (R4) rock. Discontinuities are closely spaced.		
65									64.6 feet: A 0.5-inch thick silty sand infilling was encountered within bedrock.		
	20										
				100 / 3.8			C-14		grades to moderately weak (R2) to moderately strong (R3) rock. Discontinuities are very closely to closely spaced.		
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-028-09

Job No. 33758654.00009 SR 90 Elevation 2499.1 ft (761.7 m)

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	22			100 / 3.2			C-15		72.0 feet: A 0.5-inch thick, medium dense, silty sand infilling was encountered within bedrock. 73.0 feet: A 1-2mm thick, soft clay infilling was encountered within bedrock.		
75	23										
				96 / 2.0			C-16		grades to moderately strong (R3) to strong (R4) rock.		
	24										
80									79.2 feet: A 0.5-inch thick, loose, silty sand infilling was encountered within bedrock.		
	25										
									Bottom of boring at 82.5 feet below the ground surface. Performed oriented optical and acoustic borehole logging from 35.0 to 81.0 feet depth. Backfilled to ground surface with bentonite chips.		
85	26										
	27										
90											
	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-029-09

Job No. 33758654.00009 SR 90 Elevation 2515.4 ft (766.7 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Drilling Contractor CRUX subsurface Inc.

Inspector Ken Yang

Start October 23, 2009 Completion October 23, 2009 Well ID# Not applicable

Equipment Burley 5500-1 (Skid rig) with autohammer

Station 1383+07 (Oct. 2008) Offset 19.5 R Casing HW, HQ

Method Wet Rotary

Northing 1064190.07 Easting 1754487.32 Latitude 47°20'53.46"N

Longitude 121°21'52.93"W

County Kittitas Subsection SW1/4 of NE1/4 Section 1 Range 11E Township 21

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 11.1 feet: No samples were collected between 0 and 11.1 feet below the existing ground surface.		
5	1										
	2										
10	3										
				11			C-1 GP		11.1 to 27.0 feet: Silty GRAVEL with sand or poorly graded GRAVEL with occasional cobbles, subangular to angular, loose to medium dense, brown to brownish gray or gray, moist to wet, homogenous, No HCl reaction. 11.1 feet: Poorly graded GRAVEL. 13.0 feet: grades to medium dense, silty GRAVEL with sand.		
	4			20			D-2 GM	6 3 16 (19)			
15				21			C-3 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4.5 inches.		
	5										
				7			D-4 GP	0 1 4 (5)	grades to loose, silty GRAVEL with sand.		
20	6			31			C-5 GM				

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-029-09

Job No. 33758654.00009 SR 90 Elevation 2515.4 ft (766.7 m)

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80								
	7			40			D-6 GM	10 10 9 (19)	grades to medium dense.		
25				100			C-7A GM				
	8			100 3.0			c-7B		27.0 to 73.0 feet: Metawelded Lapilli Tuff, brownish gray to greenish gray, fine to medium grained, slightly weathered to fresh, very weak (R1) to strong (R4). Discontinuities are closely to medium spaced and in fair to good condition. 27.0 feet: Slightly weathered to fresh, very weak (R1) to moderately weak (R2) rock. Discontinuities are closely spaced and in poor to fair condition. 28.8 feet: A 0.5-inch thick near vertical, soft, clay infilling was encountered within bedrock.		
				94 2.2			c-8				
30	9										
	10			94 2.5			C-9		32.5 feet: A 1.5-inch thick soft, sandy silt infilling was encountered within bedrock. 33.0 feet: grades to moderately weak (R2) rock.		
35											
	11										
				96 0.8			C-10		37.2 feet: A 0.5-inch soft sandy silt infilling was encountered within bedrock. 37.7 feet: grades to fresh, strong (R4) rock. Discontinuities are closely to medium spaced and in fair condition.		
	12										
40											
	13			100 0.8			c-11		43.5 feet: A 2-inch thick, loose, silty sand infilling was encountered within bedrock.		
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-029-09

Job No. 33758654.00009 SR 90 Elevation 2515.4 ft (766.7 m)

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14								45.7 feet: A 2mm thick, soft, clay infilling was encountered within bedrock.		
				100 / 0.98			C-12		Discontinuities are closely to medium spaced and in poor to fair condtion.		
	15										
50									49.7 and 49.9 feet: A 0.5 to 0.7-inch thick, soft clay infilling were encountered within bedrock.		
	16			100 / 2.0			C-13		Discontinuities are in fair condition.		
55											
	17								57.3 feet: A 1-inch thick, dense, silty sand layer infilling was encountered within bedrock.		
				100 / 2.2			C-14				
	18										
60											
	19								62.3 feet: A 0.5 inch thick, dense, silty sand infilling was encountered within bedrock.		
				92 / 2.9			C-15				
65											
	20										
				100 / 2.2			C-16				
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-029-09

Job No. 33758654.00009 SR 90 Elevation 2515.4 ft (766.7 m)

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	22										
									Bottom of boring at 73.0 feet below the ground surface. Performed oriented optical and acoustic borehole logging from 26.3 to 72.5 feet depth. Backfilled to ground surface with bentonite chips.		
75	23										
	24										
80											
	25										
85	26										
	27										
90											
	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-030-09

Job No. 33758654.00009 SR 90 Elevation 2527.8 ft (770.5 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East Driller Tommy Fisher Lic#

Drilling Contractor CRUX subsurface Inc. Inspector Ken Yang

Start October 24, 2009 Completion October 25, 2009 Well ID# Not applicable Equipment Burley 5500-1 (Skid rig) with autohammer

Station 1383+64 (OCt. 2008) Offset 12.0 R Casing HW, HQ Method Wet Rotary

Northing 1064133.58 Easting 1754493.58 Latitude 47°20'52.90"N Longitude 121°21'52.84"W

County Kittitas Subsection SW1/4 of NE1/4 Section 1 Range 11E Township 21

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 16.0 feet: No samples were collected between 0 and 16 feet below the ground surface. Based on the field observations, the material was silty SAND with gravel from 0 to 4 feet depth below the ground surface and poorly graded GRAVEL with cobbles and boulders from 4 to 16 feet depth below the ground surface.		
5	1										
	2										
10	3										
	4										
15	5			48			C-1 GW(C)		16.0 to 29.3 feet: Poorly to well graded GRAVEL with cobbles or silty GRAVEL with sand, angular to subangular, very dense, brownish gray to brown or gray, wet, homogenous, no HCl reaction. 16.0 feet: Well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-030-09

Job No. 33758654.00009 SR 90 Elevation 2527.8 ft (770.5 m)

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	7			14			C-2 GM		grades to silty GRAVEL.		
25											
	8			22			D-3 GM	5 50/5" (>50)	grades to very dense, silty GRAVEL with sand.		
				32			C-4A GP(C)				
	9			100 / 1.8			C-4B		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4 inches.		
30									29.3 to 87.7 feet: Metawelded Lapilli Tuff, fine to medium grained, brownish gray to light bluish gray, fresh to slightly weathered, moderately weak (R2) to strong (R4). Discontinuities are very closely to medium spaced and in very poor to fair condition. No HCl reaction. (CR - 98 to 100%, RQD - 13 to 90%, FF - 0.8 to 3.3)		
	10			98 / 3.3			C-5		29.3 feet: Slightly weathered, moderately weak (R2) rock. Discontinuities are very closely to medium spaced and in very poor to fair condition. 31.3 feet: A 1 to 1.5-inch thick, loose, sandy silt infilling was encountered within bedrock. 32.7 feet: A 0.2-inch thick, loose, sandy silt infilling was encountered within bedrock. 34.1 feet: A 0.5-inch thick, loose, sandy silt infilling was encountered within bedrock. 34.6 feet: A 1-inch thick silty sand infilling was encountered within bedrock.		
35											
	11			100 / 1.2			C-6		37.9 feet: : A 0.5-inch thick silty sand infilling was encountered within bedrock. grades to fresh, strong (R4) rock.		
	12										
40											
	13			100 / 1.6			C-7		Discontinuities are closely to medium spaced and in poor to fair condition.		
45									44.2 feet: A 0.5 to 0.8-inch thick silty sand was encountered within bedrock.		

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-030-09

Job No. 33758654.00009 SR 90 Elevation 2527.8 ft (770.5 m)

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			100 / 1.8			C-8				
	15								48.7 feet: A 0.3-inch thick, silty SAND infilling was encountered within bedrock.		
50											
	16			100 / 0.8			C-9		Discontinuities are in fair to good condition.		
55											
	17			98 / 2.0			C-10		Discontinuities are very closely to medium spaced and in very poor to fair condition.		
	18										
60									60.2, 60.5, 60.8 and 61.2 feet: A 0.2 to 1.0-inch thick silty sand infilling was encountered within bedrock.		
	19			98 / 1.2			C-11				
									64.2 feet: A 2-inch thick silty sand infilling was encountered within bedrock.		
65	20			98 / 3.2			C-12				
									grades to moderately strong (R2) rock. Discontinuities are very closely to closely spaced.		
	21										
									69.2 feet: A 1.5 to 2.0-inch thick, medium dense, silty sand with fine gravel infilling was encountered within		
70				100			C-13				

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card SE03680

HOLE No. SCB-030-09

Job No. 33758654.00009 SR 90 Elevation 2527.8 ft (770.5 m)

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Tommy Fisher Lic#

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				1.3					bedrock. grades to strong (R4) rock. Discontinuities are closely spaced and in fair to good condition.		
	22			100 / 1.2			c-14		Discontinuities are closely to medium spaced and in poor to fair condition.		
75	23										
				98 / 2.8			c-15		grades to moderately strong (R3) to strong (R4) rock.		
	24										
80									80.5 feet: A 2mm thick, loose, sandy silt infilling was encountered within bedrock.		
	25								82.0 feet: A 0.4-inch thick, loose, sandy silt infilling was encountered within bedrock.		
				98 / 2.8			c-16				
									83.4 feet: A 1-inch thick, loose, sandy silt infilling was encountered within bedrock.		
85	26										
									87.5 feet: A 2mm thick, soft, silt infilling was encountered within bedrock.		
	27								Bottom of boring at 87.7 feet depth below the ground surface. Performed oriented optical and acoustic borehole logging from 29.6 to 87 feet depth. Backfilled to ground surface with bentonite chips.		
90											
	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/18/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-031-10

Job No. 33761951.00008 SR 90 Elevation 2539.1 ft (773.9 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Dennis Dunn

Start July 13, 2010 Completion July 13, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1065276.76 Easting 1754386.82 Latitude 47?1'04.85"N

Longitude 121?1'52.00"W

County Kittitas Subsection _____ Section _____ Range _____ Township_____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				36			C-1 GW(C)		0 to 0.3 feet: Asphalt. 0.3 to 8.8 feet: Well graded GRAVEL with cobbles, subangular, greenish gray.		
5	1			64			C-2A GW(C)				
	2										
				64			C-2B		8.8 to 35.0 feet: Lapilli Tuff, greenish gray, coarse grained, fresh, strong (R4). Discontinuities are medium to closely spaced and in fair to good condition. No Hcl reaction. (CR - 90 to 100%, RQD - 30 to 88%, FF - 0.8 to 2.0) 8.8 feet: Discontinuities are medium spaced and in good condition. Note: Thin layer of silt was observed in fractures. 9.8 feet: PLT - Moderately strong (R3) rock.		
10	3			100 / 1			C-3				
	4										
15	5			100 / 1			C-4		Discontinuities are medium spaced and in good condition. Note: Thin layer of silt was observed in fractures. 1 to 2-inch thick fracture zones were encountered. 16.3 feet: PLT - Moderately strong (R3) rock. PLT - Very strong (R5) rock.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2539.1 ft (773.9 m) HOLE No. SCB-031-10

Sheet 2 of 2

Project I-90 Snoqualmie Pass East Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100 / 1.6			C-5		Discontinuities are medium to closely spaced and in fair condition. Note: 7-inch thick fracture zone was encountered.		
25	7			90 / 0.8			C-6		Discontinuities are medium spaced and in good condition. Note: Iron oxide stains were observed in last 1.7 feet. PLT - Strong (R4) rock.		
30	8 9			100 / 2			C-7		PLT - Very strong (R5) rock. Discontinuities are closely spaced and in fair condition. Note: Iron oxide stains were observed. PLT - Moderately strong (R3) rock.		
35	10 11								Bottom of boring at 35.0 feet depth below ground surface. Backfilled to ground surface with bentonite chips.		
40	12										
45	13										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-032-10

Job No. 33761951.00008 SR 90 Elevation 2537.8 ft (773.5 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Dennis Dunn

Start July 14, 2010 Completion July 14, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1065283.31 Easting 1754330.37 Latitude 47?1'04.91"N Longitude 121?1'82.00"W

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				16			C-1 GW		0 to 25.3 feet: Poorly to well graded GRAVEL with sand, cobbles and boulders, occasionally silty GRAVEL with sand, subrounded to angular, gray, greenish gray, yellowish brown, moist to wet, homogenous, no HCl reaction. 0 feet: Well graded GRAVEL.		
	1										
5				76			C-2 GP(C/B)		grades to poorly graded GRAVEL with cobbles.		
	2										
10	3			76			C-3 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders.		
	4										
									Note: Very soft soil was encountered between 14 and 15 feet depth based on driller's observation.		
15				40			C-4 GM		grades to silty GRAVEL with sand.		
	5										
	6										
20											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

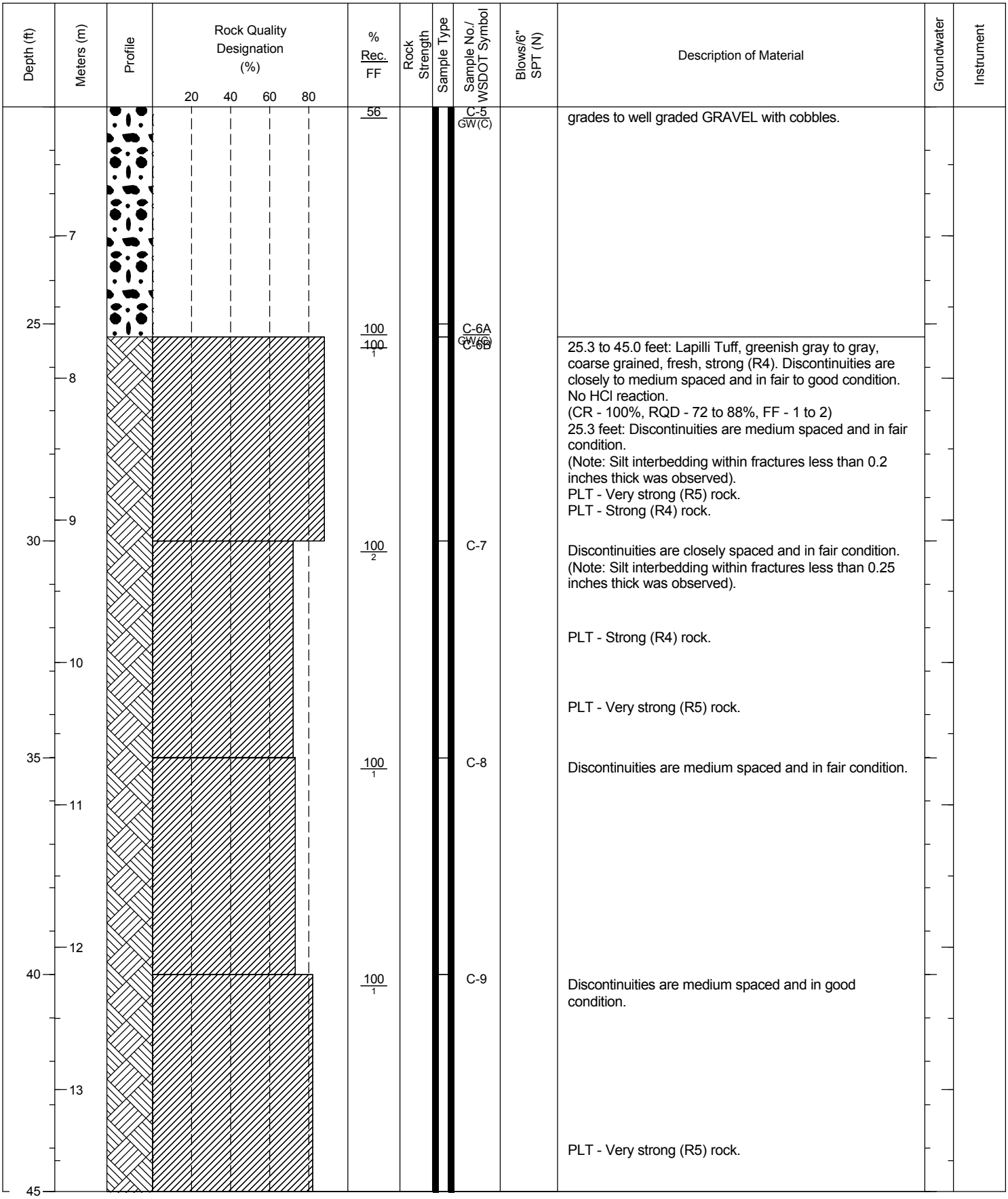
Job No. 33761951.00008 SR 90 Elevation 2537.8 ft (773.5 m)

HOLE No. SCB-032-10

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779



Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				56			C-5 GW(C)		grades to well graded GRAVEL with cobbles.		
25	7			100 / 100 1			C-6A GW(G) C-6B		25.3 to 45.0 feet: Lapilli Tuff, greenish gray to gray, coarse grained, fresh, strong (R4). Discontinuities are closely to medium spaced and in fair to good condition. No HCl reaction. (CR - 100%, RQD - 72 to 88%, FF - 1 to 2) 25.3 feet: Discontinuities are medium spaced and in fair condition. (Note: Silt interbedding within fractures less than 0.2 inches thick was observed). PLT - Very strong (R5) rock. PLT - Strong (R4) rock.		
30	8 9			100 / 2			C-7		Discontinuities are closely spaced and in fair condition. (Note: Silt interbedding within fractures less than 0.25 inches thick was observed). PLT - Strong (R4) rock. PLT - Very strong (R5) rock.		
35	10 11			100 / 1			C-8		Discontinuities are medium spaced and in fair condition.		
40	12 13			100 / 1			C-9		Discontinuities are medium spaced and in good condition. PLT - Very strong (R5) rock.		
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCB-032-10

Job No. 33761951.00008 SR 90 Elevation 2537.8 ft (773.5 m)

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14								Bottom of boring at 45.0 feet depth below ground surface. Backfilled to ground surface with bentonite chips.		
	15										
50											
	16										
55											
	17										
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-001-08

Job No. 33758632.13000 SR 90 Elevation 2533.8 ft (772.3 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 19, 2008 Completion May 20, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1384+11.83 Offset 47.16'L Casing HWT, HQ Method Wet Rotary

Northing 1064096.31 Easting 1754559.77 Latitude 47°20'53.218"N Longitude 121°21'49.305"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				46			C-1 GM(C)		0 to 0.2 feet: Asphalt concrete pavement. 0.2 to 5.3 feet : Silty GRAVEL with sand and cobbles, subrounded, brown to dark gray, wet, homogenous, HCl reaction not tested. 0.2 feet: Silty GRAVEL with sand and cobbles.		
	1										
									4.0 feet: loss of drilling water circulation.		
5				66			D-2	50 for 3"			
				100 / 1.08			C-3		5.3 to 19.0 feet: Metawelded lapilli tuff, reddish brown to brown to greenish gray, medium grained, highly weathered to fresh, moderately weak (R2) to strong rock (R4), HCl reaction not tested. Discontinuities are closely to moderately spaced, and in poor to fair condition. CR= 46% - 100%, RQD= 76% - 100%, FF= 0.6 - 1.08. 5.3 feet: Discontinuities are closely spaced and in fair condition. 6.0 feet: PLT - Moderately strong (R3) rock. 7.2 feet: Discontinuities are medium spaced and in fair condition.		
	2										
				100 / 0.6			C-4				
10	3										
									12.4 feet: PLT - Moderately strong (R3) rock.		
	4										
				100 / 1.4			C-5				
15	5										
									Bottom of boring at 19 feet below ground surface (bgs). Backfilled to ground surface with bentonite chips.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-002-08

Job No. 33758632.13000 SR 90 Elevation 2532.5 ft (771.9 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 6, 2008 Completion May 7, 2008 Well ID# Not Applicable

Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1386+80.75 Offset 30.13'L Casing HW, HQ

Method Wet Rotary

Northing 1063827.05 Easting 1754515.07 Latitude 47°20'50.556"N

Longitude 121°21'49.911"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.5 feet: Asphalt concrete pavement 0.5 to 21.2 feet : Poorly to well graded GRAVEL with sand, occasional silty SAND with gravel, occasional cobbles and boulders, subrounded to angular, loose to very dense, brown to greenish gray, moist, homogenous, no HCl reaction. 0.5 feet: Loose, silty SAND with gravel.		
	1										
5											
	2			33			D-1 SM	2 4 3 (7)			
				100			C-2 GP		grades to poorly graded GRAVEL.		
				40			D-3 SM	5 7 5 (12)	grades to medium dense, silty SAND with gravel.		
10	3			88			C-4 GP(B)		grades to poorly graded GRAVEL with sand.		
	4								grades to poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 1.3 feet.		
				21			D-5 GW	7 14 50 for 5"	grades to very dense, well graded GRAVEL with sand.		
15				98			C-6 GP(C/B)		grades to poorly graded GRAVEL with sand, cobbles and boulders. Maximum size of the cobbles encountered is 5 inches.		
	5								Maximum size of the boulders encountered is 2.1 feet (17.2 to 19.3 feet depth).		
				74			C-7 GP(C)		grades to poorly graded GRAVEL with cobbles.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2532.5 ft (771.9 m)

HOLE No. SCW-002-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				80 / 2.4			C-7		21.2 to 38.7 feet : Metawelded lapilli tuff, reddish brown to brown to light greenish gray, fine to medium grained, highly weathered to fresh, moderately weak (R2) to strong rock (R4), no HCl reaction. Discontinuities are very closely to moderately spaced, and in poor to fair condition.		
	7								CR= 80% - 100%, RQD= 20% - 100%, FF= 0.4 - 2.4		
				100 / 0.4			C-8		21.2 feet: highly weathered, moderately weak (R2) rock. Discontinuities are very closely to closely spaced, and in poor condition.		
25									22.15 feet: PLT - Moderately strong (R3) rock.		
	8								23.7 feet: grades to slightly weathered, moderately strong (R3) rock. Discontinuities are moderately spaced, and in poor to fair condition.		
									24.1 feet: grades to fresh, strong (R4) rock.		
									24.75 feet: Strong (R4) rock.		
									25.25 feet: PLT - Strong (R4) rock.		
									26.5 feet: grades to slightly weathered, moderately strong (R3) rock.		
				100 / 0.8			C-9		26.9 feet: PLT - Strong (R4) rock.		
	9								28.7 feet: Discontinuities are closely to moderately spaced, and in fair condition.		
30											
									31.7 feet: grades to fresh, strong (R4) rock.		
	10										
									33.05 feet: PLT - Moderately strong (R3) rock.		
				94 / 0.8			C-10		33.4 feet: PLT - Strong (R4) rock.		
									34.1 feet: grades to brown, slightly weathered, moderately strong (R3) rock.		
35									34.6 feet: grades to fresh, strong (R4) rock.		
	11										
									36.1 feet: grades to brown, slightly weathered, moderately strong (R3) rock.		
									Bottom of boring at 38.7 feet below ground surface (bgs). Backfilled to ground surface with bentonite chips.		
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-002A-08

