Geotechnical Data Report

Proposed Convention Center Completion Project
Spokane, Washington

for
Spokane Public Facilities District

January 15, 2013

GeoEngineers
Earth Science + Technology

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Proposed Convention Center Completion Project
Spokane, Washington

File No. 12088-001-06

January 15, 2013

Prepared for:

Spokane Public Facilities District
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1/15/2013

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GeoEngineers

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INTRODUCTION

This report presents the results of our geotechnical data compilation for the proposed Convention Center Completion (CCC) project in Spokane, Washington. We understand this data report will be used during development of design/build plans for the proposed CCC. The approximate location of the proposed project is shown on the Vicinity Map, Figure 1.

The proposed CCC site, along with the adjacent Convention Center Exhibit Hall (CCE site), was the subject of previous geotechnical and environmental site assessment (ESA) studies by GeoEngineers (GeoEngineers, 2002, 2004, 2005). We understand the SPFD plans to redevelop the proposed CCC site to expand the existing Exhibit Hall with additional convention center space. Redevelopment of the CCC site will include, at a minimum: demolition of the former C.I. Shenanigan's (Shenanigan's) restaurant building; demolition of existing asphalt concrete and portland cement concrete pavements; relocation of existing underground utilities; earthwork to establish proposed grades; installing new underground utilities; and constructing the proposed CCC building. New landscaping also will be part of site improvements.

SCOPE OF SERVICES

The purpose of our geotechnical data report was to provide a summary of geotechnical data previously developed by GeoEngineers for the existing CCE project. Our current geotechnical services were provided in general accordance with our agreement with the Spokane Public Facilities District, dated October 31, 2012 and included:

1. Review and compilation of previous geotechnical and environmental evaluations in our files for the existing CCE. We also reviewed the geologic literature and soil survey for information regarding subsurface soil, rock and groundwater conditions in the vicinity of the proposed CCE site.

SITE CONDITIONS

Surface Conditions

The site of the proposed CCC is located north of Spokane Falls Boulevard, south of the Spokane River, between Spokane Falls Court and Division Street, on the east end of Spokane's central business district and downtown area. The central and east portions of the site are occupied by the former Shenanigan's building and parking lot. Access drives for the Double Tree Hotel, and walkways and landscaping extend through the west portion of the subject site. Site grades are relatively level, ranging generally from about Elevation 1,877 on the north to Elevation 1,881 near the southeast and southwest corners of the site. (Elevations in the text of this report refer to NAVD 88 datum.)

Literature Review

General

As part of our effort for this geotechnical data report, we completed a records review of: Washington State Department of Natural Resources (DNR) geologic maps; in-house geotechnical

and environmental reports; and geotechnical and environmental reports previously provided to us by the City of Spokane. The purpose of this effort was to identify existing data for the adjacent CCE site to the south and the proposed CCC site.

Geologic Literature Review

Geologic mapping completed by Derkey, Hamilton and Stradling indicates that a significant portion of the downtown district is located within the Columbia Basin also known as the Columbia Plateau. This is a broad physiogeographic area in eastern Washington, southwestern Idaho and northern Oregon that was covered with lava from extensive volcanic events that occurred during the Miocene age (13 to 16 million years ago). The lava created a layered basalt formation known as the Columbia River Basalt Group with interbeds of fine-grained soils. This unit, which covers approximately 36 percent of Washington State, was derived from four major volcanic events. The formation reaches a maximum thickness on the order of about 16,000 feet. The basalt typically consists of dark gray, fine-grained rock.

The Spokane downtown area, including the CCC site, retains little of its original geologic surface characteristics because of past and present development. To develop relatively level sites, it was common practice during Spokane's early history to level rock outcrops and fill low areas with rock rubble, local gravelly soils or debris. Geotechnical reports from the area also indicate the presence of ash, melted glass, brick, metal and other deleterious debris that probably originated from the Spokane fire of 1889.

Subsurface Conditions

We evaluated possible subsurface conditions beneath the project area by reviewing in-house geotechnical, environmental and geophysical reports. The approximate locations of explorations on the existing CCE site and proposed CCC site are presented on the Site Plan, Figure 2. A summary of subsurface soil and groundwater conditions is provided in Summary of Previous Geotechnical Studies, Table 1. Exploration logs are provided in Appendix A. A geophysical survey completed for the existing CCE site is contained in Appendix B.

Perched groundwater was encountered in some of the explorations beneath the existing CCE and proposed CCC site, at variable depths, but generally near the contact between overlying fill or natural soil deposits, and underlying basalt rock. The depth to groundwater will vary seasonally and could be higher than reported at the time of completion of the previous explorations. Depth to groundwater also might be influenced by the water level in the Spokane River in those portions of the site where rock depth below ground surface increases, generally on the north side of the property.

Laboratory Testing

Samples acquired during GeoEngineers' geotechnical exploration activities were returned to our laboratory for evaluation and testing of select samples. Because of potential contamination, testing was limited to a few samples. Results of testing are included on the boring logs.

Select samples obtained during environmental assessment evaluations by GeoEngineers were submitted for analytical testing for select analytes. Results of that testing will be presented in the

Corrective Action Plan for the proposed Convention Center Completion project, which will be submitted under separate cover.

LIMITATIONS

We have prepared this data report for Spokane Public Facilities District for the proposed Convention Center Completion Project in Spokane, Washington. The Spokane Public Facilities District may distribute copies of this report to authorized agents, regulatory agencies and design/build teams as may be required for the project.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices for geotechnical engineering in this area at the time this report was prepared. No other warranty, express or implied, is made.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments should be considered a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix C titled "Report Limitations and Guidelines for Use" for additional information pertaining to use of this report.

REFERENCES

Derkey, Robert E., Hamilton, Michael M., and Stradling, Dale F., "Geologic Map of the Spokane Northwest 7.5-minute Quadrangle, Spokane County, Washington" Washington State Division of Geology and Earth Resources, Open File Report 2004-3.

GeoEngineers, Inc., "Geotechnical Consultation during Design of Promenade Drilled Shaft Foundations, Proposed Convention Center Expansion, Spokane, Washington," Project No. 0110-047-07, September 13, 2005.

GeoEngineers, Inc., "Supplemental Geotechnical Engineering Study, Proposed Convention Center Expansion Project, Spokane, Washington," Project No. 0110-047-02, May 13, 2004.

GeoEngineers, Inc., "Geotechnical Engineering Study, Centennial Trail, Convention Center Expansion, Spokane, Washington," Project No. 0110-047-04, January 8, 2004.

GeoEngineers, Inc., "Limited Phase I and Phase II Environmental Site Assessment, Proposed Convention Center Expansion Option 2 Site, Spokane, Washington," Project No. 0110-047-00, September 26, 2002.

GeoEngineers, Inc., "Geotechnical Engineering Study, Proposed Convention Center Expansion Option 2 Site, Spokane, Washington," Project No. 0110-047-00, September 25, 2002.

TABLES

GeoEngineers

Table 1

Summary of Previous Geotechnical Studies

Proposed Convention Center Expansion

Spokane, Washington

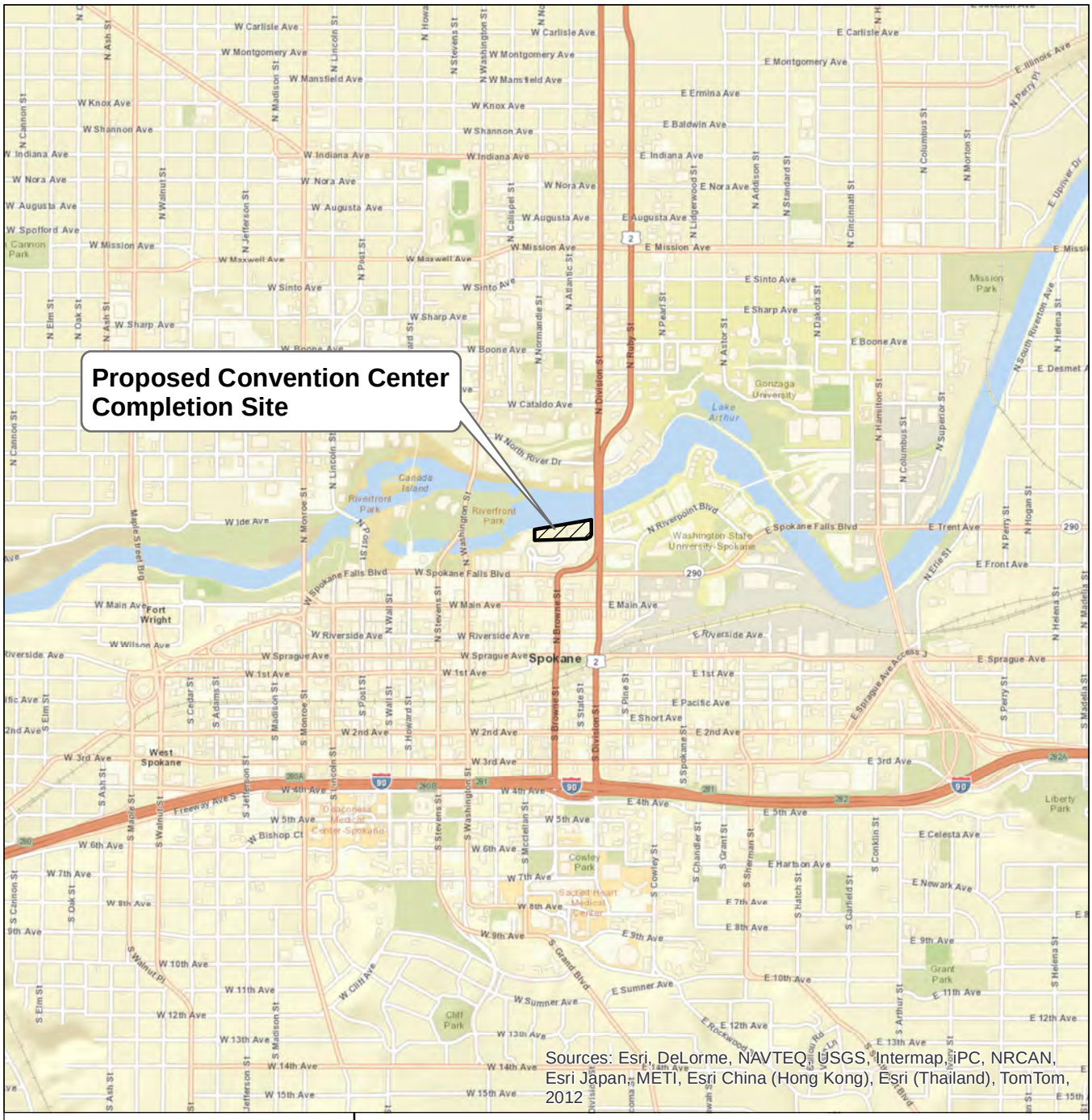
Consultant	Exploration Numbers / Year	Depth to Basalt Rock	RQD[2] / UCS[3]	Overburden Fill and Natural Soil Conditions Summary	Ground water
GeoEngineers	B-401 to B-403 / 2005	7 - 12 feet bgs[1]	RQD - 0 to 97 percent UCS - 3,500 to 39,900 psi	Overburden - silt with sand; sand and gravel with occasional cobbles and variable silt content	Perched groundwater at interface between overburden and basalt.
GeoEngineers	TP-B7 and -B8; TP-C1, -C3, and -C5 to -C7; TP-D5, -D6 and -D8; TP-E4 and -E7; TP-F1, -F2, -F4 to F7; TP-G3, -G4, -G6 / 2004	2 - 9½+ feet bgs		Fill - gravel with sand, trace silt and construction debris. Overburden - gravel with sand, trace silt and occasional cobbles; sand with trace silt	Perched groundwater at interface between fill/overburden and basalt.
GeoEngineers	B-201 to B-215 / 2002	2 - 23½ feet bgs	RQD – 0 to 100 UCS – 6,000 to 32,000 psi	Fill - sand with gravel, cobbles and variable silt content; gravel with sand, cobbles and construction debris. Overburden - gravel with sand and variable silt content; sand with gravel and variable silt content	Perched groundwater at interface between fill/overburden and basalt.
AGRA Earth & Environmental	BH-A to BH-H / 1995	Not encountered to depths between ½ and 12½ feet bgs		Fill - gravel; silty sandy gravel. Overburden - sandy silt; silty sandy gravel; sand	~ 10½ feet bgs
Lambert Group	SH-01 to SH21 / 1993	1 - 21+ feet bgs		Overburden - sandy gravel with basalt fragments	9 - 11 feet bgs
Applied Geotechnology, Inc.	TP-1 to TP-5 / 1992	Not measured		Fill - silty sand with gravel and debris; gravelly sand with debris; sand with gravel and debris.	Not encountered

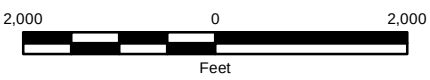
Notes:

1. bgs denotes 'below ground surface'
2. RQD – Rock Quality Designation – length of recovered drill core pieces in excess of 4 inches relative to the total length core drilled, in percent.
3. UCS - Unconfined Compressive Strength of rock in pounds per square inch (psi).

FIGURES

GeoEngineers





Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
Data Sources: ESRI Data & Maps, Street Maps 2008.
Projection: NAD 1983, UTM Zone 11 North.

