

GEOTECHNICAL ASSESSMENT REPORT

SAN JUAN COUNTY TRANSFER STATION REDEVELOPMENT FRIDAY HARBOR, WASHINGTON

Project No. 09-154
April 2010



Prepared for:

**Floyd Snider and
San Juan County**



2021A Minor Avenue East
Seattle, Washington 98102-3588
Tel: 206.262.0370 Fax: 206.262.0374

*Geotechnical & Earthquake
Engineering Consultants*

April 7, 2010
File No. 09-154

Mr. Tom Colligan
Floyd Snider
601 Union Street #600
Seattle, WA 98101

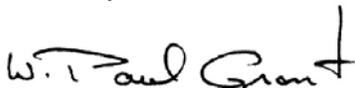
**Subject: Geotechnical Assessment Report
San Juan County Transfer Station Redevelopment
Friday Harbor, Washington**

Dear Mr. Colligan:

Enclosed is our geotechnical report which provides an assessment of subsurface conditions and their potential impacts on redevelopment of the San Juan County Transfer Station at Friday Harbor. In summary, the land parcel owned by San Juan County to the west of the existing transfer station and the City property to the south of the existing fill and transfer station is typically underlain by weathered and unweathered glacial till overlying bedrock at shallow depths (typically less than 5'). There is perched groundwater seeping at the contact of the glacial till or rock where till is not present. The heaviest seepage exists in the area south of the existing storm water detention pond.

In general, the site is underlain by relatively competent soil that is conducive to the use of conventional spread footings for building support. Site cuts in the glacial soil may be accomplished using conventional earth moving equipment while cuts in the rock will require drilling and blasting (i.e. higher costs). Local pockets of surficial soft soil beneath buildings or roads may require over excavation and replacement with structural fill. Details of our findings are discussed in the attached.

Sincerely,



W. Paul Grant, P.E.
Principal

Enclosure: Geotechnical Report

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GEOTECHNICAL ASSESSMENT REPORT
SAN JUAN COUNTY TRANSFER STATION REDEVELOPMENT
FRIDAY HARBOR, WASHINGTON

1.0 INTRODUCTION

This report summarizes the geotechnical assessment of site conditions affecting the potential redevelopment of the existing San Juan County Transfer Station located on San Juan Island. This assessment includes the San Juan County land parcel immediately west of the existing transfer station and the City of Friday Harbor land parcel located south of the existing transfer station and landfill.

1.1 SCOPE AND AUTHORIZATION

This project was conducted under contract with Floyd Snider, Inc. as authorized by Mr. Thomas Colligan on December 2, 2009.

1.2 PROJECT DESCRIPTION

The San Juan County Transfer Station on San Juan Island is located at 212 Sutton Road, roughly 1½ miles north of the town of Friday Harbor (See Figure 1). The site is currently leased from Friday Harbor and was previously the site of a municipal landfill for Friday Harbor. The purpose of the project is to evaluate the geotechnical aspects of the County and City property for redevelopment of the transfer station. The scope of work for the project included reviewing previous geotechnical and environmental studies of the property, conducting additional test pit explorations in areas not previously explored, and presenting our findings in this report.

1.3 SITE LOCATION AND DESCRIPTION

The existing transfer station and landfill (City parcel) and the adjacent San Juan County land parcel to the west are located on a gentle southerly to southwesterly facing slope. The properties are bounded by Roche Harbor Road to the south, Sutton Road to the west and north and single family residential properties to the east (see Figure 2). The existing (closed) municipal landfill is located on the northern portion of the City property and the existing transfer station facilities are located on the west side of the landfill.

Surface conditions vary across the site from open and grassy in the landfill cap, to dry woodlands on the west or wet woodlands on the south. The existing Transfer Station site is graded into differing levels as needed for the station facilities. In addition to the

grading work done for the Transfer Station, a storm water detention pond was constructed south of the landfill and an area west of the pond was cleared and rough graded to a level pad with shallow cuts and fills on the hillside slope (see Figure 2). Surficial soil conditions at the site are largely weathered deposits of glacial till with local areas of bedrock outcrops and other local areas of soft and wet colluvium or highly weathered till.

2.0 FIELD EXPLORATIONS

2.1 CURRENT STUDIES

The current field explorations were conducted between February 16 and 19, 2010. The program consisted of 24 test pits, 8 of which (TP-1 through TP-8) were conducted for environmental purposes by personnel from Floyd Snider and were located in the area of the existing transfer station and landfill. The remaining test pits were advanced for geotechnical purposes and are scattered throughout the previously un-explored area between the Transfer Station and Roche Harbor Road. The locations of all 24 test pits are shown on Figure 2 and logs of the test pits are included in Appendix A. All the environmental test pits and some of the geotechnical test pits were excavated using a John Deere 310D backhoe provided and operated by San Juan County. In areas where access was too difficult for the rubber tired backhoe, the test pits were excavated with a Hitachi 120 track excavator provided by Black Family Enterprises, under contract to San Juan County.

2.2 PREVIOUS STUDIES

Previous geotechnical studies for the site include work by Converse Consultants (1992), Earth Consultants (1994), Shannon & Wilson (2002 and 2003), and SCS Engineers (2007). The Converse and the Earth Consultants studies included test pits and monitoring wells in the area of the present Transfer Station. The 2002 Shannon & Wilson study focused on conditions in the vicinity of the existing transfer station whereas their 2003 study focused on conditions underlying the parcel west of the transfer station, which is now owned by the County. The SCS study included the logs of monitoring wells drilled adjacent to and down gradient of the landfill. The locations of the explorations are shown on Figure 2 and logs of the explorations are presented in Appendices B, C, D, and E.

3.0 GEOLOGY

3.1 REGIONAL GEOLOGY

The San Juan Islands consist of several tectonically accreted bedrock terranes ranging in age from 460 to 65 million years. The various terranes are generally separated by low

angle thrust faults that are currently inactive. The bedrock geology of San Juan Island is dominated by marine metasedimentary rocks of Cretaceous to Jurassic age, called the Constitution Formation. Rocks comprising the formation include hard, resistant metamorphosed sandstone, argillite, mudstone and conglomerate (Logan, R.L., 2003).

The Islands have been overridden several times by glacial ice from the Puget / Juan de Fuca Lobes. Around the margins of the island and in some of the interior valleys and lowland areas, thick sequences of glacial materials such as till and outwash have accumulated. However, in the project property the glacial material consists mainly of very dense, discontinuous glacial till. The till forms a thin veneer in most areas, with somewhat thick accumulations in pockets where weaknesses in the bedrock from jointing and rock discontinuities, or from softer interbedded lithologies, has allowed deeper glacial erosion and plucking.

Recent deposits include colluvium, topsoil and fills. Other than the landfill area, native glacial soil and possibly imported granular fill has been used for site grading for the buildings and roadways of the transfer station and the storm water detention pond south of the landfill. Native glacial soil and imported material may also have been used in the construction of the level pad in the clearing west of the storm water detention pond. In several test pits near the maintenance building, the fill may include minor amounts of refuse, including wood, metal and ash. Colluvium may consist of weathered glacial materials or bedrock. Bedrock colluvium is present especially in the slope area between the Transfer Station and the fill benches below the detention pond. Topsoil generally is comprised of forest duff material mixed with colluvium. However, the topsoil includes accumulations of organic materials in wet portions of the site, especially downslope of the stormwater detention pond and in the area around TP-22.

3.2 SITE SUBSURFACE CONDITIONS

The project site outside of the landfill is underlain by thin topsoil and/or colluvium, followed by dense till or bedrock. Based on the test pits conducted for this investigation, the geotechnical units found on site area as follows.

Fill – General (not landfill municipal solid waste or ash) fill on the site is discontinuous, and is generally associated with concrete wall backfill or a constructed feature, such as the detention pond berm or the fill bench south of the detention pond. Where encountered, the site fill typically consisted of medium dense, silty sand and gravel, with angular rock fragments and wood debris.

Topsoil – Topsoil was generally 6 to 12 inches deep and occasionally up to 18 inches deep. Typically, the topsoil consisted of soft, very dark gray, organic silt, clay and sand with variable amounts of woody debris and humus. The topsoil tended to be thickest in

the “dead Tree” area below the detention pond and in the area around TP-22 in the southwest corner of the new exploration area. In the drier woodland area to the west of the Transfer Station, the topsoil is described as loose, dark brown, silty sand with organics.

Till – The till consisted of medium dense to very dense, mixed sand, silt and clay with gravel. Typically, the upper 1 to 4 feet of the till is weathered and tends to be silty clay to clayey silt with abundant orange and reddish mottling. The weathered till includes some soil that is classified as colluvium. At depth the till grades to sandy silt, non-plastic to slightly plastic, with some gravel.

Bedrock – The bedrock consists of hard, argillaceous meta-siltstone and meta-sandstone. In outcrops, the rock presents a crinkly surface due to angular, multidirectional fracturing surfaces. Where weathering has weakened the rock, it tends to break into angular shards. Intact rock is very strong and not easily rippable.

Groundwater - Groundwater was observed in most test pits, generally occurring as a perched lens at the base of and somewhat below the topsoil layer. This water likely represents seasonal saturation in top soils by infiltrating rainwater and is not considered an aquifer or water bearing stratum. Most flows were observed shallower than 2 feet deep in the test pits. The till was observed to be moist and did not contain groundwater. In TP-19 groundwater was observed to a depth of 4 feet below ground surface; however, the flows occurred only from the downslope side of the test pit. We believe that this water is a small pocket of residual water trapped in a hollow in the bedrock surface. No springs of bedrock seeps were observed during the field exploration. It is likely that most groundwater flows stop during the dry summer months. However, flows may continue throughout the year in the area of the Dead Tree Zone, below the stormwater detention pond as the outfall from the pond discharges directly on the ground surface and is likely the source of water that has saturated the surficial soil in the “Dead Tree Zone” and caused the death of the trees.

4.0 SITE DEVELOPMENT CONSIDERATIONS

In general, the transfer station redevelopment may be accommodated with construction on the land parcel currently owned by San Juan County or the southern portion of the parcel owned by the City or a combination of both land parcels. The layout of the facility and the extent of site grading needed to accommodate the operations of the facility will affect construction costs as related to the amount of site cuts and fills, the extent of walls needed to retain fills and the amount of blasting required for rock excavations. While rock typically exists at depths of less than 5 feet, there are significant areas where rock is locally deeper, particularly in the southern, flatter portion of the site as shown on Figure 2. The areas underlain by deeper rock are more amenable to site grading using

conventional construction equipment whereas cuts in the bedrock would require more expensive drilling and blasting.

General factors to be considered in the site development include:

Feature	Concern	Impact to Development
Terrain	Steeper slopes require more grading (cuts/fills/walls) than the flatter slopes	Higher unit costs for development in steeper areas.
Groundwater	Groundwater flows appear to be more evident below the existing landfill. Near surface groundwater flows will weaken pavements and may cause higher lateral pressures on retaining walls	Slightly higher construction costs for French drains at the up gradient sides of excavations or fills to intercept and collect groundwater flows and channel to existing road
Existing Detention Pond	Existing detention pond likely has cause elevated water levels downstream of the pond, killing trees in the "Dead Tree Zone"	Detention pond and discharge lines can be reconfigured to increase useable space and reduce surface groundwater flows.
Rock	Site grading involving rock cuts will be more expensive than excavations in soil	Higher unit costs for rock cuts

In summary, the site is underlain by relatively competent soil that is conducive to the use of conventional spread footings for building support. Site grading involving cuts in the glacial soil may be accomplished using conventional earth moving equipment while cuts in the rock will require drilling and blasting (i.e. higher costs). Development on the steeper slopes in the currently wooded area of the site will incur higher costs associated with the greater quantity of cuts and fills and the need for retaining walls to optimize useable space. Development on the relatively flatter segment of the site adjacent to Roche Harbor Road will likely require lesser amounts of cuts and fills and lower associated construction costs. Where present beneath buildings or roads, local pockets of surficial soft soil may require over excavation and replacement with on-site glacial till or imported granular backfill. Typical stripping depths (i.e. organic topsoil) range from 6 to

April 7, 2010
SJC Transfer Station

12 inches. Pervasive groundwater seepage, particularly south of the existing detention pond, should be addressed with the construction of up gradient French drains along the northern edge of the new development. The drains should extend to the underlying till (or bedrock where the till is not present) to intercept groundwater flow and channel the water to the ditch on the north side of Roche Harbor Road.

This report is intended only to provide a conceptual assessment of geotechnical considerations for the potential development of the site and PanGEO will need to be consulted to provide specific recommendations for final siting and design of the facility.