Job No. 33758632.13000 SR 90 Elevation 2532.1 ft (771.8 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 28, 2008 Completion May 28, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1386+81.14 Offset 51.03'L Casing _____ Method Wet Rotary

Northing 1063823.57 Easting 1754535.68 Latitude 47°20'50.524"N Longitude 121°21'49.611"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				80			C-1 GP		0 to 0.75 feet: concrete pavement. 0.75 to 5.7 feet: Poorly graded to well graded GRAVEL with sand to silty GRAVEL with sand, occasional cobbles, angular, brownish yellow to gray, wet, homogenous, no HCl reaction. 0.75 feet: Poorly graded GRAVEL with sand.		
				100			D-2 GM	50 for 5" (>50)	grades to very dense, silty GRAVEL with sand (probably highly weathered rock).		
	1			100			C-3 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9 inches.		
5				100			C-4A GW		grades to well graded GRAVEL with sand.		
				100 2.6			C-4B		5.7 to 13.8 feet: Metawelded lapilli tuff, reddish brown to dark greenish gray, medium grained, slightly weathered, moderately weak (R2) to moderately strong rock (R3), none to strong HCl reaction. Discontinuities are closely spaced, and in poor to fair condition. CR= 100%, RQD= 50% - 65%, FF= 1.8 - 2.6. 5.7 feet: light brown, slightly weathered, moderately weak rock (R2), no HCl reaction.		
	2										
				100 1.8			C-5		grades to dark greenish gray, moderately strong rock (R3), weak HCl reaction.		
10	3										
									11.9 feet: PLT - Strong (R4) rock.		
	4										
									Bottom of boring at 13.8 feet below ground surface (bgs). Backfilled to ground surface with bentonite chips.		
15	5										
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-003-08

Job No. 33758632.13000 SR 90 Elevation 2531.7 ft (771.6 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 7, 2008 Completion May 8, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1389+22.20 Offset 29.29'L Casing HW, HQ Method Wet Rotary

Northing 1063588.48 Easting 1754473.71 Latitude 47°20'48.197"N Longitude 121°21'50.474"W

County Kittitas Subsection SE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.5 feet: Asphalt concrete pavement. 0.5 to 24.9 feet : Poorly graded GRAVEL with sand, occasionally silty GRAVEL and silty SAND, occasional cobbles, subrounded to angular, medium dense to very dense, brown to greenish gray, moist, homogenous, no HCl reaction. 6 feet: Poorly graded GRAVEL with sand.		
5	1			37			C-1 GP				
	2			33			D-2 GP	1 5 15 (20)	8.7 feet: traces of silt were observed.		
10	3			57			C-3 GP(C)		grades to poorly graded GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 4.5 inches.		
	4			100			D-4 SM	50 for 5"	grades to very dense, silty SAND with gravel.		
				100			C-5 GP(C)		14.2 feet: grades to poorly graded GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 11 inches.		
15	5			100			C-6 GP(C)		15.7 feet: Maximum size of the cobbles encountered is 11.5 inches.		
	6			86			D-7 GM	14 35 50 for 5"	grades to very dense, silty GRAVEL with sand.		
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2531.7 ft (771.6 m) HOLE No. SCW-003-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				73			C-8 / GP	(>85)	grades to poorly graded GRAVEL with sand.		
				100			C-9 / GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.5 inches.		
				61			C-10 / GP		grades to poorly graded GRAVEL with sand.		
	7										
				33			D-11 / SM	11 50 for 5" (>50)	grades to very dense, silty SAND with gravel.		
25				100			C-12A				
				100 / 2.1			C-12B		24.9 to 38.7 feet: Meta welded lapilli tuff, brown to greenish gray, fine to medium grained, highly weathered to fresh, moderately strong (R3) to strong rock (R4), no HCl reaction. Discontinuities are closely to moderately spaced, and in poor to fair condition. (CR=100%, RQD=55% - 100%, FF=0 - 2.1)		
	8								24.9 feet: brown, highly to slightly weathered, moderately strong (R3) rock. Discontinuities are closely spaced, and in poor to fair condition.		
									26.5 feet: PLT - Moderately strong (R3) rock.		
				100 / 0.4			C-13		27.8 feet: grades to fresh, strong rock.		
30	9										
									30.85 feet: PLT - Strong (R4) rock.		
									31.3 feet: PLT - Strong (R4) rock.		
	10										
				100 / 0			C-14		33.7 feet: grades to greenish gray, moderately strong (R3) rock. There were no discontinuities in the sample.		
35											
	11										
									Bottom of boring at 38.7 feet below ground surface (bgs). Backfilled with asphalt concrete patching material from 0 to 0.7 ft bgs, with silty SAND with gravel from 0.7 to 5.7 ft bgs, and with bentonite chips from 5.7 to 38.7 ft bgs.		
40	12										
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-004-08

Job No. 33758632.13000 SR 90 Elevation 2531.5 ft (771.6 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 9, 2008 Completion May 9, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1392+17.67 Offset 28.62'L Casing HW, HQ Method Wet Rotary

Northing 1063297.45 Easting 1754422.67 Latitude 47°20'45.320"N Longitude 121°21'51.168"W

County Kittitas Subsection SE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.6 feet: Asphalt concrete pavement. 0.6 to 9.5 feet: Well graded gravel with sand to silty GRAVEL, occasional silty SAND with gravel, subangular to angular, medium dense to very dense, brown, moist, homogenous, no HCl reaction. 5.0 feet: Loose, silty SAND with gravel..		
5	1			50			D-1 / GM	5 5 5 (10)			
	2			100			C-2 / GW(C)		grades to well graded GRAVEL with sand, occasional cobbles. Maximum size of the cobbles encountered is 4.5 inches.		
				100			D-3 / GM	8 50 for 4"	grades to very dense, silty GRAVEL with sand.		
10	3			100 / 3.3			C-4		9.5 to 28.7 feet: Metawelded lapilli tuff, brown to bluish gray, fine to medium grained, highly to slightly weathered, moderately weak (R2) to moderately strong (R3) rock, no HCl reaction. Discontinuities are closely to moderately spaced, and in poor to fair condition. CR=90% - 100%, RQD=33% - 100%, FF=0.3 - 3.3. 9.5 feet: highly weathered, moderately weak (R2) rock. Discontinuities are closely spaced and in fair condition. 10.7 feet: grades to slightly weathered, moderately strong (R3) rock. Discontinuities are closely to moderately spaced and in fair condition.		
				90 / 0.3			C-5				
	4			90 / 0.3			C-6				
15	5			100 / 1.2			C-6		17.8 feet: grades to fresh, strong (R4) rock. Discontinuities are in poor to fair condition.		
				100 / 1.2			C-7		19.0 feet: PLT - Moderately strong (R3) rock.		
20	6			100 / 1.4			C-7		19.5 feet: grades to slightly weathered, moderately		

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2531.5 ft (771.6 m)

HOLE No. SCW-004-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									strong (R3) rock. Discontinuities are closely to moderately spaced, and in poor to fair condition. 19.55 feet: PLT - Very weak (R1) rock. 21.3 feet: PLT - Moderately weak (R2) rock.	▽	
	7										
25				100 / 0.6			C-8		23.7 feet: grades to slightly weathered, moderately strong (R3) rock. 23.95 feet: PLT - Moderately strong (R3) rock.		
	8										
	9								Bottom of boring at 28.7 feet below ground surface (bgs). Backfilled with asphalt concrete patching material from 0 to 0.5 ft bgs, with silty SAND with gravel from 0.5 to 6 ft bgs, and with bentonite chips from 6.0 to 28.7 ft bgs.		
30											
	10										
35											
	11										
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-004A-08

Job No. 33758632.13000 SR 90 Elevation 2531.0 ft (771.4 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

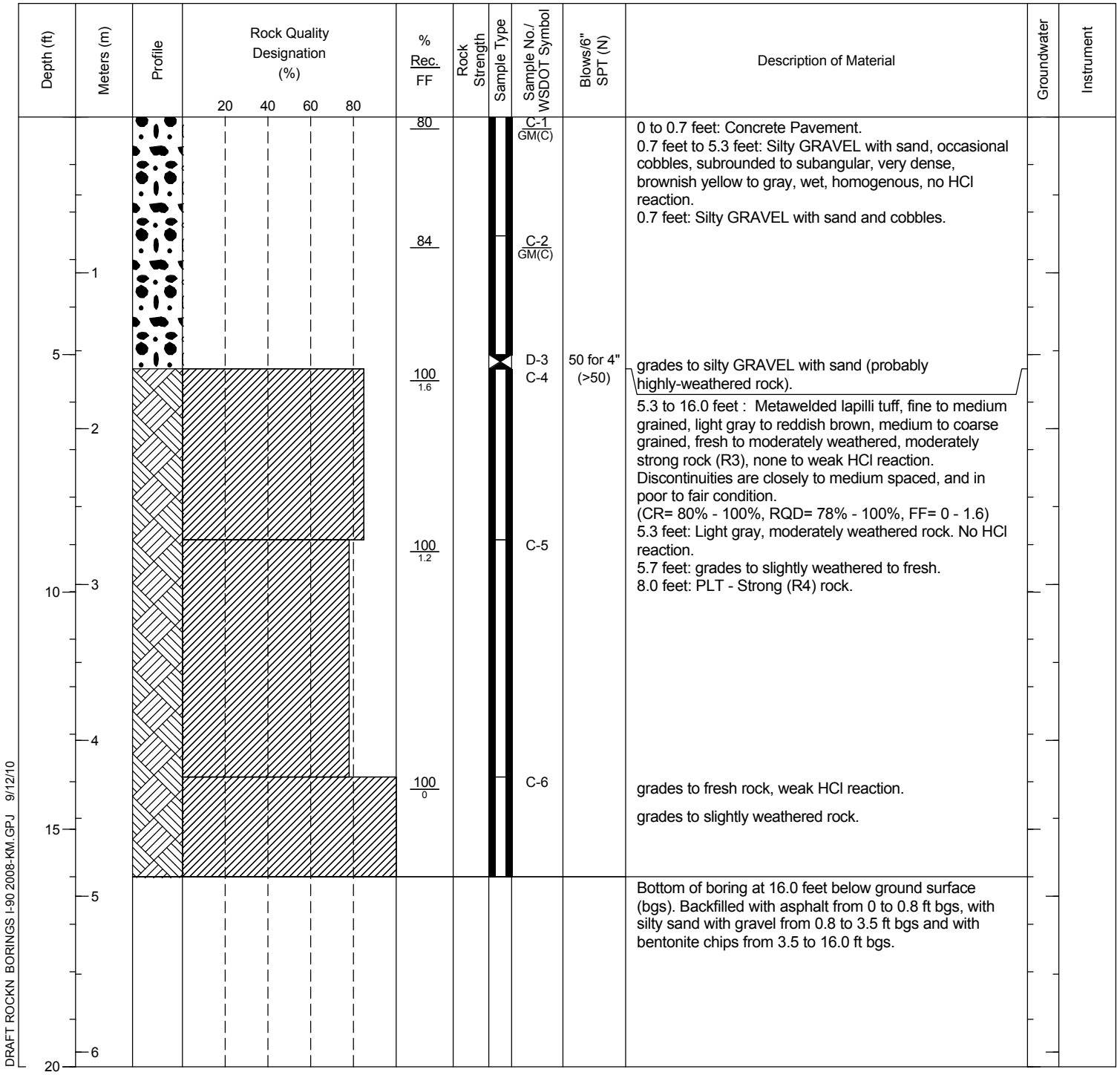
Inspector Abhijit Bathe

Start May 28, 2008 Completion May 28, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1392+18.54 Offset 50.9'L Casing _____ Method Wet Rotary

Northing 1063292.8 Easting 1754444.47 Latitude 47°20'45.276"N Longitude 121°21'50.851"W

County Kittitas Subsection SE1/4 of SE1/4 Section 35 Range 11E Township 22N



DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-005-08

Job No. 33758632.13000 SR 90 Elevation 2531.4 ft (771.6 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 6, 2008 Completion May 7, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1395+08.88 Offset 28.01'L Casing HW, HQ Method Wet Rotary

Northing 1063011.59 Easting 1754374 Latitude 47°20'42.494"N Longitude 121°21'51.829"W

County Kittitas Subsection SE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				54			C-1 GP		0 to 0.3 feet: Asphalt concrete pavement. 0.3 to 13 feet : Poorly graded GRAVEL with sand, occasional cobbles, subrounded to angular, brown to greenish gray, moist to wet, homogenous, no HCl reaction. 0.3 feet: Poorly graded GRAVEL with sand.		
	1								grades to poorly graded GRAVEL with cobbles (metawelded lapilli tuff).		
5				42			C-2 GP(C)				
	2										
				40			C-3A GP(C)				
10	3								Loss of drilling water circulation.		
	4			40 / 5			C-3B		13.0 to 39.0 feet: Metawelded lapilli tuff, brown to greenish gray, fine to medium grained, highly weathered to fresh, very weak (R1) to strong (R4) rock, none to weak HCl reaction. Discontinuities are very closely to moderately spaced, and in poor to fair condition. CR=40% - 100%, RQD=0 - 54%, FF= 1.2 to 5. 13.0 feet : greenish gray, highly weathered, very weak (R1) rock, no HCl reaction. Discontinuities are closely spaced and in fair condition. 14.0 feet: grades to fine grained, fresh, strong (R4) rock.		
				40 / 1.4			C-4				
15	5								17.65 feet: PLT - Very strong (R5) rock.		
				100 / 2			C-5				
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2531.4 ft (771.6 m)

HOLE No. SCW-005-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									grades to fresh to highly weathered, weak (R1) to strong (R4) rock. Discontinuities are very closely to closely spaced, and in very poor condition.		
	7			100 / 1.8			C-6		grades to brown to greenish gray, fine to medium grained, moderately weathered, moderately weak rock (R2), weak HCl reaction. Discontinuities are very closely to closely spaced, and in poor condition (fractures incline at about 30 degrees to vertical axis).		
25	8										
				100 / 1.6			C-7		28.7 feet: PLT - Very strong (R5) rock. grades to slightly weathered rock. Discontinuities are closely spaced, and in fair condition.		
30	9										
	10			100 / 1.2			C-8		33.8 feet: PLT - Very strong (R5) rock. grades to slightly weathered to fresh rock.		
35	11										
									38.7 feet: PLT - Very strong (R5) rock.		
	12								Bottom of boring at 39.0 feet below ground surface (bgs). Backfilled to ground surface with bentonite chips.		
40											
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-006-08

Job No. 33758632.13000 SR 90 Elevation 2532.6 ft (771.9 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 7, 2008 Completion May 8, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1397+57.82 Offset 27.93'L Casing HW, HQ Method Wet Rotary

Northing 1062767.76 Easting 1754362.66 Latitude 47°20'40.086"N Longitude 121°21'51.955"W

County Kittitas Subsection SE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.3 feet: Asphalt concrete pavement. 0.3 to 16.0 feet : Poorly graded GRAVEL with sand, subangular, very loose to medium dense, brown to gray, wet, homogenous, HCl reaction not tested.		
5	1			6			D-1 GP	6 4 7 (11)	5.0 feet: medium dense. Loss of drilling water circulation at 5.5 feet.		
10	2 3			6			D-2 GP	3 2 1 (3)	grades to very loose.		
15	4 5			50			D-3 GP	5 3 5 (8)	grades to loose. 16.0 to 19.0 feet: Poorly graded GRAVEL with sand, locally slightly silty, subangular, very dense, brown to gray, wet, homogenous, HCl reaction not tested.		
20	6			50			D-4	32 50 for 3" (>50)	19.0 to 23.5 feet: Meta welded lapilli tuff, brown to gray, fine to medium grained, slightly to moderately weathered,		

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2532.6 ft (771.9 m)

HOLE No. SCW-006-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100 / 1.8			C-1		moderately weak (R2) to strong (R4) rock, HCl reaction not tested. Discontinuities are closely spaced, and in fair to good condition. (CR - 61 to 100%, RQD - 38 - 100%, FF - 0.7 - 1.8) 19 feet: moderately weathered, moderately weak (R2) rock. Discontinuities are in fair condition.		
	7								. 23.3 feet: PLT - Extremely weak (R0) rock.		
				61			D-5	40 34 21 (55)	23.5 feet: grades to highly weathered rock.		
25				100 / 1			C-2		grades to slightly weathered to fresh, moderately strong (R3) rock.		
	8										
				100 / 0.7			C-3		28.75 feet: PLT - Moderately strong (R3) rock. grades to moderately strong (R3) rock. Discontinuities are closely spaced and in good condition.		
30	9										
				100			C-4		grades to slightly weathered to fresh rock, moderately strong (R3) rock.		
	10										
35									34.75 feet: PLT - Moderately strong (R3) rock. Bottom of boring at 35.0 feet below ground surface (bgs). Backfilled to ground surface with bentonite chips.		
	11										
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-006A-08

Job No. 33758632.13000 SR 90 Elevation 2530.4 ft (771.3 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 27, 2008 Completion May 28, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1397+58.47 Offset 50.79'L Casing HW, HQ Method Wet Rotary

Northing 1062767.95 Easting 1754385.52 Latitude 47°20'40.091"N Longitude 121°21'51.623"W

County Kittitas Subsection SE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				80			C-1 GP		0 to 0.7 feet: Concrete pavement 0.7 to 4.5 feet: Poorly graded GRAVEL or silty GRAVEL with sand, occasional cobbles, subangular, dense to very dense, dark brown to reddish yellow to dark gray, wet, homogenous, no HCl reaction. 0.7 feet: poorly graded GRAVEL 2.5 feet: grades to dense, silty GRAVEL.		
				60			D-2 GM	35 25 10 (35)			
	1			100			C-3A GM(C) C-3B		grades to silty GRAVEL with cobbles.		
				100 / 2.0					4.5 to 16.6 feet : Metawelded lapilli tuff, reddish brown to greenish gray, medium grained, highly to moderately weathered, moderately weak (R2) to moderately strong (R3) rock, no HCl reaction. Discontinuities are closely spaced, and in poor to fair condition. (CR= 96% - 100%, RQD= 0% - 66%, FF= 1.2 - 2.7)		
5				100			D-4	16 34 50 for 5" (>50)			
	2			100 / 2.7			C-5		4.5 feet: moderately to highly weathered, moderately weak (R2) to moderately strong (R3) rock. Discontinuities are in poor to fair condition. 7.65 feet: PLT - Weak (R1) rock.		
				96 / 1.2			C-6		8.6 feet: grades to moderately weathered, moderately strong (R3) rock. Discontinuities are in fair condition.		
10	3								12.25 feet: PLT - Moderately weak (R2) rock.		
	4			100 / 2.3			C-7		grades to moderately to highly weathered rock.		
15									16.15 feet: PLT - Strong (R4) rock.		
	5								Bottom of boring at 16.6 feet below ground surface (bgs). Backfilled to ground surface with bentonite chips.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-007-08

Job No. 33758632.13000 SR 90 Elevation 2533.6 ft (772.2 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 8, 2008 Completion May 9, 2008 Well ID# Not Applicable

Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1399+30.40 Offset 27.87'L Casing HW, HQ

Method Wet Rotary

Northing 1062599.16 Easting 1754378.22 Latitude 47°20'38.424"N

Longitude 121°21'51.702"W

County Kittitas Subsection SE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.3 feet: Asphalt concrete pavement. 0.3 to 5.2 feet : Poorly graded GRAVEL with sand, subrounded to subangular, medium dense to very dense, brown to gray, moist to wet, homogenous, no HCl reaction.		
	1								loss of drilling water circulation.		
5				71			D-1 GP	18			
				87 / 1.3			C-1	50 for 2" (>50)	5.2 to 23.2 feet: Metawelded lapilli tuff, brown to greenish gray, fine to medium grained, fresh, strong (R4) rock, weak HCl reaction. Discontinuities are closely spaced, and in fair condition. CR=87% - 100%, RQD=53% - 100%, FF=0.5 - 1.3.		
	2										
				100 / 0.7			C-2		7.95 feet: PLT - Very strong (R5) rock.		
10	3										
				93 / 0.7			C-3				
				100 / 0.5			C-4				
	4										
				100 / 1.3			C-5				
15											
	5										
									18.3 feet: PLT - Strong (R4) rock.		
				100 / 0.5			C-6				
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-007-08

Job No. 33758632.13000 SR 90 Elevation 2533.6 ft (772.2 m)

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	7										
									Bottom of boring at 23.2 feet below existing ground surface. Backfilled to ground surface with bentonite chips.		
25	8										
	9										
30	10										
35	11										
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-008-08

Job No. 33758632.13000 SR 90 Elevation 2534.6 ft (772.5 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 9, 2008 Completion May 12, 2008 Well ID# Not Applicable

Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1401+17.92 (Nov. 2007) Offset 28.43'L Casing HW, HQ

Method Wet Rotary

Northing 1062419.41 Easting 1754417.24 Latitude 47°20'36.655"N

Longitude 121°21'51.107"W

County Kittitas Subsection SE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.3 feet: Asphalt concrete pavement 0.3 to 7.9 feet : Well graded GRAVEL with sand to silty GRAVEL, subrounded to subangular, very dense, brown to gray, moist to wet, homogenous, HCl not tested.		
	1										
5				44			D-1 GM	6 20 39 (59)	5 feet: Very dense, silty GRAVEL with sand.		
	2			87			C-2A GW		grades to well graded GRAVEL with sand.		
				100 3.6			C-2B		7.9 to 24.0 feet: Metawelded lapilli tuff, gray, fine to medium grained, fresh to slightly weathered, strong (R4) rock, no HCl reaction. Discontinuities are closely spaced, and in fair condition. CR=31 to 100%, RQD=40 to 100%, FF=1.2 to 3.6. 7.9 feet: fresh to slightly weathered rock. 8.75 feet: PLT - Moderately strong (R3) rock. 9.0 feet: grades to fresh rock.		
				100 2			C-3				
10	3										
	4										
				100 1.8			C-4				
15									15.4 feet: PLT - Moderately strong (R3) rock.		
	5										
				100 1.8			C-5				
				100 1.8			C-6		Note: Drilling bit was broken and changed. grades to fresh to slightly weathered rock.		
	6			100 1.8			C-7				
20				100			C-8				

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2534.6 ft (772.5 m)

HOLE No. SCW-008-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				1.2					Fractures inclined at about 10 to 15 degrees to the vertical axis were observed between 22 and 23 feet depth.		
25	7								Bottom of boring at 24.0 feet below ground surface (bgs). Backfilled with asphalt concrete patching material from 0 to 0.7 ft bgs, with silty sand with gravel from 0.7 to 3.7 ft bgs, and with bentonite chips from 3.7 to 24.0 ft bgs.		
	8										
30	9										
	10										
35	11										
	12										
40	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-008A-08

Job No. 33758632.13000 SR 90 Elevation 2532.3 ft (771.8 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 27, 2008 Completion May 27, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1401+17.10 (Nov. 2007) Offset 51.72'L Casing HW, HQ Method Wet Rotary

Northing 1062426.44 Easting 1754439.46 Latitude 47°20'36.727"N Longitude 121°21'50.786"W