Vicinity Map

Proposed Convention Center Completion Project
Spokane, Washington

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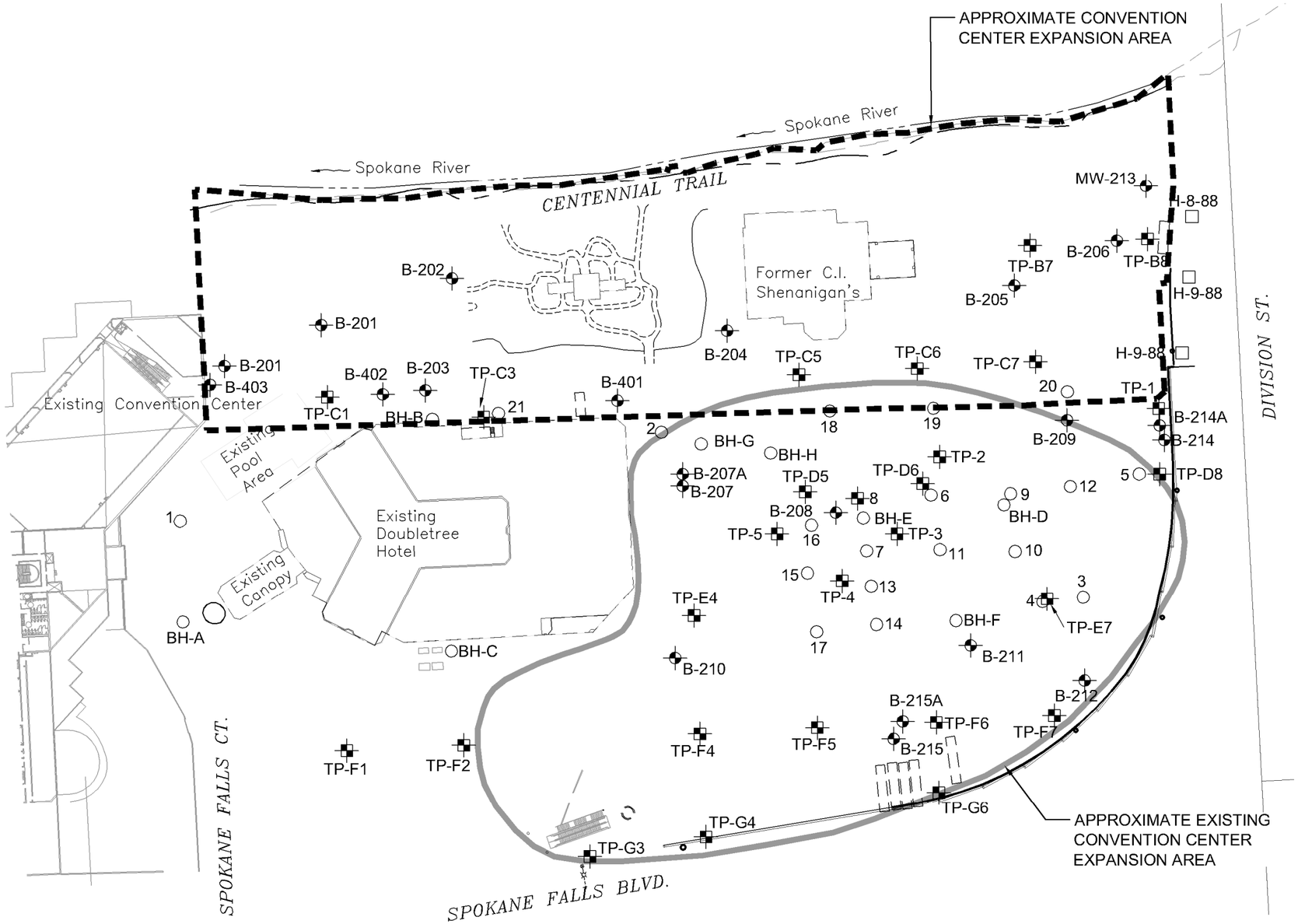
Figure 1

Office: SPO Path: W:\Spokane\Projects\12\12088001\06\GIS\12088001 06_VM_F1.mxd Map Revised: 12/05/2012 CRC



EXPLANATION:

B-401	GEOTECHNICAL SOIL BORING NUMBER AND APPROXIMATE LOCATION (GEOENGINEERS, 2005)
TP-B7	ENVIRONMENTAL TEST PIT NUMBER AND APPROXIMATE LOCATION (GEOENGINEERS, 2004)
B-201	ENVIRONMENTAL SOIL BORING NUMBER AND APPROXIMATE LOCATION (GEOENGINEERS, 2002)
MW 213	ENVIRONMENTAL MONITORING WELL NUMBER AND APPROXIMATE LOCATION (GEOENGINEERS, 2002)
○BH-A	PREVIOUS BORE HOLE NUMBER AND APPROXIMATE LOCATION (AGRA, 1995)
○3	PREVIOUS SOIL BORING NUMBER AND APPROXIMATE LOCATION (LAMBERT, 1993)
□TP-1	PREVIOUS TEST PIT NUMBER AND APPROXIMATE LOCATION (AGI, 1992)

N W E S

100 0 100
FEET

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Base drawing provided by LMN Architects titled "Spokane Convention Center Expansion" dated 2/2/04.

Site Plan

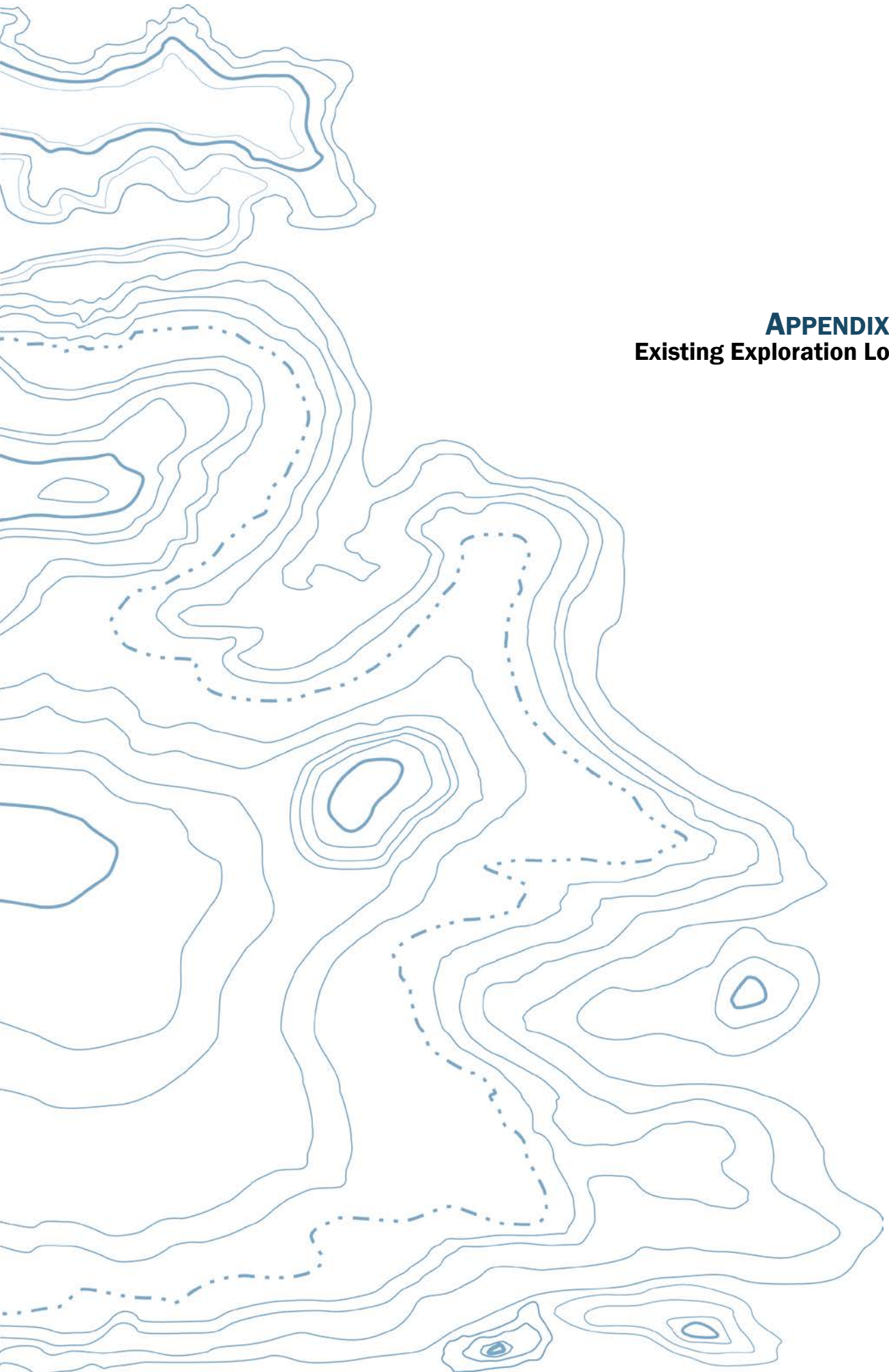
Convention Center Completion Project
Spokane, Washington

GeoEngineers

Figure 2

APPENDICES

GeoEngineers



APPENDIX A
Existing Exploration Logs

GEOENGINEERS 2005

Date(s) Drilled	08/10/05	Logged By	DRB	Checked By	LDS
Drilling Contractor	GeoEngineers	Drilling Method	Hollow-Stem Auger/NX Core	Sampling Methods	SPT/Rockcore
Auger Data	3 3/4-inch ID	Hammer Data	140 lb hammer/30 in drop	Drilling Equipment	CME 75
Total Depth (ft)	34	Surface Elevation (ft)	Not measured	Approximate Groundwater Level (ft. bgs)	9
.		.		.	

Elevation feet / Depth feet	SAMPLES: Interval Recovered (in)	Blows/foot	Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft^3	OTHER TESTS AND NOTES
0						GP-GM	Brownish gray fine gravel with silt and sand (loose, moist) (crushed surfacing)			
						ML	Dark brown silt with fine sand and trace gravel (stiff, moist)			
5	13	10	1							
						SM	Brown silty fine sand with occasional cobbles (very loose, wet)			
	8	2	2	▼						
10										
	22		3			BRX	Fractured and weathered basalt; dark gray; stained state; fine-grained rebound quality; open 3-dimensional, stepped to undulating joints with orange Fe-stained surfaces; no infilling; joints inclined at 35 to 45 degrees; near-horizontal and near vertical; joints spaced 0.5 inches to 2.0 inches apart. CAE0			REC=85% RQD=0%
	12		4							REC=92% RQD=50%
15	56		5							REC=93% RQD=20%
						BRX	Basalt; dark gray; visually fresh state; fine-grained rebound quality; open 2-dimensional joints with rough planar to undulating surfaces; surfaces stained by yellow to green mineralization; inclined at 35 to 45 degrees near horizontal; joints spaced 4 inches to 6 inches apart; unit weight=169 pcf; BADA			
20	4		6							REC=96% RQD=47% UCC*=3,500 psi
	36		7							REC=97% RQD=54%

LOG OF BORING B-401

GeoEngineers

Project: Convention Center Expansion
Project Location: Spokane, Washington
Project Number: 0110-047-07

Figure: A- 3
Sheet 1 of 2

V6_GTBORING P:\00\0110047\07\FINALS\0110047707.GPJ GEIV6_1.GDT 9/13/05

Elevation feet / Depth feet	SAMPLES: Interval	Recovered (in)	Blows/foot	Sub-Sample	Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
25		60			8				Grades to joints planar, rough, yellow-green mineralized surfaces, inclined 45 to 50 degrees, spaced 8 to 12 inches			REC=98% RQD=100%
									Grades to joints spaced 16 inches apart			
		57			9						169	REC=86% RQD=74%
30												
35									Boring completed at approximately 34 foot depth Groundwater encountered at approximately 9 foot depth during drilling			* presumptive unconfined compressive strength of rock core
40												
45												
50												

V6_GTBORING P:\00\0110047\07\FINALS\0110047.GPJ GEIV6_1.GDT 9/13/05

LOG OF BORING B-401 (continued)

GeoEngineers

Project: Convention Center Expansion
Project Location: Spokane, Washington
Project Number: 0110-047-07

Figure: A- 3
Sheet 2 of 2

Date(s) Drilled	08/11/05	Logged By	DRB	Checked By	LDS
Drilling Contractor	GeoEngineers	Drilling Method	Hollow-Stem Auger/NX Core	Sampling Methods	SPT/Rockcore
Auger Data	3 3/4-inch ID	Hammer Data	140 lb hammer/30 in drop	Drilling Equipment	CME 75
Total Depth (ft)	30.5	Surface Elevation (ft)	Not measured	Approximate Groundwater Level (ft. bgs)	7.5
.		.		.	

Elevation feet	Depth feet	SAMPLES: Interval Recovered (in)	SAMPLES: Blows/foot	SAMPLES: Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0						AC	3 inches asphalt concrete pavement			
							GW	Dark gray fine to coarse gravel with sand and occasional cobbles (dense, moist)			
		8	38	1							
	5										
					▼		ML	Brown silt with fine sand (very soft, wet)			
		18	0	2							
	10										
		44		3			BRX	Fractured and weathered basalt; dark gray; stained state; fine-grained; rebound quality; open 2-dimensional planar to undulating, rough joints, surfaces stained with orange Fe-oxide; joints near-horizontal; spaced 8 inches to 10 inches, joints spaced 0.5 inches to 1.0 inches; CAD0			REC=98% RQD=82%
	15						BRX	Basalt; dark gray; visually fresh; joints stained with green to yellow mineralization; inclined at 35 to 45 degrees and near-horizontal numerous healed joints inclined 70 to 90 degrees; joints spaced 12 inches to 24 inches; unit weight=171 pcf; BADA		171	REC=100% RQD=88%
		60		4							
	20										
		59		5				Grades to joints spaced 10 inches to 20 inches; planar, rough, mineralized surfaces			REC=100% RQD=97%

LOG OF BORING B-402

GeoEngineers

Project: Convention Center Expansion
Project Location: Spokane, Washington
Project Number: 0110-047-07

Figure: A- 4
Sheet 1 of 2

Elevation feet / Depth feet	SAMPLES: Interval	SAMPLES: Recovered (in)	SAMPLES: Blows/foot	SAMPLES: Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft^3	OTHER TESTS AND NOTES
25		60		6							UCC*=39,000 psi REC=100% RQD=93%
30								Boring completed at approximately 30 1/2 foot depth Groundwater encountered at approximately 7 1/2 foot depth during drilling			* presumptive unconfined compressive strength of rock core
35											
40											
45											
50											

LOG OF BORING B-402 (continued)

GeoEngineers

Project: Convention Center Expansion
Project Location: Spokane, Washington
Project Number: 0110-047-07

Figure: A- 4
Sheet 2 of 2

V6_GTBORING P:\00\01\10047\07\FINALS\011004707.GPJ GEN6_1.GDT 9/13/05

Date(s) Drilled	08/12/05	Logged By	DRB	Checked By	LDS
Drilling Contractor	GeoEngineers	Drilling Method	Hollow-Stem Auger/NX Core	Sampling Methods	SPT/Rockcore
Auger Data	3 3/4-inch ID	Hammer Data	140 lb hammer/30 in drop	Drilling Equipment	CME 75
Total Depth (ft)	30	Surface Elevation (ft)	Not measured	Approximate Groundwater Level (ft. bgs)	Not Encountered
.		.		.	