Please call with any questions on this report.



W. Paul Grant, P.E.
Principal Geotechnical Engineer

REFERENCES

Converse Consultants, 1992, Geotechnical Report, Friday Harbor Landfill, Friday Harbor, Washington: report to San Juan County

Earth Consultants, 1994, Geotechnical Engineering Study, San Juan County Transfer Station and Recycling Center, San Juan Island, Washington: report to SCS Engineers, April 29.

Logan, R.L., 2003, Geologic map of the Washington portion of the Roche Harbor 1:100,000 Quadrangle, Washington State Department of Natural Resources Open File Report 2003-17

SCS Engineers, 2007, Groundwater Monitoring Network Enhancement and Groundwater Contamination Assessment, Friday Harbor Landfill: report to the Town of Friday Harbor.

Shannon & Wilson, 2002, Geotechnical Engineering Report, Trash to Treasures Facility, Friday Harbor, Washington: report to SvR Design

Shannon & Wilson, 2003, Geotechnical Engineering Report, Trash to Treasures Facility, San Juan Island, Washington: report to SvR Design



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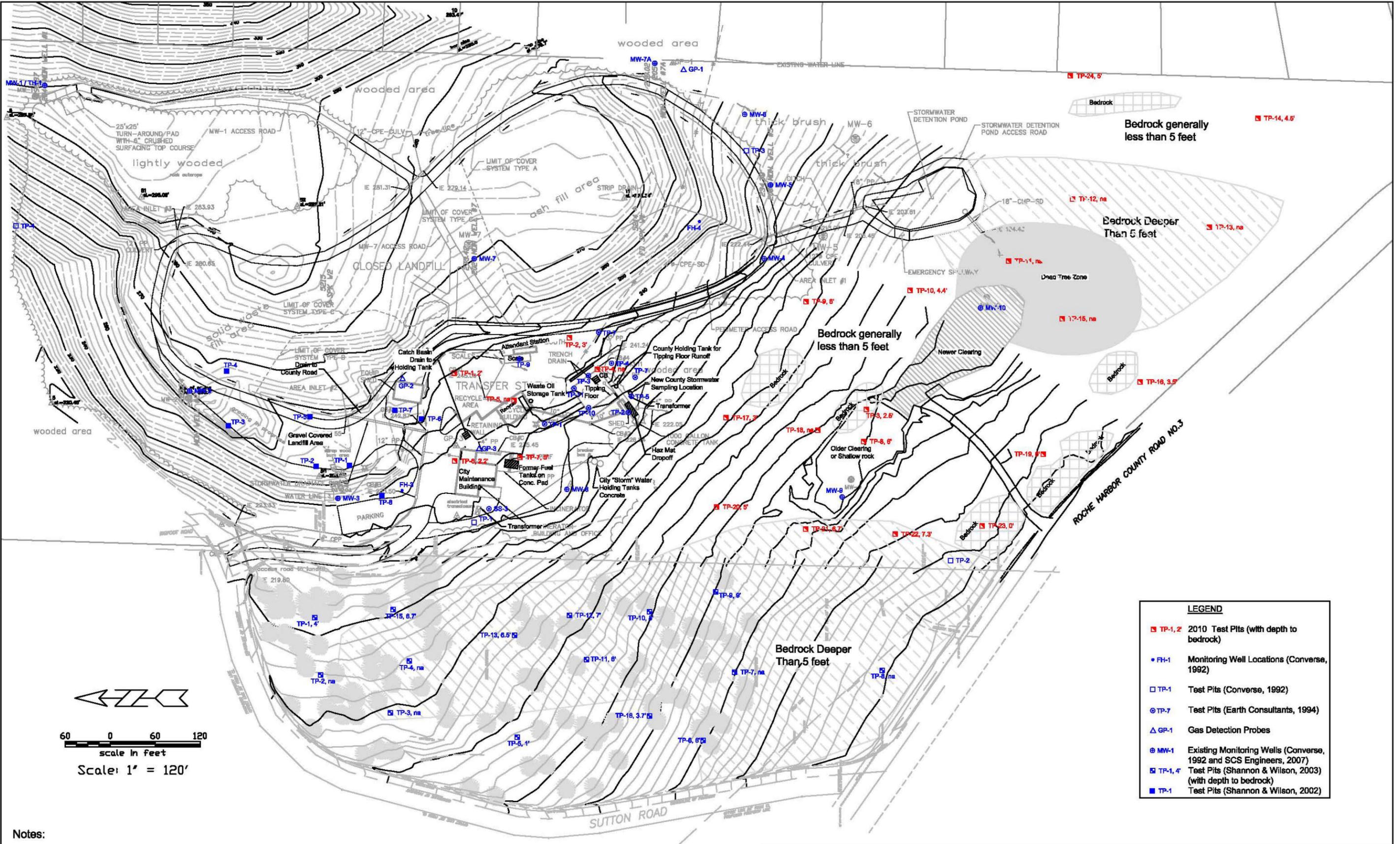
**San Juan County
Transfer Station Redevelopment
Friday Harbor, Washington**

VICINITY MAP

Project No. 09-154

Figure No. 1

DRAWN BY: SHE
 CHECKED BY: WPC
 DATE: 04.06.10
 PROJECT: 09-154 San Juan Co Transfer Sta Drawings PanGEO_Base.dwg



Notes:

1. Base map provided by Floyd Snider, January, 2010. Elevations are based on the NAVD83 datum.
2. Test pit locations for 2010 are approximate and based on the relative locations of known site features.
3. Logs for the 2010 Test Pits are located in Appendix A. Test pits TP-1 to TP-8 contain environmental and sampling information. Test pits TP-9 to TP-24 were advanced for geotechnical purposes.
4. Test pit and boring logs for prior explorations are located in Appendix B through Appendix E.

	San Juan County Transfer Station Redevelopment Friday Harbor, Washington		SITE AND EXPLORATION PLAN	
	PROJECT NO. 09-154	FIGURE NO. 2		

APPENDIX A
CURRENT SUBSURFACE EXPLORATIONS

RELATIVE DENSITY / CONSISTENCY

SAND / GRAVEL			SILT / CLAY		
Density	SPT N-values	Approx. Relative Density (%)	Consistency	SPT N-values	Approx. Undrained Shear Strength (psf)
Very Loose	<4	<15	Very Soft	<2	<250
Loose	4 to 10	15 - 35	Soft	2 to 4	250 - 500
Med. Dense	10 to 30	35 - 65	Med. Stiff	4 to 8	500 - 1000
Dense	30 to 50	65 - 85	Stiff	8 to 15	1000 - 2000
Very Dense	>50	85 - 100	Very Stiff	15 to 30	2000 - 4000
			Hard	>30	>4000

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS		GROUP DESCRIPTIONS	
Gravel 50% or more of the coarse fraction retained on the #4 sieve. Use dual symbols (eg. GP-GM) for 5% to 12% fines.	GRAVEL (<5% fines)		GW: Well-graded GRAVEL
	GRAVEL (>12% fines)		GP: Poorly-graded GRAVEL
Sand 50% or more of the coarse fraction passing the #4 sieve. Use dual symbols (eg. SP-SM) for 5% to 12% fines.	SAND (<5% fines)		GM: Silty GRAVEL
	SAND (>12% fines)		GC: Clayey GRAVEL
			SW: Well-graded SAND
			SP: Poorly-graded SAND
Silt and Clay 50% or more passing #200 sieve	Liquid Limit < 50		SM: Silty SAND
			SC: Clayey SAND
			ML: SILT
	Liquid Limit > 50		CL: Lean CLAY
			OL: Organic SILT or CLAY
			MH: Elastic SILT
			CH: Fat CLAY
Highly Organic Soils		OH: Organic SILT or CLAY	
		PT: PEAT	

TEST SYMBOLS

for In Situ and Laboratory Tests listed in "Other Tests" column.

CBR	California Bearing Ratio
Comp	Compaction Tests
Con	Consolidation
DD	Dry Density
DS	Direct Shear
%F	Fines Content
GS	Grain Size
Perm	Permeability
PP	Pocket Penetrometer
R	R-value
SG	Specific Gravity
TV	Torvane
TXC	Triaxial Compression
UCC	Unconfined Compression

SYMBOLS

Sample/In Situ test types and intervals

	2-inch OD Split Spoon, SPT (140-lb. hammer, 30" drop)
	3.25-inch OD Split Spoon (300-lb hammer, 30" drop)
	Non-standard penetration test (see boring log for details)
	Thin wall (Shelby) tube
	Grab
	Rock core
	Vane Shear

- Notes:**
- Soil exploration logs contain material descriptions based on visual observation and field tests using a system modified from the Uniform Soil Classification System (USCS). Where necessary laboratory tests have been conducted (as noted in the "Other Tests" column), unit descriptions may include a classification. Please refer to the discussions in the report text for a more complete description of the subsurface conditions.
 - The graphic symbols given above are not inclusive of all symbols that may appear on the borehole logs. Other symbols may be used where field observations indicated mixed soil constituents or dual constituent materials.

DESCRIPTIONS OF SOIL STRUCTURES

Layered: Units of material distinguished by color and/or composition from material units above and below	Fissured: Breaks along defined planes
Laminated: Layers of soil typically 0.05 to 1mm thick, max. 1 cm	Slickensided: Fracture planes that are polished or glossy
Lens: Layer of soil that pinches out laterally	Blocky: Angular soil lumps that resist breakdown
Interlayered: Alternating layers of differing soil material	Disrupted: Soil that is broken and mixed
Pocket: Erratic, discontinuous deposit of limited extent	Scattered: Less than one per foot
Homogeneous: Soil with uniform color and composition throughout	Numerous: More than one per foot
	BCN: Angle between bedding plane and a plane normal to core axis

COMPONENT DEFINITIONS

COMPONENT	SIZE / SIEVE RANGE	COMPONENT	SIZE / SIEVE RANGE
Boulder:	> 12 inches	Sand	
Cobbles:	3 to 12 inches	Coarse Sand:	#4 to #10 sieve (4.5 to 2.0 mm)
Gravel	3 to 3/4 inches	Medium Sand:	#10 to #40 sieve (2.0 to 0.42 mm)
		Fine Sand:	#40 to #200 sieve (0.42 to 0.074 mm)
Coarse Gravel:	3 to 3/4 inches	Silt	0.074 to 0.002 mm
Fine Gravel:	3/4 inches to #4 sieve	Clay	<0.002 mm

MONITORING WELL

	Groundwater Level at time of drilling (ATD)
	Static Groundwater Level
	Cement / Concrete Seal
	Bentonite grout / seal
	Silica sand backfill
	Slotted tip
	Slough
	Bottom of Boring

MOISTURE CONTENT

Dry	Dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water

LOG KEY 09-154 SJC-TRANSFER STN. ENV.GPJ PANGEO.GDT 3/3/10

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0				PID=0.0		Medium to dark gray, silty GRAVEL, compact, dry to moist, no odor, no sheen.	0	50	100
0 - 2	TP-1			PID=0.0		Light brown, fine SILT, medium dense, compact, dry to moist, trace rounded cobbles, no odor, no sheen.			
2						Bottom of Test Pit. Test pit met refusal on bedrock. Groundwater seepage at gravel - silt contact from upgradient side of pit, approximately 0.5 gpm, clear. Test pit filled in minutes.			
4									
6									
8									
10									
12									

Completion Depth:	2.0ft	Remarks: Test pit located on north side of scale house, 2 to 3 feet from base of slope to landfill. Note: PID means photoionization detector, readings are in parts per million (ppm).
Date Test Pit Started:	2/16/10	
Date Test Pit Completed:	2/16/10	
Logged By:	M. McCullough	
Excavation Company:	San Juan County	

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 4/6/10



LOG OF TEST PIT TP-1

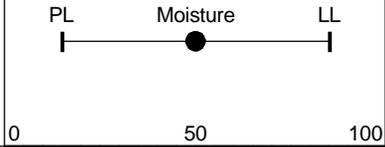


Figure A-2

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0				PID=0.1		Medium gray, silty GRAVEL, wet, loose, no odor. Beneath 2 inches of asphalt.	0	50	100
0 - 2	TP-2			PID=0.1		Light brown to gray, silty, fine SAND with roots, dry to moist, medium dense, trace gravel, green staining, no odor.			
2 - 3.0						Grades to light brown to gray, very fine sand with trace of silt, dry, no odor.			
3.0 - 12						Bottom of Test Pit. Test pit met refusal on bedrock.			