County Kittitas Subsection SE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.6 feet: Concrete pavement.		
									0.6 to 6.8 feet: Poorly graded GRAVEL with sand, occasionally poorly graded SAND or silty SAND with gravel, occasional cobbles, subangular to angular, medium dense to dense, reddish brown to dark gray, wet, homogenous, no HCl reaction.		
				33			D-1 / SM	3 14 28 (42)	2.5 feet: Dense, silty SAND with gravel.		
	1			100			C-2 / GP(C)		grades to poorly graded GRAVEL with sand and cobbles.		
5				47			D-3 / SP	11 10 7 (17)	grades to medium dense, poorly graded SAND with gravel.		
	2			100			C-4A / GP		grades to poorly graded GRAVEL with sand.		
				100 / 3.0			C-4B		6.8 to 18.8 feet: Metawelded lapilli tuff, greenish gray, fine to medium grained, slightly to moderately weathered, moderately weak (R2) to moderately strong (R3) rock, none or weak HCl reaction. Discontinuities are very closely to closely spaced, and in very poor to fair condition. (CR= 100%, RQD= 25% - 68%, FF= 1.2 - 3.0)		
				100 / 2.0			C-5		6.8 feet: Dark greenish gray, moderately weathered, moderately weak (R2) rock, no HCl reaction. Discontinuities are very closely spaced and in very poor condition.		
10	3								8.8 feet: grades to moderately strong (R3) rock, weak HCl reaction. Discontinuities are closely spaced and in fair condition.		
	4								13.2 feet: PLT - Strong (R4) rock.		
				100 / 1.2			C-6		grades to slightly weathered rock.		
15	5								18.65 feet: PLT - Very strong (R5) rock.		
	6								Bottom of boring at 18.8 feet below ground surface (bgs). Backfilled with asphalt patching material from 0 to		
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-008A-08

Job No. 33758632.13000 SR 90 Elevation 2532.3 ft (771.8 m)

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0.8 feet depth bgs, with silty sand with gravel from 0.8 to 4.0 feet depth bgs and with bentonite chips from 4.0 feet depth bgs to bottom of boring.		
	7										
25											
	8										
	9										
30											
	10										
35											
	11										
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-009-08

Job No. 33758632.13000 SR 90 Elevation 2535.6 ft (772.8 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 12, 2008 Completion May 13, 2008 Well ID# Not Applicable

Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1403+14.05 (Nov. 2007) Offset 28.44'L Casing HW, HQ

Method Wet Rotary

Northing 1062237.89 Easting 1754480.83 Latitude 47°20'34.870"N

Longitude 121°21'50.155"W

County Kittitas Subsection NE1/4 of NE1/4 Section 2 Range 11E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				22			C-1 GP		0 to 0.2 feet: Asphalt concrete pavement. 0.2 to 17.5 feet : Poorly graded GRAVEL with sand, occasional cobbles and boulders, subrounded to subangular, medium dense to dense, brown to greenish gray, moist to wet, homogenous, no HCl reaction. 0.2 feet: Poorly graded GRAVEL with sand.		
	1										
5				40			D-2 GP	14 9 8 (17)			
	2			87			C-3 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 2.4 inches.		
				47			D-4 GM	9 23 10 (33)	grades to silty GRAVEL with sand.		
10	3			77			C-5 GP(C)		grades to poorly graded GRAVEL with cobbles.		
	4								grades to poorly graded GRAVEL with cobbles and boulders.		
				76			C-6 GP(C/B)/GC				
15	5								17.5 to 18.5 feet: CLAY with sand and gravel, soft, brown, wet, homogeneous, no HCl reaction.		
				100			C-7 GP(C/B)		18.5 to 26.5 feet: Poorly graded GRAVEL with cobbles and boulders. subangular, gray to brown, homogenous, HCl not tested.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2535.6 ft (772.8 m)

HOLE No. SCW-009-08

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80								
				45			C-8 GP(C/B)		Wood pieces were encountered between 20 and 23 feet depth.		
	7										
				70			C-9A GP(C/B)				
25											
	8			70 / 0.4			C-9B		26.5 to 44.0 feet: Metawelded lapilli tuff, gray, fine to medium grained, fresh to slightly weathered, moderately strong (R3) rock, no HCl reaction. Discontinuities are closely spaced and in fair condition. (CR=9%-100%, RQD=0 % to 42%, FF=0.4-2.4) 26.5 feet: fresh rock. 28.5 feet: PLT - Moderately strong (R3) rock. 29.0 feet: grades to fresh to slightly weathered rock.		
				48 / 0.8			C-10				
	9										
30											
	10										
				9			C-11				
35											
	11			58			C-12				
				100 / 1.5			C-13				
	12										
40									40.45 feet: PLT - Strong (R4) rock.		
				81 / 2.4			C-14				
	13										
									Bottom of boring at 44.0 feet below existing ground surface (bgs). Backfilled with asphalt from 0 to 0.7 ft		
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-009-08

Job No. 33758632.13000 SR 90 Elevation 2535.6 ft (772.8 m)

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									bgs, with silty sand with gravel from 0.7 to 3.7 ft bgs and with bentonite chips from 3.7 to 44 ft bgs.		
	14										
	15										
50											
	16										
55											
	17										
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-010-08

Job No. 33758632.13000 SR 90 Elevation 2533.7 ft (772.3 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 14, 2008 Completion May 14, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1411+01.51 Offset 57.62'L Casing HW, HQ Method Wet Rotary

Northing 1061657.54 Easting 1754967.17 Latitude 47°20'29.196"N Longitude 121°21'43.003"W

County Kittitas Subsection NE1/4 of NE1/4 Section 2 Range 11E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				24			C-1A GP		0 to 0.2 feet: Asphalt concrete pavement. 0.2 to 4.3 feet: Poorly to well graded GRAVEL with sand, occasional cobbles, subrounded to subangular, brown to gray, moist, homogenous. No HCl reaction. 0.2 feet: Poorly graded GRAVEL with sand.		
	1						GW(C)		grades to well graded GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 6.5 inches.		
5				64 / 2.5			C-1B		4.3 to 28.7 feet: Basalt to metawelded lapilli tuff to metawelded ash tuff, brown to gray, fine to medium grained, fresh to moderately weathered, moderately strong (R3) to strong (R4) rock, HCl reaction not tested. Discontinuities are very closely to closely spaced, and in poor to good condition. (CR=64% - 100%, RQD=20% - 100%, FF=0 - 3.0)		
	2			85 / 1.5			C-2				
				100 / 1.8			C-3		4.3 feet: Basalt, gray, fresh, moderately strong (R3) rock. Discontinuities are closely spaced and in fair condition. 6.73 feet: PLT - Moderately strong (R3) rock.		
				100 / 3			C-4		7.5 feet: grades to slightly weathered rock.		
10	3								grades to metawelded ash tuff, moderately weathered, moderately weak (R2) rock. Discontinuities are very closely spaced, and in good to poor condition. 11.9 feet: grades to metawelded lapilli tuff, very weak (R1) rock. Discontinuities are very closely spaced and in fair condition.		
	4			100 / 1.6			C-5		grades to basalt, gray, highly to slightly weathered, moderately strong (R3) rock. Discontinuities are closely spaced, and in fair condition. 14.8 feet: grades to metawelded lapilli tuff, gray, slightly weathered to fresh.		
15	5								grades to fresh rock.		
				100 / 0.8			C-6				
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2533.7 ft (772.3 m)

HOLE No. SCW-010-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7			100 / 0			C-7		23.3 feet: PLT - Strong (R4) rock.		
30	8								Bottom of boring at 28.7 feet below ground surface (bgs). Backfilled with asphalt concrete patching material from 0 to 0.7 ft bgs, with silty SAND with gravel from 0.7 to 3.7 ft bgs, and with bentonite chips from 3.7 to 28.7 ft bgs.		
35	9										
40	10										
45	11										
	12										
	13										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-011-08

Job No. 33758632.13000 SR 90 Elevation 2530.9 ft (771.4 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 14, 2008 Completion May 14, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1414+79.87 Offset 55.73'L Casing HW, HQ Method Wet Rotary

Northing 1061473.08 Easting 1755280.19 Latitude 47°20'27.410"N Longitude 121°21'38.429"W

County Kittitas Subsection NE1/4 of NE1/4 Section 2 Range 11E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				12			C-1 GM(C)		0 to 0.2 feet: Asphalt concrete pavement 0.2 to 4 feet : Silty GRAVEL with sand, occasional cobbles, subangular to angular, medium dense to very dense, brown to gray, moist to wet, homogenous, no HCl reaction.		
				50			C-2 GM(C)				
	1			20			D-3	50 for 4"			
				91			C-4 SM(C)		4 to 6.2 feet: Poorly graded silty SAND with gravel and cobbles with trace of organic soil or decayed wood, occasional cobbles, subangular to angular, gray to dark gray, moist to wet, homogenous to locally stratified, no HCl reaction.		
5											
	2			100 / 0.8			C-5		6.2 to 18.7 feet: Metawelded lapilli tuff, bluish gray to gray, fine to medium grained, fresh, strong rock, no HCl reaction. Discontinuities are closely to medium spaced, and in fair condition. CR=82% - 100%, RQD=59% - 100%, FF=0.8 to 1.6. 6.2 feet: Discontinuities are closely spaced and in fair condition.		
				82 / 1.4			C-6				
10	3								9.7 feet: PLT - Very strong (R5) rock.		
				100 / 1.4			C-7		Discontinuities are closely to medium spaced.		
	4										
				100 / 1.6			C-8		Discontinuites are closely spaced.		
				100 / 0.9			C-9				
15	5								17.8 feet: PLT - Strong (R4) rock.		
									Bottom of boring at 18.7 ft below ground surface (bgs). Backfilled with asphalt from 0 to 0.5 ft bgs, with silty sand with gravel from 0.5 to 5 ft bgs and with bentonite		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-011-08

Job No. 33758632.13000 SR 90 Elevation 2530.9 ft (771.4 m)

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									chips from 5 to 18 ft bgs.		
	7										
25											
	8										
	9										
30											
	10										
35											
	11										
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-012-08

Job No. 33758632.13000 SR 90 Elevation 2527.2 ft (770.3 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 14, 2008 Completion May 14, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1418+12.96 Offset 56.48'L Casing HW, HQ Method Wet Rotary

Northing 1061381.18 Easting 1755586.88 Latitude 47°20'26.536"N Longitude 121°21'33.962"W

County Kittitas Subsection NW1/4 of NW1/4 Section 1 Range 11E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100			D-1 GM	14 50 for 4"	0 to 0.3 feet: Asphalt concrete pavement 0.3 to 3.3 feet : Silty GRAVEL with sand, subrounded to angular, medium dense to very dense, brown to gray, moist, homogenous, no HCl reaction.		
5	1			98 / 2.1			C-2		3.3 to 18.7 feet: Meta welded lapilli tuff, brown to reddish brown to gray, fine to medium grained, moderately weathered to fresh, moderately weak (R2) to strong (R4) rock. Discontinuities are generally closely to widely spaced, and in poor to fair condition. No HCl reaction. CR=98% - 100%, RQD=45% - 98%, FF=0.2 to 2.1. 4.5 feet : fresh, moderately strong (R2) rock. Discontinuities are closely spaced, and in poor to fair condition. 5.7 feet : grades to moderately to slightly weathered, moderately weak (R2) to moderately strong (R3) rock.	▽	
10	2										
	3			100 / 1.2			C-3		grades to moderately strong (R3) rock.		
15	4			98 / 0.2			C-4		grades to gray, fresh, strong (R4) rock. Discontinuities are closely to widely spaced, and in fair condition. Discontinuities are widely spaced and in fair condition.		
	5										
20	6								Bottom of boring at 18.7 ft below ground surface (bgs). Backfilled with asphalt from 0 to 0.4 ft bgs, with silty sand with gravel from 0.4 to 5.0 ft bgs, and with		

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2527.2 ft (770.3 m)

HOLE No. SCW-012-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									bentonite chips from 5.0 to 18.7 ft bgs.		
	7										
25											
	8										
	9										
30											
	10										
35											
	11										
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SCW-013-08

Job No. 33758632.13000 SR 90 Elevation 2525.6 ft (769.8 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 9, 2008 Completion May 13, 2008 Well ID# Not Applicable Equipment 5500-1(Skid-rig) w/ manual-hammer

Station 1422+85.31 Offset 43.3'L Casing HW, HQ Method Wet Rotary

Northing 1061326.75 Easting 1756049.65 Latitude 47°20'26.048"N Longitude 121°21'27.235"W

County Kittitas Subsection NW1/4 of NW1/4 Section 1 Range 11E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.3 feet: Asphalt Concrete Pavement. 0.3 to 15.2 feet: Silty GRAVEL with sand, occasional cobbles, subangular to angular, loose to very dense, grayish brown to brown, moist to wet, homogenous, no HCl reaction. 6 feet: Very dense, silty GRAVEL with sand.		
5	1			50			D-1 GM	15 15 44 (64)			
	2			100			C-2 GM(C)		grades to silty GRAVEL with cobbles.		
							D-3 GM	5 8 16 (24)	grades to medium dense, silty GRAVEL.		
10	3			100			C-4 GM(C)		grades to silty GRAVEL with cobbles.	▽	
				60			C-5 GM(C)				
	4			67			D-6 GM	7 5 9 (14)	grades to silty GRAVEL with sand.		
15				43			C-7 GM		15.2 to 53.0 feet: Silty GRAVEL with sand or poorly graded GRAVEL, occasional cobbles and boulders, subangular to angular, loose to very dense, grayish brown to gray, moist to wet, homogenous, no HCl reaction. 15.2 feet: Silty GRAVEL with sand.		
	5										
				50			D-8 GM	17 17 18	grades to dense.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2525.6 ft (769.8 m)

HOLE No. SCW-013-08

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				63			C-9 GM	(35)			
	7			7			D-10 GP	5 5 6 (11)	grades to medium dense, poorly graded GRAVEL.		
25				89			C-11 GP(B)		grades to poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 12 inches.		
	8										
				56			C-12 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4.5 inches.		
	9										
30				40			C-13 GP(C)		Maximum size of the cobbles encountered is 4 inches.		
	10										
				13			D-14 GP	33 3 2 (5)	grades to loose, poorly graded GRAVEL with sand.		
35				60			C-15 GP				
	11			80			C-16 GP(B)		grades to poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 12 inches.		
				0 / 57			D-17 GP(B)	50 for 1"	grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 13 inches.		
40	12										
	13										
				33			D-19 GM	13 10 5	grades to silty GRAVEL with sand.		
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2525.6 ft (769.8 m) HOLE No. SCW-013-08

Sheet 3 of 4

Project I-90 Snoqualmie Pass East Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100			C-20 GM	(15)			
	14			100			C-21 GM				
				40			D-22 GM(C)	1 11 10 (21)	grades to silty GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.25 inches.		
50	15			71			C-23 GM		grades to silty GRAVEL with sand.		
	16										
				100			D-24 SM	1 2 2 (4)	53.0 to 70.2 feet : Silty SAND, locally trace of gravel, occasional poorly graded SAND, rounded to subangular, very loose to loose, reddish brown to brown, moist to wet, homogenous, no HCl reaction. 53.0 feet : Very loose, silty SAND with trace of fine gravel.		
55				43			C-25 SM				
	17										
	18			100			D-26 SP	2 1 5 (6)	grades to loose, poorly graded SAND.		
60				100			C-27 SM		grades to silty SAND.		
				88			C-28 SM				
	19										
				67			D-29 SM	4 5 5 (10)			
65				86			C-30 SM				
	20										
	21			67			D-31 SM	3 3 5			
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2525.6 ft (769.8 m)

HOLE No. SCW-013-08

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
								(8)	Bottom of boring at 70.2 ft below ground surface (bgs). Backfilled with asphalt concrete patching material from 0 to 0.5 ft bgs, with silty SAND with gravel from 0.5 to 5.5 ft bgs, and with bentonite chips from 5.5 to 70.2 ft bgs.		
	22										
75	23										
	24										
80											
	25										
85	26										
	27										
90											
	28										
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/12/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-006-09

Job No. 33758654.00009 SR 90 Elevation 2497.5 ft (761.2 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 2, 2009 Completion June 4, 2009 Well ID# Not applicable

Equipment CME 45 (Barge rig) with auto hammer

Station 1353+71 Offset 31.4 R Casing HWT 44', HQ 67', NQ 79'

Method Wet Rotary

Northing 1067029.14 Easting 1753805.38 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
0				23			C-1 GP(C)		0 to 6 feet: Poorly graded GRAVEL with cobbles, angular, gray, wet, homogenous, no HCl reaction. Maximum size of the cobbles encountered is 7.5 inches.		
5	1										
				40			C-2 GW(C)		6 to 54 feet: Poorly to well graded GRAVEL with cobbles and occasional boulders, subrounded to angular, light brown to gray, wet, homogenous, no HCl reaction. 6 feet: Well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6.5 inches.		
10	2										
	3			34			C-3 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
15	4										
	5			52			C-4 GW(C/B)		grades to well graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 13 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2497.5 ft (761.2 m)

HOLE No. SSD-006-09

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				68			C-5 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 10 inches.		
	7										
25											
	8			44			C-6 GP(C)				
	9										
30				38			C-7 GP(C)		Maximum size of the cobbles encountered is 3.5 inches.		
	10										
35											
	11			40			C-8 GP(C)		Maximum size of the cobbles encountered is 8.5 inches. Two pieces of wood were encountered.		
	12										
40				20			C-9 GP(C)				
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

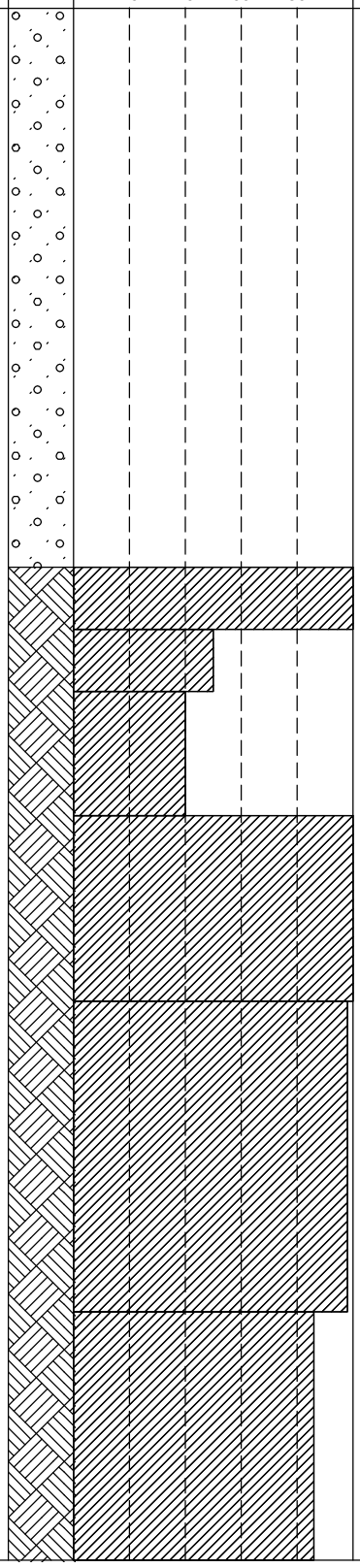
Job No. 33758654.00009 SR 90 Elevation 2497.5 ft (761.2 m)

HOLE No. SSD-006-09

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T



Depth (ft)	Meters (m)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14	0			C-10 GP(C)		No recovery. Material was washed away. Material is probably poorly graded GRAVEL.		
	15	54			C-11 GW		grades to well graded GRAVEL.		
50	16	100			C-12A GW		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 10.5 inches.		
		100 / 1			C-12B		54 to 79 feet: Meta Welded Lapilli Tuff, bluish gray, fine to medium grained, fresh, strong (R4) to very strong (R5). Discontinuities are closely to widely spaced and in poor to good condition. None to weak HCl reaction. (CR= 80 to 100%, RQD = 40 to 100%, FF = 0 to 2.0)		
55		80 / 2			C-13		54 feet: Strong (R4) rock. Discontinuities are closely to medium spaced and in fair condition. No HCl reaction.		
	17	80 / 2			C-14		54.7 feet: PLT - very strong (R5) rock.		
							55 feet: Discontinuities are closely spaced.		
							56 feet: Discontinuities are in fair to poor condition.		
		100 / 0.3			C-15		58 feet: Discontinuities are medium to closely spaced.		
	18								
60							PLT - very strong (R5) rock.		
							PLT - very strong (R5) rock.		
		98 / 0			C-16		grades to strong (R4) to very strong (R5) rock. No discontinuities.		
	19								
65									
	20	86 / 0.2			C-17		Discontinuities are closely to medium spaced and in good condition. Weak HCl reaction.		
	21				45		PLT - very strong (R5) rock.		
70									

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2497.5 ft (761.2 m)

HOLE No. SSD-006-09

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				84 / 0.8			C-18		PLT - strong (R4) rock. No HCl reaction.		
75	22										
	23			100 / 0.4			C-19 / 35		PLT - moderately strong (R3) rock.		
	24			100 / 0.7			C-20		PLT - strong (R4) rock.		
80									Bottom of boring at 79 feet depth below the mudline. Backfilled to mudline with bentonite chips. Lake level measurements: -06/02/09 at 08:30: 18 feet above the mudline -06/03/09 at 08:00: 18 feet above the mudline -06/04/09 at 06:00: 18 feet above the mudline		
	25										
85	26										
	27										
90	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-007-09

Job No. 33758654.00009 SR 90 Elevation 2497.0 ft (761.1 m)

Sheet 1 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start May 30, 2009 Completion June 1, 2009 Well ID# Not applicable

Equipment CME 45 (Barge rig) with auto hammer

Station 1356+29 Offset 29.1 R Casing HWT 26', HQ 77', NQ

Method Wet Rotary

Northing 1066795.63 Easting 1753908.13 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				9			C-1 GP		0 to 9.0 feet: Poorly graded GRAVEL, angular, gray to dark gray, wet, homogenous, no HCl reaction.		
5	1										
	2										
10	3			30			C-2 GW(C)		9.0 to 61.0 feet: Poorly to well graded GRAVEL with cobbles, subrounded to angular, greenish gray, bluish gray or gray, wet, homogenous, no HCl reaction. 9.0 feet: Well graded GRAVEL with cobbles and trace of wood. Maximum size of the cobbles encountered is 4 inches.		
	4			28			C-3 GW(C)		grades to well graded GRAVEL without wood. Maximum size of the cobbles encountered is 3.75 inches.		
15	5										
				48			C-4 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2497.0 ft (761.1 m) HOLE No. SSD-007-09

Sheet 2 of 5

Project I-90 Snoqualmie Pass East Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	7			34			C-5 GP(C)		Maximum size of the cobbles encountered is 6 inches.		
25	8										
	9			60			C-6 GP(C)		Maximum size of the cobbles encountered is 7 inches.		
30	10										
				36			C-7 GP(C)		Maximum size of the cobbles encountered is 9.5 inches.		
35	11										
	12			0			C-8 GP?		No Recovery. Material is washed away. Material is probably poorly graded GRAVEL.		
40	13										
				10			C-9 GP		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3 inches.		
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2497.0 ft (761.1 m)