Elevation feet	Depth feet	SAMPLES: Interval Recovered (in)	SAMPLES: Blows/foot	SAMPLES: Sub-Sample Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0						CC	4 inches portland cement concrete pavement			
							SW-SM	Brown fine to coarse sand with silt, gravel and occasional cobbles (very dense, moist)			
		9	72	1							
	5										
		36		2			BRX	Fractured and weathered basalt; dark gray; stained state; fine-grained; rebound quality; open, planar to undulating, 2- and 3-dimensional rough joints with orange Fe-oxide staining; joints spaced 2 inches to 12 inches; inclined 30 to 50 degrees, near-horizontal, and 70 to 90 degrees; CAE0			REC=87% RQD=52%
	10										
		58		3							REC=96% RQD=89%
	15										
		59		4			BRX	Basalt; dark gray; visually fresh state, fine-grained; rebound quality open 2-dimensional joints stained with green mineralization; joints spaced 4 inches to 10 inches; unit weight=169 pcf; BAEA			REC=98% RQD=73% UCC*=35,000 psi
	20										
		60		5							REC=100% RQD=75%

V6_GTBORING P:\00\0110047\07\FINALS\0110047707.GPJ GEIV6_1.GDT 9/13/05

LOG OF BORING B-403

GeoEngineers

Project: Convention Center Expansion
Project Location: Spokane, Washington
Project Number: 0110-047-07

Figure: A- 5
Sheet 1 of 2

Elevation feet / Depth feet	SAMPLES: Interval	SAMPLES: Recovered (in)	SAMPLES: Blows/foot	SAMPLES: Sub-Sample / Sample Number	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Moisture Content %	Dry Unit Weight, lbs/ft^3	OTHER TESTS AND NOTES
25		54		6						169	REC=100% RQD=51%
30								Boring completed at approximately 30 foot depth No groundwater observed to 7 feet below ground surface Below 7 feet unable to distinguish groundwater from drilling fluid			* presumptive unconfined compressive strength of rock core
35											
40											
45											
50											

V6_GTBORING P:\00\0110047\07\FINALS\0110047707.GPJ GEIV6_1.GDT 9/13/05

LOG OF BORING B-403 (continued)

GeoEngineers

Project: Convention Center Expansion
Project Location: Spokane, Washington
Project Number: 0110-047-07

Figure: A- 5
Sheet 2 of 2

GEOENGINEERS 2004

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Dark brown fine to coarse gravel with sand, trace silt and construction debris (medium dense, moist) (fill)			
								NS	0.6	
							6 inch layer of black cinder			
	5					GP	Tan fine to coarse gravel with sand and trace silt (medium dense, moist)			
							4 inch layer of white caliche	NS	0.9	
							Test pit completed at approximately 8 foot depth Rapid groundwater seepage observed at approximately 8 foot depth No caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-B7

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-2

Sheet 1 of 1

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Gray fine gravel with sand (medium dense, dry)			
						GP	Brown gravel with sand, trace silt and construction debris (medium dense, moist) (fill)			
								NS	0.6	
	5					GP	Brown fine to coarse gravel with sand and trace silt (medium dense, moist)			
								NS	0.6	
	10						Test pit completed at approximately 8 1/2 foot depth Rapid groundwater seepage observed at approximately 8 foot depth No caving observed			
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-B8

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-3

Sheet 1 of 1

0110-047-02 GEI_ENVTESTPIT_2.1.0 P:\00\0110047\02\FINALS\0110047.GPJ GEIV2_2.GDT 4/7/04

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet / Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
0					AC	2 inches asphalt concrete pavement			
					GP	Black gravel with sand, trace silt and construction debris (medium dense, moist) (fill)			
					SP	Brown fine sand with trace silt (loose, moist)	NS	0.7	
5							NS	0.5	
10						Test pit terminated at approximately 9 foot depth due to refusal on basalt rock Rapid groundwater seepage observed below approximately 7 foot depth No caving observed			
15									
20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-C1

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-4

Sheet 1 of 1

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Brown fine to coarse gravel with sand, trace silt and construction debris (medium dense, moist) (fill)			
								NS	0.7	
						SP	Brown fine sand with trace silt (loose, moist)			
	5							NS	0.7	
	10						Test pit completed at approximately 9 foot depth Rapid groundwater seepage observed below approximately 8 1/2 foot depth No caving observed			
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-C3

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-5

Sheet 1 of 1

0110-047-02 GEI_ENVTESTPIT_2.1.0 P:\00\0110047\02\FINALS\0110047.GPJ GEIV2_2.GDT 4/7/04

Date Excavated: 03/18/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Brown fine to coarse gravel with sand, trace silt and large chunks of concrete with rebar (medium dense, moist) (fill)			
								NS		
	5						Test pit terminated at approximately 3 1/2 foot depth due to backhoe refusal on concrete slab No groundwater seepage observed No caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-C5

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

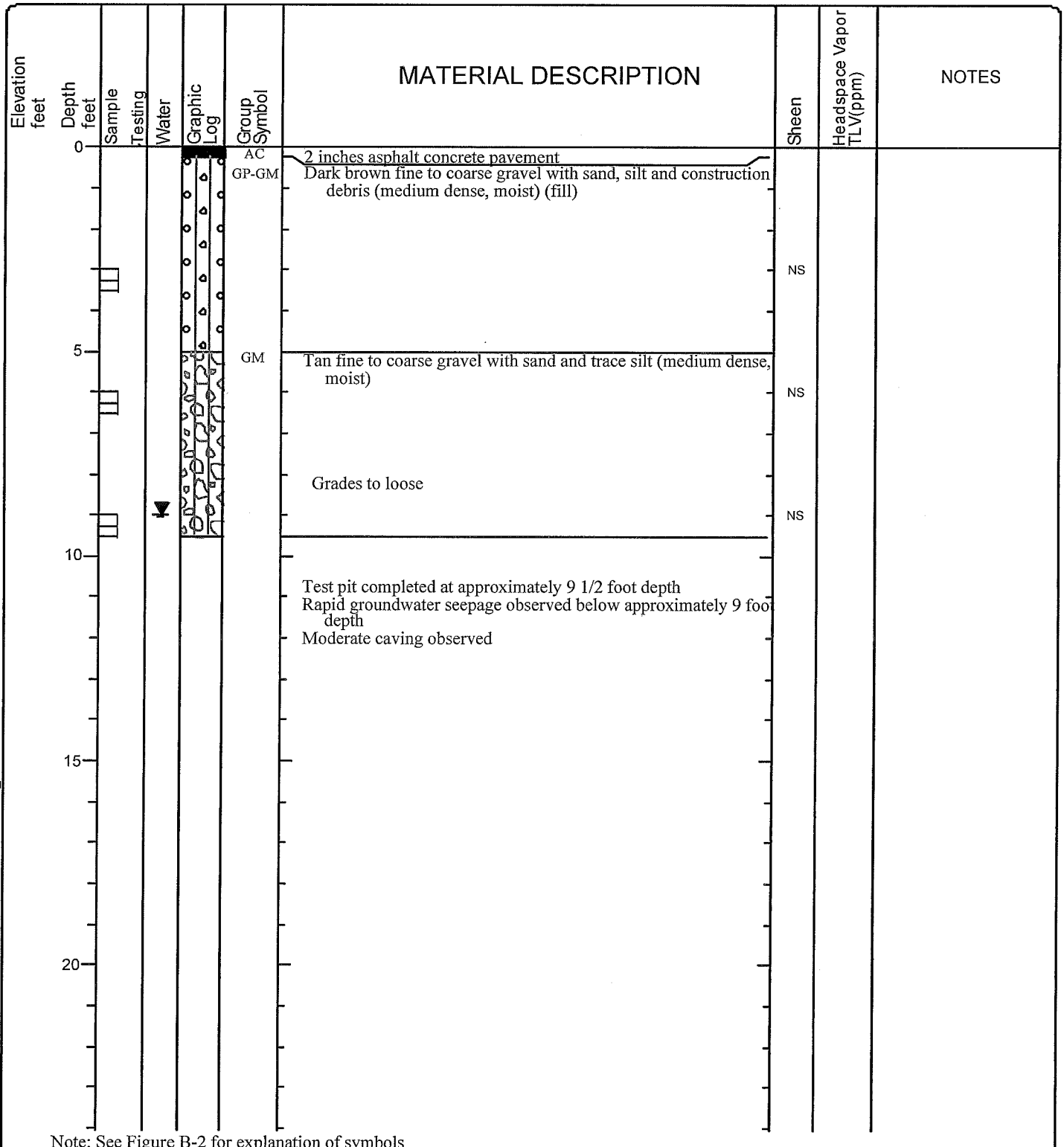
Project Number: 0110-047-02

Figure: B-6

Sheet 1 of 1

Date Excavated: 03/18/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM



Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-C6

GeoEngineers

Project: Convention Center Expansion
Project Location: Spokane, Washington
Project Number: 0110-047-02

Figure: B-7
Sheet 1 of 1

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Gray fine gravel with sand (medium dense, dry)			
						GP	Brown fine to coarse gravel with sand and cobbles (medium dense, moist) (fill)			
								NS	1.1	
						GP	Black fine to coarse gravel with sand and trace silt (medium dense, moist) (fill)			
	5					GP	Light brown fine to coarse gravel with sand and trace silt (medium dense, moist) (fill)			
						GP	Black fine to coarse gravel with sand, trace silt and ash (medium dense, moist) (fill)	NS	0.5	
						GM	Tan fine to coarse gravel with sand (medium dense, moist)	NS	0.5	
	10						Test pit completed at approximately 9 1/2 foot depth Rapid groundwater seepage observed at approximately 9 1/2 foot depth Minor caving observed			
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-C7

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-8

Sheet 1 of 1

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Gray fine gravel with sand (medium dense, dry)			
						GP	Dark brown fine to coarse gravel with sand, trace silt and construction debris (very dense, moist) (fill)			
								NS	0.7	
						GP	Light brown fine to coarse gravel with sand and trace silt (medium dense, moist)			
	5							NS	0.6	
							Grades to loose	NS	0.8	
	10						Test pit completed at approximately 9 foot depth No groundwater seepage observed No caving observed			
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-D5

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-9

Sheet 1 of 1

0110-047-02 GEI_ENVTESTPIT_2.1.0 P:\00\0110047\02\FINALS\0110047.GPJ GEIV2_2.GDT 4/7/04

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					CC	2 inches asphalt concrete pavement			
						GP	Gray fine gravel with sand (medium dense, dry)			
						GP	Dark brown fine to coarse gravel with sand, trace silt and construction debris (very dense, moist) (fill)			
	5						Test pit terminated at approximately 3.7 foot depth due to backhoe refusal on concrete slab No groundwater seepage observed No caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-D5A

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-10

Sheet 1 of 1

Date Excavated: 03/18/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Black fine to coase gravel with sand, trace silt and coal dust (medium dense, moist) (fill)			
								NS		
						GP	Brown fine to coarse gravel with sand and trace silt (medium dense, moist)			
	5							NS		
							Test pit completed at approximately 7 foot depth No groundwater seepage observed Severe caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-D6

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-11

Sheet 1 of 1

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Gray fine gravel with sand (medium dense, dry)			
						GP	Brown fine to coarse gravel with sand and trace silt (medium dense, moist)	NS	0.8	
							Test pit terminated at approximately 2 foot depth due to backhoe refusal on basalt rock No groundwater seepage observed No caving observed			
	5									
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-D8

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-12

Sheet 1 of 1

Date Excavated: 03/18/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Brown fine to coarse gravel with sand and trace silt (medium dense, moist) (fill)	NS		
							Test pit terminated at approximately 2 1/2 foot depth due to backhoe refusal on basalt rock No groundwater seepage observed No caving observed			
	5									
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-E4

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-13

Sheet 1 of 1

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet / Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
0					AC	4 inches asphalt concrete pavement			
					GP	Light brown fine to coarse gravel with sand and trace silt (medium dense, moist)	NS	0.6	
5						Test pit terminated at approximately 3 foot depth due to backhoe refusal on basalt rock No groundwater seepage observed No caving observed			
10									
15									
20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-E7

GeoEngineers

Project: Convention Center Expansion
Project Location: Spokane, Washington
Project Number: 0110-047-02

Figure: B-14
Sheet 1 of 1

Date Excavated: 03/18/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Brown fine to coarse gravel with sand, trace silt and construction debris (medium dense, moist) (fill)			
								NS		
	5							NS		
							Test pit terminated at approximately 5 foot depth due to backhoe refusal on basalt rock No groundwater seepage observed No caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-F1

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-15

Sheet 1 of 1

Date Excavated: 03/18/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Dark brown fine to coarse gravel with sand, cobbles, trace silt and construciton debris (medium dense, moist)	NS		
	5						Test pit terminated at approximately 3 foot depth due to backhoe refusal on bedrock No groundwater seepage observed No caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-F2

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-16

Sheet 1 of 1

0110-047-02 GEI_ENVTESTPIT_2.1.0 P:\00\0110047\02\FINALS\0110047.GPJ GEIV2_2.GDT 4/7/04

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Dark brownish black fine to coarse gravel with sand, trace silt and construction debris (medium dense, moist) (fill)			
								NS		
						GP	Tan fine to coarse gravel with sand and trace silt (medium dense, moist)			
	5							NS		
							Test pit terminated at approximately 7 1/2 foot depth due to backhoe refusal on bedrock No groundwater seepage observed No caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-F4

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-17

Sheet 1 of 1

Date Excavated: 03/18/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Dark brown fine to coarse gravel with sand, trace silt and construction debris (medium dense, moist) (fill)	NS		
						BASALT	Dark gray fractured basalt (very dense, moist)			
	5						Test pit terminated at approximately 5 foot depth due to backhoe refusal in basalt rock No groundwater seepage observed No caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-F5

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-18

Sheet 1 of 1

Date Excavated: 03/18/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Gray fine to coarse gravel with sand (medium dense, dry)			
							Test pit terminated at approximately 1/2 foot depth due to backhoe refusal on brick paving No groundwater seepage observed No caving observed			
	5									
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-F5A

GeoEngineers

Project: Convention Center Expansion
Project Location: Spokane, Washington
Project Number: 0110-047-02