Completion Depth: 3.0ft
 Date Test Pit Started: 2/16/10
 Date Test Pit Completed: 2/16/10
 Logged By: M. McCullough
 Excavation Company: San Juan County

Remarks: Test pit located south of scale house, 2 feet west and 1 foot south of wood structure. Thin wire of unknown source or status encountered in south end of test pit, 1 foot below ground. No groundwater encountered during field exploration. Note: PID means photoionization detector, readings are in parts per million (ppm).

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PAN GEO.GDT 4/6/10



Phone: 206.262.0370

LOG OF TEST PIT TP-2



Figure A-3

The stratification lines represent approximate boundaries. The transition may be gradual.

Project: San Juan Co. Trans. Sta. Geotechnical / Environmental Assess. Job Number: 09-154 / SJC - Transfer Location: San Juan Island, San Juan County, Washington Coordinates: not surveyed	Surface Elevation: Top of Casing Elev.: Excavation Method: John Deere 310D Sampling Method: Grab
--	---

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	<div style="text-align: center;"> PL ————— Moisture ————— LL </div>
0						Sparse moss and weed surface cover. Medium brown GRAVEL (bedrock clasts), trace of sand and silt, angular.	0 50 100
2						Bottom of Test Pit. Test pit met refusal on bedrock.	
4							
6							
8							
10							
12							

Completion Depth: 2.5ft Date Test Pit Started: 2/16/10 Date Test Pit Completed: 2/16/10 Logged By: M. McCullough Excavation Company: San Juan County	Remarks: Test pit located on north side of a clearing west of roadway. No groundwater encountered during field exploration. Note: PID means photoionization detector, readings are in parts per million (ppm).
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LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 4/6/10



Phone: 206.262.0370

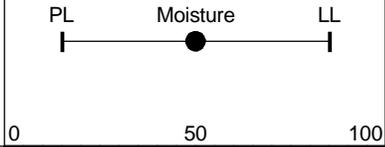
LOG OF TEST PIT TP-3


Figure A-4

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0				PID=1.9		Dark gray, silty, coarse SAND with gravel and roots, moist, loose no odor.	0	50	100
2				PID=2.1		Light to medium brown, silty SAND and gravel, moist, medium dense, large and small angular rock, wood debris. (Fill).			
4						Pockets of light gray, very fine sand and silt, no odor.			
6									
8									
8.7					∇	Groundwater seepage. Pit walls begin to cave.			
9.7						Bottom of Test Pit. Marlin spike probed to 9.7 feet, no footing encountered.			
10									
12									



LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ_PANGEO.GDT 4/6/10

Completion Depth: 8.7ft
 Date Test Pit Started: 2/17/10
 Date Test Pit Completed: 2/17/10
 Logged By: S. Evans
 Excavation Company: San Juan County

Remarks: Pit located on the east corner of the tipping floor platform, between storm drain and platform pad. Note: PID means photoionization detector, readings are in parts per million (ppm).



LOG OF TEST PIT TP-4



Figure A-5

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	Moisture		
							PL	Moisture	LL
0	TP-5	Hand		PID=0.7		Medium gray, coarse SAND with gravel, moist, medium dense, trace silt, gravel decreases with depth, no odor, no sheen.	0	50	100
				PID=0.3					
				PID=0.3					
2				PID=0.1		Medium gray, sandy SILT with fine gravel, moist, dense, gradational contact at top. At 2 feet grades to medium brown SILT with sand and gravel, no sheen, no odor, trace woody debris.			
				PID=0.2		Medium brown, silty, coarse SAND with gravel, moist, dense at top grading to loose, trace woody debris, no odor.			
4				PID=0.2					
6						Grades to silty fine sand with gravel at 6 feet. Piece of plastic observed at bottom of pit.			
8						Bottom of Test Pit.			
10									
12									

Completion Depth:	7.0ft	Remarks: Test pit located at waste oil drop location. No groundwater encountered during field exploration. Note: PID means photoionization detector, readings are in parts per million (ppm).
Date Test Pit Started:	2/16/10	
Date Test Pit Completed:	2/16/10	
Logged By:	M. McCullough	
Excavation Company:	San Juan County	

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ_PANGEO.GDT 4/6/10



LOG OF TEST PIT TP-5

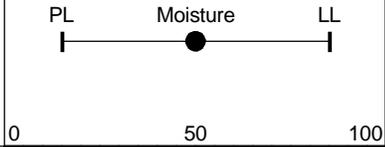


Figure A-6

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL	
0	TP-6			PID=1.4		Medium brown to gray, silty GRAVEL.	0		100	
						Medium brown, silty SAND with gravel, dry, well graded fine to coarse, trace refuse (glass, can lid, plastic and charred wood), no odor.				
2						Medium to light gray SAND, dry to moist, medium dense, fine to medium grained, no odor.				
2				PID=0.5						
						Bottom of Test Pit. Test pit met refusal on bedrock.				
4										
6										
8										
10										
12										



LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 4/6/10

Completion Depth: 2.3ft
 Date Test Pit Started: 2/16/10
 Date Test Pit Completed: 2/16/10
 Logged By: M. McCullough
 Excavation Company: San Juan County

Remarks: Test pit located north of City Maintenance Building, 10 feet north of building and 3 feet east of east side of main roll-up door. No groundwater encountered during field exploration. Note: PID means photoionization detector, readings are in parts per million (ppm).



LOG OF TEST PIT TP-6

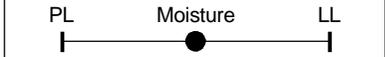


Figure A-7

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0				PID=0.1		Medium brown, silty SAND with gravel, trace rubble (nails, ceramics, metal).	0	50	100
1	TP-7			PID=0.1		At 1 foot, lenses of light brown to white, silty material (ash?) with trace of glass, ceramic material, and metal mixed with medium brown, silty sand with gravel. More abundant fabric, metal waste, slag.			
4				PID=0.2		Medium brown, silty SAND with gravel, moist, medium dense, less rubble, piece of 2 by 4 wood, no odor, gradational contact at top. Multiple wood pieces.			
6						Bottom of Test Pit. Test pit met refusal on bedrock.			
8									
10									
12									



Completion Depth: 5.0ft
 Date Test Pit Started: 2/16/10
 Date Test Pit Completed: 2/16/10
 Logged By: M. McCullough
 Excavation Company: San Juan County

Remarks: Test pit located near east side of former UST pad, 3 feet north of SE corner of pad. Location 26 feet south of Incinerator building, 12 feet west of east building wall. No groundwater encountered during field exploration. Note: PID means photoionization detector, readings are in parts per million (ppm).

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 4/6/10



LOG OF TEST PIT TP-7



Figure A-8

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0				PID=0.6		Dark brown, silty, gravelly, coarse SAND, wet, medium dense, organic odor, rootlets and wood debris.	0	50	100
1				PID=0.9		Light gray silty SAND with angular gravel.			
2						Grades to medium gray, coarse SAND with silt and gravel, trace debris (ceramics, plastic, large rocks, asphalt chunks, soda bottle).			
3	TP-8			PID=2.5		From 3.0 to 3.5 feet, treated wood fragments mixed with soil. Slight odor in soil, wood debris - odor sweet (wood treatment?).			
6						Bottom of Test Pit. Test pit met refusal on bedrock.			
8									
10									
12									

Completion Depth:	6.0ft	Remarks: Test pit located on south side of clearing for MW-9, 53 feet from monitoring well MW-9. Note: PID means photoionization detector, readings are in parts per million (ppm).
Date Test Pit Started:	2/16/10	
Date Test Pit Completed:	2/16/10	
Logged By:	M. McCullough	
Excavation Company:	San Juan County	

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 4/6/10



LOG OF TEST PIT TP-8



Figure A-9

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	Hitachi 120 Excavator
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	Moisture		
							PL		LL
0						Soft, very dark gray, organic SILT with clay: wet, abundant woody debris. (Topsoil).	0	50	100
2						Medium stiff, mottled gray, clayey SILT: moist to wet, low plastic, some fine sand and gravel, massive. (Weathered Till).			
4	S-1					Very stiff to hard, mottled gray, clayey SILT: moist, low plastic, some sand and gravel, breaks in shards. (Glacial Till).			
6						Bottom of Test Pit. Test pit stopped due to refusal on bedrock. Perched, moderate groundwater seepage from topsoil layer. Bedrock knob at south end of the pit. Dip contact 70°.			
8									
10									
12									

Completion Depth: 6.0ft
 Date Test Pit Started: 2/19/10
 Date Test Pit Completed: 2/19/10
 Logged By: S. Evans
 Excavation Company: Black Family Enterprises

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



LOG OF TEST PIT TP-9



Figure A-10

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	Hitachi 120 Excavator
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, very dark gray, organic SILT with clay: wet. (Topsoil).	0	50	100
2	S-1	☒				Soft to medium stiff, gray and brown with orange mottling, gravelly SILT with clay: moist to wet, some sand, abundant rounded cobbles and subangular bedrock cobbles, massive. (Weathered Till).			
4	S-2	☒				Very stiff to hard, gray with orange mottles and lenses, clayey SILT: moist to wet, some fine sand and gravel, rounded cobbles, massive, breaks in shards. (Till).			
						Bedrock.			
						Bottom of Test Pit.			
						Test pit stopped due to refusal on bedrock. Perched, abundant groundwater seepage from topsoil layer.			
6									
8									
10									
12									

Completion Depth: 4.5ft
 Date Test Pit Started: 2/19/10
 Date Test Pit Completed: 2/19/10
 Logged By: S. Evans
 Excavation Company: Black Family Enterprises

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



LOG OF TEST PIT TP-10



Phone: 206.262.0370

Figure A-11

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	Hitachi 120 Excavator
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, very dark gray, ORGANICS with silt: wet, woody peat. (Topsoil).	0	50	100
1	S-1					Soft, brown and gray, clayey SILT to silty CLAY: moist to wet, low plastic, trace gravel, orange mottled, massive. (Weathered Till).			
3.5	S-2					Very stiff to hard, brown gray clayey SILT: moist, trace sand and gravel, low plastic, massive, breaks in shards. (Till).			
6.5						Bottom of Test Pit. Test pit stopped due to practical refusal in till. Perched, abundant groundwater seepage from top 1 foot.			

Completion Depth: 6.5ft
 Date Test Pit Started: 2/19/10
 Date Test Pit Completed: 2/19/10
 Logged By: S. Evans
 Excavation Company: Black Family Enterprises

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



LOG OF TEST PIT TP-11



Phone: 206.262.0370

Figure A-12

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	Hitachi 120 Excavator
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, very dark gray, organic SILT with humus: wet. (Topsoil).	0	50	100
2						Soft to medium stiff, gray with orange mottles and streaks, sandy SILT: wet, some clay, non-plastic to low plastic, fine grained, some gravel and cobbles. (Weathered Till).			
4	S-1					Dense to very dense, gray with orange mottles, silty SAND: moist, fine to medium grained, some gravel and cobbles, trace clay, breaks in shards. (Till).			
4	S-2					Dense to very dense, gray with orange mottles, silty SAND: moist, fine to medium grained, some gravel and cobbles, trace clay, breaks in shards. (Till).			
6						Bottom of Test Pit. Test pit stopped due to practical refusal in dense till. Perched, minor groundwater seepage from topsoil layer.			
8									
10									
12									

Completion Depth: 6.0ft
Date Test Pit Started: 2/18/10
Date Test Pit Completed: 2/18/10
Logged By: S. Evans
Excavation Company: Black Family Enterprises

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



LOG OF TEST PIT TP-12



Figure A-13

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	Hitachi 120 Excavator
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, very dark gray, organic SILT with clay: wet, abundant woody debris. (Topsoil).	0	50	100
2						Soft to medium stiff, gray with orange lenses and mottles, sandy SILT: moist to wet, non-plastic to slightly plastic, fine grained, trace gravel, massive. (Weathered Till).			
4	S-1					Very stiff to hard, gray with some mottling, sandy SILT: moist, fine grained, some gravel and clay, breaks in shards. (Till).			
6						Bottom of Test Pit. Test pit stopped due to effective refusal in till. Perched, moderate groundwater seepage from topsoil layer, top 1 foot.			
8									
10									
12									

Completion Depth: 5.7ft
 Date Test Pit Started: 2/18/10
 Date Test Pit Completed: 2/18/10
 Logged By: S. Evans
 Excavation Company: Black Family Enterprises

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



Phone: 206.262.0370

LOG OF TEST PIT TP-13



Figure A-14

The stratification lines represent approximate boundaries. The transition may be gradual.