HOLE No. SSD-007-09

Sheet 3 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
	15										
50											
	16			16			C-10 GP				
55											
	17										
	18			70			C-11A GP		grades to poorly graded GRAVEL.		
60											
				70 / 3.0			C-11B		61.0 to 100.0 feet: Meta welded Lapilli Tuff, greenish gray, fine to medium grained, fresh, very weak (R1) to moderately strong (R3). Discontinuities are very closely to closely spaced and in poor to fair condition. No HCl reaction. (CR= 70 to 100%, RQD = 12 to 60%, FF= 1.4 to 5.0) 61.0 feet: Very weak (R1) rock. Discontinuities are very closely spaced and in poor to fair condition. 64.0 feet: Discontinuities are in fair condition. 64.2 feet: PLT - very weak (R1) rock.		
	19										
				80 / 3.4			C-12				
65											
	20								PLT - Moderately weak (R2) rock.		
	21			100 / 2.7			C-12B				
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2497.0 ft (761.1 m)

HOLE No. SSD-007-09

Sheet 4 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				85 / 3.9			C-13		PLT - moderately strong (R3) rock.		
	22										
75	23			90 / 3.6			C-14		Discontinuities are very closely spaced and in poor condition.		
	24								PLT - moderately strong (R3) rock.		
80											
	25			90 / 5.0			C-15		Discontinuities are very closely to closely spaced and in poor to fair condition.		
85	26			96 / 3.0			C-16		PLT - Moderately weak (R2) rock. grades to moderately strong (R3) rock. Discontinuities are very closely to closely spaced and in fair condition.		
	27								PLT - strong (R4) rock.		
90				84 / 1.4			C-17		Discontinuities are closely spaced and in fair condition.		
	28										
								23	PLT - moderately strong (R3) rock.		
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2497.0 ft (761.1 m)

HOLE No. SSD-007-09

Sheet 5 of 5

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29			98 / 2.8			C-18 / 27				
	30								PLT - very weak (R1) rock.		
100									Bottom of boring at 100.0 feet below the mudline. Backfilled to mudline with bentonite chips. Lake level measurements: -5/30/09 at 08:00: 18.5 feet above the mudline -5/31/09 at 08:45: 17.5 feet above the mudline -6/01/09 at 07:45: 18.5 feet above the mudline		
105	31										
	32										
	33										
110											
	34										
115	35										
	36										
120											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-008-09

Job No. 33758654.00009 SR 90 Elevation 2499.6 ft (761.9 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 9, 2009 Completion June 11, 2009 Well ID# Not applicable

Equipment CME 45 (Barge rig) with auto hammer

Station 1358+86 Offset 29.3 R Casing HWT, HQ

Method Wet Rotary

Northing 1066553.62 Easting 1753987.41 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				36			C-1 GP(C)		0 to 4 feet: Poorly graded GRAVEL with cobbles, angular, dark gray to gray, wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles is 3.25 inches.		
	1										
5									4 to 42 feet: Poorly to well graded GRAVEL with cobbles and boulders, angular to subrounded, dark gray, gray or greenish gray, wet, homogenous, no HCl reaction. 4 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3.25 inches.		
	2			34			C-2 GP(C)		7 feet: Maximum size of the cobbles encountered is 4.5 inches.		
10	3										
				76			C-3 GP(C)		Maximum size of the cobbles encountered is 9 inches.		
	4										
15											
	5			80			C-4 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 14 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2499.6 ft (761.9 m) HOLE No. SSD-008-09

Sheet 2 of 3

Project I-90 Snoqualmie Pass East Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				62			C-5 GP(C/B)		Maximum size of the boulders encountered is 12 inches.		
	7										
25											
	8			30			C-6 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 8 inches. Note: Drilling rod dropped about 8 inches at about 29 feet per driller.		
	9										
30											
				36			C-7 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9.5 inches.		
	10										
35											
	11			24			C-8 GW		grades to well graded GRAVEL.		
	12										
40											
				96 / 1.6			C-9		42.0 to 67.0 feet: Meta welded Lapilli Tuff, greenish gray, fine to medium grained, fresh, moderately weak (R2) to moderately strong (R3) rock. Discontinuities are closely to medium spaced and in poor to fair condition. No HCl reaction. (CR=83 to 96%, RQD = 40 to 81%, FF = 1.3 to 4.0)		
	13								42.0 feet: Moderately weak (R2) to moderately strong (R3) rock. Discontinuities are closely to medium spaced		
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2499.6 ft (761.9 m)

HOLE No. SSD-008-09

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									and in poor to fair condition.		
							16		43.7 feet: PLT - very weak (R1) rock.		
	14			94 / 1.3			C-10		PLT - moderately strong (R3) rock.		
	15										
50									PLT - moderately weak (R3) rock.		
				86 / 2.7			C-11		Discontinuities are closely spaced and in fair condition.		
	16										
				83 / 4.0			C-12				
55											
	17								PLT - moderately weak (R3) rock.		
				92 / 2.2			C-13		Discontinuities are in poor to fair condition.		
	18										
60											
									PLT - moderately weak (R3) rock.		
							23				
	19			96 / 1.6			C-14		Discontinuities are closely to medium spaced and in fair condition.		
							22		62.4 feet: PLT - moderately strong (R3) rock.		
									PLT - very weak (R1) rock.		
65											
	20										
									Bottom of boring at 67 feet below the mudline. Backfilled to mudline with bentonite chips.		
	21								Lake level measurements:		
									-06/09/09 at 08:15: 16.4 feet above the mudline -06/10/09 at 07:45: 19.6 feet above the mudline -06/11/09 at 08:30: 16.8 feet above the mudline		
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-009-09

Job No. 33758654.00009 SR 90 Elevation 2507.2 ft (764.2 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 12, 2009 Completion June 13, 2009 Well ID# Not applicable

Equipment CME 45 (Barge rig) with auto hammer

Station 1355+01 Offset 20.8 R Casing HWT 62', HQ 89'

Method Wet Rotary

Northing 1066915.92 Easting 1753868.59 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				20			C-1 GP(C/B)		0 to 11 feet: Poorly graded GRAVEL with cobbles and boulders, angular, bluish gray to dark gray, wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 16 inches.		
	1										
5											
	2										
10	3								11 to 61.5 feet: Poorly to well graded GRAVEL with cobbles and ocasional boulders, subrounded to angular, gray to brown, wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 16 inches.		
	4										
				32			C-2 GW		grades to well graded GRAVEL with sand.		
15											
	5										
				20			C-3 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2507.2 ft (764.2 m)

HOLE No. SSD-009-09

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7										
	8										
30	9			16			C-4 GW(C)		Maximum size of the cobbles encountered is 3.5 inches.		
	10										
35	11			55			C-5 GW(C/B)		grades to well graded GRAVEL with boulders. Maximum size of the boulders encountered is 15 inches.		
	12										
40	13			50			C-6 GW(C)		grades to well graded GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 7.5 inches.		
45				18			C-7 GW		grades to well graded GRAVEL.		

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2507.2 ft (764.2 m)

HOLE No. SSD-009-09

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
	15			42			C-8 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9 inches.		
50											
	16										
				44			C-9 GP(C)		Maximum size of the cobbles encountered is 11.5 inches.		
55	17										
				72			C-10 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 8 inches.		
60	18										
				72 / 1.6			C-11		61.5 to 89.0 feet: Meta welded Lapilli Tuff, bluish gray, fine to medium grained, fresh, very weak (R1) to moderately strong (R3). Discontinuities are very closely to closely spaced and in poor to fair condition. No HCl reaction. (CR=72 to 100%, RQD=14 to 60%, FF=1.6 to 5.0) 61.5 feet: Moderately strong (R3) rock. Discontinuities are closely spaced and in fair condition. 61.7 feet: PLT - moderately weak (R2) rock. 63 feet: PLT - moderately weak (R2) rock. 64.0 feet: Discontinuities are in poor to fair condition.		
	19										
				90 / 2.0			C-12 / 14				
65	20										
									PLT - moderately strong (R3) rock.		
	21			100 / 1.8			C-13				
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2507.2 ft (764.2 m)

HOLE No. SSD-009-09

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									PLT - moderately strong (R3) rock.		
	22						22		PLT - moderately strong (R3) rock.		
				100 / 5			C-14		grades to very weak (R1) to moderately weak (R2) rock. Discontinuities are very closely to closely spaced and in poor to fair condition.		
75	23										
									PLT - very weak (R1) rock.		
	24			98 / 3.2			C-15		grades to moderately weak (R2) to moderately strong (R3) rock. Discontinuities are very closely to closely spaced and in fair condition.		
80									PLT - moderately strong (R3) rock.		
	25						25		PLT - strong (R4) rock.		
				100 / 3.0			C-16				
85	26										
									PLT - moderately strong (R3) rock.		
	27										
90									Bottom of boring at 89.0 feet above the mudline. Backfilled to mudline with bentonite chips. Lake level mesaurements: -06/12/09 at 08:30: 9 feet above the mudline -06/13/09 at 08:30: 9.5 feet above the mudline		
	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-010-09

Job No. 33758654.00009 SR 90 Elevation 2498.9 ft (761.7 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 14, 2009 Completion June 16, 2009 Well ID# Not applicable

Equipment CME 45 (Barge rig) with auto hammer

Station 1357+55 Offset 24.7 R Casing HWT, HQ

Method Wet Rotary

Northing 1066679.3 Easting 1753953.92 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				47			C-1 GP(C)		0 to 18.0 feet: Poorly graded GRAVEL with cobbles, angular, gray, greenish gray or bluish gray, wet, homogenous, no HCl reaction. 0 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
	1										
5				50			C-2 GP(C)				
	2										
	3										
10				40			C-3 GP(C)		Maximum size of the cobbles encountered is 6 inches.		
	4										
15				20			C-4 GP(C)		Maximum size of the cobbles encountered is 3.5 inches.		
	5										
				47			C-5 GP(C)		18.0 to 54.7 feet: Poorly to well graded GRAVEL with cobbles, subrounded to angular, gray, greenish gray or bluish gray, wet, homogenous, no HCl reaction. 18.0 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 11 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2498.9 ft (761.7 m)

HOLE No. SSD-010-09

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7										
	8			40			C-6 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 9.5 inches.		
30	9										
				50			C-7 GW(C)		Maximum size of the cobbles encountered is 4.5 inches.		
	10										
35											
	11			48			C-8 GW(C)		Maximum size of the cobbles encountered is 7.5 inches.		
	12										
40											
				58			C-9 GP(C)		grades to poorly GRAVEL with cobbles. Maximum size of the cobbles encountered is 11 inches.		
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2498.9 ft (761.7 m) HOLE No. SSD-010-09

Sheet 3 of 4

Project I-90 Snoqualmie Pass East Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			70			C-10 GP(C)		Maximum size of the cobbles encountered is 9 inches.		
	15										
50				96			C-11A GP		grades to poorly graded GRAVEL.		
	16										
55				96 / 3.8			C-11B		54.7 to 81.0 feet: Meta welded Lapilli Tuff, bluish gray, fine to medium grained, fresh, very weak (R1) to strong (R4). Discontinuities are very closely to medium spaced and in poor to fair condition. No HCl reaction. (CR = 88 to 100%, RQD = 31 to 98%, FF=1.1 to 3.8)		
	17			88 / 2.0			C-12		54.7 feet: Very weak (R1) rock. Discontinuities are very closely to closely spaced and in poor to fair condition.		
							14		55.8 feet: PLT - Very weak (R1) rock. grades to moderately weak (R2) to moderately strong (R3) rock. Discontinuities are closely to medium spaced.		
	18								57.3 feet: PLT - moderately strong (R3) rock. 58.5 feet: PLT - moderately strong (R3) rock.		
60				98 / 1.2			C-13		grades to moderately strong (R3) to strong (R4) rock. Discontinuities are medium spaced and in fair condition.		
	19										
							16		PLT - strong (R4) rock.		
65									PLT - moderately strong (R3) rock.		
	20			96 / 1.1			C-14		Discontinuities are closely to medium spaced. PLT - moderately strong (R3) rock.		
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2498.9 ft (761.7 m)

HOLE No. SSD-010-09

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100 / 1.2			C-15		PLT - moderately weak (R2) rock.		
	22						16		PLT - moderately strong (R3) rock.		
75	23			100 / 2.0			C-16				
	24						15		PLT - moderately weak (R2) rock.		
80									PLT - moderately strong (R3) rock.		
	25								Bottom of boring at 81 feet below the mudline. Backfilled to ground surface with bentonite chips.		
									Lake level measurements:		
									-06/14/09 at 09:30: 17 feet above the mudline -06/15/09 at 08:45: 17.3 feet above the mudline -06/16/09 at 08:00: 17.7 feet above the mudline		
85	26										
	27										
90	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-011-09

Job No. 33758654.00009 SR 90 Elevation 2538.1 ft (773.6 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 25, 2009 Completion June 29, 2009 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station 1351+36 Offset 7.4 R Casing HWT, HQ

Method Wet Rotary

Northing 1067246.28 Easting 1753716.6 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 18.0 feet: Poorly to well graded GRAVEL with or without cobbles, angular to subangular, gray, bluish gray or brownish gray, wet, homogenous, no HCl reaction.		
5	1										
	2										
				33			C-1 / GW		8.5 feet: Well graded GRAVEL.		
10	3										
				44			C-2 / GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.		
	4										
15											
	5			54			C-3 / GP(C)		Maximum size of the cobbles encountered is 7.5 inches.		
									18.0 to 32.7 feet: Poorly to well graded GRAVEL with or without cobbles, angular to subangular, bluish gray to brownish gray, wet, homogenous, no HCl reaction. 18.0 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7.5 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2538.1 ft (773.6 m) HOLE No. SSD-011-09

Sheet 2 of 3

Project I-90 Snoqualmie Pass East Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
										▽	
				44			C-4 GW(C)		grades to well graded GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 3.5 inches.		
	7										
25											
	8			48			C-5 GW		grades to well graded GRAVEL with sand.		
	9										
30											
				25			C-6A GW				
	10			100 / 1.8			C-6B		32.7 to 58.0 feet: Meta welded Lapilli Tuff, greenish gray to gray, fine to medium grained, fresh to slightly weathered, moderately strong (R3) to strong (R4). Discontinuities are closely to medium spaced and in poor to fair condition. No HCl reaction. (CR =98 to 100%, RQD=50 to 100%, FF= 0 to 2.2) 32.7 feet: Slightly weathered to fresh, moderately strong (R3) rock. Discontinuities are closely to medium spaced and in poor to fair condition. 33.7 feet: PLT - very weak (R1) rock.		
							11				
35											
	11			100 / 1.2			C-7				
									PLT - moderately weak (R2) rock.		
40	12										
				100 / 1.2			C-8		grades to fresh, moderately strong (R3) to strong (R4) rock. Discontinuities are closely to medium spaced and in fair condition. PLT - moderately strong (R3) rock.		
	13						17				
45									PLT - moderately strong (R3) rock.		

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

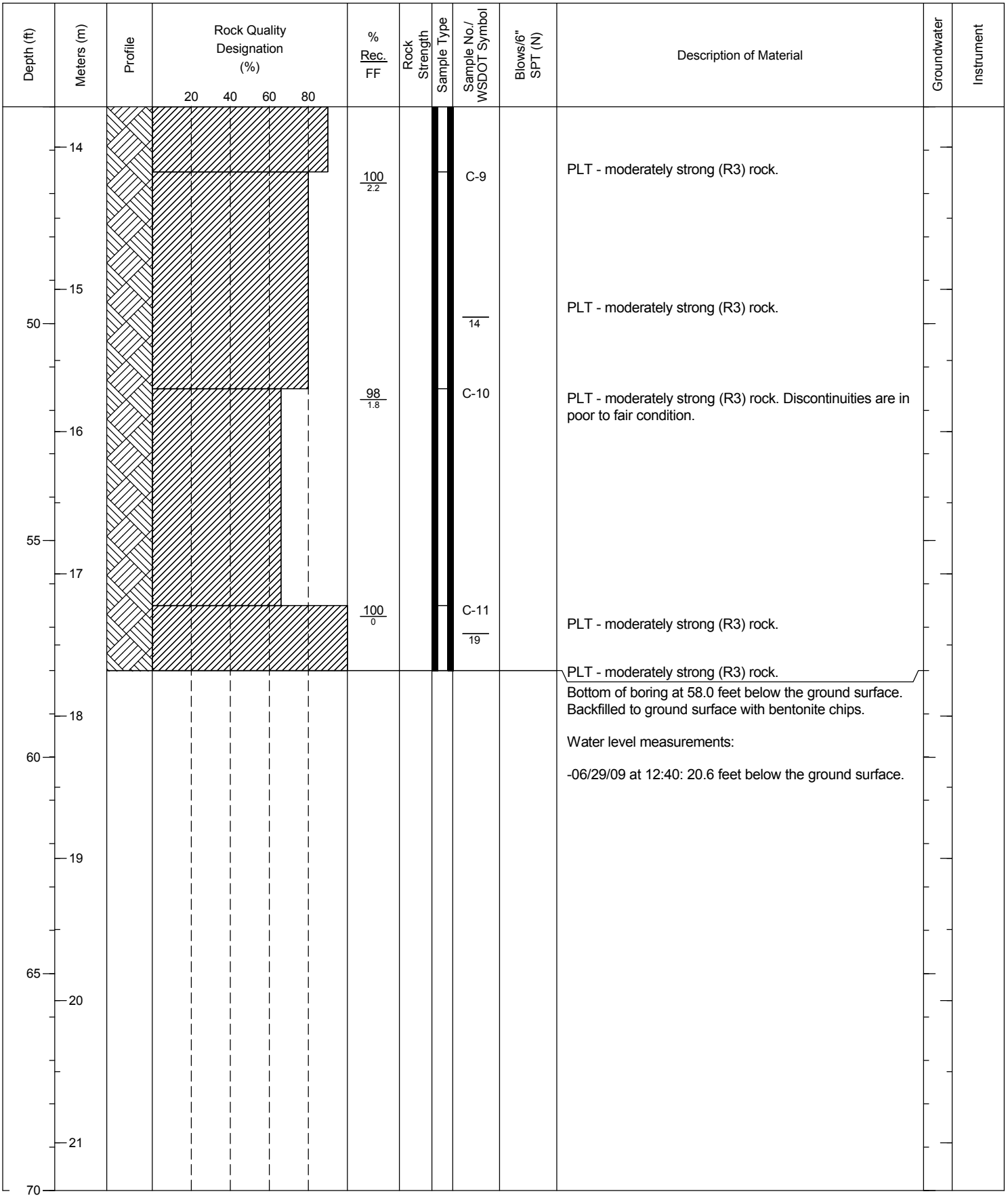
Job No. 33758654.00009 SR 90 Elevation 2538.1 ft (773.6 m)

HOLE No. SSD-011-09

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779



Depth (ft)	Meters (m)	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14		100 / 2.2			C-9		PLT - moderately strong (R3) rock.		
	15							PLT - moderately strong (R3) rock.		
50						14				
			98 / 1.8			C-10		PLT - moderately strong (R3) rock. Discontinuities are in poor to fair condition.		
	16									
55										
	17		100 / 0			C-11		PLT - moderately strong (R3) rock.		
						19		PLT - moderately strong (R3) rock.		
	18							Bottom of boring at 58.0 feet below the ground surface. Backfilled to ground surface with bentonite chips.		
60								Water level measurements:		
								-06/29/09 at 12:40: 20.6 feet below the ground surface.		
	19									
65										
	20									
	21									
70										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-012-09

Job No. 33758654.00009 SR 90 Elevation 2533.4 ft (772.2 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 23, 2009 Completion June 23, 2009 Well ID# Not applicable

Equipment CME 45 (track rig) with auto hammer

Station 1362+10 Offset 19.1 R Casing HWT 38', HQ 81'

Method Wet Rotary

Northing 1066243.33 Easting 1754078.27 Latitude _____ Longitude _____

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 15 feet: Silty SAND with gravel (fine), angular, loose to very dense, brownish gray, wet, homogenous, no HCl reaction. 5 feet: Loose.		
5	1			50			D-1 SM	5 4 4 (8)			
10	2 3			43			D-2 SM	4 6 4 (10)			
15	4 5			0 98 51			D-3 GP(B) C-4 C-5 GW(C)	50 for 4" (>50)	15 to 36 feet: Poorly to well graded GRAVEL with cobbles and boulders, angular to subangular, greenish gray to gray, wet, homogenous, no HCl reaction. 15 feet: Poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 13 inches. 16.5 feet: grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 7 inches.	▽	
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2533.4 ft (772.2 m) HOLE No. SSD-012-09

Sheet 2 of 4

Project I-90 Snoqualmie Pass East Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				18			C-6 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4 inches.		
	7										
25											
	8			26			C-7 GP(C)		Maximum size of the cobbles encountered is 3 inches.		
	9										
30											
				50			C-8 GW(C)		grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4.5 inches.		
	10										
35											
	11			100 2.0			C-9		36 to 81 feet: Meta welded Lapilli Tuff, greenish gray, brownish gray to bluish gray, fine to coarse grained, fresh to slightly weathered, very weak (R1) to strong (R4). Discontinuities are very closely to medium spaced and in poor to fair condition. None to weak HCl reaction. (CR =88 to 100%, RQD = 22 to 96%, FF= 0 to 3.0) 36 feet: Greenish gray, fine to medium grained, slightly weathered, moderately weak (R2) to moderately strong (R3) rock. Discontinuities are closely to medium spaced and in poor to fair condition. No HCl reaction 37 feet: PLT - Strong (R4) rock.		
	12										
40				100 1.8			C-10		grades to gray, fine to coarse grained, slightly weathered to fresh, moderately weak (R2) to moderately strong (R3). Discontinuities are closely to medium spaced and in fair condition. 41.2 feet: PLT - very weak (R1) rock. 42.3 feet: PLT - very weak (R1) rock.		
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2533.4 ft (772.2 m) HOLE No. SSD-012-09

Sheet 3 of 4

Project I-90 Snoqualmie Pass East Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			98 / 1.4			C-11		PLT - very weak (R1) rock.		
	15								PLT - very weak (R1) rock.		
50				98 / 2.8			C-12		grades to greenish gray, moderately weak (R2) rock. Discontinuities are in poor to fair condition. 51.5 feet: PLT - very weak (R1) rock.		
	16										
55											
	17			94 / 2.2			C-13		grades to brownish gray, very weak (R1) to moderately weak (R2) rock.		
	18								PLT - very weak (R1) rock.		
60				88 / 2.6			C-14		grades to brownish gray to bluish gray, fine to medium grained, moderately weak (R2) to moderately strong (R3) rock. Discontinuities are very closely to closely spaced and in poor to fair condition. Note: 2-inch thick clay was encountered at 62.6 feet. 61.4 feet: PLT - moderately weak (R2) rock.		
	19										
65											
	20			96 / 3.0			C-15		grades to bluish gray, moderately strong (R2) rock.		
	21								PLT - strong (R4) rock.		
70							10				

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758654.00009 SR 90 Elevation 2533.4 ft (772.2 m)