Figure: B-19
Sheet 1 of 1

0110-047-02 GEI_ENVTESTPIT_2.1.0 P:\00\0110047\02\FINALS\0110047.GPJ GEIV2_2.GDT 4/7/04

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Dark brown fine to coarse gravel with sand, trace silt and construction debris (medium dense, moist) (fill)			
						BASALT	Dark gray fractured basalt (very dense, moist)	NS		
	5						Test pit terminated at approximately 5 foot depth due to backhoe refusal in basalt rock No groundwater seepage observed No caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-F6

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-20

Sheet 1 of 1

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Black fine to coarse gravel with sand and trace silt (medium dense, moist) (fill)			
						GP	Tan fine to coarse gravel with sand, trace silt and construction debris (medium dense, moist) (fill)	NS	0.6	
	5					BASALT	Dark gray fractured basalt (very dense, moist)			
							Test pit terminated at approximately 7 foot depth due to backhoe refusal in basalt rock No groundwater seepage observed No caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-F7

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-21

Sheet 1 of 1

0110-047-02 GEI_ENVTESTPIT_2.1.0 P:\00\0110047\02\FINALS\0110047.GPJ GEIV2_2.GDT 4/7/04

Date Excavated: 03/18/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Brown fine to coarse gravel with sand, trace silt and construction debris (medium dense, moist) (fill)	NS		
							Test pit terminated at approximately 2 foot depth due to backhoe refusal on basalt rock No groundwater seepage observed No caving observed			
	5									
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-G3

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-22

Sheet 1 of 1

0110-047-02 GEI_ENVTESTPIT_2.1.0 P:\00\01100471\02\FINALS\0110047.GPJ GEIV2_2.GDT 4/7/04

Date Excavated: 03/18/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Brown fine to coarse gravel with sand, cobbles, and trace silt (medium dense, moist)	NS		
							Test pit terminated at approximately 2 1/2 foot depth due to backhoe refusal on basalt rock No groundwater seepage observed No caving observed			
	5									
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-G4

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-23

Sheet 1 of 1

0110-047-02 GEI_ENVTESTPIT_2.1.0 P:\00\0110047\02\FINALS\0110047.GPJ GEIV2_2.GDT 4/7/04

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Black fine to coarse gravel with sand, cobbles and trace silt (medium dense, moist)			
								NS	0.5	
						BASALT	Dark gray fractured basalt (very dense, moist)			
	5									
							Test pit terminated at approximately 7 foot depth due to backhoe refusal in basalt rock No groundwater seepage observed No caving observed			
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-G6

GeoEngineers

Project: Convention Center Expansion

Project Location: Spokane, Washington

Project Number: 0110-047-02

Figure: B-24

Sheet 1 of 1

Date Excavated: 03/17/04 Logged by: MBE

Equipment: CAT 420 Extendahoe Surface Elevation (ft): NM

Elevation feet	Depth feet	Sample	Testing	Water	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	Headspace Vapor TLV(ppm)	NOTES
	0					AC	2 inches asphalt concrete pavement			
						GP	Gray fine gravel with sand (meduim dense, dry to moist)			
							Test pit terminated at approximately 1/2 foot depth due to backhoe refusal on brick paving No groundwater seepage observed No caving observed			
	5									
	10									
	15									
	20									

Note: See Figure B-2 for explanation of symbols

LOG OF TEST PIT TP-G6A

GeoEngineers

Project: Convention Center Expansion
Project Location: Spokane, Washington
Project Number: 0110-047-02

Figure: B-25
Sheet 1 of 1

GEOENGINEERS 2002

Date(s) Drilled	06/25/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	15	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet	Depth feet	SAMPLES Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							AC	3 inches asphalt concrete			
			1		26			SP-SM	Gray fine to coarse sand with silt, gravel and cobbles (medium dense,moist) (fill)	7		93% finer than the U.S. No. 200 sieve
	5		2		10			SM	Tan silty fine sand (very loose to loose, moist to wet) (fill)			
			3		3	▽						
			4		10					28		
	10		5					BRX	Dark gray, slightly vesicular basalt, stained state pit to rebound quality with 3- to 2-dimensaionl planes of separation, unit weight not measured, (CBEO to CADO)			Rec = 100%, RQD = 50 UCC ~32 ksi Rec = 100%, RQD = 48 UCC ~ 27 ksi ~~Rec = 80%, RQD = 0~~
			6									
			7									
	15								Boring completed at approximately 15 foot depth on 06/25/02 Groundwater encountered at approximately 7 1/2 foot depth during drilling			
	20											
	25											
	30											
	35											
	40											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-201

GeoEngineers

Project: Spokane Public Facilities District - Option 2 Site

Project Location: Spokane, WA

Project Number: 0110-047-00

Figure: A-4

Sheet 1 of 1

Date(s) Drilled	06/27/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	23.5	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet	Depth feet	SAMPLES Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							AC	4 inches asphalt concrete			
			1		20			SP-SM	Brown to gray fine to coarse sand with silt, gravel, cobbles and occasional brick fragments (medium dense, moist) (fill)			
	5		2		20							
						▽		SP	Brown to gray fine to coarse sand with gravel (medium dense, wet) (fill)			
	10		3		13							
								SM	Olive-green silty fine to coarse sand with gravel (medium dense, wet) (fill)			
	15		4		6							
			5		21			GP-GM	Gray fine to coarse gravel with trace sand (medium dense, wet)			
	20		6		30/3"			BRX	Gray basalt with small minor vesicles, stained state to visually fresh state, pit to rebound quality, with 3- to 2-dimensioanl planes of separation, unit weight not measured (CBEO to BADO)			UCC ~ 31 ksi
			7									Rec = 100%, RQD = 88
											177	UCC ~ 31 ksi
	25								Boring completed at approximately 23 1/2 foot depth on 06/27/02			
									Groundwater encountered at approximately 8 foot depth during drilling			
	30											
	35											
	40											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-202

GeoEngineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-5
Sheet 1 of 1

Date(s) Drilled	06/26/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	17	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet / Depth feet	SAMPLES: Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
0							AC	3 inches asphalt concrete			
	1			10			GP	Brown fine gravel with sand, cobbles and construction debris (loose, moist) (fill)			
	2			4			SM	Brown silty fine sand (very loose, moist to wet) (fill)			
5	3			0							
	4			16			SP-SM	Brown fine to coarse sand with gravel (medium dense, wet)			
10	5			49			GP	Brown fine to coarse gravel with silt and sand (dense, wet)			
	6			33/4"			BRX	Gray slightly vesicular basalt, stained to visually fresh state, pit to rebound quality with 3- to 2-dimensaionl planes of separation, unit weight not measured (CBEO to BADO)			UCC ~ 19 ksi
15	7										Rec = 100%, RQD = 26
											UCC ~ 26 ksi
								Boring completed at approximately 17 foot depth on 06/26/02			
								Groundwater encountered at approximately 5 1/5 foot depth during drilling			
20											
25											
30											
35											
40											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-203

GeoEngineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-6
Sheet 1 of 1

Date(s) Drilled	06/28/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	17.5	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet / Depth feet	Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
0							AC	4 inches asphalt concrete			
		1		22			GP-GM	Brown to gray fine to coarse gravel with silt, sand and brick fragments (loose to dense, dry) (fill)	5		
		2		7					8		
5		3		28	▽						
		4		43							
10		5		2			SM	Gray silty fine to medium sand with occasional gravel (very loose, wet) (fill)			
		6		12							
15		7		30/4"			GP-GM	Brown fine to coarse gravel with fine to coarse sand and silt (medium dense, wet)			
								Boring terminated at approximately 17 1/2 foot depth due to auger refusal on 06/28/02			
20								Groundwater encountered at approximately 7 foot depth during drilling			
25											
30											
35											
40											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-204

GeoEngineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-7
Sheet 1 of 1

Date(s) Drilled	07/02/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	27	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet	Depth feet	SAMPLES Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft^3	OTHER TESTS AND NOTES
	0							AC	2 inches asphalt concrete			
			1		18			GP	Brown fine to medium gravel with silt, sand, cobbles and construction debris (medium dense, moist) (fill)			
			2		18			GM	Dark brown silty fine to coarse gravel with sand and cobbles (loose to medium dense, moist) (fill)			
	5		3		10	▼			Becomes wet			
			4		4							
	10		5		30/1"							
			6		21							
	15		7		75							
			8		10			GP	Brown to gray fine to coarse gravel with sand and cobbles (loose to medium dense, wet)			
	20							GM	Gray silty fine to coarse gravel with sand and cobbles (very dense, wet)			
			9		50/2"			BRX	Gray moderately vesicular basalt, stained to visually fresh state, pit quality with 3- to 2-dimensional planes of separation, unit weight not measured (CBEO to BBDO)			Rec = 100%, RQD = 50
	25		10									
									Boring completed at approximately 27 foot depth on 07/02/02 Groundwater encountered at approximately 8 foot depth during drilling			
	30											
	35											
	40											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-205

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-8
Sheet 1 of 1

Date(s) Drilled	06/26/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	16.5	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet / Depth feet	SAMPLES: Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
0	1			30			AC	4 inches asphalt concrete			
							GP	Gray to brown fine to coarse gravel with sand and trace silt (medium dense to dense, moist) (fill)			
5	2										
	3			9	▼						
							GP	Gray to coarse gravel with sand and trace silt (loose, wet)			
	4			7							
10	5			15							
	6						BRX	Light gray to gray moderatley vesicular basalt, stained state, pit quality with 3- to 2-dimensional planes of separation, unit weight not measured (CBEO to CBDO)		158	Rec = 78%, RQD = 0 Rec = 67%, RQD = 0 Rec = 50%, RQD = 0 UCC ~ 14 ksi
15	7										
	8										
								Boring completed at approximately 16 1/2 foot depth on 06/26/02 Groundwater encountered at approximately 8 foot depth during drilling			
20											
25											
30											
35											
40											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-206

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-9
Sheet 1 of 1

Date(s) Drilled	07/03/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	2	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet	Depth feet	SAMPLES: Interval	SAMPLES: Testing/No.	SAMPLES: Recovered (in)	SAMPLES: Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							AC	2 inches asphalt concrete			
			1		30/4"			SM	Dark brown silty fine to coarse sand with gravel (medium dense, moist) (fill)			
									Boring terminated at approximately 2 foot depth due to refusal on 07/03/02			
									No groundwater encountered during drilling			
	5											
	10											
	15											
	20											
	25											
	30											
	35											
	40											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-207

GeoEngineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-10
Sheet 1 of 1

Date(s) Drilled	07/03/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	11	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet	Depth feet	SAMPLES Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft^3	OTHER TESTS AND NOTES
	0							AC	2 inches asphalt concrete			
								SM	Dark brown silty fine to coarse sand with gravel (medium dense, moist) (fill)			
			1		30/3"			CC	6 inches concrete over 3 inches basalt			
								SM	Brown silty sand with gravel (medium dense, moist)			Rec = 33%, RQD = 0
	5		2									UCC ~ 31 ksi
			3									Rec = 24%, RQD = 0
			4					BRX	Light gray moderately vesicular basalt, stained to visually fresh state, pit quality with 3- to 2-dimensaionl planes of separation, unit weight not measured (CCCO to BBCO)			Rec = 100%, RQD = 0
	10		5								177	UCC ~ 6 ksi Rec = 100%, RQD = 21
									Boring completed at approximately 11 foot depth on 07/03/02			
									Groundwater not measured due to drill fluids			
	15											
	20											
	25											
	30											
	35											
	40											

Note: See Figure A-2 for explanation of symbols

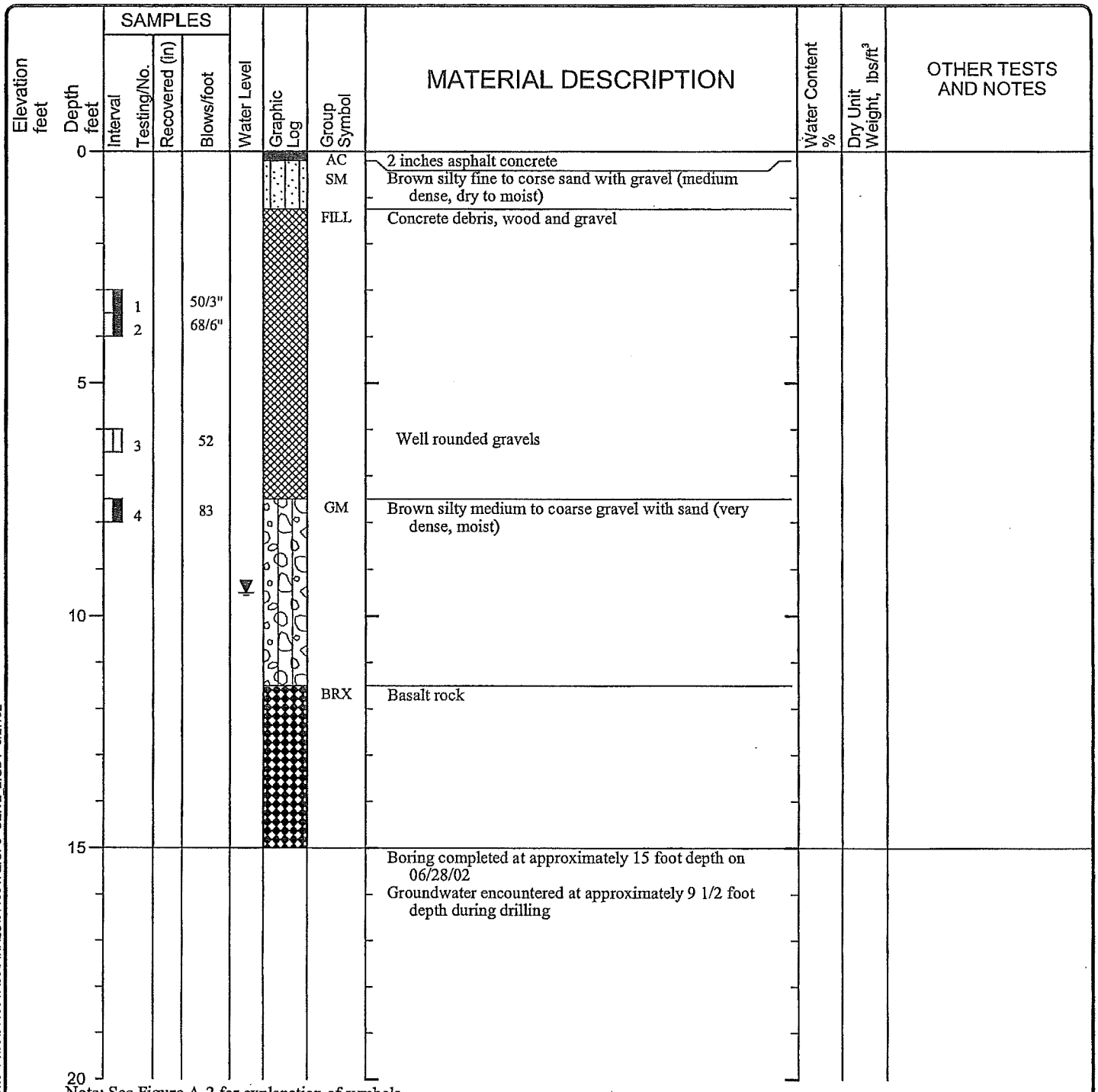
LOG OF BORING B-207A

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-11
Sheet 1 of 1

Date(s) Drilled	06/28/02	Logged By	GDP	Checked By	MLB
Drilling Contractor	Enviornmental West	Drilling Method	Air Rotary	Sampling Methods	2.5" O.D. Split Spoon
Auger Data	NA	Hammer Data	140# hammer, 30" drop	Drilling Equipment	Schramm T300M Rota Drill
Total Depth (ft)	15	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA



Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-208

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-12
Sheet 1 of 1

Date(s) Drilled	06/28/02	Logged By	GDP	Checked By	MLB
Drilling Contractor	Environmental West	Drilling Method	Air Rotary	Sampling Methods	2.5" O.D. Split Spoon
Auger Data	NA	Hammer Data	140# hammer	Drilling Equipment	Schramm T300M Rota Drill
Total Depth (ft)	19.7	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet	Depth feet	SAMPLES Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							AC	3 inches asphalt concrete pavement over 2 inches base course			
								GM	Dark brown silty gravel with sand (very dense, moist)			
			1		65/2"							
			2		88			SP-SM	Brown fine to coarse gravel (very dense, dry)			
	5		3		78							
			4		107							
			5		126	▼						
	10							SP	Gray medium to coarse sand with gravel (dense, wet)			
			6		64							
								SM	Brown silty medium to coarse sand with gravel (very dense, wet)			
			7		110							
	15		8		50/2"			BRX	Basalt			
	20								Boring completed at approximately 19.7 foot depth on 06/28/02 Groundwater encountered at approximately 10 foot depth during drilling			
	25											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-209

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site

Project Location: Spokane, WA

Project Number: 0110-047-00

Figure: A-13

Sheet 1 of 1

Date(s) Drilled	06/27/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	12.25	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet / Depth feet	SAMPLES: Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
0							AC	5 inches asphalt concrete			
	1			27			SM	Brown-gray silty fine to coarse sand with gravel (medium dense, dry to moist) (fill)	6		14% passing the U.S. No 200 sieve
							CC	5 inches concrete			
5	2						BRX	Light gray to gray moderately vesicular basalt, stained state to visually fresh state, dent to pit quality with 3- to 2-dimensaionl palnes of separation, unit weight not measured (CCEO to BBDO)			Rec = 89%, RQD = 39 UCC ~ 25 ksi
	3										Rec = 100%, RQD = 100
10	4										Rec = 100%, RQD = 100 UCC ~ 31 ksi
								Boring completed at approximately 12.25 foot depth on 06/27/02 Groundwater not measured due to drill fluids			
15											
20											
25											
30											
35											
40											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-210

GeoEngineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-14
Sheet 1 of 1

Date(s) Drilled	07//02/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	13.5	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet	Depth feet	SAMPLES Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
	0							AC	2 inches asphalt concrete			
			1		16			GP	Brown to gray fine to coarse gravel with sand, cobbles and trace silt (medium dense to very dense, moist)			
			2		50/2"							
	5		3					BRX	Light gray moderately vesicular basalt, stained state to visually fresh, dent quality with 3- to 2-dimensioanl planes of separation, separation to 8 feet where solids preferred breakage, unit weight not measured (CCCO to BCBO)			Rec = 100%, RQD = 36 UCC ~ 27 ksi
			4									Rec = 100%, RQD = 44
	10		5								169	Rec = 100%, RQD = 94 UCC ~ 27 ksi
									Boring completed at approximately 13 1/2 foot depth on 07/02/02 Groundwater not measured due to drill fluids			
	15											
	20											
	25											
	30											
	35											
	40											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-211

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-15
Sheet 1 of 1

Date(s) Drilled	06/25/02	Logged By	LDS	Checked By	CAS
Drilling Contractor	GeoEngineers, Inc.	Drilling Method	Hollow-Stem Auger	Sampling Methods	SPT/Nx Coring
Auger Data	7 3/4" O.D.	Hammer Data	140# hammer, 30" drop	Drilling Equipment	CME-75
Total Depth (ft)	12	Surface Elevation (ft)	NA	Station:	NA
Datum/ System	NA			Centerline Offset:	NA

Elevation feet / Depth feet	SAMPLES: Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Water Content %	Dry Unit Weight, lbs/ft³	OTHER TESTS AND NOTES
0							AC	2 inches asphalt concrete			
	1			15/5"			GP	Brown fine to coarse gavel with silt, sand and cobbles (medium dense, dry to moist)			UCC ~ 16 ksi
							BRX	Gray vesicular basalt, visually fresh state, pit quality with 3- to 2-dimensioanl planes of separation, unit weight not measured (BBEO to BBDO)		171	Rec = 100%, RQD = 61
5	2										
	3										Rec = 100%, RQD = 74
	4										Rec = 100%, RQD = 100
10	5										Rec = 100%, RDD = 39
								Boring completed at approximately 12 foot depth on 06/25/02 Groundwater not measured due to drill fluid			
15											UCC ~ 17.3 ksi
20											
25											
30											
35											
40											

Note: See Figure A-2 for explanation of symbols

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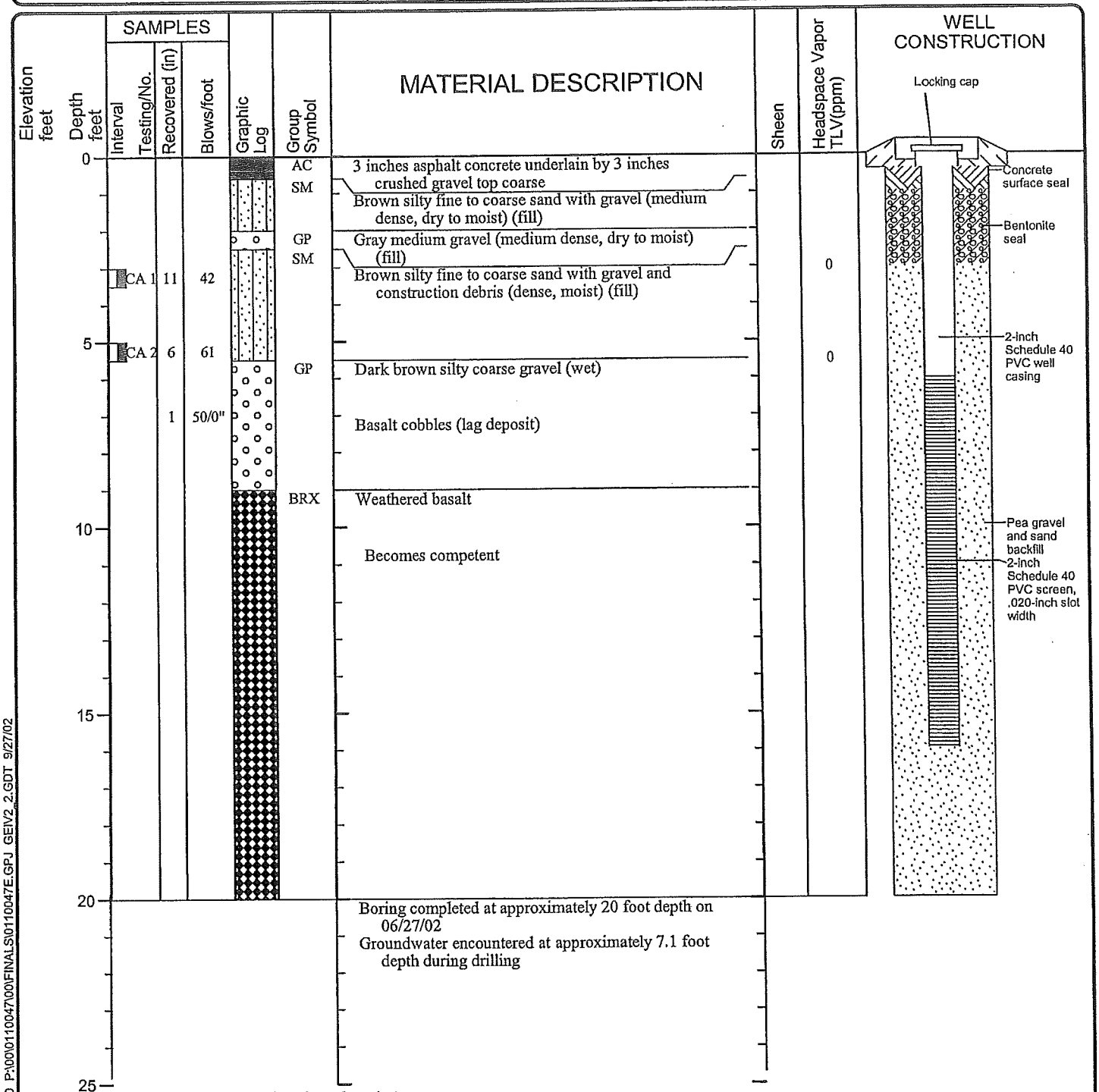
LOG OF BORING B-212

GeoEngineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-16
Sheet 1 of 1

Date(s) Drilled	06/27/02	Logged By	GDP	Checked By	MLB
Drilling Contractor	Environmental West	Drilling Method	Air Rotary	Sampling Methods	3" O.D. split spoon
Total Boring Depth (ft)	20	Hammer Data	140# hammer	Drilling Equipment	Schramm T300M Rota Drill
Well Depth (ft)	16	Top of Well Elevation (ft)		Groundwater Level (ft. bgs)	7.1



Note: See Figure A-2 for explanation of symbols

LOG OF MONITORING WELL MW-213

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-17
Sheet 1 of 1

Date(s) Drilled	06/27/02	Logged By	GDP	Checked By	MLB
Drilling Contractor	Environmental West	Drilling Method	Air Rotary	Sampling Methods	3" O.D. Split Spoon
Auger Data	NA	Hammer Data	140# hammer	Drilling Equipment	SchrammT300M Rota Drill
Total Depth (ft)	5	Surface Elevation (ft)	NM	Ground Water Level (ft. bgs)	NA
Datum/ System					

Elevation feet / Depth feet	SAMPLES: Interval Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	PID Reading (ppm)	NOTES
0						AC	3 inches of asphalt concrete underlain by 3 inches crushed top coarse (fill)			
	1	0	50/0"*			GM	Cobbles with silt, sand and gravel (loose, dry to moist)	NS	0	
						BRX	Basalt bedrock	NS	0	
5							Boring completed at approximately 5 foot depth on 06/27/02 No groundwater encountered during drilling *Blow counts not representative because of coarse-grained nature of material			
10										
15										

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-214

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-18
Sheet 1 of 1

Date(s) Drilled	06/27/02	Logged By	GDP	Checked By	MLB
Drilling Contractor	Environmental West	Drilling Method	Air Rotary	Sampling Methods	3" O.D. Split Spoon
Auger Data	NA	Hammer Data	140# hammer	Drilling Equipment	Schramm T300M Rota Drill
Total Depth (ft)	8	Surface Elevation (ft)	NM	Ground Water Level (ft. bgs)	NA
Datum/ System					

Elevation feet	Depth feet	SAMPLES Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	PID Reading (ppm)	NOTES
	0							AC	3 inches asphalt concrete underlain by 3 inches crushed gravel top coarse (fill)			
								GP	Gray brown silty gravel (very dense, dry) (fill)	SS	0	Sample EB-6A-1.0
		CA 1		11	100/6"*			SM	Brown silty fine to coarse sand with gravel (medium dense,dry) (fill)			
								BRX	Weathered basalt			
	5								Competent basalt			
									Boring completed at approximately 8 foot depth on 06/27/02 No groundwater encountered during drilling *Blow counts not representative because of coarse-grained nature of material			
	10											
	15											

Note: See Figure A.-2 for explanation of symbols

LOG OF BORING B-214A

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-19
Sheet 1 of 1

Date(s) Drilled	06/27/02	Logged By	GDP	Checked By	MLB
Drilling Contractor	Environmental West	Drilling Method	Air Rotary	Sampling Methods	3" O.D. Split Spoon
Auger Data	NA	Hammer Data	140# hammer	Drilling Equipment	Schramm T300M Rota Drill
Total Depth (ft)	9	Surface Elevation (ft)	NM	Ground Water Level (ft. bgs)	NA
Datum/ System					

Elevation feet	Depth feet	SAMPLES Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	PID Reading (ppm)	NOTES
	0							AC	3 inches asphalt concrete over 3 inches crushed gravel top coarse			
								FILL	4-inch-thick concrete slab with occasional asphalt and other construction debris (fill)			
			1	0	50/2"							
			2	0	50/0"							
	5							BRX	Basalt slightly weathered			
									Becomes competent			
	10								Boring completed at approximately 9 foot depth on 06/27/02 No groundwater encountered during drilling			
	15											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-215

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-20
Sheet 1 of 1

Date(s) Drilled	06/27/02	Logged By	GDP	Checked By	MLB
Drilling Contractor	Environmental West	Drilling Method	Air Rotary	Sampling Methods	3" O.D. Split Spoon
Auger Data	NA	Hammer Data	140# hammer	Drilling Equipment	Schramm T300M Rota Drill
Total Depth (ft)	10.5	Surface Elevation (ft)	NM	Ground Water Level (ft. bgs)	NA
Datum/ System					