Project: San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:
Job Number: 09-154 / SJC - Transfer	Top of Casing Elev.:
Location: San Juan Island, San Juan County, Washington	Excavation Method: Hitachi 120 Excavator
Coordinates: not surveyed	Sampling Method: Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	
0						Soft, very dark gray, organic SILT with clay: moist to wet, abundant woody debris. (Topsoil).	
2						Soft to medium stiff, light brown and gray with orange lenses and mottles, sandy SILT: moist to wet, fine grained, trace gravel and clay, non-plastic to slightly plastic, massive. (Weathered Till).	
4	S-1					Dense to very dense, gray with orange lenses and mottles, silty SAND: moist, fine grained, some rounded gravel, trace clay, non-plastic to slightly plastic fines, massive, breaks in shards. (Till).	
4.6						Bottom of Test Pit. Test pit stopped due to refusal on bedrock. Perched, moderate groundwater seepage from topsoil layer.	
6							
8							
10							
12							

Completion Depth: 4.6ft Date Test Pit Started: 2/18/10 Date Test Pit Completed: 2/18/10 Logged By: S. Evans Excavation Company: Black Family Enterprises	Remarks:
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LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



Phone: 206.262.0370

LOG OF TEST PIT TP-14


Figure A-15

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	Hitachi 120 Excavator
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, very dark gray, organic SILT: wet, abundant woody debris. (Topsoil).	0	50	100
0 - 2	S-1					Soft to medium stiff, brown gray with orange mottles, clayey SILT: moist, low plastic, trace gravel and sand, massive. (Weathered Till).			
2 - 4	S-2					Very stiff to hard, gray and brown with orange mottles and lenses, clayey SILT: moist, medium plastic, trace to some sand and gravel, massive. (Till).			
4 - 8									
8 - 12						Bottom of Test Pit. Test pit stopped due to practical refusal in till. Perched, minor groundwater seepage from topsoil layer.			

Completion Depth: 8.0ft
 Date Test Pit Started: 2/19/10
 Date Test Pit Completed: 2/19/10
 Logged By: S. Evans
 Excavation Company: Black Family Enterprises

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



LOG OF TEST PIT TP-15



Figure A-16

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	Hitachi 120 Excavator
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, very dark gray, organic SILT: wet. (Topsoil).	0	50	100
0 - 3.5						Medium stiff, gray and brown with orange mottles and lenses, gravelly SILT with clay: moist to wet, abundant angular gravel (bedrock clasts) with some rounded gravel, trace sand, low plastic, massive. (Weathered Till).			
3.5	S-1	☒				Hard, mottled gray and brown, clayey SILT with gravel: moist, massive. (Till).			
3.5 - 4	S-2	☒				Hard, mottled gray and brown, clayey SILT with gravel: moist, massive. (Till).			
4						Bottom of Test Pit. Test pit stopped due to refusal on bedrock. Perched, moderate groundwater seepage from topsoil layer. Bedrock surface dips to south at approximately 10°.			

Completion Depth:	3.5ft	Remarks:
Date Test Pit Started:	2/19/10	
Date Test Pit Completed:	2/19/10	
Logged By:	S. Evans	
Excavation Company:	Black Family Enterprises	

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ_PANGEO.GDT 3/29/10



Phone: 206.262.0370

LOG OF TEST PIT TP-16



Figure A-17

The stratification lines represent approximate boundaries. The transition may be gradual.

Project: San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:
Job Number: 09-154 / SJC - Transfer	Top of Casing Elev.:
Location: San Juan Island, San Juan County, Washington	Excavation Method: John Deere 310D
Coordinates: not surveyed	Sampling Method: Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	<div style="text-align: center;"> PL Moisture LL </div>
0						Loose, dark gray, organic GRAVEL: moist to wet, forest soil with abundant broken bedrock clasts. (Topsoil).	0 50 100
2	S-1					Medium dense, red brown GRAVEL: moist, coarse grained, weathered, angular bedrock gravel, blocky fracture. (Weathered Bedrock / Colluvium).	
4						Bottom of Test Pit. Test pit stopped due to refusal on bedrock. No groundwater seepage..	
6							
8							
10							
12							

Completion Depth: 3.0ft Date Test Pit Started: 2/19/10 Date Test Pit Completed: 2/19/10 Logged By: S. Evans Excavation Company: San Juan County	Remarks:
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LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



Phone: 206.262.0370

LOG OF TEST PIT TP-17


Figure A-18

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, very dark gray, organic SILT: wet, with wood debris. (Topsoil).	0	50	100
						Soft, brown to red brown, silty CLAY: wet, some gravel and sand, low to medium plastic, massive. (Colluvium).			
2						Soft, brown with orange lenses and mottles, sandy SILT with clay: wet, low plastic, trace fine gravel, layered with rusty lenses. (Weathered Till).			
	S-1								
4						Very stiff to hard, brown gray, sandy SILT with clay: moist, low plastic, trace gravel, fine grained, massive to layered, breaks in platy shards, occasional boulders. (Till).			
	S-2								
6									
8						Bottom of Test Pit. Test pit stopped due to practical refusal in dense till. Perched, moderate groundwater seepage from depth of 3 feet in pit.			
10									
12									

Completion Depth: 6.5ft
 Date Test Pit Started: 2/19/10
 Date Test Pit Completed: 2/19/10
 Logged By: S. Evans
 Excavation Company: San Juan County

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



LOG OF TEST PIT TP-18



Phone: 206.262.0370

Figure A-19

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	Hitachi 120 Excavator
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, very dark gray, organic SILT with clay: wet, unit thickens on downhill side of pit. (Topsoil).	0	50	100
2	S-1					Medium stiff, mottled gray, clayey SILT: moist to wet, low plastic, trace sand and fine gravel, massive. (Weathered Till).			
4						Hard, mottled gray, clayey SILT: moist, low plastic, some sand and gravel, massive. (Till).			
6						Bottom of Test Pit. Test pit stopped due to refusal on bedrock. Abundant groundwater seepage downslope side of test pit at depth of 3 to 4 feet. Bedrock contact varies from 4.5 to 6.0 over horizontal distance of 3 feet.			
8									
10									
12									

Completion Depth:	6.0ft	Remarks:
Date Test Pit Started:	2/19/10	
Date Test Pit Completed:	2/19/10	
Logged By:	S. Evans	
Excavation Company:	Black Family Enterprises	

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 4/6/10



LOG OF TEST PIT TP-19



Phone: 206.262.0370

Figure A-20

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, dark brown, organic SILT with clay: wet. (Topsoil).	0	50	100
2						Soft, orange mottled gray and brown, sandy SILT: wet, trace clay, non-plastic, rapid dilatancy, fine sand, massive. (Weathered Till).			
3.5	S-1								
4.5	S-2								
5.0	S-3					Strong, gray Bedrock.			
5.2						Bottom of Test Pit.			
6						Test pit stopped due to refusal in bedrock. Perched, slight groundwater seepage from top 2 feet.			
8									
10									
12									

Completion Depth: 5.2ft
Date Test Pit Started: 2/18/10
Date Test Pit Completed: 2/18/10
Logged By: S. Evans
Excavation Company: San Juan County

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



LOG OF TEST PIT TP-20



Figure A-21

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, dark brown to black, organic SILT with clay: wet. (Topsoil).	0	50	100
2	S-1					Soft, light brown with orange mottles, sandy SILT: moist to wet, non-plastic, trace gravel and cobbles, fine grained, massive to indistinctly layered. (Weathered Till).			
4	S-3					Very stiff to hard, brown gray, sandy SILT: moist, fine grained, trace gravel and cobbles, material breaks in shards. (Till).			
6									
8						Bottom of Test Pit. Test pit stopped due to refusal on bedrock. Perched, moderate groundwater seepage from top 2 feet.			
10									
12									

Completion Depth: 6.8ft
 Date Test Pit Started: 2/18/10
 Date Test Pit Completed: 2/18/10
 Logged By: S. Evans
 Excavation Company: San Juan County

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



Phone: 206.262.0370

LOG OF TEST PIT TP-21



Figure A-22

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	John Deere 310D
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, very dark gray, organic SILT: wet. (Topsoil).	0	50	100
2						Soft to medium stiff, gray and brown with orange mottles, SILT: moist to wet, non-plastic, some fine sand and gravel, trace clay, layered with orange lenses and slight plasticity in some layers, scattered cobbles and boulders. (Weathered Till).			
4	S-1					Very stiff to hard, brown gray with orange mottling, sandy SILT: moist, non-plastic to slightly plastic, some gravel, trace to some clay, massive, breaks in shards, scattered cobbles. (Till).			
8	S-2					Bedrock.			
8						Bottom of Test Pit. Test pit stopped due to refusal on bedrock. Perched, moderate groundwater seepage from top 1.8 feet.			

Completion Depth: 7.5ft
Date Test Pit Started: 2/18/10
Date Test Pit Completed: 2/18/10
Logged By: S. Evans
Excavation Company: San Juan County

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN. COMB.GPJ PANGEO.GDT 3/29/10



LOG OF TEST PIT TP-22



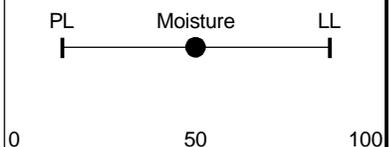
Figure A-23

The stratification lines represent approximate boundaries. The transition may be gradual.

Project: San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.
 Job Number: 09-154 / SJC - Transfer
 Location: San Juan Island, San Juan County, Washington
 Coordinates: not surveyed

Surface Elevation:
 Top of Casing Elev.:
 Excavation Method:
 Sampling Method:

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Bedrock Outcrop.	0	50	100
2									
4									
6									
8									
10									
12									



Completion Depth: 0.0ft
 Date Test Pit Started: 2/18/10
 Date Test Pit Completed: 2/18/10
 Logged By: S. Evans
 Excavation Company: San Juan County

Remarks: Test pit located on bedrock outcrop - test pit cancelled.

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



LOG OF TEST PIT TP-23



Figure A-24

The stratification lines represent approximate boundaries. The transition may be gradual.

Project:	San Juan Co. Trans. Sta. Geotechnical / Environmental Assess.	Surface Elevation:	
Job Number:	09-154 / SJC - Transfer	Top of Casing Elev.:	
Location:	San Juan Island, San Juan County, Washington	Excavation Method:	Hitachi 120 Excavator
Coordinates:	not surveyed	Sampling Method:	Grab

Depth, (ft)	Sample No.	Sample Type	In Situ Tests	Other Tests	Symbol	MATERIAL DESCRIPTION	PL	Moisture	LL
0						Soft, very dark gray, organic SILT with clay: wet. (Topsoil).	0	50	100
2	S-1	▼				Loose, mottled orange gray and light brown, silty SAND: wet, fine grained, non-plastic fines, trace clay, trace rounded gravel, massive, homogeneous. (Weathered Till).			
4	S-2	▼				Medium dense to very dense, gray, silty SAND: moist, fine grained, some gravel, orange mottles and lenses, massive, breaks in shards. (Till).			
6	S-3	▼				Bottom of Test Pit. Test pit stopped due to refusal on bedrock. Perched, moderate groundwater seepage from top 2 feet.			
8									
10									
12									

Completion Depth: 5.2ft
Date Test Pit Started: 2/18/10
Date Test Pit Completed: 2/18/10
Logged By: S. Evans
Excavation Company: Black Family Enterprises

Remarks:

LOG OF TEST PIT 09-154 SJC-TRANSFER STN_COMB.GPJ PANGEO.GDT 3/29/10



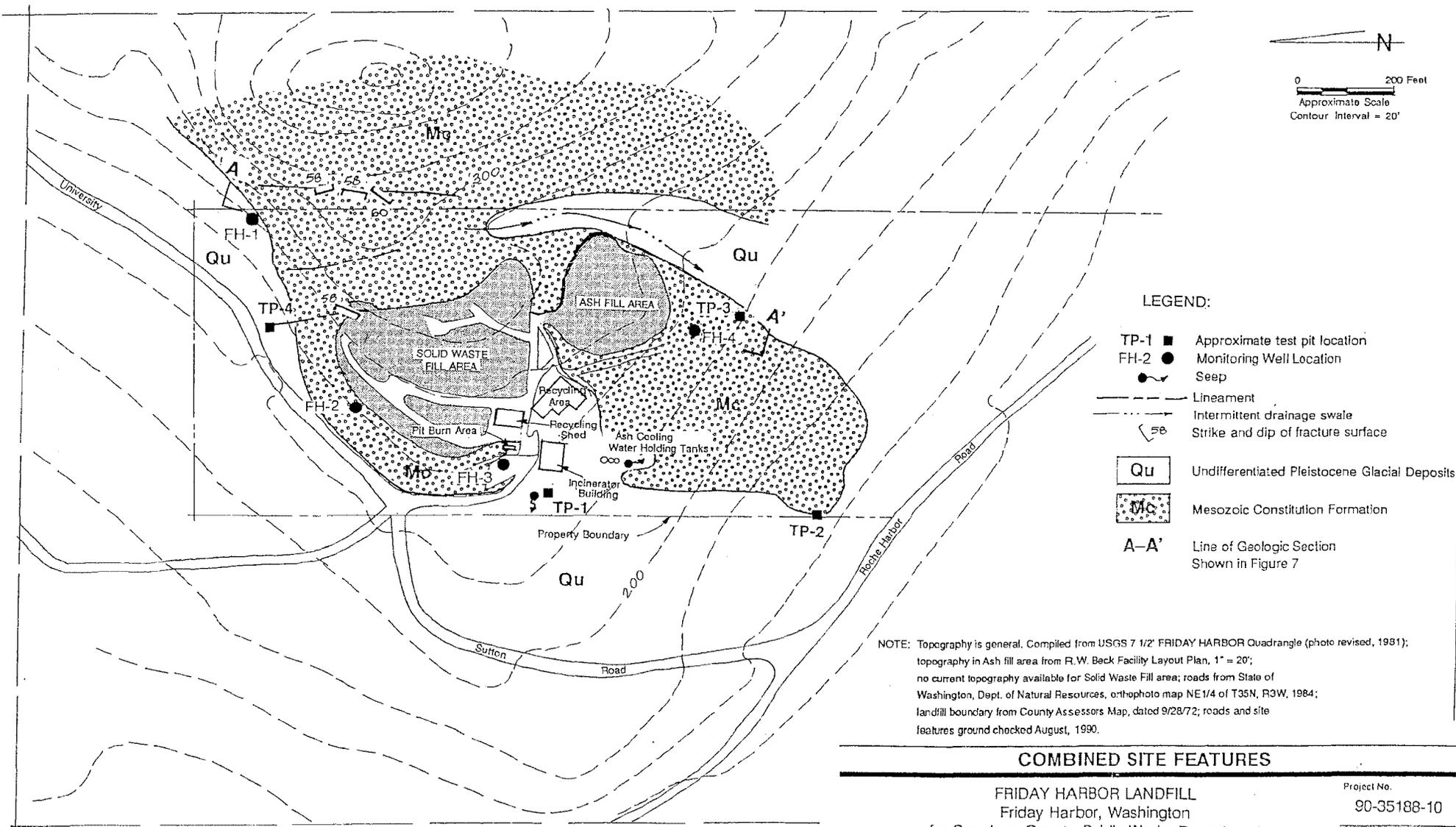
LOG OF TEST PIT TP-24



Figure A-25

The stratification lines represent approximate boundaries. The transition may be gradual.

APPENDIX B
PREVIOUS SUBSURFACE EXPLORATIONS
(Converse, 1992)



LEGEND:

- TP-1 ■ Approximate test pit location
- FH-2 ● Monitoring Well Location
- Seep
- Lineament
- - - Intermittent drainage swale
- 58 Strike and dip of fracture surface
- Qu Undifferentiated Pleistocene Glacial Deposits
- Mc Mesozoic Constitution Formation
- A-A' Line of Geologic Section
Shown in Figure 7

NOTE: Topography is general. Compiled from USGS 7 1/2' FRIDAY HARBOR Quadrangle (photo revised, 1981); topography in Ash fill area from R.W. Beck Facility Layout Plan, 1" = 20'; no current topography available for Solid Waste Fill area; roads from State of Washington, Dept. of Natural Resources, orthophoto map NE 1/4 of T35N, R3W, 1984; landfill boundary from County Assessors Map, dated 9/28/72; roads and site features ground checked August, 1990.

COMBINED SITE FEATURES

FRIDAY HARBOR LANDFILL
 Friday Harbor, Washington
 for San Juan County Public Works Department

Project No.
 90-35188-10
 Figure No.

LOG OF TEST PIT NO. TP-1

Surface Conditions: **Wet grass; surface water; west of incinerator in area adjacent to surface seep**

Elevation (Approx.):

Depth, ft	Elev., ft	Samples	Moisture Content, %	Other tests	Graphic Symbol	DESCRIPTION
						<p>This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this trench at the time of excavation. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</p>
						0.0' - 0.3' Black ORGANIC LAYER, very fine with roots; medium dense, wet
1						0.3' - 1.5' Gray-brown CLAYEY SILT, some well rounded gravel, some organic debris, fine, roots to 1.8'; moist
2						1.5' - 2.1' Gray SILTSTONE, massive, iron staining on fracture surface, upper surface fractured, refusal on competent bedrock
						Bottom of test pit at depth 2.1 feet due to refusal on bedrock. Test pit completed and backfilled on 8/16/90. No groundwater encountered.

FRIDAY HARBOR LANDFILL
 Friday Harbor, Washington
 San Juan County Public Works Department

Project No.
90-35188-10



LOG OF TEST PIT NO. TP-2

Surface Conditions: **Flat, grassy; approx. 100 feet north of Roche Harbor Rd., SW of landfill**

Elevation (Approx.):

Depth, ft	Elev., ft	Samples	Moisture Content, %	Other tests	Graphic Symbol	DESCRIPTION
						<p>This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this trench at the time of excavation. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</p>
1						0.0' - 0.8' Brown SANDY SILT, little gravel, very fine sand; medium dense, dry
2						0.8' - 7.7' Light gray SANDY SILT (Glacial Till), fine sand, some well rounded gravel, some clay, distinct mottles (iron staining) to 3.4', roots to depth 3'; very dense
3						
4						
5						
6						
7						<p>Bottom of test pit at depth 7.7 feet. Test pit completed and backfilled on 8/16/90. No groundwater encountered.</p>

FRIDAY HARBOR LANDFILL
 Friday Harbor, Washington
 San Juan County Public Works Department

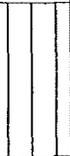
Project No.
90-35188-10



LOG OF TEST PIT NO. TP-3

Surface Conditions: **Grassy depression; SE corner of landfill**

Elevation (Approx.):

Depth, ft	Elev., ft	Samples	Moisture Content, %	Other tests	Graphic Symbol	DESCRIPTION
					<p style="font-size: small;">This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this trench at the time of excavation. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.</p>	
						0.0' - 0.7' Dark brown CLAYEY SILT, very fine; dense, moist
1						0.7' - 3.8' Gray SILTSTONE, upper surface weathered and fractured, iron staining and calcite, inter-growth observed on fracture surfaces; moist
2						
3						
						Bottom of test pit at depth 3.8 feet due to refusal on bedrock. Test pit completed and backfilled on 8/16/90. No groundwater encountered.

FRIDAY HARBOR LANDFILL
 Friday Harbor, Washington
 San Juan County Public Works Department

Project No.
90-35188-10



Converse Consultants NW

Geotechnical Engineering
and Applied Earth Sciences

Figure No.
B-4

LOG OF TEST PIT NO. TP-4

Surface Conditions: **Wooded area, slight slope; NE corner of site adjacent to Sutton Road**

Elevation (Approx.):

Depth, ft	Elev., ft	Samples	Moisture Content, %	Other tests	Graphic Symbol	DESCRIPTION
This log is part of the report prepared by Converse Consultants NW for the named project and should be read together with that report for complete interpretation. This summary applies only at the location of this trench at the time of excavation. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.						
1						0.0' - 3.4' Brown SILT, very fine, little fine sand; medium dense, dry
2						
3						
4						3.4' - 4.4' Orange-brown SAND, fine to medium, some silt; dense, slightly moist
5						4.4' - 5.3' Gray SANDY SILT, some well rounded gravel, fine; very dense, slightly moist
						Bottom of test pit at depth 5.3 feet due to refusal on bedrock (gray Siltstone). Test pit completed and backfilled on 8/16/90. No groundwater encountered.

FRIDAY HARBOR LANDFILL
 Friday Harbor, Washington
 San Juan County Public Works Department

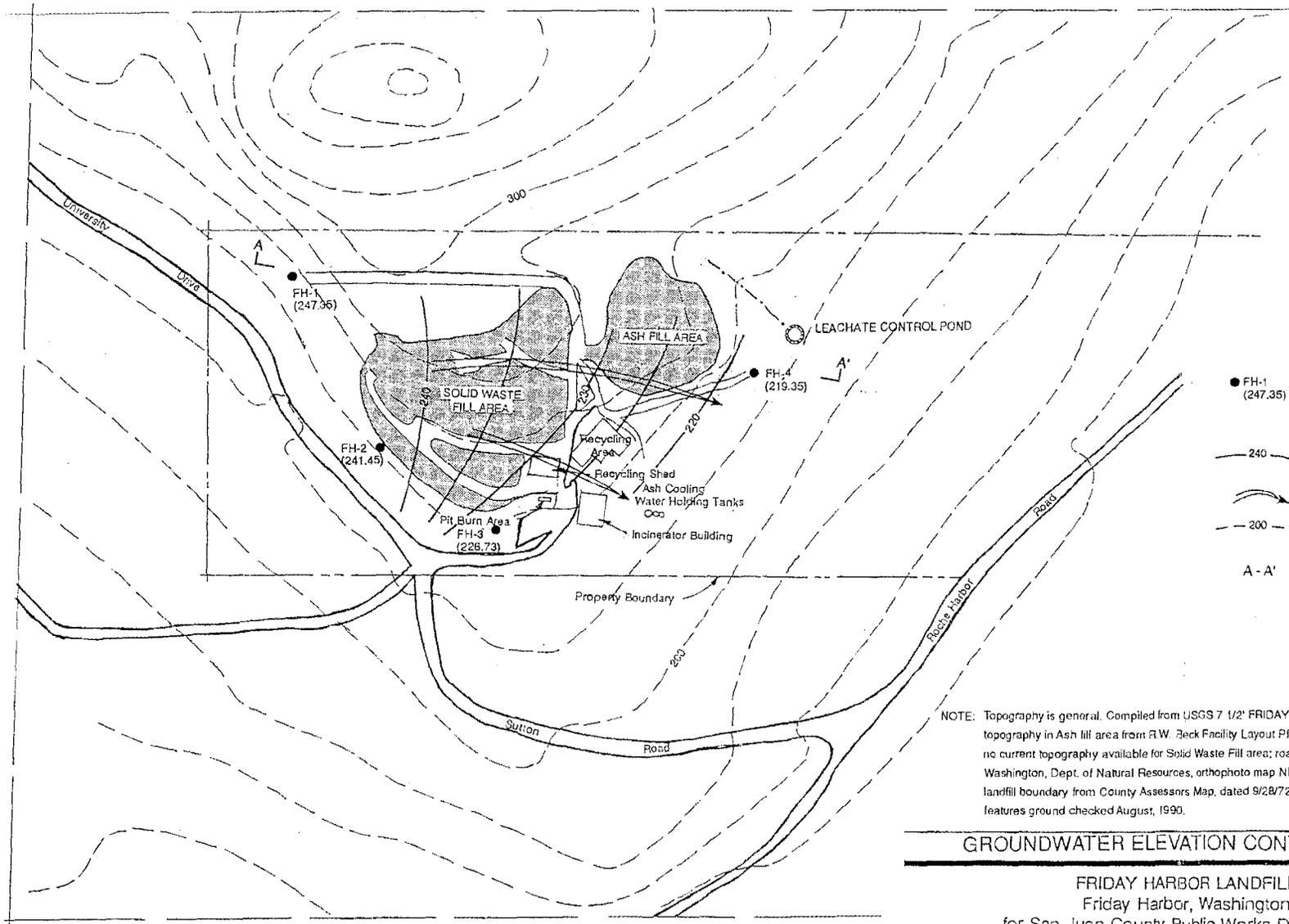
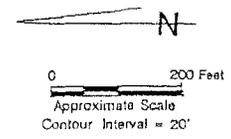
Project No.
90-35188-10



Converse Consultants NW

Geotechnical Engineering
and Applied Earth Sciences

Figure No.
B-5



LEGEND

- FH-1 (247.35) Monitoring Well Location and No. with Static Water Level; Elevation (in feet above MSL) Measured 1/9/91
- 240 — Interpolated Contours of Potentiometric Surface (in feet above MSL)
- Inferred Groundwater Flow Direction
- - - 200 - - - Generalized Topographic Contours. See Note Below
- A - A' Line of Geologic Section Shown in Figure 7.