HOLE No. SSD-012-09

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				96 / 0			C-16		PLT - very weak (R1) rock.		
	22								grades to fresh, moderately strong (R2) to strong (R4) rock. No discontinuities.		
									PLT - moderately strong (R3) rock.		
							13				
75	23								PLT - moderately weak (R2) rock.		
				98 / 0.6			C-17		Discontinuities are closely to medium spaced and in fair condition. None to weak HCl reaction.		
	24										
80									PLT - moderately weak (R1) rock.		
	25								Bottom of boring at 81.0 feet depth below the ground surface. Backfilled to ground surface with bentonite chips.		
									Water level measurements:		
									-06/24/09 at 07:45: 18.4 feet below the ground surface.		
85	26										
	27										
90											
	28										
95											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 8/25/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S26175

HOLE No. SSD-013-09

Job No. 33758654.00009 SR 90 Elevation 2539.6 ft (774.1 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start November 5, 2009 Completion November 5, 2009 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

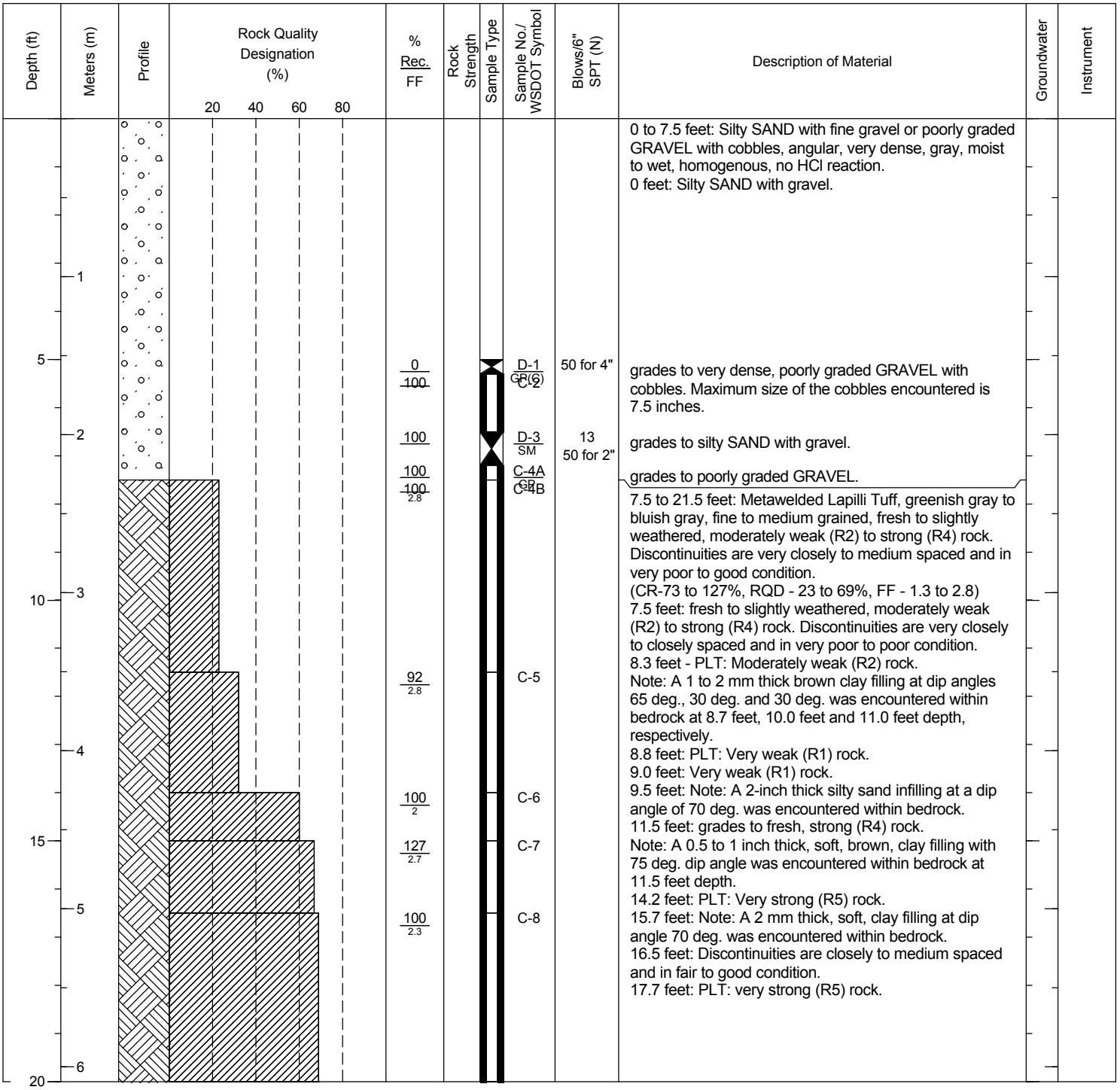
Station 1351+55 (Nov. 2007) Offset 110.5 L Casing HQ

Method Wet Rotary

Northing 1067289.16 Easting 1753828.1 Latitude 47°21'24.64"N

Longitude 121°22'00.44"W

County Kittitas Subsection NW1/4 of NE1/4 Section 35 Range 11 Township 22



DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/10/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S26175

HOLE No. SSD-013-09

Job No. 33758654.00009 SR 90 Elevation 2539.6 ft (774.1 m)

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				73 / 1.3			C-9		Discontinuities are very closely to closely spaced. PLT: Very strong (R5) rock. Bottom of the boring at 21.5 feet depth below ground surface. Backfilled to ground surface with bentonite chips.		
25	7										
	8										
30	9										
	10										
35	11										
	12										
40	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/10/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R72794

HOLE No. SSD-014-09

Job No. 33758654.00009 SR 90 Elevation 2539.4 ft (774.0 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start November 3, 2009 Completion November 4, 2009 Well ID# SSD-014-09 (OW) Equipment CME 45 (Skid rig) with auto hammer

Station 1352+24 (Nov. 2007) Offset 112.0 L Casing HQ Method Wet Rotary

Northing 1067226.92 Easting 1753864.74 Latitude 47°21'24.03"N Longitude 121°21'59.90"W

County Kittitas Subsection NW1/4 of NE1/4 Section 35 Range 11 Township 22

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				10			C-1 SM		0 to 8.2 feet: Silty SAND with gravel to poorly graded GRAVEL, angular to rounded, gray to reddish brown, very dense, moist to wet, homogenous, no HCl reaction. 0 feet: Silty SAND with gravel (based on field observations).		
	1										
5				50			C-2 SM				
	2			33			D-3 SM			▽	
							C-4A		grades to poorly graded GRAVEL.		
				100 1.0			C-4B		8.2 to 26.0 feet: Metawelded Lapilli tuff, greenish gray to gray, fine to coarse grained, fresh, moderately strong (R3) to strong (R4). Discontinuities are very closely to medium spaced and in poor to fair condition. (CR - 76 to 100%, RQD - 24 to 90%, FF - 1.0 to 3.0) 8.2 feet: Moderately strong (R3) to strong (R4) rock. Discontinuities are closely to medium spaced and in fair condition. 8.7 feet: Note: A 1mm thick, soft, brown clay infilling at 60 deg. dip angle was encountered within bedrock at 8.7 feet depth. 8.9 feet: PLT: Moderately weak (R2) rock. 11.0 feet: Discontinuities are very closely to medium spaced and in poor to fair condition. 11.2 feet: PLT: Moderately weak (R2) rock. 12.5 feet: A 1-inch thick silty sand infilling at a dip angle of 75 degrees was encountered within bedrock.		
10	3			76 3.0			C-5				
	4										
15				98 1.8			C-6		16.7 feet: PLT: Strong (R4) rock. 17.0 feet: A 1 to 2 mm thick sandy clay at a dip angle of 50 deg. was encountered within bedrock.		
	5										
	6										
20											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/10/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R72794

HOLE No. SSD-014-09

Job No. 33758654.00009 SR 90 Elevation 2539.4 ft (774.0 m)

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				98 / 1.8			C-7		grades to strong (R4) rock. Discontinuities are in fair to poor condition. PLT: very weak (R1) rock.		
	7										
25									PLT: Moderately strong (R3) rock.		
	8								Bottom of boring at 26.0 feet depth below ground surface (bgs). A 1-inch diameter observation well was installed. Water level measurements: -11/4/2009 at 12:30 : 7.0 feet depth bgs before observation well installation.		
	9										
30											
	10										
35											
	11										
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/10/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S26175

HOLE No. SSD-015-09

Job No. 33758654.00009 SR 90 Elevation 2537.9 ft (773.6 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start November 3, 2009 Completion November 3, 2009 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station 1353+12 (Nov. 2007) Offset 110.5 L Casing HQ

Method Wet Rotary

Northing 1067145.46 Easting 1753906.11 Latitude 47°21'23.24"N

Longitude 121°21'59.28"W

County Kittitas Subsection NW1/4 of NE1/4 Section 35 Range 11 Township 22

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				0			c-1 SM		0 to 5.3 feet: Silty SAND with occasional fine gravel, dense, gray, homogenous, no HCl reaction.		
5	1			80			D-2 SM	16 for 6"			
				0			C-3A SM				
				100 0			C-3B		5.3 to 21.5 feet: Metawelded Lapilli Tuff, fine to medium grained, dark gray, fresh, strong (R4) to very strong (R5). Discontinuities are very closely to medium spaced and in poor to fair condition. (CR - 96 to 100%, RQD - 70 to 100%, FF - 0 to 2.0) 5.3 feet: Strong (R4) to very strong (R5) rock. No discontinuities. 6.8 feet: PLT: Strong (R4) rock.		
	2			100 0			C-4				
				98 2			C-5		Discontinuities are closely to medium spaced and in poor to fair condition. 9.1 feet: A 1mm to 2mm thick, soft, brownish gray, clay at dip angle of 70 deg. was encountered within bedrock. 9.7 feet: A 1mm thick, soft, brownish gray, clay at dip angle of 25 deg. was encountered within bedrock.		
10	3			100 2			C-6		Discontinuities are very closely to medium spaced and in fair condition. PLT: Very strong (R5) rock.		
	4										
15	5			96 1.2			C-7		PLT: Very strong (R5) rock.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/10/09

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card S26175

HOLE No. SSD-015-09

Job No. 33758654.00009 SR 90 Elevation 2537.9 ft (773.6 m)

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									PLT: Strong (R4) rock.		
									Bottom of boring at 21.5 feet depth below ground surface.		
	7										
25											
	8										
	9										
30											
	10										
35											
	11										
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 11/10/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-016-10

Job No. 33761951.00008 SR 90 Elevation 2542.4 ft (774.9 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Dennis Dunn

Start July 27, 2010 Completion July 27, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

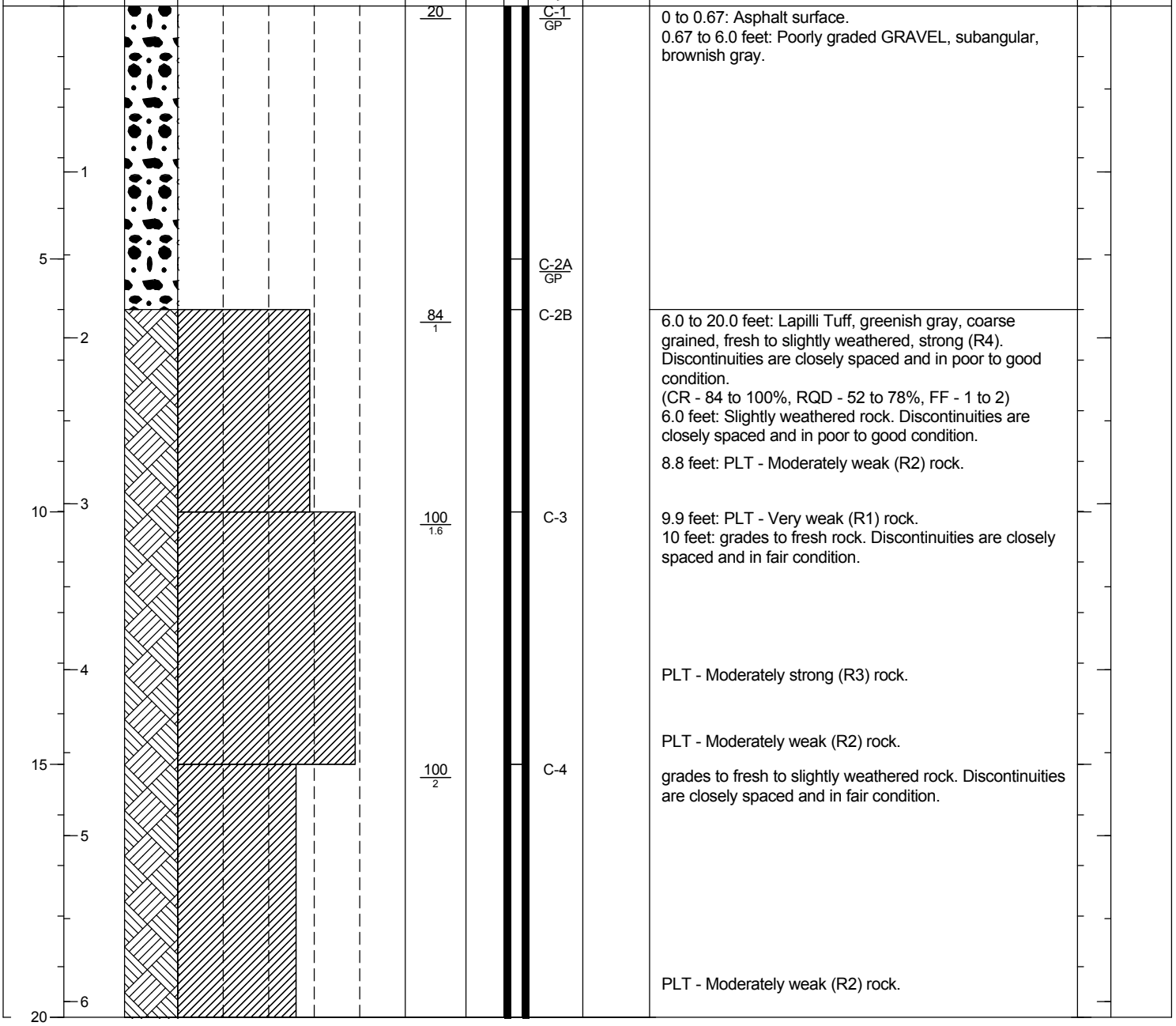
Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1067427.88 Easting 1753725.47 Latitude 47?1'26.00"N

Longitude 121?2'01.95"W

County Kittitas Subsection _____ Section _____ Range _____ Township_____



DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-016-10

Job No. 33761951.00008 SR 90 Elevation 2542.4 ft (774.9 m)

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									PLT - Moderately strong (R3) rock.		
									Borrom of boring at 20.0 feet. Backfilled to ground surface with bentonite chips. Asphalt was patched upon completion.		
	7										
25											
	8										
	9										
30											
	10										
35											
	11										
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-017-10

Job No. 33761951.00008 SR 90 Elevation 2540.4 ft (774.3 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Dennis Dunn

Start July 26, 2010 Completion July 1, 2710 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

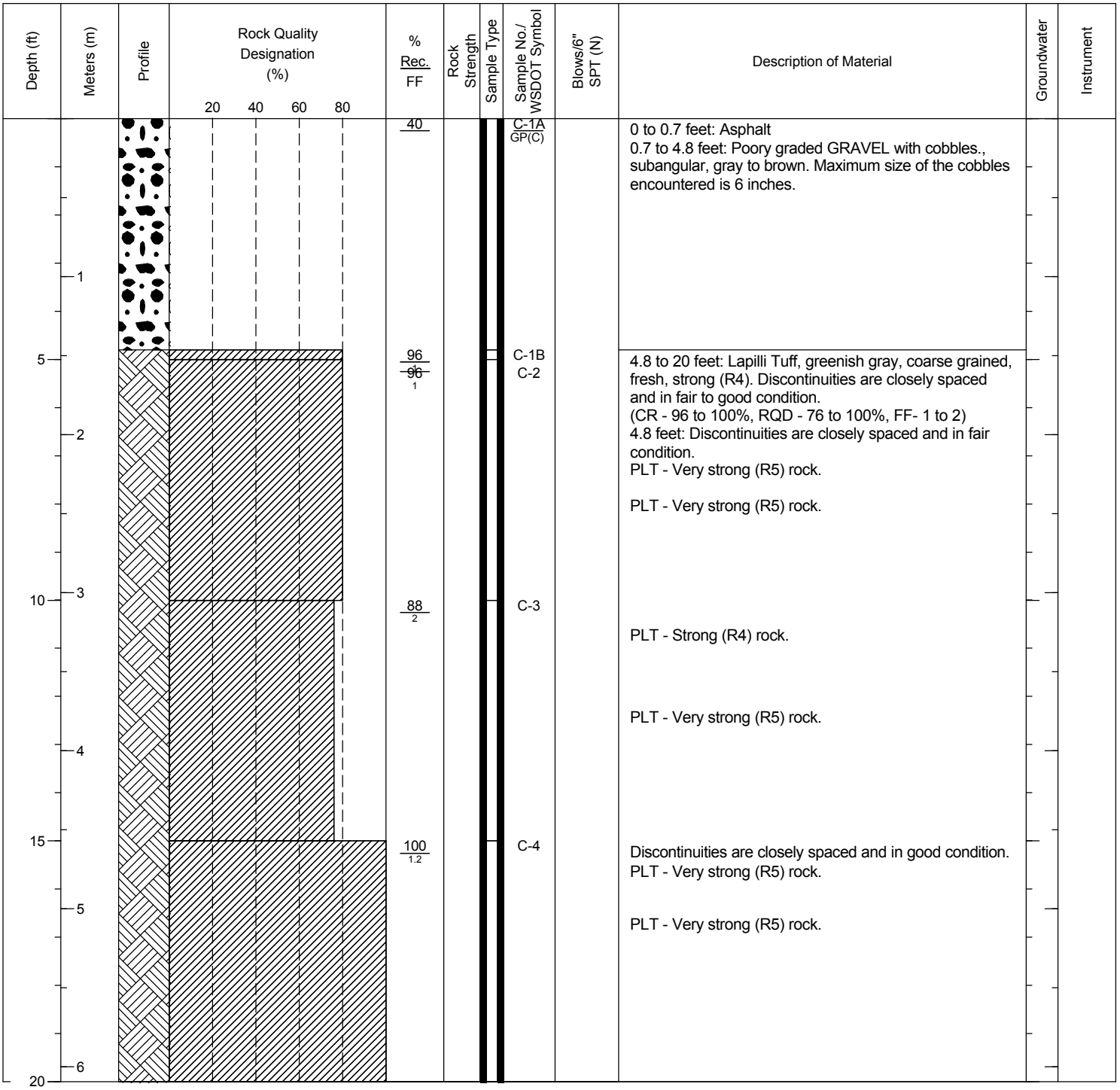
Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1067347.37 Easting 1753779.06 Latitude 47?1'25.21"N

Longitude 121?2'01.16"W

County Kittitas Subsection _____ Section _____ Range _____ Township_____



DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-017-10

Job No. 33761951.00008 SR 90 Elevation 2540.4 ft (774.3 m)

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									Bottom of boring at 20 feet depth below the ground surface. Backfilled to ground surface with bentonite chips. Asphalt was patched at completion.		
25	7										
	8										
30	9										
	10										
35	11										
	12										
40	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-018-10

Job No. 33761951.00008 SR 90 Elevation 2630.3 ft (801.7 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Dennis Dunn

Start July 20, 2010 Completion July 20, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1067398.25 Easting 1753891.93 Latitude 47?1'25.73"N

Longitude 121?1'59.53"W

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				34			C-1 GP(C)		0 to 35.0 feet: Poorly to well graded GRAVEL with cobbles and occasional boulders, subangular, loose to very dense, brown to gray, moist, no HCl reaction. 0 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
	1										
5				33			D-2 GP	6 4 5 (9)	grades to loose, poorly graded GRAVEL with sand.		
	2			49			C-3 GP(C)		6.5 feet: grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
10	3			27			D-4 GP	6 5 9 (14)	grades to medium dense, poorly graded GRAVEL with sand.		
				63			C-5 GP(C)		grades to poorly graded GRAVEL with cobbles. Note: Trace organics were observed.		
	4										
15				54			D-6 GP	20 35 50/3" (>50)	grades to very dense, poorly graded GRAVEL with sand and silt.		
	5			78			C-7 GP(C/B)		16.3 feet: grades to poorly graded GRAVEL with cobbles.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2630.3 ft (801.7 m)

HOLE No. SSD-018-10

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				53			D-8 / GP	16 28 16 (44)	grades to dense, poorly graded GRAVEL with sand.		
				69			C-9 / GP(C)		21.5 feet: grades to well graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
25	7			80			C-10 / GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders.		
	8										
	9										
30				66			C-11 / GP(C/B)				
	10										
35				88 0			C-12		35.0 to 55.0 feet: Lapilli Tuff, greenish gray, coarse grained, fresh, strong (R4). Discontinuities are medium to widely spaced and in fair to good condition. No HCl reaction (CR- 88 to 100%, RQD - 72 to 100%, FF - 0 to 1.2) 35.0 feet: Discontinuities are widely spaced and in good condition.		
	11										
	12										
40				100 0			C-13		40.2 feet: PLT - Strong (R4) rock.		
	13								PLT - Strong (R4) rock.		
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2630.3 ft (801.7 m)

HOLE No. SSD-018-10

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100 / 1.2			C-14		Discontinuities are medium spaced and in fair condition.		
	14										
									PLT - Strong (R4) rock.		
	15										
50				100 / 0.6			C-15		Discontinuities are medium spaced and in good condition.		
	16								PLT - Strong (R4) rock.		
									PLT - Strong (R4) rock.		
55									Bottom of boring at 55 feet depth below ground surface. Backfilled to ground surface with bentonite chips.		
	17										
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSD-019-10

Job No. 33761951.00008 SR 90 Elevation 2634.1 ft (802.9 m)

Sheet 1 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Dennis Dunn

Start July 21, 2010 Completion July 22, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1067406.61 Easting 1753896.56 Latitude 47?1'25.81"N

Longitude 121?1'59.46"W

County Kittitas Subsection _____ Section _____ Range _____ Township_____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									Note: This boring was drilled at a 45 degree angle into the rock slope. 0 to 35.0 feet: Poorly graded GRAVEL with cobbles and boulders, subangular, brown to gray.		
5	1										
	2			50			C-1 GP(C)		6 feet: Poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 3 inches.		
10	3			52			C-2 GP(C)		Maximum size of the cobbles encountered is 6 inches.		
	4										
15	5			68			C-3 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 14 inches.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2634.1 ft (802.9 m)

HOLE No. SSD-019-10

Sheet 2 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				56			C-4 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 10 inches.		
	7										
25				76			C-5 GP(C)				
	8										
	9										
30				68			C-6 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders.		
	10										
35				94 / 2			C-7		35.0 to 50.0 feet: Lapilli Tuff, greenish gray, coarse grained, fresh to slightly weathered, moderately strong (R3) to strong (R4). Discontinuities are moderately spaced and in fair to good condition. No HCl reaction. (CR - 84 to 100%, RQD - 40 to 94%, FF - 0.4 to 2.0) 35.0 feet: Slightly weathered, moderately strong (R3) rock. Discontinuities are closely spaced and in fair condition.		
	11										
	12										
40				84 / 1			C-8		grades to fresh, strong (R4) rock. Discontinuities are medium spaced and in good condition.		
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33761951.00008 SR 90 Elevation 2634.1 ft (802.9 m)