Elevation feet / Depth feet	SAMPLES Interval	Testing/No.	Recovered (in)	Blows/foot	Water Level	Graphic Log	Group Symbol	MATERIAL DESCRIPTION	Sheen	PID Reading (ppm)	NOTES
0							AC	3 inches asphalt concrete over 3 inches crushed gravel top coarse			
							FILL	Construction debris consisting of bricks and concrete, very little soil (dense, dry) (fill)			
	CA	1	6	66					NR	0	Sample EB-8A-1
							SM	Gray-brown silty medium to coarse sand with gravel (medium dense, moist) (fill)			
	CA	2	6	25					NR	0	Sample EB-8A-3.5
5		3	0	60/5"				Possible debris filled basement	NR	NR	
		4	0	50/0"			BRX	Basalt, slightly weathered	NR	NR	
								Becomes competent			
10								Boring completed at approximately 10 1/2 foot depth on 06/27/02 Perched groundwater encountered at approximately 7 foot depth during drilling Perched groundwater was possibly trapped in basement and disappeared once bedrock was encountered			
15											

Note: See Figure A-2 for explanation of symbols

LOG OF BORING B-215A

Geo Engineers

Project: Spokane Public Facilities District - Option 2 Site
Project Location: Spokane, WA
Project Number: 0110-047-00

Figure: A-21
Sheet 1 of 1

AGRA EARTH & ENVIRONMENTAL 1995

PROJECT *Red Lion/Sheraton Hotel* W.O. *21-8027* BORING NO. *BH-A*

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM (PPM)	GROUND WATER	STANDARD PENETRATION RESISTANCE Blows per foot 0 10 20 30 40 50	TESTING
0	0-2" Asphalt Gravel							HCID
	Hand sample of gravel at three feet	⊠	A-2		0			
	Boring terminated at approxiamtely 3 feet Refusal at 3 feet on basalt bedrock							
5								
10								
15								
20								
25								
30								

0 10 20 30 40 50
MOISTURE CONTENT
Plastic limit — Natural — Liquid limit

LEGEND

I 2-inch OD split spoon sampler

⊠ Grab Sample

AGRA
Earth & Environmental
539 West Sharp, Suite D
Spokane, WA 99201

Drilling completed: 13 April 1995 Logged by: RCL

PROJECT *Red Lion/Sheraton Hotel* W.O. *21-8027* BORING NO. *BH-B*

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM (PPM)	GROUND WATER	STANDARD PENETRATION RESISTANCE ▲ Blows per foot	TESTING
0	0-2" Roots and topsoil							
	Very loose, moist, dark brown fine sandy SILT		B-1	4	0		▲	HCID
5								
	Very dense, wet to saturated, brown fine SAND with trace silt		B-2	52/5"	--		▲	HCID
	Boring terminated at approxiamtely 8.8 feet Refusal on bedrock or rubble							
10								
15								
20								
25								
30								

0 10 20 30 40 50

MOISTURE CONTENT

Plastic limit — Natural — Liquid limit

LEGEND

I 2-inch OD split spoon sampler

AGRA
Earth & Environmental
539 West Sharp, Suite D
Spokane, WA 99201

Drilling started: *13 April 1995* Drilling completed: *13 April 1995* Logged by: *DCJ*

PROJECT *Red Lion/Sheraton Hotel* W.O. *21-8027* BORING NO. *BH-C*

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM (PPM)	GROUND WATER	STANDARD PENETRATION RESISTANCE Blows per foot 0 10 20 30 40 50	TESTING
0	0-2" Asphalt/2-6" Pea gravel (FILL)							
	Boring terminated at approxiamtely 6 inches due to running into strom drain							
5								
10								
15								
20								
25								
30								

MOISTURE CONTENT
0 10 20 30 40 50
Plastic limit — Natural — Liquid limit

LEGEND

I 2-inch OD split spoon sampler

AGRA
Earth & Environmental
539 West Sharp, Suite D
Spokane, WA 99201

Drilling started: *14 April 1995* Drilling completed: *14 April 1995* Logged by: *DCJ*

PROJECT *Red Lion/Sheraton Hotel* W.O. *21-8027* BORING NO. *BH-D*

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM READING	GROUND WATER	STANDARD PENETRATION RESISTANCE ▲ Blows per foot 0 10 20 30 40 50	TESTING
0	0-2" Asphalt							
	Dense, damp, black, silty sandy GRAVEL	X	DI		5			METALS
	Boring terminated at approxiamtely 2 feet Refusal on bedrock or rubble							
5								
10								
15								
20								
25								
30								

0 10 20 30 40 50

MOISTURE CONTENT

Plastic limit — Natural — Liquid limit

LEGEND

I 2-inch OD split spoon sampler

X Grab sample

AGRA
Earth & Environmental
539 West Sharp, Suite D
Spokane, WA 99201

Drilling started: *14 April 1995* Drilling completed: *14 April 1995* Logged by: *DCJ*

PROJECT *Red Lion/Sheraton Hotel* W.O. *21-8027* BORING NO. *BH-E*

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM (PPM)	GROUND WATER	STANDARD PENETRATION RESISTANCE Blows per foot 0 10 20 30 40 50	TESTING
0	0-2" Asphalt Gravel							
	Dense, damp, dark brown, silty fine sandy GRAVEL- chemical odor (FILL)	X	EI		123			8080 8010 8020
	Boring terminated at approxiamtely 3 feet Refusal on bedrock or rubble							
5								
10								
15								
20								
25								
30								

0 10 20 30 40 50
MOISTURE CONTENT
Plastic limit — Natural — Liquid limit

LEGEND

I 2-inch OD split spoon sampler

X Grab sample

AGRA
Earth & Environmental
539 West Sharp, Suite D
Spokane, WA 99201

Drilling started: *13 April 1995* Drilling completed: *13 April 1995* Logged by: *DCJ*

PROJECT *Red Lion/Sheraton Hotel* W.O. *21-8027* BORING NO. *BH-F*

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM (PPM)	GROUND WATER	STANDARD PENETRATION RESISTANCE ▲ Blows per foot 0 10 20 30 40 50	TESTING
0	0-2" Asphalt							
	Dense, dry, light brown, fine sandy GRAVEL	⊠	FI		0			8015
	Boring terminated at approxiamtely 2.75 feet Refusal on bedrock or rubble							
5								
10								
15								
20								
25								
30								

LEGEND

I 2-inch OD split spoon sampler

⊠ Grab sample

0 10 20 30 40 50
MOISTURE CONTENT
Plastic limit — Natural — Liquid limit

AGRA
Earth & Environmental
539 West Sharp, Suite D
Spokane, WA 99201

Drilling started: *13 April 1995* Drilling completed: *13 April 1995* Logged by: *DCJ*

PROJECT *Red Lion/Sheraton Hotel* W.O. *21-8027* BORING NO. *BH-G*

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVA READING	GROUND WATER	STANDARD PENETRATION RESISTANCE Blows per foot	TESTING
0	0-2" Asphalt Gravel (FILL)							
5	Very loose, damp, fine sandy SILT with trace gravel		G-1					8010 8020
10	Very loose, wet, brown, fine to medium SAND		G-2	ATD	--			
	Boring terminated at approxiamtely 12.5 feet Refussal on bedrock or rubble							
15								
20								
25								
30								

0 10 20 30 40 50

MOISTURE CONTENT

Plastic limit — Natural — Liquid limit

LEGEND

I 2-inch OD split spoon sampler

AGRA
Earth & Environmental
539 West Sharp, Suite D
Spokane, WA 99201

Drilling started: *13 April 1995* Drilling completed: *13 April 1995* Logged by: *DCJ*

PROJECT *Red Lion/Sheraton Hotel* W.O. *21-8027* BORING NO. *BH-H*

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	BLOW COUNTS	OVM (PPM)	GROUND WATER	STANDARD PENETRATION RESISTANCE ▲ Blows per foot 0 10 20 30 40 50	TESTING
0	0-2" Asphalt Gravel							
	Dense, dry grading to damp, light brown, silty sandy GRAVEL	⊠	HI		0			8010 8020 8015
	Boring terminated at approxiamtely 3 feet Refusal on bedrock or rubble							
5								
10								
15								
20								
25								
30								

LEGEND

I 2-inch OD split spoon sampler

⊠ Grab sample

0 10 20 30 40 50
MOISTURE CONTENT
Plastic limit — Natural — Liquid limit

AGRA
Earth & Environmental
539 West Sharp, Suite D
Spokane, WA 99201

Drilling started: *14 April 1995* Drilling completed: *14 April 1995* Logged by: *DCJ*

LAMBERT GROUP 1993

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 26, 1993
P.N: E9338 Time In: 07:15 Time Out: 10:30
Owner: River Front Associates Observer: DEI
Project Type: Drill/Sampling/Monitoring Well Weather: Cool-Clear-45°
Boring No: SH-01 Boring Location: West end property near entrance to Hotel

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from surface to 4" then from 4" to 5' Sand gravel	N/A	Reddish brown to light tan in color no odor noticeable
5 -	Damp	Sampled with split spoon HNU = 1ppm	SH01-1	Sandy Gravel Brown to light Tan-white in color
9	Damp	Sampled with split spoon	SH02-1	Sand dark in color no odor -
10 -	Wet	HNU = 1ppm		Appears to be a coal seam(?)
11	Water	Water Table		Sand gravel - basalt fragments
20 -				
21	T.D.			Drilled from 19 to 21 basalt Fresh basalt fragments

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 26, 1993
P.N: E9338 Time In: 11:00 Time Out: 13:00
Owner: Riverfront Associates Observer: DEL
Project Type: Drill / Sample Weather: 50° partly cloudy
Boring No: SH-02 Boring Location: East end of building - North west corner

Depth	Moisture	Field Observations	Sample #	Description
0 -	slight	Asphalt 2 - 4 " below surface	N/A	Asphalt - sand - pea gravels
5 -	damp	split spoon HNU = 10 ppm	SH02 - 1	silt - sand - gravel Tan to brown in color / No odors
8 -	wet	water table	N/A	sand gravels
10 -		Bed rock	N/A	Fresh basalt
11 -	T.D.	Bed rock		Basalt fragments fresh

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 26, 1993
P.N: E9338 Time In: 14:00 Time Out: 16:00
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Partly cloudy
Boring No: SH03 Boring Location: South east corner of property

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from surface to 4"	N/A	
2 -	slight	Fill material	SH03-1	sand gravel grab sample from two feet to three feet. No discoloration or odors.
5 -	T.D.	Basalt at three		Fresh basalt fragments from three feet.

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: 4-26-93 & 4-27-93
P.N: E9338 Time In: 16:15 Time Out: 09:30
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Rain - clearing
Boring No: SH04 Boring Location: 4' west of SH03

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from surface to Approximately 4" bgs	N/A	Asphalt to 4" then sand - gravel to 4 feet. Sand and gravel is brown to tan in color. No odors.
4 -	dry	bedrock - basalt	N/A	switched over to down hole rotary hammer
5 -				
10 -				
20 -				
25 -	moist			damp area in basalt. Seep from rock - not water table.
30 -				
40 -	T.D.			Basalt bedrock from four feet to forty feet.

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 27, 1993
P.N: E9338 Time In: 10:30 Time Out: 11:00
Owner: River Front Associates Observer: DEI
Project Type: Drill Sample Weather: Partly cloudy
Boring No: SH05 Boring Location: NE property line ≈ 75 north of SH04

Depth	Moisture	Field Observations	Sample #	Description
0 -	dry to damp	Asphalt from 0 to 4" Sand gravel- from 4" Slight odor - HNU = 1ppm	N/A SH05-1	Asphalt Sand gravel - brown to tan in color No discoloration
1 -	dry to damp	Basalt - Fresh	N/A	Bed rock
3 -	T.D.	Bedrock		Fresh basalt fragments
-				
-				
-				
-				

BORING/WELL LOG

Project: Sheraton-Spokane Hotel
Date: April 27, 1993
P.N: E9338
Time In: 11:30
Time Out: 12:40
Owner: River Front Associates
Observer: DEL
Project Type: Drill / Sample
Weather: Partly Cloudy
Boring No: SH06
Boring Location: Between TP2 & TP3

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from 0 to 4" Sand and gravel to 2'	N/A	Brown to tan sand and gravel
2 -	Dry	Sampled cuttings - material appeared dark in color had an odor of Cresoles	N/A HNU = 10 - 15 ppm	
6 -	Dry	Split spoon sample Dark colored soil slight odor	HNU = 10 - 15 ppm SH06-1	Dark brown to black soil some white fragments noted in material, could be organic.
7 -	Dry	Basalt rock	N/A	Bedrock
8.5 -	T.D.	Basalt		Bedrock

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 27, 1993
P.N: E9338 Time In: 13:00 Time Out: 14:00
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Partly Cloudy
Boring No: SH-07 Boring Location: Between TP4 & TP3

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from 0 to 4"	N/A	
2 -	Dry	Brown to tan sand & gravel (split spoon)	SH07-2	Sand and gravel appears to be clean no odors present at 2" to 3"
3 -	Dry	railroad tie (?) wood fragments - no odor or discoloration	HNU = 1 ppm	
4 -	Dry	Basalt rock fresh angular fragments	N/A	Boulder
5 -	Dry	Softer material sand to silt	SH7-01 HNU = 1 ppm	Brown to dark brown soil to 5.5' Grab sample from cuttings
6 -	Dry	Fresh angular basalt	N/A	Dark colored basalt - fresh angular fragments
9 -	T.D.	Basalt bedrock		

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 27, 1993
P.N: E9338 Time In: 15:45 Time Out: 16:30
Owner: River Front Associates Observer: DEL
Project Type: Drill/Sample Weather: Cloudy
Boring No: SH08 Boring Location: North 50' from SH07

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from 0 to 4"	N/A	Sand silt and gravel below 4"
3 -	Dry	Silt sand and gravels Split spoon sample	SH08-1 HNU = 1 ppm	Brown to tan silt sand and gravels No odors or discoloration
6 -	Dry	Conglomerate fragments and silty sand soil split spoon	SH08-2 HNU = 5 ppm	Silty to sandy soil - light brown to dark brown in color
7 -	Dry	Basalt rock fragments	N/A	Silty to sandy soil with basalt fragments (fresh)
8.5 -	T.D.	Basalt rock	N/A	Bedrock

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 27, 1993
P.N: E9338 Time In: 16:45 Time Out: 17:30
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Cloudy
Boring No: SH09 Boring Location: ≈ 60 to 75 feet east of SH06