NOTE: Topography is general. Compiled from USGS 7 1/2' FRIDAY HARBOR Quadrangle (photo revised, 1981); topography in Ash fill area from R.W. Beck Facility Layout Plan, 1" = 20'; no current topography available for Solid Waste Fill area; roads from State of Washington, Dept. of Natural Resources, orthophoto map NE1/4 of T35N, R3W, 1984; landfill boundary from County Assessor's Map, dated 9/28/72; roads and site features ground checked August, 1990.

GROUNDWATER ELEVATION CONTOURS, JAN. 9, 1991

FRIDAY HARBOR LANDFILL
 Friday Harbor, Washington
 for San Juan County Public Works Department

Project No.
 90-35188-10
 Figure No.

BRUNING 40-107



Converse NW

Monitoring Well Geologic & Construction Log

Project Number
90-35188-10

Well Number
FH-1

Sheet 1 of 4

Project **FRIDAY HARBOR LANDFILL**

Location **Friday Harbor, Washington**

Elevation (Top of Well Casing) 296.97

Surface Elevation 294

Water Level Elev. 246

Start Date **November 26, 1990**

Drilling Contractor **Martel Well Drilling**

Finish Date **December 4, 1990**

Drilling Method **Air Rotary**

Depth feet	Well Construction	Lab Tests	Blows/6"	OVM Reading	Description
	locking 8" dia. steel protective casing concrete surface seal				Shaley fill material
5	bentonite seal				CONSTITUTION FORMATION (BEDROCK) Metamorphosed, volcanoclastic siltstone to sandstone; gray-blue, minor quartz veining, bedrock
10	2" dia. PVC well casing blank				
15					gray-brown, some balling of cuttings faster drilling, fracture zone at 15.5 feet
25	high solids bentonite grout				
30					minor chert
35					

ST - Sampler Type:

- 2" OD Split Spoon
- Bulk Grab Sample
- Drive Barrel

Lab Tests:

- S - Soil Properties
- C - Chemical Properties
- Water Level

Logged by: EWM

Approved by: EWM

Figure No. B-7



Converse NW

Monitoring Well Geologic & Construction Log

Project Number
90-35188-10

Well Number
FH-1

Sheet 2 of 4

Project FRIDAY HARBOR LANDFILL

Location Friday Harbor, Washington

Elevation (Top of Well Casing) 296.97

Surface Elevation 294

Water Level Elev. 246

Start Date November 26, 1990

Drilling Contractor Martel Well Drilling

Finish Date December 4, 1990

Drilling Method Air Rotary

Depth feet	Well Construction	Lab Tests	Blows/6"	OVM Reading	Description
					CONSTITUTION FORMATION (BEDROCK) Metamorphosed volcanoclastic sandstone (continued) cuttings balling
45	bentonite seal				
50					some black shale fragments
55					soft drilling, fracture zone 53 to 55 feet, black shale
60	8/12 Colorado silica sand				blow hole, no water
65					
70					
75					

ST - Sampler Type:

- 2" OD Split Spoon
- Bulk Grab Sample
- Drive Barrel

Lab Tests:

- S - Soil Properties
- C - Chemical Properties
- Water Level

Logged by: EWM

Approved by: EWM

Figure No. B-7 cont



Converse NW

Monitoring Well Geologic & Construction Log

Project Number
90-35188-10

Well Number
FH-1

Sheet 3 of 4

Project **FRIDAY HARBOR LANDFILL**

Location **Friday Harbor, Washington**

Elevation (Top of Well Casing) 296.97

Surface Elevation 294

Water Level Elev. 246

Start Date **November 26, 1990**

Drilling Contractor Martel Well Drilling

Finish Date December 4, 1990

Drilling Method Air Rotary

Depth feet	Well Construction	Lab Tests	S Blows/6"	OVM Reading	Description
					CONSTITUTION FORMATION (BEDROCK) Metamorphosed volcanoclastic sandstone (continued)
85					
90					
95					soft drilling 93 to 100 feet some veining
100					soft drilling Dark gray metamorphic volcanoclastic sandstone with minor quartz or calcite veining, possible slickensides on fragments, some interlayered black shale allowed hole to fill 20 minutes and blew out, no water
105					end soft drilling
110	0.02" slot PVC screen				less shale
115	sampling pump intake				

ST - Sampler Type:

- 2" OD Split Spoon
- Bulk Grab Sample
- Drive Barrel

Lab Tests:

- S - Soil Properties
- C - Chemical Properties
- Water Level

Logged by: EWM

Approved by: EWM

Figure No. B-7 cont



Converse NW

Monitoring Well Geologic & Construction Log

Project Number
90-35188-10

Well Number
FH-1

Sheet 4 of 4

Project FRIDAY HARBOR LANDFILL

Location Friday Harbor, Washington

Elevation (Top of Well Casing) 296.97

Surface Elevation 294

Water Level Elev. 246

Start Date November 26, 1990

Drilling Contractor Martel Well Drilling

Finish Date December 4, 1990

Drilling Method Air Rotary

Depth feet	Well Construction	Lab Tests	Blows/6"	OVM Reading	Description
	sediment trap				CONSTITUTION FORMATION (BEDROCK) Metamorphosed volcanoclastic sandstone (continued) some water blowing out of hole
125					Total depth, 125 feet.
130					
135					
140					
145					
150					
155					

ST - Sampler Type:

-  2" OD Split Spoon
-  Bulk Grab Sample
-  Drive Barrel

Lab Tests:

- S - Soil Properties
- C - Chemical Properties
-  Water Level

Logged by: EWM

Approved by: EWM

Figure No. B-7 cont



Converse NW

Monitoring Well Geologic & Construction Log

Project Number
90-35188-10

Well Number
FH-2

Sheet 1 of 2

Project FRIDAY HARBOR LANDFILL

Elevation (Top of Well Casing) 265.34

Water Level Elev. 238

Drilling Contractor Martel Well Drilling

Drilling Method Air Rotary

Location Friday Harbor, Washington

Surface Elevation 262

Start Date November 28, 1990

Finish Date December 5, 1990

Depth feet	Well Construction	Lab Tests	S Blows/ 6"	OVM Reading	Description
0 - 5	locking 8" dia. steel protective casing concrete surface seal				CONSTITUTION FORMATION (BEDROCK) Metamorphic volcanoclastic sandstone, greenish-brown, fresh faces, blue-gray, minor quartz, very dense
5 - 10	2" dia. PVC well casing blank				
10 - 15					increases blue-gray in color
15 - 20	high solids bentonite grout				Metamorphic volcanoclastic sandstone, blue-gray, weathered greenish-brown in places, minor quartz
20 - 25					less quartz, minor weathering
25 - 30					unweathered
30 - 35					
35 - 40	bentonite seal				

- ST - Sampler Type:
- 2" OD Split Spoon
 - Bulk Grab Sample
 - Drive Barrel

- Lab Tests:
- S - Soil Properties
 - C - Chemical Properties
 - Water Level

Logged by: EWM
Approved by: EWM

Figure No. B-8



Converse NW

Monitoring Well Geologic & Construction Log

Project Number
90-35188-10

Well Number
FH-2

Sheet 2 of 2

Project FRIDAY HARBOR LANDFILL
 Elevation (Top of Well Casing) 265.34
 Water Level Elev. 238
 Drilling Contractor Martel Well Drilling
 Drilling Method Air Rotary

Location Friday Harbor, Washington
 Surface Elevation 262
 Start Date November 28, 1990
 Finish Date December 5, 1990

Depth feet	Well Construction	Lab Tests	S Blows / 6"	OVM Reading	Description
					CONSTITUTION FORMATION (BEDROCK) Metamorphosed volcanoclastic sandstone (continued)
					with minor green and white chert, no water
45	8/12 Colorado silica sand				
50					minor black shale
55					faster drilling 53 to 55 feet, soft zone more quartz and black shale
60	0.02" slot PVC screen				minor quartz, no black shale, some water
65					gray metamorphic volcanoclastic sandstone; some minor quartz
70	sampling pump intake				
75	sediment trap				
					Total depth, 75 feet.

ST - Sampler Type:

- 2" OD Split Spoon
- Bulk Grab Sample
- Drive Barrel

Lab Tests:

- S - Soil Properties
- C - Chemical Properties
- Water Level

Logged by: EWM

Approved by: EWM

Figure No. B-8 cont



Converse NW

Monitoring Well Geologic & Construction Log

Project Number
90-35188-10

Well Number
FH-3

Sheet 1 of 2

Project FRIDAY HARBOR LANDFILL
 Elevation (Top of Well Casing) 242.65
 Water Level Elev. 227
 Drilling Contractor Martel Well Drilling
 Drilling Method Air Rotary

Location Friday Harbor, Washington
 Surface Elevation 240
 Start Date November 30, 1990
 Finish Date December 6, 1990

Depth feet	Well Construction	Lab Tests	S Blows/ 6"	OVM Reading	Description
	locking 8" dia. steel protective casing				FILL Light brown, gravelly, clayey silt with sand; gravel pebble size
	concrete surface seal				CONSTITUTION FORMATION (BEDROCK) Metamorphosed volcanoclastic sandstone; blue-gray to blackish-gray, weathers greenish-brown
5					fractured
	2" dia. PVC well casing blank				Volcanoclastic sandstone, metamorphosed, gray to blue-gray with minor quartz
10					fractured
	high solids bentonite grout				with black shale massive bedrock
15					no black shale
20					
25	bentonite seal				decreasing oxidized fragments
30	8/12 Colorado silica sand				decreasing green-brown oxidized
35					trace oxidized

- ST - Sampler Type:
- 2" OD Split Spoon
 - Bulk Grab Sample
 - Drive Barrel

- Lab Tests:
- S - Soil Properties
 - C - Chemical Properties
 - Water Level

Logged by: EWM
 Approved by: EWM

Figure No. B-9



Converse NW

Monitoring Well Geologic & Construction Log

Project Number
90-35188-10

Well Number
FH-3

Sheet 2 of 2

Project FRIDAY HARBOR LANDFILL
 Elevation (Top of Well Casing) 242.65
 Water Level Elev. 227
 Drilling Contractor Martel Well Drilling
 Drilling Method Air Rotary

Location Friday Harbor, Washington
 Surface Elevation 240
 Start Date November 30, 1990
 Finish Date December 6, 1990

Depth feet	Well Construction	Lab Tests	Blows/6"	OVM Reading	Description
					CONSTITUTION FORMATION (BEDROCK) Metamorphosed volcanoclastic sandstone (continued)
45	0.02" slot PVC screen				no oxidation some water
55	sampling pump intake sediment trap				
60					no noticeable increase in water
65					black shale black shale, hard; dense with quartz veining
70	high solids bentonite grout				Metamorphosed volcanoclastic sandstone, blue-gray
75					Total depth, 75.5 feet.

- ST - Sampler Type:
- 2" OD Split Spoon
 - Bulk Grab Sample
 - Drive Barrel

- Lab Tests:
- S - Soil Properties
 - C - Chemical Properties
 - Water Level

Logged by: EWM
 Approved by: EWM

Figure No. B-9 cont



Converse NW

Monitoring Well Geologic & Construction Log

Project Number
90-35188-10

Well Number
FH-4

Sheet 1 of 1

Project **FRIDAY HARBOR LANDFILL**

Location **Friday Harbor, Washington**

Elevation (Top of Well Casing) 230.23

Surface Elevation 227

Water Level Elev. 219

Start Date **December 5, 1990**

Drilling Contractor **Martel Well Drilling**

Finish Date **December 7, 1990**

Drilling Method **Air Rotary**

Depth feet	Well Construction	Lab Tests	S Blows/ 6"	OVM Reading	Description
	locking 8" dia. steel protective casing concrete surface seal				CONSTITUTION FORMATION (BEDROCK)
5	bentonite seal 2" dia. PVC well casing blank				
10	8/12 Colorado silica sand				Black shale
15					Black shale with minor quartz veining, very fractured, green-brown oxidized faces prevalent
20	0.02" slot PVC screen				Dark gray shale with calcite(?) veining, green-brown to red-brown oxidized faces prevalent, fractured
25					Metamorphosed volcanoclastic sandstone; blue-gray, minor quartz veining, prevalent green-brown oxidized surfaces
30	sampling pump intake sediment trap				decreasing green-brown oxidized surfaces, some black shale, increased quartz veining
35					no oxidation, minor veining, water
					Extremely fractured, oxidized reddish-brown volcanoclastic sandstone with quartz veining
					Total depth, 33 feet.