HOLE No. SSD-019-10

Sheet 3 of 3

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14			100 / 0.4			C-9				
	15										
50									Bottom of boring at 50.0 feet depth below ground surface. Backfilled to ground surface with bentonite chips.		
55	16										
	17										
	18										
60											
	19										
65											
	20										
	21										
70											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-004-08

Job No. 33758632.13000 SR 90 Elevation 2543.9 ft (775.4 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 19, 2008 Completion May 19, 2008 Well ID# Not Applicable Equipment 5500-1 (Skid rig) w/ manual-hammer

Station 1333+79.51 Offset 3.28'L Casing HW, HQ Method Wet Rotary

Northing 1068571.97 Easting 1752574.48 Latitude 47°21'37.167"N Longitude 121°22'18.848"W

County Kittitas Subsection SE1/4 of SW1/4 Section 26 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				68			C-1 GP(C/B)		0 to 0.3 feet: Asphalt concrete pavement. 0.3 to 13.6 feet: Poorly graded GRAVEL with or without sand, occasional cobbles and boulders, subangular, dense to very dense, brown to gray, wet, homogeneous, HCl reaction not tested. 0.3 feet: Poorly graded GRAVEL with cobbles and boulders. 2.5 feet: grades to poorly graded GRAVEL.		
	1			60			D-2 GP	13 34 24 (58)			
				90			C-3 GP				
5				46			C-4 GP(C/B)		grades to poorly graded GRAVEL with occasional cobbles and boulders. 7 feet: loss of drilling circulation.		
	2										
				48			C-5A GP(C/B)				
10	3										
	4										
				100 / 2.5			C-5B		13.6 to 17.5 feet: Meta welded lapilli tuff, dark greenish gray, medium grained, fresh, strong (R4) rock. Discontinuities are closely spaced and in fair condition. (CR=94-100%, 44-100%, FF=2.28-2.5)		
15	5			94 / 2.28			C-6				
	6								Bottom of boring at 17.5 feet below ground surface (bgs). Backfilled with asphalt material from 0 to 0.8 ft bgs, with silty sand with gravel from 0.8 to 3.8 ft bgs and with bentonite chips from 3.8 to 17.5 ft bgs.		
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/14/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-005-08

Job No. 33758632.13000 SR 90 Elevation 2545.7 ft (775.9 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 15, 2008 Completion May 15, 2008 Well ID# Not Applicable

Equipment 5500-1 (Skid rig) w/ manual-hammer

Station 1333+99.62 Offset 25.61'R Casing HW, HQ

Method Wet Rotary

Northing 1068553.67 Easting 1752549.96 Latitude 47°21'36.984"N

Longitude 121°22'19.201"W

County Kittitas Subsection SE1/4 of SW1/4 Section 26 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.3 feet: Asphalt concrete pavement. 0.3 to 6.5 feet: Silty SAND with gravel to silty GRAVEL with sand, subangular, medium dense to dense, brown to gray, moist to wet, homogenous, no HCl reaction.		
				67			D-1 SM	14 18 19 (37)	2.0 feet : Dense, silty SAND with gravel.		
	1										
5				27			D-2 GM	5 6 6 (12)	grades to medium dense, silty GRAVEL with sand.		
	2										
				20			D-3 SP	5 3 5 (8)	6.5 to 13.7 feet: Poorly graded SAND with gravel, subangular, loose, gray, wet, homogenous, no HCl reaction. 7 feet: Poorly graded SAND with gravel.		
10	3			0			D-4 SP/SM	9 4 3 (7)	No recovery. Material was probably washed away. Material is probably poorly graded SAND or silty SAND.		
				18			C-5 SP		grades to poorly graded SAND with gravel.		
	4										
				54			C-6 GP(C)		13.7 to 18 feet: Poorly graded GRAVEL with sand and cobbles, angular, very dense, gray, moist, homogenous, no HCl reaction.		
15				0			D-7	50 for 4"			
				85			C-8 GP(C)	(>50)			
	5										
									Bottom of boring at 18.0 feet below ground surface (bgs). Backfilled with asphalt material from 0 to 0.4 ft bgs, with silty sand with gravel from 0.4 to 6.0 ft bgs and with bentonite chips from 6 ft to 18 ft bgs.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/14/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-006-08

Job No. 33758632.13000 SR 90 Elevation 2539.3 ft (774.0 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 15, 2008 Completion May 15, 2008 Well ID# Not Applicable

Equipment 5500-1 (Skid rig) w/ manual-hammer

Station 1368+15.88 Offset 39.82'R Casing HW, HQ

Method Wet Rotary

Northing 1065655.09 Easting 1754212.1 Latitude 47°21'08.562"N

Longitude 121°21'54.601"W

County Kittitas Subsection SE1/4 of NE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.2 feet: Asphalt concrete pavement. 0.2 to 4.5 feet: Poorly graded to well graded GRAVEL with sand, subrounded to angular, very dense, gray, wet, homogenous, HCl reaction not tested.		
							D-1 / GW	50 for 6" (>50)	2.5 feet: Well graded GRAVEL with sand.		
	1						D-2 / GP C-3	50 for 5.5" (>50)	grades to poorly graded GRAVEL with sand.		
5				82 / 1.1					4.5 to 9.0 feet: Meta welded Lapilli Tuff, gray, fine to medium grained, fresh, strong (R4) rock, Discontinuities are closely spaced, and in fair condition. CR= 82%, RQD= 60%, FF= 1.1		
	2										
	3								Bottom of boring at 9.0 feet below ground surface (bgs). Backfilled with asphalt material from 0 to 0.7 feet, with silty sand with gravel from 0.7 to 3.7 ft bgs and with bentonite chips from 3.7 to 9.0 ft bgs.		
10											
	4										
15											
	5										
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/14/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-008-08

Job No. 33758632.13000 SR 90 Elevation 2523.6 ft (769.2 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 15, 2008 Completion May 15, 2008 Well ID# Not Applicable Equipment 5500-1 (Skid rig) w/ manual-hammer

Station 1498+02.93 Offset 27.45'R Casing HW, HQ Method Wet Rotary

Northing 1056534.31 Easting 1761343.12 Latitude 47°19'39.318"N Longitude 121°20'09.651"W

County Kittitas Subsection NW1/4 of SW1/4 Section 10 Range 12E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
							C-0 GP		0 to 8.5 feet: Poorly graded GRAVEL with sand, occasional well graded SAND with gravel, occasional cobbles and boulders, subangular, dense to very dense, light brown to gray, wet, homogenous, HCl reaction not tested. 0 feet: Poorly graded GRAVEL with sand.		
				44			D-1 SW	19 18 11 (29)	grades to well graded SAND with gravel.		
	1			100			C-2 GP		grades to poorly graded GRAVEL.		
5				100			D-3 GP	50 for 4" (>50)	grades to poorly graded GRAVEL with cobbles.		
	2			72			C-4 GP(C)				
									Bottom of boring at 8.5 feet below ground surface. Backfilled to ground surface with bentonite chips.		
10	3										
	4										
15	5										
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/14/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-009-08

Job No. 33758632.13000 SR 90 Elevation 2535.7 ft (772.9 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 15, 2008 Completion May 15, 2008 Well ID# Not Applicable

Equipment 5500-1 (Skid rig) w/ manual-hammer

Station 1438+90.59 Offset 156.61'L Casing HW, HQ

Method Wet Rotary

Northing 1060905.38 Easting 1757638.51 Latitude 47°20'22.060"N

Longitude 121°21'04.104"W

County Kittitas Subsection NE1/4 of NW1/4 Section 1 Range 12E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				50			D-1 SM	17 25 22 (47)	0 to 4.0 feet: Silty SAND with gravel, subangular, dense, brownish gray, moist, homogenous, no HCl reaction.		
5	1			73			D-2 SC	8 21 50 for 5.5" (>50)	4.0 to 6.5 feet : Clayey SAND, subangular to angular (for coarse granular particles), very dense, reddish brown, moist, medium plasticity, no HCl reaction.		
	2			67			D-3 SM	16 26 21 (47)	6.5 to 8.5 feet: Silty SAND with gravel, subangular, dense, brownish gray, moist, homogenous, no HCl reaction.		
10	3								Bottom of boring at 8.5 feet below ground surface (bgs). Backfilled to ground surface with bentonite chips.		
15	4										
20	5										
	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/14/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-010-08

Job No. 33758632.13000 SR 90 Elevation 2533.5 ft (772.2 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 8, 2008 Completion May 8, 2008 Well ID# Not Applicable Equipment 5500-1 (Skid rig) w/ manual-hammer

Station 1384+03.92 Offset 89.46'L Casing HW, HQ Method Wet Rotary

Northing 1064103 Easting 1754598.28 Latitude 47°20'53.288"N Longitude 121°21'48.747"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.5 feet: Asphalt concrete pavement. 0.5 to 6.5 feet : Silty GRAVEL to well graded GRAVEL with sand, subrounded, medium dense, brown, moist, homogenous, no HCl reaction.		
				50			D-1 GM	7 13 9 (21)			
	1										
5				33			D-2 GW	5 10 6 (16)	grades to well graded GRAVEL with sand.		
	2								6.5 to 8.5 feet: Silty SAND with gravel, subrounded, very loose, brown, moist, homogenous, no HCl reaction.		
				40			D-3 SM	1 1 0 (1)			
									Bottom of boring at 8.5 feet below ground surface (bgs). Backfilled with asphalt patching material from 0 to 0.6 ft bgs and with silty SAND with gravel from 0.6 to 8.5 ft bgs.		
10	3										
	4										
15											
	5										
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/14/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-011-08

Job No. 33758632.13000 SR 90 Elevation 2533.5 ft (772.2 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 14, 2008 Completion May 14, 2008 Well ID# Not Applicable Equipment 5500-1 (Skid rig) w/ manual-hammer

Station 1390+60.39 Offset 68.91'L Casing HW, HQ Method Wet Rotary

Northing 1064102.09 Easting 1754602.45 Latitude 47°20'53.279"N Longitude 121°21'48.686"W

County Kittitas Subsection NE1/4 of SE1/4 Section 35 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				47			D-1 GP	18 14 24 (38)	0 to 6.5 feet: Poorly graded GRAVEL to silty GRAVEL with sand, angular, dense to very dense, brown to gray, wet, homogenous, HCl reaction not tested. 2.5 feet: Dense, poorly graded GRAVEL with sand.		
	1			100			C-2 GP				
5				80			D-3 GM	12 50 for 6" (>50)	grades to very dense, silty GRAVEL with sand.		
	2			0			C-4a GM				
				100 / 0.8			C-4b		6.5 to 13.5 feet: Metawelded lapilli tuff, gray to brown, fine to medium grained, slightly to moderately weathered, moderately weak (R2) to moderately strong (R3) rock. Discontinuities are closely spaced, and in poor to fair condition. CR=100%, RQD= 54%-80%, FF= 0.8 to 2.2		
				100 / 2.2			C-5		6.5 feet: Slightly weathered, moderately strong (R3) rock. Discontinuities are in fair condition.		
10	3								9.7 feet: grades to moderately weathered, moderately weak (R2) rock. Discontinuities are in poor to fair condition.		
	4								Bottom of boring at 13.5 feet below ground surface. Backfilled to ground surface with bentonite chips.		
15	5										
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/14/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-012-08

Job No. 33758632.13000 SR 90 Elevation 2535.4 ft (772.8 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 20, 2008 Completion May 20, 2008 Well ID# Not Applicable Equipment 5500-1 (Skid rig) w/ manual-hammer

Station 1290+81.52 Offset 120.21'L Casing HW, HQ Method Wet Rotary

Northing 1072660.5 Easting 1751733.15 Latitude 47°22'17.420"N Longitude 121°22'31.725"W

County Kittitas Subsection NE1/4 of NW1/4 Section 26 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				56			C-1 GP		0 to 0.2 feet: Asphalt concrete pavement. 0.2 to 8.2 feet: Poorly graded GRAVEL with or without sand, occasional boulders, subangular, dense to very dense, dark bluish gray to yellowish red, wet, homogenous, HCl reaction not tested. 0.2 feet: Poorly graded GRAVEL with sand.		
				50			D-2 GP	4 50 for 6" (>50)			
	1			100			C-3 GP(B)		grades to poorly graded GRAVEL with boulders.		
5							C-4 GP		grades to poorly graded GRAVEL.		
	2										
									Bottom of boring at 8.2 feet below ground surface. Backfilled to ground surface with bentonite chips.		
10	3										
	4										
15											
	5										
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/14/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-022-09

Job No. 33758654.00009 SR 90 Elevation 2534.0 ft (772.4 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Pam Craig

Start June 17, 2009 Completion June 17, 2009 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station 1383+44 (Nov. 2007) Offset _____ Casing HQ

Method Wet Rotary

Northing 1064145.37 Easting 1754609 Latitude 47°20'53.02"N

Longitude 121°21'51.16"W

County Kittitas Subsection _____ Section _____ Range _____ Township_____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				67			D-1 SW	2 8 9 (17)	0 to 7.0 feet: Well graded GRAVEL, silty GRAVEL with sand or well graded SAND with gravel, angular to subangular, medium dense to dense, reddish brown, brownish gray or greenish gray, homogenous, moist, no HCl reaction.		
				29			C-3 GW		0 feet: Medium dense, well graded SAND with gravel. 1.5 feet: grades to well graded GRAVEL.		
	1			60			D-2 GM	30 28 14 (42)	grades to dense, silty GRAVEL with sand.		
5				80			C-4A GW		grades to well graded GRAVEL.		
	2			80 / 1.4			C-4B		7.0 to 10.5 feet: Meta welded Lapilli Tuff, greenish gray, fine to medium grained, fresh, moderately weak (R2) to strong (R4). Discontinuities are closely spaced and in fair to poor condition. weak HCl reaction. (CR = 80 to 100%, RQD = 71 to 81%, FF = 1 to 2) 7.0 feet: Strong (R4) rock.		
10	3			100 / 2			C-5		PLT: strong (R4) rock.		
	4										
15				100 / 1			C-6		grades to moderately weak (R2) rock. PLT: moderately strong (R3) rock.		
	5										
									Bottom of boring at 18.0 feet below the existing ground surface. Backfilled to ground surface with bentonite chips.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/21/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-025-10

Job No. 33761951.00008 SR 90 Elevation 2524.7 ft (769.5 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start April 29, 2010 Completion April 29, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing HQ

Method Wet Rotary

Northing 1060275.51 Easting 1757906.28 Latitude 47?0'15.87"N

Longitude 121?1'00.12"W

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				67			D-1 SM	1 2 13 (15)	0 to 21.5 feet: Silty SAND with gravel or silty GRAVEL or poorly graded GRAVEL with sand, occasional cobbles, angular to subrounded, medium dense to very dense, gray to yellowish to reddish brown, wet, homogenous, no HCl reaction. 0 feet: Medium dense, silty SAND with gravel.		
5	1			80			D-2 SM	3 5 29 (34)			
	2								8 feet: grades to medium dense, silty GRAVEL with sand.		
10	3			33			D-3 GM	5 6 11 (17)			
	4										
15	5			100/23			D-4 CB/C-5A GP (C)	50/3" (>50)	grades to very dense, poorly graded GRAVEL with sand with occasional cobbles. Maximum size of the cobbles encountered is 3.5 inches.		
				34			C-5B GM (C)		16.5 feet: grades to silty GRAVEL with sand and cobbles.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-025-10

Job No. 33761951.00008 SR 90 Elevation 2524.7 ft (769.5 m)

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Richard Cooper Lic# 2964T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100			D-6 SM	9 24 50 (74)	20.0 feet: Very dense, silty SAND with fine gravel.		
									Bottom of boring at 21.5 feet depth below the existing ground surface. Backfilled to ground surface with bentonite chips.		
	7										
25											
	8										
	9										
30											
	10										
35											
	11										
	12										
40											
	13										
45											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-026-10

Job No. 33761951.00008 SR 90 Elevation 2534.3 ft (772.5 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start May 13, 2010 Completion May 13, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing HQ

Method Wet Rotary

Northing 1066156.43 Easting 1754183.67 Latitude 47?1'13.51"N

Longitude 121?1'55.09"W

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				25			C-1 GW		0 to 4.0 feet: Well graded GRAVEL with sand, angular to subangular, brownish gray to gray, wet, homogenous, no HCl reaction.		
	1										
				80 / 3.0			C-2		4.0 to 13.0 feet: Meta Welded Lapilli Tuff, gray, fine to medium grained, fresh, moderately strong (R3) to strong (R4). Discontinuities are closely to medium spaced and in good condition. Weak HCl reaction. (CR = 80 to 100%, RQD = 30 to 97%, FF = 1.0 to 3.0) Discontinuities are closely to medium spaced.		
5				88 / 1.4			C-3		5.5 feet: PLT - strong (R4) rock		
	2										
10	3			100 / 1.0			C-4		9.8 feet: PLT - strong (R4) rock		
									12.4 feet: PLT - strong (R4) rock		
	4								Bottom of the boring at 13.0 feet below the existing ground surface. Backfilled to ground surface with bentonite chips.		
15											
	5										
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-027-10

Job No. 33761951.00008 SR 90 Elevation 2535.1 ft (772.7 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start May 12, 2010 Completion May 12, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing HQ

Method Wet Rotary

Northing 1065929.36 Easting 1754220.23 Latitude 47?1'11.27"N

Longitude 121?1'54.53"W

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				47			C-1A GP		0 to 0.3 feet: Asphalt 0.3 to 2.1 feet: Poorly graded GRAVEL, angular , gray, wet, homogenous, no HCl reaction.		
				100 / 3.6			C-1B		2.1 to 9.0 feet: Meta Welded Lapilli Tuff, gray to brownish gray, fine to medium grained, slightly weathered, moderately weak (R2) to very strong (R5). Discontinuities are very closely to closely spaced and in poor to fair condition. No HCl reaction. (CR = 60 to 100%, RQD = 0 to 44%, FF = 1.6 to 3.5) 3.5 feet: grades to strong (R4) rock. Discontinuities are closely spaced.		
5	1			60 / 1.6			C-2				
	2			90 / 2.7			C-3		PLT - very strong (R5) rock 6.0 feet: grades to moderately strong (R3) to strong (R4) rock. Discontinuities are in poor to fair condition. 6.6 feet: PLT - very strong (R5) rock		
10	3								Bottom of boring at 9.0 feet below the existing ground surface. Backfilled to ground surface with bentonite chips.		
	4										
15	5										
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SSE-028-10

Job No. 33761951.00008 SR 90 Elevation 2534.6 ft (772.5 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start May 12, 2010 Completion May 12, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

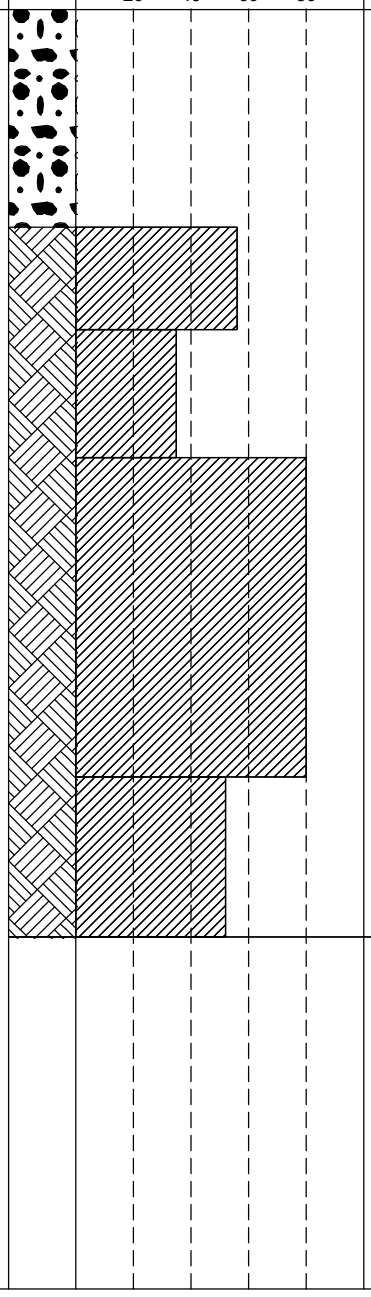
Station _____ Offset _____ Casing HQ

Method Wet Rotary

Northing 1065705.15 Easting 1754278.75 Latitude 47?1'09.06"N

Longitude 121?1'53.64"W

County Kittitas Subsection _____ Section _____ Range _____ Township_____



Depth (ft)	Meters (m)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
		25			C-1 GP		0 to 3.4 feet: Poorly graded GRAVEL with sand, angular to subrounded, gray to brown, wet, homogenous, no HCl reaction.		
		14			C-2A				
	1	100 / 2.5			C-2B		3.4 to 14.5 feet: Meta Welded Lapilli Tuff, gray, fine to medium grained, fresh, strong (R4) to very strong (R5). Discontinuities are closely to medium spaced and in fair to good condition. Weak HCl reaction. (CR = 35 to 100%, RQD = 35% to 80%, FF = 0.0 to 2.5)		
5		35 / 0			C-3		3.4 feet: Meta Welded Lapilli Tuff, gray, fine to medium grained, fresh, strong (R4) to very strong (R5). Discontinuities are closely spaced and in good condition.		
	2	100 / 1.0			C-4		4.3 feet: PLT - very strong (R5) rock 7.0 feet: grades to strong (R4) rock. Discontinuities are closely to medium spaced and in fair to good condition.		
10	3						PLT - very strong (R5) rock		
		100 / 1.6			C-5				
	4								
15							Bottom of boring at 14.5 feet depth below the existing ground surface. Backfilled to ground surface with bentonite chips.		
	5								
	6								
20									

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card R-72626

HOLE No. SW2-006-08(I)

Job No. 33758632.13000 SR 90 Elevation 2540.9 ft (774.5 m)

Sheet 1 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Kerry Cooper

Start October 21, 2008 Completion October 22, 2008 Well ID# Not Applicable

Equipment CME 45 (skid-rig) w/auto-hammer

Station Offset Casing

Method Wet rotary

Northing 1061806.28 Easting 1754681.83 Latitude Longitude

County Kittitas Subsection NE 1/4 of NE 1/4 Section 2 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									Samples were not collected at this boring location. URS did not inspect this boring. Stratigraphical information was provided by WSDOT Field Exploration Unit.		
	1										
5											
	2										
10	3										
	4										
15											
	5										
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-72626

HOLE No. SW2-006-08(I)

Job No. 33758632.13000 SR 90 Elevation 2540.9 ft (774.5 m)

Sheet 2 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
25	7										
	8										
30	9										
	10										
35	11										
	12										
40	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-72626

HOLE No. SW2-006-08(I)

Job No. 33758632.13000 SR 90 Elevation 2540.9 ft (774.5 m)

Sheet 3 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
50	14										
	15										
55	16										
	17										
60	18										
	19										
65	20										
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card R-72626

HOLE No. SW2-006-08(I)

Job No. 33758632.13000 SR 90 Elevation 2540.9 ft (774.5 m)

Sheet 4 of 4

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	22										
75	23										
	24										
80	25										
	26										
85	27										
	28										
90											
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SW2-007-08

Job No. 33758632.13000 SR 90 Elevation 2401.2 ft (731.9 m)

Sheet 1 of 5

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Drilling Contractor WSDOT Field Exploration Unit

Inspector Pam Craig

Start September 9, 2008 Completion September 11, 2008 Well ID# Not Applicable Equipment CME 45 (barge-rig) w/auto-hammer