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from 0 to 4"	N/A	Sand and gravel from 4" To 2'
2 -	Dry	Basalt rock fragments - sand and silt Split spoon	SH09-1 HNU = 1 ppm	No odor or discoloration noted
5 -	Damp	Sand and silt Split spoon	SH09-2 HNU = 1 ppm	Upper portion of sample was dark brown to black. No odor was noted.
7.5 -	T.D.	Drilling became hard at 5.5'	N/A	Fresh basalt fragments
-				
-				

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 28, 1993
P.N: E9338 Time In: 08:00 Time Out: 08:30
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: High Clouds
Boring No: SH10 Boring Location: ≈ 50' South of SH09

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt to 4"	N/A	
2 -	Moist	Sand - gravel Split spoon	N/A	Sand - gravel from cuttings. Split spoon only recovered rounded gravel no soil. No odor or discolor observed. Cuttings were tan to light brown in color.
5 -	Moist	Grab sample from drill cuttings	SH10-1	As above except fresh basalt rock fragments at 4.5'.
5.5 -	T.D.	No water		Fresh basalt outcrop

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 28, 1993
P.N: E9338 Time In: 08:50 Time Out: 09:30
Owner: River Front Associates Observer: DEL
Project Type: Drill / sample Weather: High Clouds
Boring No: SH11 Boring Location: = 50 feet south of SH06

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from 0 to 4 "	N/A	Brown to tan silt sand gravel
2 -	Moist	Split spoon No odors	HNU = 1 ppm SH11-1	Dark brown sand - gravel. Some clay in sample. About 1%
5 -	Moist	No odors HNU = 1 ppm	N/A	Brown to tan gravels, sand & silt to 5'.
5.5 -	T.D.	Fresh basalt		Bedrock

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 28, 1992
P.N: E9338 Time In: 10:05 Time Out: 11:00
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: High Clouds
Boring No: SH12 Boring Location: ≈ 50 Feet west of SH05

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from 0 to 4"	N/A	
2 -	Moist	Split spoon	HNU = 2 ppm	No sample Cuttings showed tan to light brown sand gravel. No odor
5 -	Moist	Split spoon	SH12-1 HNU = 1 ppm	Brown to tan sand & gravel
8 -	Moist	Drill cuttings sampled Slight discoloration in cuttings	SH12-2	Light brown to dark brown sand-gravels with some clay.
8.5 -	T.D.			Basalt bed rock
-				

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 28, 1993
P.N: E9338 Time In: 11:30 Time Out: 12:00
Owner: River Front Associates Observer: DEL
Project Type: Drill / sample Weather: Cloudy
Boring No: SH13 Boring Location: ≈ 50 feet south of SH07

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from 0 to 4"	N/A	
2 -	Moist	Dark discoloration No odor	SH13-1 HNU = 2 ppm	Silt - Clay - Sand Brown to black sand silt and clay
2.5 -	Moist	Soil changed colors to more natural colors.	SH13-2 Grab	As above, except material is light brown to tan in color.
5 -	T.D.	Basalt		Bedrock
-				
-				
-				

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 28, 1993
P.N: E9338 Time In: 12:00 Time Out: 12:40
Owner: River Front Associates Observer: DEL
Project Type: Drill / sample Weather: Cloudy
Boring No: SH14 Boring Location: ≈ 40 feet south of SH13 on property line

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from 0 to 4"	N/A	
1 -	Moist	Sand - Silt - Clays	N/A	Brown in color no odor or discoloration
2 -	Moist	Sand - Gravels Split spoon	SH14-1	Brown to tan sand gravels with slight discoloration - no odor.
2.5 -	Dry	Fresh rock	N/A	Basalt rock fragments
3.5 -	T.D.			Basalt rock Bed rock
-				
-				

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 28, 1993
P.N: E9338 Time In: 12:30 Time Out: 13:00
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Cloudy
Boring No: SH15 Boring Location: West of TP4

Depth	Moisture	Field Observations	Sample #	Description
0 -	Dry	Asphalt from 0 to 4"	N/A	
				Brown to tan sand gravel
2 -	Moist	Split spoon	SH15-1	Brown to tan sand gravel - noted some discoloration - no odor
3 -	Moist	Fresh basalt		Basalt fragments
4 -	T.D.	bed rock		
-				
-				
-				

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 28, 1993
P.N: E9338 Time In: 14:30 Time Out: 15:15
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Cloudy & Rain
Boring No: SH16 Boring Location: ≈ 50 feet north of SH15

Depth	Moisture	Field Observations	Sample #	Description
0 -	Wet	Asphalt from 0 to 4"	N/A	
2.5 -	Moist	Split spoon	SH16-1	Gray sand - silt - no odors
4 -	Moist	Split spoon	SH16-2 HNU = 1 ppm	Gray to black sand - silt - slight discoloration - no odors
5 -	T.D.	Basalt		Bed rock
-				
-				

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 28, 1993
P.N: E9338 Time In: 15:35 Time Out: 16:25
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Cloudy
Boring No: SH17 Boring Location: ≈45 feet south of SH15

Depth	Moisture	Field Observations	Sample #	Description
0 -	Damp	Asphalt from 0 to 4"	N/A	
				Brown to tan sand
2 -	Moist	Split spoon	SH17-1	Dark brown to black sand - silt - clay. No odors.
3.4-	Moist	Split spoon	SH17-2	Dark brown to black clay soil. No odor.
6 -	Moist	Rock fragments		Fresh basalt
7.2 -	T.D.			Basalt bedrock
-				

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 29, 1993
P.N: E9338 Time In: 08:30 Time Out: 09:10
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Partly cloudy - Rain
Boring No: SH18 Boring Location: ≈ 50 north of SH08

Depth	Moisture	Field Observations	Sample #	Description
0 -	Wet	Asphalt from 0 to 4"		
1 -	Moist	No odors or discoloration	N/A	Sand gravel some silt and clay - brown to tan in color.
2 -	Moist	No odors or discoloration	N/A	Drill is bouncing having trouble penetrating. Soil is same as above.
3 -	Dry	Wood fragments	SH18-1 HNU = 1ppm	Railroad tie - sand - gravel - sand and gravel are dark colored. Some odor is present.
5 -	Moist	Split spoon	SH18-2 HNU = 1 ppm	Sand gravel are dark brown to black. No odors present.
5.5 -	Moist	Color change	N/A	Sand - gravel - silt brown to tan
6 -		Basalt fragments		Fresh angular fragments
7 -	T.D.	Basalt		Bed rock

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 29, 1993
P.N: E9338 Time In: 09:45 Time Out: 11:00
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Cloudy & Rain
Boring No: SH19 Boring Location: ≈ 80 feet east of SH18

Depth	Moisture	Field Observations	Sample #	Description
0 -	Wet	Asphalt from 0 to 4"		
1 -	Moist	Brown to tan		Sand - silt - gravel
2 -	Moist	Split spoon	SH19-1 HNU = 1 ppm	Gray to brown sand - silt - clay no odors - slight discoloration.
5 -	Moist	Split spoon	SH19-2 HNU = 1 ppm	Dark colored sand - gravel - clays
5.5 -				Soil is becoming lighter in color.
6 -	Damp			Pea gravel brown to tan in color.
8 -	Damp	Split spoon	SH19-3 HNU = 1 ppm	Brown to tan sand and gravels.
9 -	Wet	Water table		
12.5 -	T.D.	Basalt		Bed rock

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 29, 1993
P.N: E9338 Time In: 11:35 Time Out: 14:20
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Raining
Boring No: SH20 Boring Location: ≈ 50 feet east of SH19

Depth	Moisture	Field Observations	Sample #	Description
0 -	Wet	Asphalt from o to 4"		
2 -	Moist	Dark brown clay	SH20-1	Grab sample from cuttings. Sample ranges from 2 feet to 4 feet.
5 -	Moist	Split spoon	SH20-2 HNU = 1 ppm	Dark discolored soil - No odors Soil is Black in color possibly oil or grease.
9 -	Moist to Damp			Soil appears the same as above
11 -	Wet	Water table		Water is dark in color
12 -				Water is cleaner in appearance.
21 -	T.D.			Did not reach bed rock Installed monitoring well
-				

BORING/WELL LOG

Project: Sheraton-Spokane Hotel Date: April 29, 1993
P.N: E9338 Time In: 14:35 Time Out: 15:00
Owner: River Front Associates Observer: DEL
Project Type: Drill / Sample Weather: Raining
Boring No: SH21 Boring Location: North side of Hotel near Service Entrance

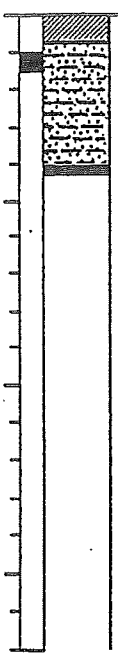
Depth	Moisture	Field Observations	Sample #	Description
0 -	Wet	Asphalt 0 to 4"		
				Brown to tan sand - gravel - clay
2 -	T.D.			Hole stopped due to disturbance of meeting inside hotel.
-				
-				
-				
-				
-				

APPLIED GEOTECHNOLOGY INC. 1992

Laboratory Tests	Moisture Content	OVM	Depth	Sample

Test Pit Number 1

Date 12/10/92 Elevation



0

Asphaltic Concrete Pavement.

0

BROWN SILTY SAND (SM) medium dense, moist; fine to coarse grained, with some gravel, concrete, brick, and wood (Fill).

Groundwater not encountered during excavation.

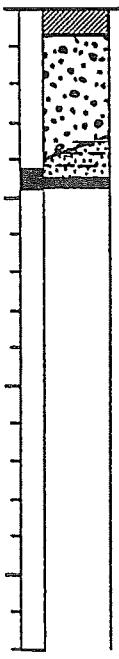
5

10

15

Test Pit Number 2

Date 12/10/92 Elevation



0

Asphaltic Concrete Pavement.

BROWN GRAVELLY SAND (SW) medium dense, moist; fine to medium grained, with bricks, wood, and concrete (Fill).

Railroad ties at 4 feet.

2

5

BLACK SILTY SAND (SM) medium dense, moist; fine to medium grained, with some gravel (Fill).

Groundwater not encountered during excavation.

10

15

Applied Geotechnology Inc.

Log of Test Pit 1 and 2
Riverfront Associates/Sheraton-Spokane
Spokane, Washington

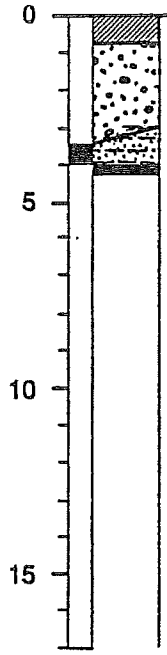
PLATE
A2

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,710.001	SES	TSA	5 Feb. 93		

Laboratory Tests	Moisture Content	OVM	Depth	Sample

Test Pit Number 3

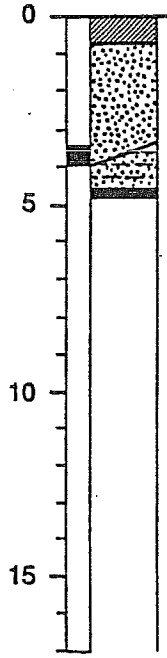
Date 12/10/92 Elevation



Asphaltic Concrete Pavement.
BROWN GRAVELLY SAND (SW) medium dense, moist; fine to medium grained, with brick and concrete (Fill).
Railroad Tie at 4 feet.
BLACK SILTY SAND (SM) medium dense, wet; fine to medium grained, with some gravel (Fill).

Test Pit Number 4

Date 12/10/92 Elevation



Asphaltic Concrete Pavement.
BROWN SAND (SP) medium dense, moist; fine to medium grained, with some gravel, cobbles, brick, and concrete (Fill).
Railroad tie at 4 feet.
LIGHT BROWN SILTY SAND (SM) medium dense, moist; fine to medium grained (Fill).

Groundwater not encountered during drilling.

Applied Geotechnology Inc.

Log of Test Pit 3 and 4
Riverfront Associates/Sheraton-Spokane
Spokane, Washington

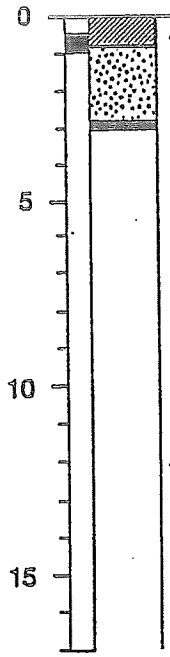
PLATE
A3

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,710.001	SES	TSM	5 Feb. 93		

Test Pit Number 5

Date 12/10/92 Elevation

Laboratory Tests	Moisture Content	OVM	Depth	Sample	
			0		Asphaltic Concrete Pavement.
					BROWN SAND (SP) medium dense, moist; fine to medium grained, with some gravel, brick, and concrete (Fill).
					Concrete road with steel rails at 3 feet.
			5		Groundwater not encountered during excavation.
			10		
			15		



Applied Geotechnology Inc.

Log of Test Pit 5

Riverfront Associates/Sheraton-Spokane
Spokane, Washington

PLATE A4

JOB NUMBER	DRAWN	APPROVED	DATE	REVISED	DATE
15,710.001	SES	TSM	5 Feb. 93		

APPENDIX B
Aquila GeoSciences, Inc. – Seismic Refraction Survey

AQUILA GEOSCIENCES, INC.

P.O. Box 544
Potlatch, Idaho 83855
(208) 875-1175

July 23, 2002

Mr. Christopher A. Sneider, P.E.
Geotechnical Engineer
GeoEngineers-Gifford
523 East Second Avenue
Spokane, Washington 99202

Results of a Seismic Refraction Survey performed at Site 2, Proposed Spokane Convention Center Expansion, Spokane, Washington

Introduction

Aquila Geosciences, Inc., conducted a seismic refraction survey, at your request, at Site 2 of the proposed Spokane Convention Center expansion in Spokane, Washington, on Saturday, July 20, 2002. The purpose of the survey was to determine depths to basalt "bedrock" and information on the basalt seismic velocities of the basalt to aid in GeoEngineer-Gifford's site characterization. Data were collected along two traverse lines. Line 3 ran from South to North and was 460 feet long. Line 4 ran from East to West and was 380 feet long. Chris Sneider provided assistance by barricading the survey line locations, helping lay out and pick up geophones, and providing traffic control during data acquisition.