ST - Sampler Type:

- 2" OD Split Spoon
- Bulk Grab Sample
- Drive Barrel

Lab Tests:

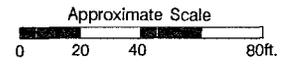
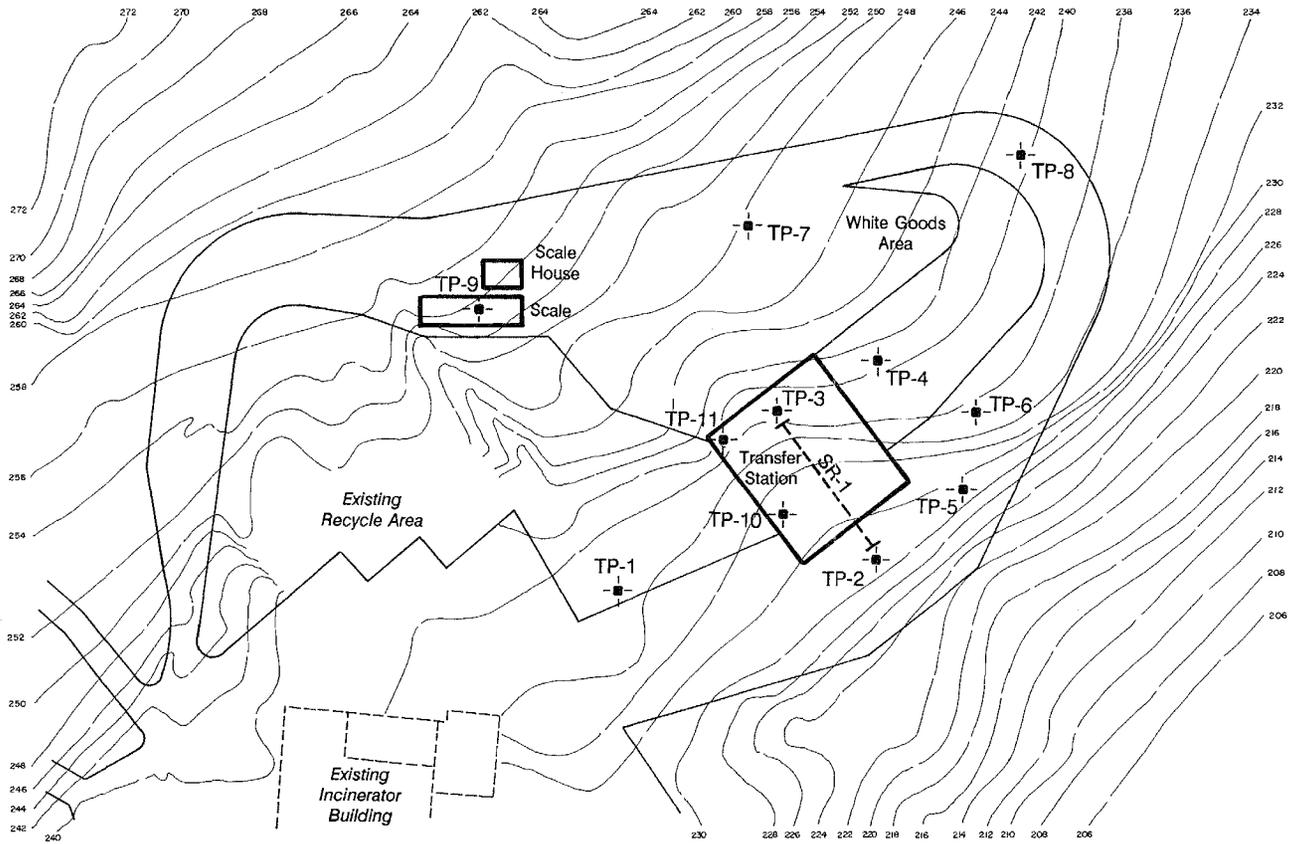
- S - Soil Properties
- C - Chemical Properties
- Water Level

Logged by: EWM

Approved by: EWM

Figure No. B-10

APPENDIX C
PREVIOUS SUBSURFACE EXPLORATIONS
(Earth Consultants, 1994)



LEGEND

- TP-1-⊕ Approximate Location of ECI Test Pit, Proj. No. E-6515, Apr. 1994
-  Proposed Building
-  Existing Building
-  SR-1 Seismic Traverse

Note:
 The existing grade contours shown on this plan are approximate only. They were interpolated from the Site Plan provided by SCS Engineers, Inc., dated Feb. 1994.

Reference:
 Site Plan - Revision 3/18/94
 By SCS Engineers, Inc.
 Dated 3/18/94

 Earth Consultants Inc. <small>Geotechnical Engineers, Geologists & Environmental Scientists</small>		Test Pit Location Plan San Juan Co. Transfer/Recycling Station San Juan Island, Washington			
				Proj No. 6515	Drwn. GLS

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet 1 of 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/94	Test Pit No: TP-1
Excavation Contractor: San Juan Island County		Ground Surface Elevation: ±236'*	

Notes:

W (%)	Graphic Symbol	Depth Ft.	Sample	USCS Symbol	Surface Conditions:
					Grass 6 inches in depth of topsoil and sod
14.4		1		sm	6" topsoil and sod FILL: Dark brown silty medium SAND with gravel, medium dense, moist
		2			
		3			
		4			
11		5		sm	Tan silty medium SAND, saturated, loose -minor seepage -becomes medium dense -harder excavating -becomes gray, with mottles -becomes dense to very dense
		6			
		7			
		8			
		9			Test pit terminated at 8 feet below existing grade. Minor groundwater seepage encountered at 5 feet during excavation. *Elevations from site plan by SCS Engineers dated February, 1994.
		10			
		11			
		12			
		13			
		14			
		15			
		16			
		17			
		18			
		19			

 Earth Consultants Inc. <small>Geotechnical Engineers, Geologists & Environmental Scientists</small>	Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON
---	---

Proj. No. 6515	Dwn. GSL	Date APR'94	Checked SDD	Date 4/18/94	Plate C-2
----------------	----------	-------------	-------------	--------------	-----------

Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet of 1 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/94	Test Pit No: TP-2
Excavation Contractor: San Juan Island County			Ground Surface Elevation: ±239'

Notes:

	W (%)	Graphic Symbol	Depth Ft.	Sample	USCS Symbol	Surface Conditions:
	17.7	[Hatched Pattern]	1	sm		Wooded 6 inches in depth of topsoil and sod
			2			6" topsoil and sod Brown silty fine to medium SAND with gravel, medium dense, moist to wet -3" weathered basalt over unweathered basalt
			3			Test pit terminated at 2 feet below existing grade. No groundwater seepage encountered during excavation.
			4			
			5			
			6			
			7			
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			

 Earth Consultants Inc. <small>Geotechnical Engineers, Geologists & Environmental Scientists</small>	Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON
---	---

Proj. No. 6515	Dwn. GLS	Date APR'94	Checked SDD	Date 4/18/94	Plate C-3
----------------	----------	-------------	-------------	--------------	-----------

Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet 1	of 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/95	Test Pit No: TP-3	
Excavation Contractor: San Juan Island County			Ground Surface Elevation: ±239	
Notes:				

W (%)	Graphic Symbol	Depth Ft.	Sample	USCS Symbol	Surface Conditions: Wooded
		1			3" moss unweathered basalt
		2			Test pit terminated at 3 inches below existing grade. No groundwater seepage encountered during excavation.
		3			
		4			
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			
		13			
		14			
		15			
		16			
		17			
		18			
		19			

 Earth Consultants Inc. Geotechnical Engineers, Geologists & Environmental Scientists	Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON
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Proj. No. 6515	Dwn. GLS	Date APR'94	Checked SDD	Date 4/18/94	Plate C-4
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Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet of 1 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/94	Test Pit No: TP-4
Excavation Contractor: San Juan Island County			Ground Surface Elevation: ±238'

Notes:

	W (%)	Graphic Symbol	Depth Ft. Sample	USCS Symbol	Surface Conditions:
					Wooded 6" in depth of topsoil and sod
		[Hatched Pattern]			6" topsoil and duff and sod 3" weathered basalt over unweathered basalt
			1		Test pit terminated at 3 inches below existing grade. No groundwater seepage encountered during excavation.
			2		
			3		
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		

 <p>Earth Consultants Inc. Geotechnical Engineers, Geologists & Environmental Scientists</p>	<p>Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON</p>
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Proj. No. 6515	Dwn. GLS	Date APR '94	Checked SDD	Date 4/18/94	Plate C-5
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Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet 1	of 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/94	Test Pit No: TP-5	
Excavation Contractor: San Juan Island County			Ground Surface Elevation: ±230'	

Notes:

	W (%)	Graphic Symbol	Depth Ft.	Sample	USCS Symbol	Surface Conditions:
						Wooded 6 inches in depth of topsoil and duff
	30.3		1		sm	6" topsoil and duff Reddish brown silty fine to medium SAND with angular gravel -3" weathered basalt over unweathered basalt
			2			Test pit terminated at 2 feet below existing grade. No groundwater seepage encountered during excavation.
			3			
			4			
			5			
			6			
			7			
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			

 Earth Consultants Inc. <small>Geotechnical Engineers, Geologists & Environmental Scientists</small>	Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON
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Proj. No. 6515	Dwn. GSL	Date APR'94	Checked SDD	Date 4/18/94	Plate C-6
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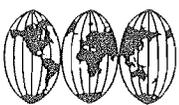
Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet 1	of 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/94	Test Pit No: TP-6	
Excavation Contractor: San Juan Island County			Ground Surface Elevation: ±238'	

Notes:

	W (%)	Graphic Symbol	Depth Ft. Sample	USCS Symbol	Surface Conditions:
					Wooded 6 inches in depth of topsoil and duff
			1	sm	6" topsoil and duff Reddish brown silty fine to medium SAND with angular gravel
			2		-3" weathered basalt overlying unweathered basalt
			3		Test pit terminated at 2.5 feet below existing grade. No groundwater seepage encountered during excavation.
			4		
			5		
			6		
			7		
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		

 Earth Consultants Inc. <small>Geotechnical Engineers, Geologists & Environmental Scientists</small>	Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON				
Proj. No. 6515	Dwn. GSL	Date ARP '94	Checked SDD	Date 4/18/94	Plate C-7

Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet of 1 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/94	Test Pit No: TP-7
Excavation Contractor: San Juan Island County		Ground Surface Elevation: ±248'	
Notes:			

	W (%)	Graphic Symbol	Depth Ft. Sample	USCS Symbol	Surface Conditions:
	13.3		1	ML	Wooded 6 inches in depth of topsoil and duff
	9.1		2		
			3		
			4		-becomes dense to very dense, gray -hard digging
			5		
			6		
			7		Test pit terminated at 6 feet below existing grade. No groundwater seepage encountered during excavation.
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		

 Earth Consultants Inc. <small>Geotechnical Engineers, Geologists & Environmental Scientists</small>	Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON
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Proj. No. 6515	Dwn. GLS	Date APR '94	Checked SDD	Date 4/18/94	Plate C-8
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Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet of 1 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/94	Test Pit No.: TP-8
Excavation Contractor: San Juan Island County			Ground Surface Elevation: ±240'

Notes:

	W (%)	Graphic Symbol	Depth Ft. Sample	USCS Symbol	Surface Conditions: Wooded 6 inches in depth of topsoil and duff
	12.0		1	SM	6" topsoil and duff Brown silty fine to medium SAND with gravel, medium dense, moist -becomes dense
			2		
			3		
			4		
			5		
			6		
			7		Test pit terminated at 6 feet below existing grade. No groundwater seepage encountered during excavation.
			8		
			9		
			10		
			11		
			12		
			13		
			14		
			15		
			16		
			17		
			18		
			19		

 <p>Earth Consultants Inc. Geotechnical Engineers, Geologists & Environmental Scientists</p>	<p>Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON</p>
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Proj. No. 6515	Dwn. GLS	Date APR '94	Checked SDD	Date 4/18/94	Plate C-9
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Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet of 1 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/94	Test Pit No: TP-9
Excavation Contractor: San Juan Island County		Ground Surface Elevation: ±254'	

Notes:

	W (%)	Graphic Symbol	Depth Ft.	Sample	USCS Symbol	Surface Conditions:
	11.4		1		sm	Road shoulder 8 inches in depth of topsoil and sod
			2			8" topsoil and sod Brown silty fine to medium SAND, medium dense, moist
			3			-trace gravel
			4			-becomes dense
			5			Test pit terminated at 5 feet below existing grade. No groundwater seepage encountered during excavation.
			6			
			7			
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			