Station 1406+35.35 Offset 236.95'R Casing HQ 82", NQ Method Wet rotary

Northing 1061810.175 Easting 1754416.496 Latitude _____ Longitude _____

County Kittitas Subsection NE 1/4 of NE 1/4 Section 2 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 79 feet: Poorly graded GRAVEL with cobbles and boulders, subrounded to subangular, medium dense to very dense, greenish gray, wet, none to strong HCl reaction.		
							D-1 GP(B)	15 18 3 (21)	2 feet: Medium dense, poorly graded GRAVEL with boulders. No HCl reaction. Maximum size of the boulders encounetered is 15 inches.		
	1			28			C-2 GP(B)				
5	2										
10	3										
	4			14			D-3 GP	12	13 feet: grades to very dense, poorly graded GRAVEL.		
				36			C-4 GP(B)	50 for 2" (>50)	grades to poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 20 inches.		
15	5										
				62			C-5 GP(B)				
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2401.2 ft (731.9 m)

HOLE No. SW2-007-08

Sheet 2 of 5

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	7			54			C-6 GP(B)				
25	8										
				48			C-7 GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 8 inches. Strong HCl reaction.		
30	9										
	10			26			C-8 GP(B)		grades to poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 1 foot. No HCl reaction.		
35	11										
				44			C-9 GP(B)				
40	12										
	13			47			C-10 GP(B)		Maximum size of the boulders encountered is 5 feet.		
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2401.2 ft (731.9 m)

HOLE No. SW2-007-08

Sheet 3 of 5

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
	15										
50											
	16			31			C-11 / GP		grades to poorly graded GRAVEL.		
55											
	17										
	18										
60											
	19			25			C-12 / GP(C)		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 6 inches.		
65											
	20										
	21										
70											

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

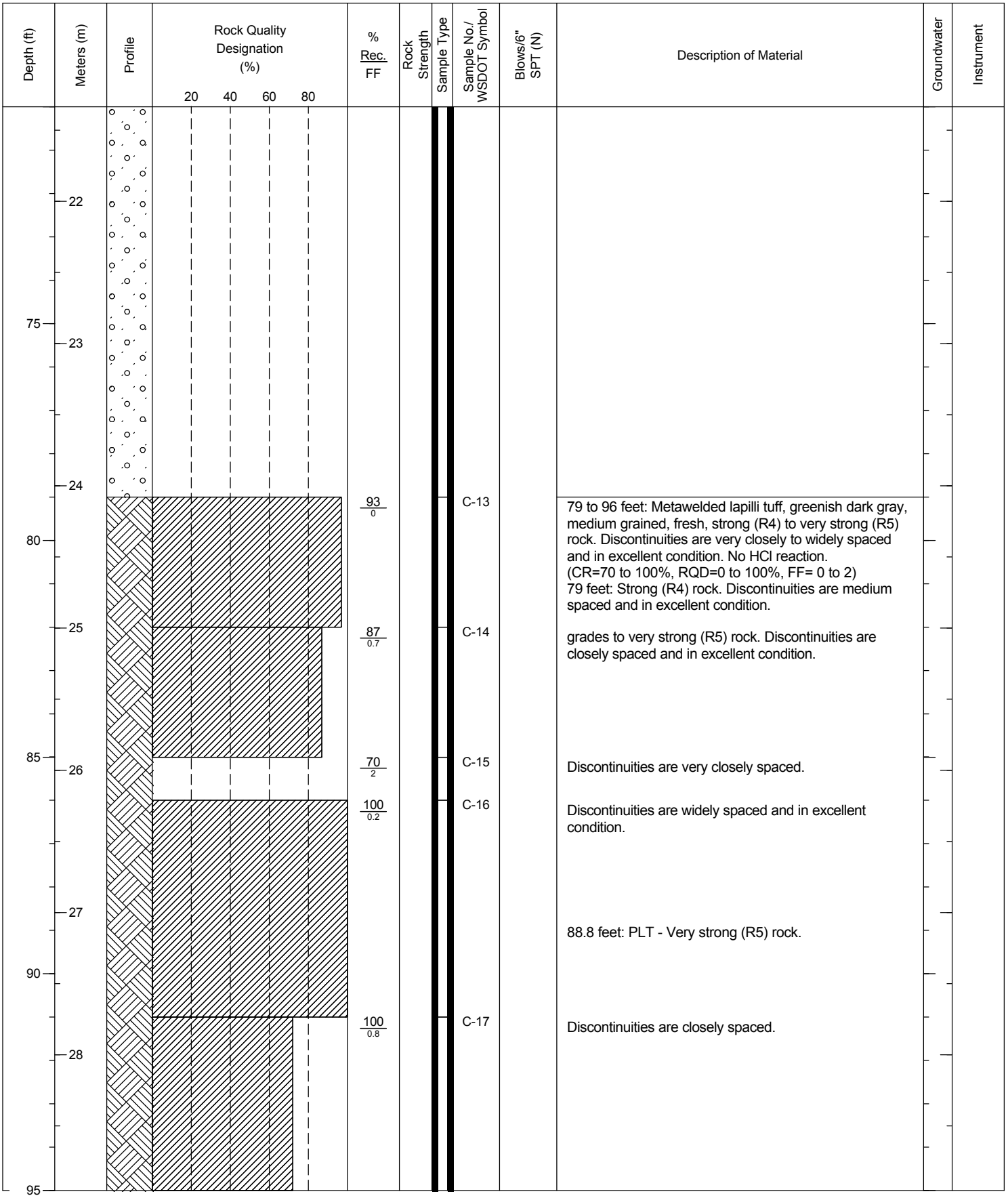
Job No. 33758632.13000 SR 90 Elevation 2401.2 ft (731.9 m)

HOLE No. SW2-007-08

Sheet 4 of 5

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552



DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2401.2 ft (731.9 m)

HOLE No. SW2-007-08

Sheet 5 of 5

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29								95.5 feet: PLT - Very strong (R5) rock.		
									Bottom of boring at 96 feet below the mudline.		
									Lake level measurements (above mudline):		
									-9/9/08 at 13:50: 66 feet above mudline -9/10/08 at 09:05: 65 feet above mudline -9/11/08 at 09:15: 63 feet above mudline		
	30										
100											
	31										
105	32										
	33										
110											
	34										
	35										
115											
	36										
120											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SW2-008-08

Job No. 33758632.13000 SR 90 Elevation 2343.2 ft (714.2 m)

Sheet 1 of 6

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Drilling Contractor WSDOT Field Exploration Unit

Inspector Pam Craig/Dave Walker/Xiangdong Han

Start September 12, 2008 Completion September 17, 2008 Well ID# Not Applicable Equipment CME 45 (barge-rig) w/auto-hammer

Station 1406+31.65 Offset 503.28'R Casing _____ Method Wet rotary

Northing 1061661.068 Easting 1754195.773 Latitude _____ Longitude _____

County Kittitas Subsection NE 1/4 of NE 1/4 Section 2 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 10.5 feet: Poorly graded GRAVEL with sand or well graded SAND with gravel, medium dense to very loose, subangular to subrounded, reddish brown to greenish gray, wet, homogenous, no HCl reaction.		
	1			6			D-1 GP	2 12 8 (20)	3 feet: Medium dense, poorly graded GRAVEL with sand.		
5				7			C-2 GP				
	2								Note: soft material was encountered at 7 feet per driller's observation.		
				100			D-3 SW	3 1 0 (1)	grades to very loose, well graded SAND.		
10	3								10.5 to 32 feet: CLAY/clayey SILT with or without trace of sand, very soft to soft, medium plasticity, gray, moist, homogenous, no HCl reaction, slow dilitancy.		
	4										
15											
	5										
				100			D-4 CL	0 0 0	19.0 feet: Very soft to soft CLAY (medium plasticity, slow dilitancy) Field Torvane results= 0.28 ksf.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2343.2 ft (714.2 m)

HOLE No. SW2-008-08

Sheet 2 of 6

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
								(0)			
	7			100			U-5 / ML		grades to SILT. Field Torvane results=0.16 ksf		
25											
	8			13			C-6 / ML		grades to very soft clayey SILT, trace of fine SAND, low plasticity.		
30	9										
	10								32 to 124.0 feet: Well graded to poorly graded SAND with gravel, occasionally silty, occasionally well graded to poorly graded GRAVEL, occasional cobbles and boulders, subrounded to subangular, greenish gray to bluish gray to gray, wet, homogenous, no HCl reaction.		
				94			D-7 / SM	3	34.0 feet: Loose, silty SAND.		
35								3			
								6			
				12			C-8 / GW	(9)	grades to well graded GRAVEL.		
	11										
	12										
40											
	13										
				100			D-9	7	grades to medium dense, poorly grades SAND.		
45								13			
								12			

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2343.2 ft (714.2 m)

HOLE No. SW2-008-08

Sheet 3 of 6

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
								(25)			
	14			18			C-10 SP-SW		grades to poorly to well graded SAND with gravel, trace of silt.		
	15										
50											
	16										
				50			D-11 SW	9 12 11 (23)	grades to well graded SAND with gravel.		
55											
	17			24			C-12 SW				
	18										
60											
	19										
				67			D-13 GW	13 18 15 (33)	grades to dense, well graded GRAVEL with sand.		
65											
	20			35			C-14 SW		grades to well graded SAND with gravel.		
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2343.2 ft (714.2 m)

HOLE No. SW2-008-08

Sheet 4 of 6

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	22										
				44			D-15 GW	10 17 13 (30)	grades to well graded GRAVEL with sand.		
75	23			35			C-16A SW		grades to well graded SAND with gravel		
	24										
80				100			C-16B GP(B)		grades to poorly graded GRAVEL with boulders. Maximum size of the boulders encountered is 2.7 feet.		
	25										
				100			C-17 GP(B)		Maximum size of the boulders encountered is 3.3 feet.		
85	26										
				66			C-18 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders. Maximum size of the boulders encountered is 14 inches.		
	27										
90											
	28										
				17			D-19 SM		grades to silty SAND (fine) with gravel.		
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2343.2 ft (714.2 m)

HOLE No. SW2-008-08

Sheet 5 of 6

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29										
	30										
100											
	31								grades to dense, poorly graded SAND (fine to medium) with gravel.		
				39			D-20 SP	10 18 27 (45)			
105	32										
	33										
110											
	34										
				0			D-21	50/0"	No recovery. Material is probably well graded GRAVEL with boulders and cobbles.		
				47			C-21 GW(C/B)		grades to well graded GRAVEL with boulders and cobbles. Maximum size of the boulders encountered is 17 inches.		
115	35										
	36										
120											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State
Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SW2-008-08

Job No. 33758632.13000 SR 90 Elevation 2343.2 ft (714.2 m)

Sheet 6 of 6

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	37										
	38								Bottom of boring at 124 feet below the mudline. Lake level measurements (above the mudline): -9/12/08 at 11:30: 124 feet above the mudline -9/13/08 at 9:15: 124 feet above the mudline		
125											
	39										
130											
	40										
	41										
135											
	42										
140											
	43										
	44										
145											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. SW2-009-08

Job No. 33758632.13000 SR 90 Elevation 2339.7 ft (713.1 m)

Sheet 1 of 5

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Drilling Contractor WSDOT Field Exploration Unit

Inspector Pam Craig

Start September 23, 2008 Completion September 24, 2008 Well ID# Not Applicable

Equipment CME 45 (barge-rig) w/auto-hammer

Station 1407+69.19 Offset 496.54' R Casing HWT, HQ

Method Wet rotary

Northing 1061520.343 Easting 1754312.452 Latitude _____

Longitude _____

County Kittitas Subsection NE 1/4 of NE 1/4 Section 2 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				56			D-1 SM	5 6 2 (8)	0 to 17 feet: Silty SAND with fine gravel and silt to poorly graded GRAVEL with cobbles and boulders, subrounded to subangular, loose to dense, light reddish brown to greenish dark gray, wet, homogenous, no HCl reaction. 1.0 feet: Loose, silty SAND with fine gravel.		
				16			C-2 GP(C/B)		grades to poorly graded GRAVEL with cobbles and boulders.		
	1										
5											
	2										
	3										
10											
	4										
15											
	5								17 to 55.5 feet: Organic CLAY to CLAY, soft to very soft, brownish dark gray or light to medium gray, wet, homogenous, no HCl reaction with occasional clayey/silty GRAVEL with sand and clayey or silty SAND with fine gravel or poorly graded SAND (fine to medium), subrounded to angular, brown to dark gray, wet, homogenous, no HCl reaction.		
				100			D-3 OH	6 7 7	17 feet: Organic CLAY (high plasticity).		
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2339.7 ft (713.1 m)

HOLE No. SW2-009-08

Sheet 2 of 5

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
							SM	(14)	grades to medium dense, well graded SAND.		
									grades to clayey silty GRAVEL with sand.		
	7										
				4			C-4 GM/GC				
25											
	8										
				6			D-5 SW	6 7 2 (9)	grades to loose, well graded SAND with gravel.		
	9										
30											
	10										
35											
	11								grades to very soft CLAY.		
				100			D-6 CL	0 0 0 (0)			
	12										
40											
	13										
							D-7 CL				
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2339.7 ft (713.1 m)

HOLE No. SW2-009-08

Sheet 3 of 5

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	14										
	15										
50											
	16										
				100			D-8 SM	3 3 2 (5)	Material is probably loose, poorly graded SAND (fine) per driller's observations.		
55											
	17			6			C-9 GW		55.5 to 117.0 feet: Well graded GRAVEL with sand or poorly graded to silty SAND (fine) with or without gravel, subrounded to subangular, loose to very dense, brown to dark gray, wet, homogenous, no HCl reaction. 55.5 feet: Well graded GRAVEL.		
	18										
60											
	19										
							D-10 SP		grades to loose, poorly graded SAND (fine).		
65											
	20						D-11 SP	4 4 4 (8)			
	21										
70											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2339.7 ft (713.1 m)

HOLE No. SW2-009-08

Sheet 4 of 5

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	22										
75	23			61			D-12 SM	5 7 6 (13)	grades to medium dense, silty SAND (fine) with gravel.		
	24										
80											
	25										
85	26						D-13 SM	12 12 9 (21)			
				16			C-14 GW(C)		grades to well graded GRAVEL with cobbles.		
	27										
90											
	28										
95											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2339.7 ft (713.1 m)

HOLE No. SW2-009-08

Sheet 5 of 5

Project I-90 Snoqualmie Pass East

Driller Kerry Cooper Lic# 2552

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
	29			39			D-15 SP	10 12 16 (28)	grades to dense, poorly graded SAND (fine to medium) with gravel.		
	30										
100											
	31										
105	32			0			D-16 SW	38 42 22 (64)	grades to dense, well graded SAND with gravel.		
				80			C-17 GW/GM		grades to well graded GRAVEL. grades to silty GRAVEL. grades to poorly graded GRAVEL with boulders.		
	33										
110											
	34			90 1.8			C-18		111.0 to 117.0 feet: Lapilli Tuff, light greenish gray, coarse-grained, moderately weathered, very weak rock (R1). Discontinuities are closely to medium spaced, no HCl reaction. CR=80-100%, RQD=35-70%, FF=1.75 to 6		
115	35			100 0.3			C-19				
	36								Bottom of boring at 117.0 feet below the mudline. Boring was backfilled with bentonite chips. Lake level measurements (above the mudline): -9/23/08 at 9:30: 127 feet above the mudline.		
120											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TCC-001-08

Job No. 33758632.13000 SR 90 Elevation 2526.0 ft (769.9 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T

Drilling Contractor WSDOT Field Exploration Unit

Inspector Xiangdong Han

Start September 8, 2008 Completion September 8, 2008 Well ID# Not Applicable

Equipment CME 45 (skid-rig) w/ auto-hammer

Station 1484+61.30 Offset 204.24'L Casing HWT, HQ

Method Wet Rotary

Northing 1057362.371 Easting 1760277.015 Latitude 47°19'47.377"N

Longitude 121°20'25.253"W

County Kittitas Subsection SE1/4 of SE1/4 Section 1 Range 11E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 21 feet: Silty SAND with gravel, occasional silty GRAVEL and well graded SAND with gravel, occasional cobbles and boulders, subangular, medium dense to very dense, brown to gray, wet, homogenous, no HCl reaction.		
	1										
5				40			D-1 / SM	5 5 7 (12)	5 feet: Medium dense, silty SAND with gravel.		
	2										
	3										
10				80			D-2 / SM	50 for 5" (>50)	grades to very dense.		
				44			C-3 / GM(C/B)		grades to silty GRAVEL with sand, cobbles and boulders. Maximum size of the boulders encountered is 1.9 feet.		
	4										
15											
	5			47			D-4 / SM	3 8 6 (14)	grades to medium dense, silty SAND with gravel.		
				28			C-5 / SW(C)		grades to well graded SAND with gravel. Maximum size of the cobbles encountered is 3.5 inches.		
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2526.0 ft (769.9 m)

HOLE No. TCC-001-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Jamie Wilson Lic# 2941T

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%)	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
			20 40 60 80								
									21.0 to 37.3 feet: Well graded SAND with gravel to silty SAND with gravel, occasional silty GRAVEL with sand, occasional cobbles and roots, subangular, very dense, brownish gray, wet, homogenous, no HCl reaction.		
				53			D-6 SW	11 35 38 (>50)	21.0 feet: Well graded SAND with gravel, cobbles and trace roots. Maximum size of the cobbles encountered is 3.5 inches.		
	7			86			C-7 GM		21.5 feet: grades to very dense, well graded SAND with gravel.		
25									23.0 feet: grades to silty GRAVEL with sand.		
	8			83			D-8 SM	25 45 50 (>50)	grades to silty SAND with gravel.		
				29			C-9 GM		grades to silty GRAVEL with sand.		
	9										
30											
				100			D-10 SW	20 50 for 3" (>50)	grades to well graded SAND with gravel.		
				24			C-11 SW				
	10										
35											
	11			63			D-12 SM	12 50 for 3" (>50)	grades to silty SAND with gravel.		
									Bottom of boring at 37.3 feet below ground surface (bgs). Backfilled to ground surface with bentonite chips.		
									Water level measurements (below existing ground surface):		
	12								-9/9/08 at 09:00: 1.5 feet.		
40											
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TCC-002-08

Job No. 33758632.13000 SR 90 Elevation 2525.9 ft (769.9 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 11, 2008 Completion May 11, 2008 Well ID# Not Applicable Equipment Skid-mounted 5500-1 w/ manual-hammer

Station 1484+84.89 Offset 87.73'L Casing HW, HQ Method Wet Rotary

Northing 1057250.45 Easting 1760236.97 Latitude 47°19'46.269"N Longitude 121°20'25.816"W

County Kittitas Subsection SE1/4 of SE1/4 Section 1 Range 11E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 20.8 feet: Poorly graded GRAVEL with sand, occasional silty GRAVEL and silty SAND with gravel, occasional cobbles, subangular to angular, very loose to medium dense, brown to bluish gray, moist to wet, homogenous, no HCl reaction.		
				0			D-1 SM	7 11 9 (20)	2 feet: Medium dense, silty SAND with gravel.		
	1								loss of drilling water circulation.		
5											
	2			33			D-2 GP	3 2 2 (4)	grades to very loose, poorly graded GRAVEL with sand.		
				17			C-3		grades to poorly graded GRAVEL with cobbles. Maximum size of the cobbles encountered is 4.5 inches.		
				36			C-4 GP(C)				
10	3										
	4			50			D-5 GM	5 5 7 (12)	grades to medium dense, silty GRAVEL with sand.		
15				23			C-6 GP		grades to poorly graded GRAVEL with sand.		
	5										
				50			D-7 GP	5 7 11			
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2525.9 ft (769.9 m)

HOLE No. TCC-002-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100			C-8 GP	(18)	grades to poorly graded GRAVEL with sand.		
				97			C-9 SP		20.8 to 33.9 feet: Poorly graded GRAVEL with sand, occasionally poorly graded SAND, occasional cobbles, subrounded to angular, very dense, brown to gray, moist to wet, homogenous, no HCl reaction. 20.8 feet : poorly graded SAND. 21.6 feet: grades to silty GRAVEL with sand.		
	7			33			D-10 GP	22 50 for 4"	grades to poorly graded GRAVEL with sand (fine).		
25				100			C-11 GP(C)		grades to poorly graded GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 5 inches.		
	8			85			C-12 GP(C)				
				67			D-13 GP	15 21 31 (52)	grades to poorly graded GRAVEL with sand.		
	9										
30				28			C-14 GP				
	10										
				25			D-15 GP	50 for 5"			
				63			C-16 GW		33.9 to 38.8 feet: Well graded GRAVEL with sand to silty GRAVEL with sand, subrounded to angular, gray, moist, homogenous, no HCl reaction. 33.9 feet: Well graded GRAVEL with sand.		
35											
	11			80			C-17 GM		grades to silty GRAVEL with sand.		
				50			D-18 SM	6 18 19 (37)	38.8 to 40.3 feet: Silty SAND, subangular, dense, gray, moist, homogenous, no HCl reaction.		
40	12								Bottom of boring at 40.3 feet below existing ground surface.		
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. TCC-003-08

Job No. 33758632.13000 SR 90 Elevation 2525.3 ft (769.7 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 28, 2008 Completion May 29, 2008 Well ID# Not Applicable Equipment Skid-mounted 5500-1 w/ manual-hammer

Station 1484+71.38 Offset 20.18'R Casing HW, HQ Method Wet Rotary

Northing 1057165.07 Easting 1760169.61 Latitude 47°19'45.419"N Longitude 121°20'26.781"W

County Kittitas Subsection SE1/4 of SE1/4 Section 1 Range 11E Township 21N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.3 feet: Asphalt Concrete Pavement 0.3 to 15.0 feet : Poorly to well graded silty GRAVEL with sand, occasional silty SAND with gravel and silty GRAVEL with sand, occasional cobbles, angular, medium dense to very dense, brown to gray to bluish gray, moist to wet, homogenous, no HCl reaction. 1.5 feet: Medium dense, silty GRAVEL with sand.	▽	
				100			C-1 GM				
	1			40			D-2 GP	3 5 12 (17)	grades to poorly graded GRAVEL with sand.		
5				77			C-3 GW		grades to well graded GRAVEL with sand.		
	2										
				67			D-4 SM	50 for 3" (>50)	grades to silty SAND with fine gravel.		
				70			D-5 GM(C)		grades to silty GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 3.25 inches.		
10	3										
	4			13			D-6 GP	7 15 17 (32)	grades to dense, poorly graded SAND with gravel.		
15				0			C-7 SM		14.9 to 23.9 feet : Silty GRAVEL with sand or silty SAND with gravel, subrounded to angular, medium dense, reddish brown to dark gray, moist to wet, homogenous, no HCl reaction. 14.9 feet: No recovery. Material is probably washed away. Material is probably silty SAND with gravel.		
	5										
				50			D-8 SM	5 7 7 (14)	Medium dense, silty SAND with gravel.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