Data Acquisition

Seismic data were acquired using a Geometrics S-24 seismograph. We used a 12-pound sledge hammer beaten either directly against the asphalt pavement or against an aluminum plate as an energy source. Receivers were 10 Hz. vertical geophones spaced at 20-foot intervals. Shot point locations were selected to provide as much information about the overburden velocities as feasible given the budget, and coverage on the target refractor that would be adequate for data processing and interpretation using the Generalized Reciprocal Method (GRM) of interpreting seismic refraction data.

Data Quality

The quality of the seismic data ranges from fair to poor. Noise, particularly noise from traffic and from the Spokane River, was a constant problem during data acquisition. There was both high frequency and low frequency noise present. To mitigate the effects of this noise we used a 100 Hz. low cut filter and a 250 Hz. high

cut filter (*see footnote at end). We also placed shot points at 40 to 60 foot intervals along the seismic lines. This provided more information on overburden velocities, as well as much greater redundancy of arrival time data for the bedrock refractor. This increase in the number of arrival times from the bedrock refractor at each geophone provides a significant increase in the signal-to-noise ratio for the survey.

A second problem encountered at the site was the "pavement wave". The asphalt pavement acts as a wave guide for high frequency seismic energy. Since the seismic velocity of the asphalt is relatively high, this burst of energy tends to interfere with arrivals from the overburden. We dealt with this by basically disregarding the pavement wave and looking for a lower frequency minimum phase arrival within the pavement wave.

Results and Interpretation

The seismic refraction data were processed and interpreted using the GRM (Generalized Reciprocal Method) of Palmer (1980). The results are shown in the accompanying tables, depth profiles, and velocity plots.

We treated the subsurface as a two layer case for the purposes of the interpretation. The first, upper, layer is "overburden", probably unconsolidated alluvium or fill that is unsaturated (at shallow depths) to saturated (at greater depths). This layer has a seismic velocity ranging from approximately 500 feet/second (south end of line 3) to approximately 2,500 feet/second (central part of line 4).

The second layer is basalt. The velocity of this layer is greater than 16,000 feet/second except for the westernmost 60 feet of line 4, where it appears to be about 12,300 feet/second.

Figures 1 and 2 show the depth profiles for lines 3 and 4, respectively, while tables 1 and 2 contain tabular information on depths and velocities. There is a fair amount of topography on the basalt surface in the survey area. The depths to bedrock calculated from the seismic data are consistent with the depth information from the boreholes drilled at the site, and the two data sets together provide an internally consistent interpretation of the configuration of the bedrock surface.

One word of caution is advised regarding depths to bedrock determined from the seismic data. The arcs on the depth profiles represent the distance from the geophone to the refractor surface (basalt, in this case). These arcs are actually slices of hemispheres taken in the place of the seismic line. There is an unstated assumption in the depth profile that the topography actually occurs in the place of the seismic section. If, however, bedrock is closer to a geophone at a point to the side of the line, the slant distance from the geophone to the bedrock surface is what will be calculated. It is therefore possible for the profiles to show a shallower depth

than is actually present directly below the line.

Summary

The seismic refraction survey you requested that we perform at Site 2 of the planned Spokane Convention Center Expansion has been completed. The results of this survey are intended for use in project planning and management. We consider data derived from geophysical surveys as useful for supplementing and augmenting observations made by direct sampling techniques such as drilling or trenching. The geophysical surveys we do are intended to guide direct sampling, not replace it. Surveys are designed based on information known about the survey area prior to conducting the survey. All interpretations are opinions based on inferences from electrical measurements and the accuracy or correctness of such interpretations cannot be guaranteed. The interpretations apply only to the lines surveyed and features should not be extrapolated beyond or perpendicular to the surveyed line.

Please do not hesitate to call should you have any questions.

Sincerely,

Kent R. Johnson

Kent R. Johnson, Ph.D., P.G.
Geologist/Geophysicist

* **NOTE on filters:** The filter combination used during data acquisition at this site is rather extreme. We considered it advisable to use these filters because the noise problem was so bad. We also considered that it would be acceptable because the survey lines were short enough that phase rotations should not be a problem. The agreement between the calculated depths and the borehole information indicate this decision was justified.

Reference Cited

Palmer, D., 1980, The Generalized Reciprocal Method of Seismic Refraction Interpretation: Soc. Expl. Geophysicists, Tulsa, 104 pp.

Spokane Convention Center Expansion
Site 2
Seismic Refraction Line 3

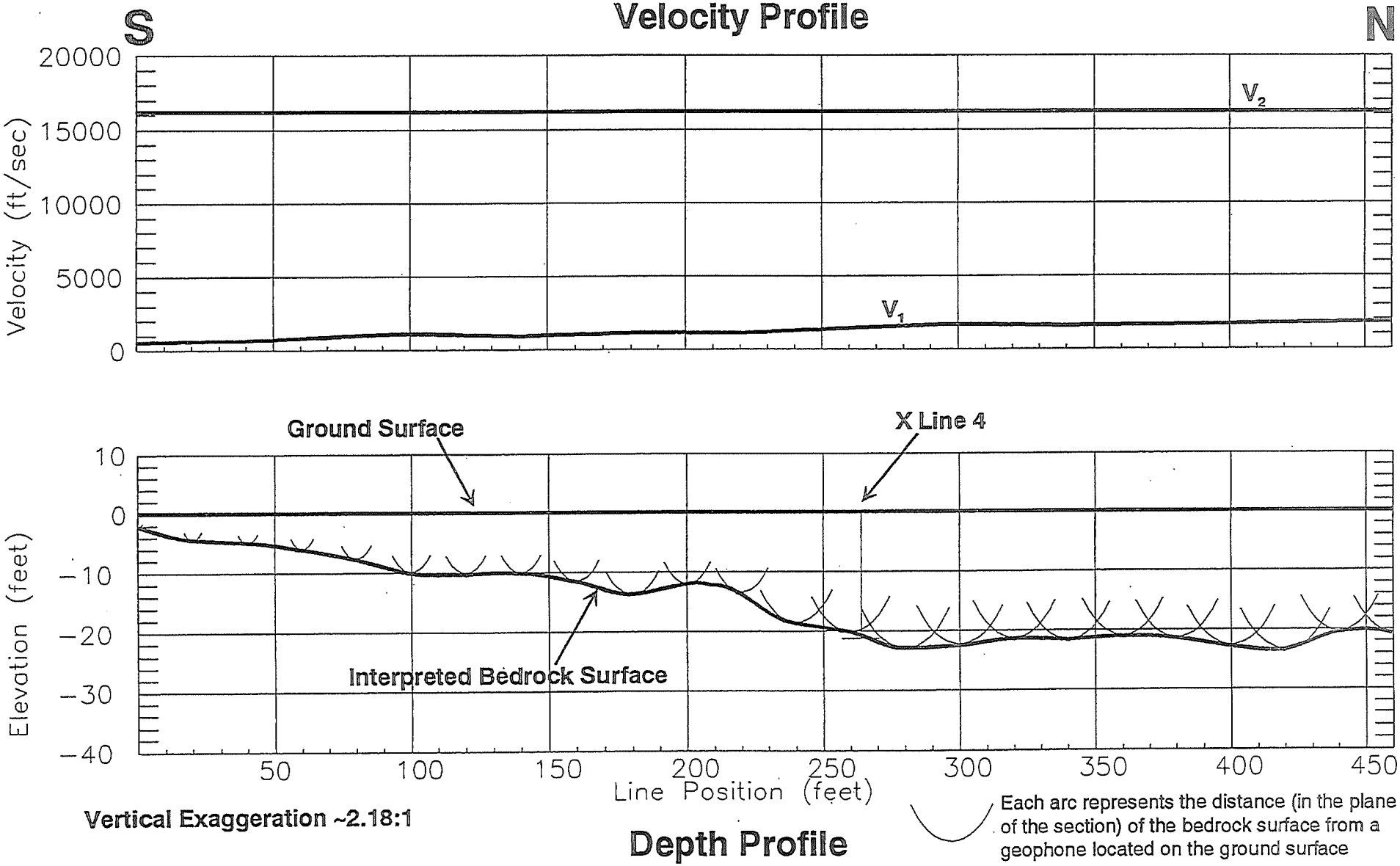


Figure 1

Spokane Convention Center Expansion
Site 2
Seismic Refraction Line 4

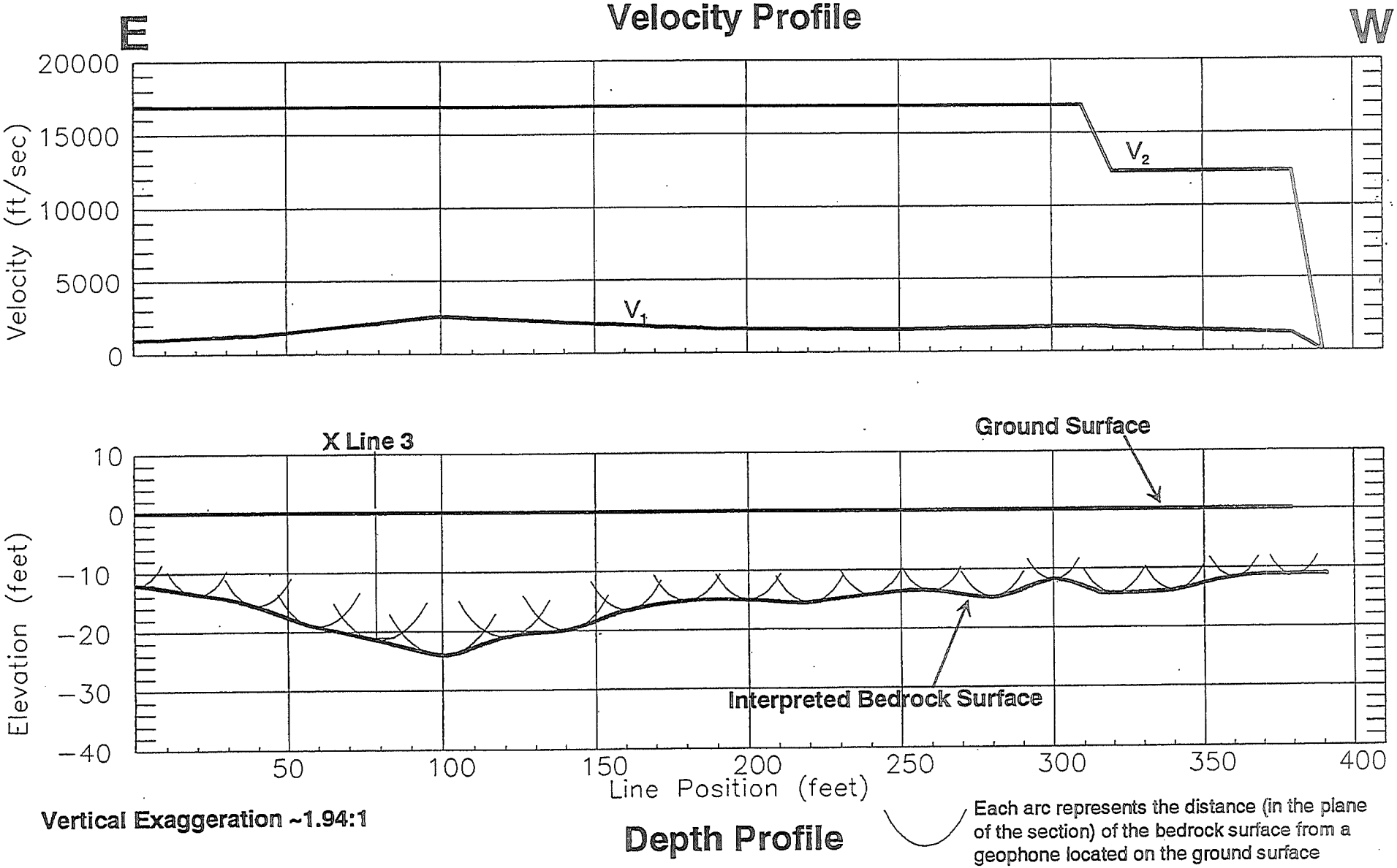


Figure 2

TABLE 1
Line 3 Depth and Velocity Results

Station	Ground Elevation	V1 (ft/sec)	V2 (ft/sec)	Depth to Top V2
0	0	534	16,203	2.2
20	0	596	16,203	4.3
40	0	657	16,203	4.9
60	0	810	16,203	5.9
80	0	964	16,203	7.5
100	0	1,117	16,203	9.8
120	0	1,025	16,203	10.0
140	0	934	16,203	10.0
160	0	1,040	16,203	11.4
180	0	1,146	16,203	13.7
200	0	1,125	16,203	11.9
220	0	1,103	16,203	13.4
240	0	1,265	16,203	18.5
260	0	1,427	16,203	20.1
280	0	1,568	16,203	22.9
300	0	1,687	16,203	22.3
320	0	1,624	16,203	21.3
340	0	1,560	16,203	21.6
360	0	1,601	16,203	20.9
380	0	1,641	16,203	21.3
400	0	1,681	16,203	22.6
420	0	1,721	16,203	23.4
440	0	1,761	16,203	20.3
460	0	1,802	16,203	20.5

TABLE 2
Line 4 Depth and Velocity Results

Station	Ground Elevation	V1 (ft/sec)	V2 (ft/sec)	Depth to Top V2
0	0	939	16,880	12.1
20	0	1,109	16,880	13.7
40	0	1,280	16,880	15.5
60	0	1,696	16,880	19.0
80	0	2,112	16,880	21.3
100	0	2,528	16,880	24.0
120	0	2,328	16,880	20.9
140	0	2,129	16,880	19.8
160	0	1,929	16,880	16.5
180	0	1,729	16,880	15.1
200	0	1,612	16,880	14.9
220	0	1,579	16,880	15.4
240	0	1,547	16,880	14.1
260	0	1,560	16,880	13.7
280	0	1,621	16,880	14.6
300	0	1,681	16,880	11.8
320	0	1,637	12,333	14.2
340	0	1,490	12,333	13.7
360	0	1,343	12,333	11.6
380	0	1,196	12,333	11.3

APPENDIX C
Report Limitations and Guidelines for Use

APPENDIX C
REPORT LIMITATIONS AND GUIDELINES FOR USE

This appendix provides information to help you manage your risks with respect to the use of this report.

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The data report has been prepared for the Spokane Public Facilities District. The report is not intended for use by others, and the information contained herein is not applicable to other projects or properties. No party or parties other than those named above may rely on the product of our services unless we agree to such reliance in advance and in writing. The purpose of this limitation is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

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