Job No. 33758632.13000 SR 90 Elevation 2525.3 ft (769.7 m) HOLE No. TCC-003-08

Sheet 2 of 2

Project I-90 Snoqualmie Pass East Driller Robert Grocery Lic# N/A

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No. / WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				49			C-9 GM		grades to silty GRAVEL with sand. Trace of decayed wood was observed.		
	7			100			D-10 SM/SC	1 1 3 (4)	23.9 to 24.9 feet: Clayey SAND or silty SAND, soft, brown to gray, low plasticity, wet, homogenous, no HCl reaction.		
25				51			C-11 GM(C)		24.9 to 39.8 feet : Silty GRAVEL with sand, occasional well graded GRAVEL and silty SAND with gravel or poorly graded SAND with gravel, occasional cobbles, subrounded to angular, very dense, brown to gray to bluish gray, moist to wet, homogenous, no HCl reaction. 24.9 feet: Silty GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 3.25 inches.		
	8			75			D-12 SP	50 for 4" (>50)	grades to poorly graded SAND with fine gravel.		
				68			C-13 GM(C)		grades to silty GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 6.5 inches.		
30	9										
	10			43			D-14 SM	16 50 for 2" (>50)	grades to very dense, silty SAND with fine gravel.		
				89			C-15 GW(C)		grades to well graded GRAVEL with sand and cobbles. Maximum size of the cobbles encountered is 4 inches.		
35	11			72			C-16 GW		grades to well graded GRAVEL with sand.		
				100			C-17 GM		grades to silty GRAVEL with sand.		
	12										
40									Bottom of boring at 39.8 feet below existing ground surface (bgs). Water level measurements: 5/29/08 at 08:10 : 2.6 feet bgs.		
	13										
45											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

PHASE 1D BORING LOGS

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. HMF-001-08

Job No. 33758632.13000 SR 90 Elevation 2545.3 ft (775.8 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 10, 2008 Completion May 11, 2008 Well ID# Not Applicable Equipment 5500-1 (skid-rig) w/ manual-hammer

Station 1205+03.02 Offset 141.11'R Casing HW, HQ Method Wet Rotary

Northing 1080146.04 Easting 1748785.96 Latitude 47°23'30.960"N Longitude 121°23'15.758"W

County Kittitas Subsection NW1/4 of SE1/4 Section 15 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.3 feet: Asphalt concrete pavement. 0.3 to 4.5 feet : Poorly-graded GRAVEL, angular, medium dense, brown to gray, dry to moist, homogenous, HCl reaction not tested.		
	1			6			D-1 GP	19 6 7 (13)			
5									4.5 to 9.5 feet : Sandy ORGANIC SOIL, trace of fine gravel, soft to medium stiff, dark brown, wet, homogenous, HCl reaction not tested. 5 feet: Soft.		
	2			22			D-2 OL	2 1 1 (2)			
				0			D-3 OL	3 2 5 (7)	grades to medium stiff.		
10	3			47			D-4 SM/GM	14 38 50 for 5" (>50)	9.5 to 11.4 feet : Silty GRAVEL with sand to silty SAND with gravel, trace of organic material, subangular, very dense, dark brown to gray, moist, homogenous, locally stratified, HCl reaction not tested.		
				83 / 0.33			C-5		11.4 to 15.0 feet : Basalt, gray, fine grained, fresh, moderately strong rock (R3), HCl reaction not tested. Discontinuities are closely spaced, and in fair condition. (CR=83%, RQD=58%, FF=0.33) Note: 1 to 3% voids were encountered.		
	4										
15									Bottom of boring at 15.0 feet below ground surface. Backfilled to ground surface with bentonite chips.		
	5										
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. HMF-002-08

Job No. 33758632.13000 SR 90 Elevation 2545.2 ft (775.8 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 10, 2008 Completion May 10, 2008 Well ID# Not Applicable

Equipment 5500-1 (skid-rig) w/ manual-hammer

Station 1205+13.69 Offset 228.96'R Casing HW, HQ

Method Wet Rotary

Northing 1080064.05 Easting 1748752.8 Latitude 47°23'30.147"N

Longitude 121°23'16.227"W

County Kittitas Subsection NW1/4 of SE1/4 Section 15 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.3 feet: Asphalt concrete pavement. 0.3 to 4.5 feet : Poorly graded GRAVEL with sand with traces of silt and clay, subrounded, medium dense, brown, wet, homogenous, HCl reaction not tested.		
	1			22			D-1 SM	20 8 8 (16)			
5				15			D-2 GM	3 2 4 (6)	4.5 to 14.0 feet : Silty SAND with gravel or silty GRAVEL with sand, subrounded, very loose to loose, brown, moist to wet, homogenous, HCl reaction not tested. 4.5 feet: Silty GRAVEL with sand.		
	2			0			D-3 SM	3 2 2 (4)	No recovery. Material was probably washed away. Material is probably silty SAND.		
									grades to silty SAND with GRAVEL.		
10	3			11			D-4 SM	2 1 1 (2)			
	4										
				25			D-5 GP	5 22 50 for 3"	14.0 to 15.3 feet : Poorly-graded GRAVEL with sand, subangular, very dense, brown, wet, homogenous, HCl reaction not tested.		
15	5								Bottom of boring at 15.3 feet below ground surface. Backfilled to ground surface with bentonite chips.		
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. HMF-003-08

Job No. 33758632.13000 SR 90 Elevation 2545.4 ft (775.8 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 11, 2008 Completion May 11, 2008 Well ID# Not Applicable Equipment 5500-1 (skid-rig) w/ manual-hammer

Station 1205+26.44 Offset 301.47'R Casing HW, HQ Method Wet Rotary

Northing 1079994.72 Easting 1748728.39 Latitude 47°23'29.460"N Longitude 121°23'16.570"W

County Kittitas Subsection NW1/4 of SE1/4 Section 15 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.7 feet: Asphalt concrete pavement. 0.7 to 13.0 feet : Poorly graded to well graded GRAVEL with sand, trace of silt, subangular to angular, very loose to dense, brown to brownish gray, wet, homogenous, HCl reaction not tested. 2.5 feet: Dense, well graded GRAVEL with sand.		
				33			D-1 GW	25 19 28 (47)			
5	1			22			D-2 GW	13 14 9 (23)	grades to medium dense, well graded GRAVEL with sand.		
	2			0			D-3 GP	2 5 2 (7)	grades to loose, poorly graded GRAVEL with sand.		
10	3			0			D-4 GP	2 1 1 (2)	grades to very loose.		
	4								13.0 to 16.5 feet : Silty SAND, subangular, dense, brownish gray, wet, homogenous, HCl reaction not tested.		
15	5			83			D-5 SM	8 15 22 (37)			
									Bottom of boring at 16.5 feet below ground surface. Backfilled to ground surface with bentonite chips.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. HMF-004-08

Job No. 33758632.13000 SR 90 Elevation 2544.4 ft (775.5 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 10, 2008 Completion May 10, 2008 Well ID# Not Applicable Equipment 5500-1 (skid-rig) w/ manual-hammer

Station 1201+93.60 Offset 224.33'R Casing HW, HQ Method Wet Rotary

Northing 1080224.35 Easting 1748481.81 Latitude 47°23'31.699"N Longitude 121°23'20.191"W

County Kittitas Subsection NW1/4 of SE1/4 Section 15 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100			C-1 GM		0 to 0.4 feet: Asphalt concrete pavement. 0.4 to 4.0 feet : Silty GRAVEL with sand, subrounded to angular, medium dense, brown to gray, moist to wet, homogenous, no HCl reaction.		
	1			33			D-2 GM	30 15 10 (25)			
				0			C-3 GM		4.0 to 15.0 feet : Silty SAND, occasional poorly graded GRAVEL or silty GRAVEL, occasional cobbles, subrounded to angular, very loose to medium dense, dark brown to dark gray, moist to wet, homogenous, no HCl reaction.		
5				0			D-4 GM	5 3 2 (5)	4.0 feet: No recovery. Material was probably washed away. Material is probably silty GRAVEL (fine).		
	2			80			C-5 GP(C)		grades to silty GRAVEL with sand. grades to poorly graded GRAVEL with cobbles.		
				33			D-6 SM	2 2 2 (4)	grades to silty fine SAND with gravel.	▽	
				60			C-7 GP		grades to poorly graded GRAVEL.		
10	3			0			D-8 SM	5 3 8 (11)	No recovery. Material was probably washed away. Material is probably silty SAND.		
				0			C-9 SM		No recovery. Material was probably washed away. Material is probably silty SAND.		
	4			13			D-10 SM	15 6 3 (9)	grades to silty SAND with fine gravel.		
				80			C-11 GP		grades to poorly graded GRAVEL with sand.		
15				40			D-12 OL	9 6 6 (12)	15.0 to 17.5 feet : Gravelly ORGANIC SOIL with sand, locally changes to poorly graded GRAVEL with organic material, stiff, dark brown to dark gray, moist, homogenous, no HCl reaction.		
	5			40			C-13 GP/OL				
				13			D-14 SM	17 24 19 (43)	17.5 to 19.0 feet : Silty fine SAND with gravel, subangular to angular, dense, dark gray, moist, homogenous, no HCL reaction.		
									Bottom of boring at 19.0 feet below ground surface. Backfilled to ground surface with bentonite chips.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. HMF-005-08

Job No. 33758632.13000 SR 90 Elevation 2545.9 ft (776.0 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 10, 2008 Completion May 10, 2008 Well ID# Not Applicable Equipment 5500-1 (skid-rig) w/ manual-hammer

Station 1202+72.44 Offset 375.13'R Casing HW, HQ Method Wet Rotary

Northing 1080054.18 Easting 1748482.6 Latitude 47°23'30.019"N Longitude 121°23'20.152"W

County Kittitas Subsection NW1/4 of SE1/4 Section 15 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				100			D-1 GP	50 for 3"	0 to 0.3 feet: Asphalt concrete pavement 0.3 to 6.5 feet : Poorly graded GRAVEL with sand or silty GRAVEL with sand, subrounded to subangular, medium dense to very dense, brown to gray, wet, homogenous, HCl reaction not tested. 2.0 feet: Very dense, poorly graded GRAVEL with sand.		
	1			44			D-2 GM	11 8 7 (15)	grades to medium dense, silty GRAVEL with sand.		
5											
	2			8			D-3 SM	8 5 7 (12)	6.5 to 14.0 feet : Silty SAND with gravel, subangular, medium dense, brown to gray, wet, homogenous, HCl reaction not tested. 6.5 feet: silty SAND with gravel.		
10	3										
				33			D-4 SM	3 6 5 (11)	grades to silty SAND with gravel.		
	4										
				100			D-5 GP	50 for 3"	14.0 to 14.3 feet : poorly graded GRAVEL with sand, subangular, very dense, gray, wet, homogenous, HCl not tested.		
15	5								Bottom of boring at 14.3 feet below ground surface. Backfilled to ground surface with bentonite chips.		
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. HMF-006-08

Job No. 33758632.13000 SR 90 Elevation 2544.1 ft (775.4 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Grocery Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Ken Yang

Start May 10, 2008 Completion May 10, 2008 Well ID# Not Applicable Equipment 5500-1 (skid-rig) w/ manual-hammer

Station 1201+28.73 Offset 154.3'R Casing HW, HQ Method Wet Rotary

Northing 1080316.35 Easting 1748456.34 Latitude 47°23'32.604"N Longitude 121°23'20.576"W

County Kittitas Subsection NW1/4 of SE1/4 Section 15 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				31			C-1 SM		0 to 0.4 feet: Asphalt concrete pavement 0.4 to 5.3 feet : Silty SAND with gravel or silty GRAVEL with sand, subrounded to angular, very dense, gray, moist to wet, homogenous, no HCl reaction. 0.4 feet: Silty SAND with gravel. 1.6 feet: grades to silty GRAVEL with sand.		
				50			D-2 GM	50 for 4"			
				73			C-3 GM				
	1			50			D-4 GM	7 15 23 (38)			
5				0			C-5 SM		5.3 to 12.8 feet: Silty SAND with fine gravel, occasional lenses of silty GRAVEL with sand, angular, loose to medium dense, gray, wet, homogenous, no HCl reaction. 5.3 feet: No recovery. Material was probably washed away. Material is probably silty sand. 6.3 feet: No recovery. Material was probably washed away. Material is probably silty sand. grades to silty GRAVEL with sand. (Note: Finer material may have been washed away.)		
	2			0			D-6 SM	8 6 7 (13)			
				67			C-7 GM				
				50			D-8 SM	3 5 15 (20)	grades to silty SAND with fine gravel.		
10	3			50			C-9 GM		grades to silty GRAVEL with sand. (Note: Finer material may have been washed away.)		
				7			D-10 SM	6 4 6 (10)	grades to silty SAND with fine gravel.	▽	
	4			100			C-11 GM		12.8 to 15.3 feet : silty GRAVEL with sand to well graded GRAVEL with sand, angular, very dense, gray, wet, homogenous, no HCl reaction. 12.8 feet: Silty GRAVEL with sand. 13.8 feet: grades to well graded GRAVEL with sand.		
				40			D-12 GW	19 25 25 (50)			
15	5								Bottom of boring at 15.3 feet below ground surface (bgs). Backfilled with asphalt patching material from 0 to 0.4 ft bgs, with silty sand with fine gravel from 0.4 to 6 ft bgs and with bentonite chips from 6 to 15.3 ft bgs.		
20	6										

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. HMF-007-08

Job No. 33758632.13000 SR 90 Elevation 2543.1 ft (775.1 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Christian Nead Lic# N/A

Drilling Contractor CRUX Subsurface, Inc.

Inspector Abhijit Bathe

Start May 11, 2008 Completion May 11, 2008 Well ID# Not Applicable Equipment 5500-1 (skid-rig) w/ manual-hammer

Station 1200+65.84 Offset 155.02'R Casing HW, HQ Method Wet Rotary

Northing 1080344.58 Easting 1748400.14 Latitude 47°23'32.876"N Longitude 121°23'21.397"W

County Kittitas Subsection NW1/4 of SE1/4 Section 15 Range 11E Township 22N

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				0			C-1 SP		0 to 0.4 feet: Asphalt concrete pavement 0.4 to 9.0 feet : Poorly graded GRAVEL with sand or poorly graded SAND with gravel, trace of silt, subangular to angular, loose to very dense, brown to gray, moist to wet, homogenous, HCl reaction not tested. 0.4 feet: Very dense, poorly graded SAND with gravel.		
				33			D-2 GW	23 50 for 6"	2.5 feet: grades to well graded GRAVEL with sand.		
	1			0			C-3 GP		grades to medium dense, poorly graded GRAVEL with sand.		
5				11			D-4 GP	6 7 5 (12)			
	2			0			C-5 GP				
				11			D-6 GP	4 4 5 (9)			
				0			C-7 OL		9.0 to 12.5 feet : Gravelly ORGANIC SOIL with sand, very stiff, dark brown, moist, homogenous, HCl reaction not tested. 9 feet: No recovery. Material probably is organic soil. 10 feet: Gravelly, organic soil.		
10	3			28			D-8 OL	6 12 15(27)			
				0			C-9 OL				
				?			D-10 SW	11 17 21 (38)	12.5 to 15.5 feet : Well graded GRAVEL with sand or well graded SAND with gravel. subangular, dense, brown to gray, wet, homogenous, HCl reaction not tested. 12.5 feet: Well graded SAND with gravel. 14.0 feet: grades to well graded GRAVEL with sand.		
	4			28			D-11 GW	17 15 12 (27)			
15									Bottom of boring at 15.5 feet below ground surface. Backfilled to ground surface with bentonite chips.		
	5										
	6										
20											

DRAFT ROCKN BORINGS I-90 2008-KM.GPJ 9/22/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S32593

HOLE No. HMF-008-09

Job No. 33758654.00009 SR 90 Elevation 2546.1 ft (776.0 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Hyak Maintenance Facility

Inspector Kranti Maturi

Start June 13, 2009 Completion June 13, 2009 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station 1204+56 (Nov. 2007) Offset Casing HQ

Method Wet Rotary

Northing 1080197.65 Easting 1748761.67 Latitude 47°23'31.45"N

Longitude 121°23'16.07"W

County Kittitas Subsection NW1/4 of SE1/4 Section 15 Range 11 Township 22

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.7 feet: Asphalt		
				80			D-1 / SW	25 37 36 (73)	0.7 to 3.1 feet: Well graded SAND with gravel or poorly graded GRAVEL with sand, subangular to angular, very dense, grayish brown to gray, moist, homogenous, no HCl reaction.		
				72			C-2 A / GP		0.7 feet: Well graded SAND with gravel.		
	1			72 / 1.7			C-2B		2.3 feet: grades to poorly graded GRAVEL with sand.		
5									3.1 to 13.3 feet: Basalt, gray, fine grained, fresh to slightly weathered, very strong. Discontinuities are closely spaced and in fair condition. No HCl reaction. (CR = 72 to 88%, RQD = 32 to 59%, FF = 1.7 to 2.0) 3.1 feet: Fresh to slightly weathered rock.		
	2										
				88 / 2			C-3		grades to slightly weathered.		
10	3										
	4								Bottom of boring at 13.3 feet below the existing ground surface (bgs). Backfilled with bentonite chips on 6/13/09.		
15	5										
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/21/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card S32593

HOLE No. HMF-008-09

Job No. 33758654.00009 SR 90 Elevation 2546.1 ft (776.0 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Hyak Maintenance Facility

Inspector Kranti Maturi

Start June 13, 2009 Completion June 13, 2009 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station 1204+56 (Nov. 2007) Offset Casing HQ

Method Wet Rotary

Northing 1080197.65 Easting 1748761.67 Latitude 47°23'31.45"N

Longitude 121°23'16.07"W

County Kittitas Subsection NW1/4 of SE1/4 Section 15 Range 11 Township 22

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) (20 40 60 80)	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
									0 to 0.7 feet: Asphalt		
				80			D-1 / SW	25 37 36 (73)	0.7 to 3.1 feet: Well graded SAND with gravel or poorly graded GRAVEL with sand, subangular to angular, very dense, grayish brown to gray, moist, homogenous, no HCl reaction.		
				72			C-2 A / GP		0.7 feet: Well graded SAND with gravel.		
	1			72 / 1.7			C-2B		2.3 feet: grades to poorly graded GRAVEL with sand.		
5									3.1 to 13.3 feet: Basalt, gray, fine grained, fresh to slightly weathered, very strong. Discontinuities are closely spaced and in fair condition. No HCl reaction. (CR = 72 to 88%, RQD = 32 to 59%, FF = 1.7 to 2.0) 3.1 feet: Fresh to slightly weathered rock.		
	2										
				88 / 2			C-3		grades to slightly weathered.		
10	3										
	4								Bottom of boring at 13.3 feet below the existing ground surface (bgs). Backfilled with bentonite chips on 6/13/09.		
15	5										
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2009.GPJ 7/21/09

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. INF-TP-010-10 (OW)

Job No. 33761951.00008 SR 90 Elevation 2435.8 ft (742.4 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 22, 2010 Completion June 22, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1049239.6 Easting 1764972.23 Latitude 47?8'27.71"N Longitude 121?9'15.88"W

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				75			D-1 SM (C)	5 6 7 8 (13)	0 to 16.5 feet: Silty SAND with gravel, silty GRAVEL with sand or well graded SAND with gravel, occasional cobbles, subangular to angular, medium dense to very dense, gray to brownish gray, moist to wet, homogenous, no HCl reaction. 0 feet: Medium dense, silty SAND with gravel with occasional cobbles.		
5	1			40			D-2 GM	44 14 13 16 (27)	grades to dense, silty GRAVEL with sand.		
10	2 3			63			D-3 SM	14 26 50 45 (76)	grades to very dense, well graded SAND with gravel.		
15	4 5			80			D-4 GM	10 46 78 (124)	grades to very dense, silty GRAVEL with sand.		
20	6								Bottom of boring at 16.5 feet depth below ground surface. A 1-inch diameter observation well was installed at this location.		

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. INF-TP-012-10 (OW)

Job No. 33761951.00008 SR 90 Elevation 2427.9 ft (740.0 m)

Sheet 1 of 1

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 22, 2010 Completion June 22, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1049049.49 Easting 1765448.99 Latitude 47?8'25.88"N Longitude 121?9'08.93"W

County Kittitas Subsection _____ Section _____ Range _____ Township_____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				75			D-1 SM	10 10 11 11 (21)	0 to 17.0 feet: Silty SAND with gravel or silty GRAVEL with sand, subrounded to angular, medium dense to very dense, brownish gray to gray, moist to wet, homogenous, no HCl reaction. 0 feet: Medium dense, silty SAND with gravel.		
	1										
5				30			D-2 GM	32 27 16 30 (46)	grades to medium dense, silty GRAVEL with sand.		
	2										
10	3			63			D-3 GM	23 27 31 36 (58)	grades to very dense.		
	4										
15				25			D-4 GM	18 22 39 30 (61)			
	5								Bottom of boring at 17 feet depth below the existing ground surface. A 1-inch diameter observation well was installed at this boring location.		
20	6										

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. INF-TP-015-10

Job No. 33761951.00008 SR 90 Elevation 2542.7 ft (775.0 m)

Sheet 1 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Drilling Contractor WSDOT Field Exploration Unit

Inspector Ken Yang

Start June 21, 2010 Completion June 21, 2010 Well ID# Not applicable

Equipment CME 45 (Skid rig) with auto hammer

Station _____ Offset _____ Casing _____

Method Wet Rotary

Northing 1048884.25 Easting 1764683.08 Latitude 47?8'24.17"N Longitude 121?9'20.02"W

County Kittitas Subsection _____ Section _____ Range _____ Township _____

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
				25			D-1 SM (C)	2 5 8 5 (13)	0 to 26.0 feet: Silty SAND with gravel or well graded GRAVEL with sand, occasional cobbles, angular to rounded, loose to very dense, gray to brown, moist to wet, homogenous to stratified, no HCl reaction. 0 feet: Medium dense, silty SAND with gravel and occasional cobbles.		
	1										
5				13			D-2 GW	5 21 8 9 (29)	grades to dense, well graded GRAVEL with sand.		
	2										
	3										
10				0 80			D-3 D-4 SM	50/5"	grades to very dense. grades to silty SAND with gravel.		
	4										
15				35			D-5 SM	5 4 3 4 (7)	grades to loose.		
	5			15			D-6 SM	6 6 6 6 (12)	grades to medium dense.		
	6						D-7 SM	3 2 3			
20											

DRAFT ROCKN BORINGS & TESTPITS 2010.GPJ 8/17/10

Washington State Department of Transportation

LOG OF TEST BORING

Start Card _____

HOLE No. INF-TP-015-10

Job No. 33761951.00008 SR 90 Elevation 2542.7 ft (775.0 m)

Sheet 2 of 2

Project I-90 Snoqualmie Pass East

Driller Robert Haller Lic# 2779

Depth (ft)	Meters (m)	Profile	Rock Quality Designation (%) 20 40 60 80	% Rec. / FF	Rock Strength	Sample Type	Sample No./ WSDOT Symbol	Blows/6" SPT (N)	Description of Material	Groundwater	Instrument
								4 (5)			
	7										
25				71			D-8 SM	112/3"	grades to very dense, well graded GRAVEL with sand. Note: Hard surface. Possibly cobble, boulder or bedrock.		
				100			D-9 SM	50/4"			
	8								Bottom of boring at 26.0 feet depth below the existing ground surface. Backfilled to ground surface with bentonite chips.		
									Water surface measurement: 6/22/2010 at 16:47 - 10 feet depth below the ground surface (after the casing was removed).		
30	9										
	10										
35											
	11										
	12										
40											
	13										
45											

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