 Earth Consultants Inc. <small>Geotechnical Engineers, Geologists & Environmental Scientists</small>	Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON				
Proj. No. 6515	Dwn. GSL	Date APR'94	Checked SDD	Date 4/18/94	Plate C-10

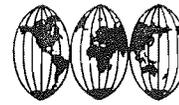
Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet 1	of 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/94	Test Pit No.: TP-10	
Excavation Contractor: San Juan Island County			Ground Surface Elevation: ±233'	

Notes:

	W (%)	Graphic Symbol	Depth Ft.	Sample	USCS Symbol	Surface Conditions:
						Wooded 6 inches in depth of topsoil and sod
	20.2		1		sm	6" topsoil and sod Brown silty fine to medium SAND, medium dense, saturated
			2			-trace gravel-rounded -seepage on north side of test pit
			3			
			4			-unweathered basalt
			5			Test pit terminated at 4 feet below existing grade. No groundwater seepage encountered during excavation.
			6			
			7			
			8			
			9			
			10			
			11			
			12			
			13			
			14			
			15			
			16			
			17			
			18			
			19			

 Earth Consultants Inc. <small>Geotechnical Engineers, Geologists & Environmental Scientists</small>	Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON
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Proj. No. 6515	Dwn. GSL	Date APR '94	Checked SDD	Date 4/18/94	Plate C-11
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Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

Test Pit Log

Project Name: San Juan County Transfer/Recycling Station			Sheet 1	of 1
Job No.: 6515	Logged by: Scott Dinkelman	Date: 3/28/94	Test Pit No: TP-11	
Excavation Contractor: San Juan Island County			Ground Surface Elevation: ±238'	

Notes:

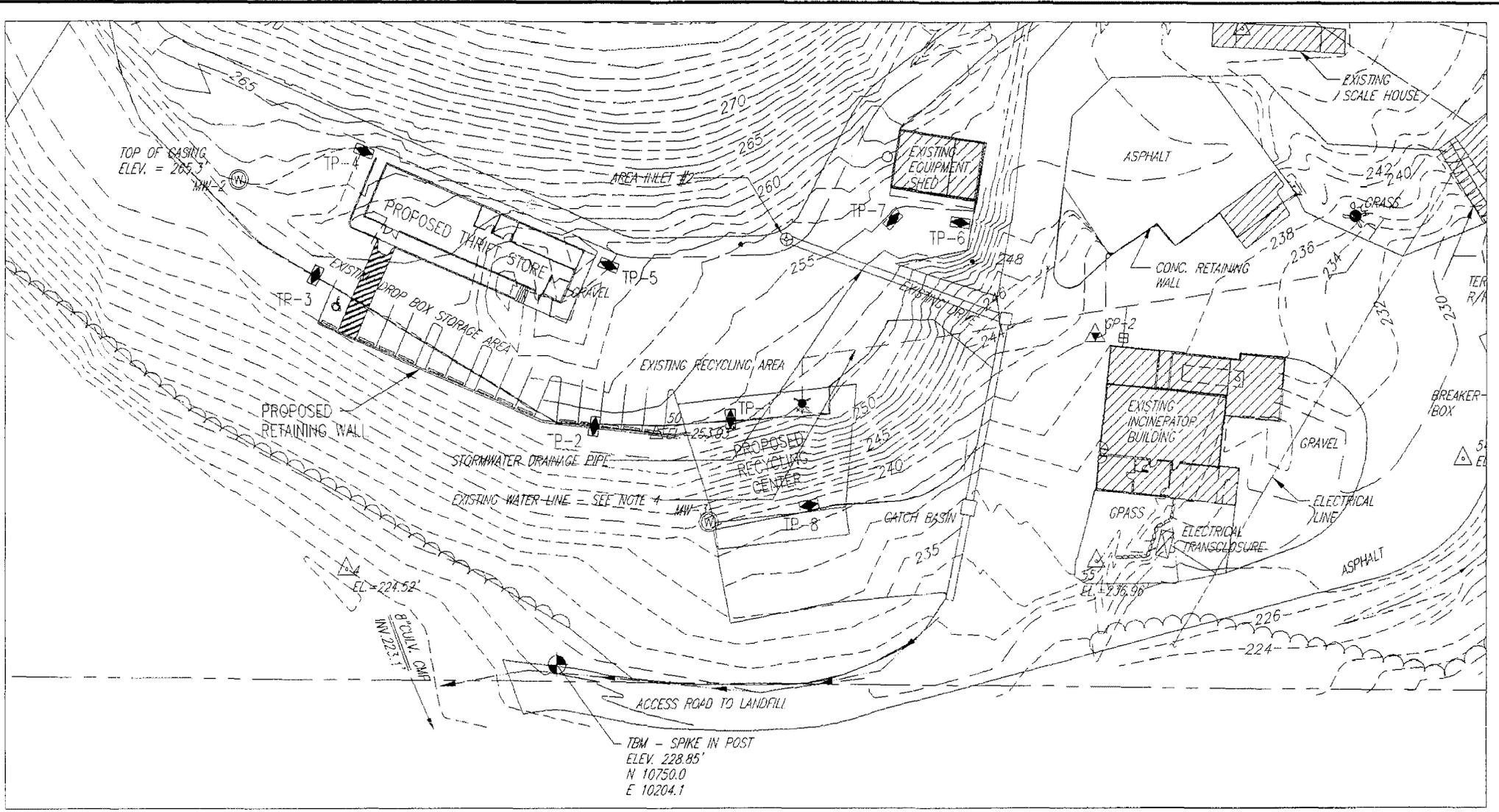
W (%)	Graphic Symbol	Depth Ft.	Sample	USCS Symbol	Surface Conditions:
15.8		1		ml	Wooded 6 inches in depth of topsoil and sod
		2			6" topsoil and sod Brown sandy SILT, medium dense, moist
		3			-some mottling 3" weathered basalt over unweathered basalt
		4			Test pit terminated at 3.5 feet below existing grade. No groundwater seepage encountered during excavation.
		5			
		6			
		7			
		8			
		9			
		10			
		11			
		12			
		13			
		14			
		15			
		16			
		17			
		18			
		19			

 Earth Consultants Inc. <small>Geotechnical Engineers, Geologists & Environmental Scientists</small>	Test Pit Log SAN JUAN CO. TRANSFER/RECYCLING STATION SAN JUAN ISLAND, WASHINGTON
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Proj. No. 6515	Dwn. GSL	Date APR '94	Checked SDD	Date 4/18/94	Plate C-12
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Subsurface conditions depicted represent our observations at the time and location of this exploratory hole, modified by engineering tests, analysis and judgment. They are not necessarily representative of other times and locations. We cannot accept responsibility for the use of interpretation by others of information presented on this log.

APPENDIX D
PREVIOUS SUBSURFACE EXPLORATIONS
(Shannon & Wilson, 2002 & 2003)

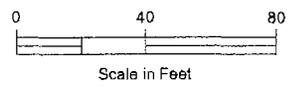


TBM - SPIKE IN POST
 ELEV. 228.85'
 N 10750.0
 E 10204.1



LEGEND

TP-1 TEST PIT



Trash to Treasures
 San Juan County Public Works
 San Juan Island, Washington

**SITE PLAN AND
 TEST PIT LOCATIONS**

September 2002 21-1-09814-001

SHANNON & WILSON, INC.
 Geotechnical and Environmental Consultants

D-1

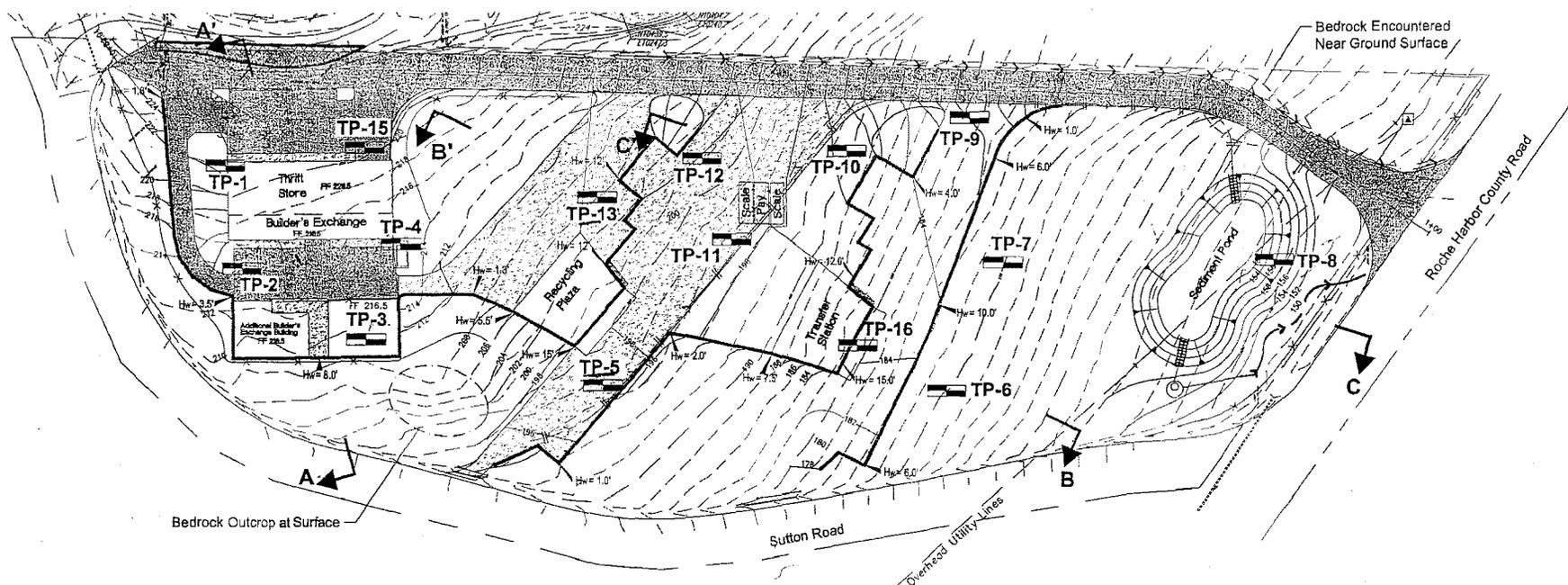
TABLE 1
SUMMARY TEST PIT LOGS

<u>Test Pit</u>	<u>Depth (ft)</u>	<u>Soil Description</u>
TP-1	0 – 0.4	Loose to medium dense, gray GRAVEL; dry; angular; (Crushed Gravel) GP.
	0.4 – 12+	Medium stiff, dark brown, sandy, clayey SILT and MSW; moist; MSW.
	Terminated test pit at the maximum reach of the backhoe.	
TP-2	0 – 0.4	Loose to medium dense, gray GRAVEL; dry; angular; GP (Crushed Gravel).
	0.4 – 12+	Medium stiff, dark brown, sandy, clayey SILT and MSW; moist; MSW.
	Terminated test pit at the maximum reach of the backhoe. No seepage or caving.	
TP-3	0 – 9.0	Sandy, clayey SILT and MSW, consisting mostly metal debris, e.g., car parts; moist; MSW.
	Terminated test pit at the maximum reach of the backhoe. No seepage observed. Minor caving occurred during excavation.	
TP-4	0 – 0.2	Loose to medium dense, gray GRAVEL; dry; (Crushed Gravel) GP.
	0.2 – 3.2	Loose to medium dense, brown, gravelly, silty SAND; moist; (Fill) SM.
	3.2 – 4.5	Medium stiff to stiff, gray, sandy, clayey SILT; moist; clay content varies; (Weathered Bedrock) ML.
	4.5+	Unable to excavate (Bedrock).
No seepage observed. Minor caving occurred during excavation.		
TP-5	0 – 0.3	Medium dense, gray GRAVEL; moist; angular; (Crushed Gravel) GP.
	0.3 – 1.5	Medium dense, brown-gray, gravelly, silty SAND; moist; (Fill) SM.
	1.5 – 10.5	Medium stiff to stiff, dark brown, sandy, clayey SILT and MSW; moist; MSW.
	10.5 – 12+	Medium dense, gray, gravelly, silty SAND to sandy SILT; varying amounts of clay; moist; (Weathered Bedrock) SM.
	Terminated test pit at the maximum reach of the backhoe. No seepage observed. Minor caving occurred during excavation. Possible creosote and/or petroleum odor.	

**TABLE 1 (CONT.)
SUMMARY TEST PIT LOGS**

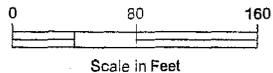
TP-6	0 – 0.3	Crushed Gravel; (Fill) GP.
	0.3 – 2.5	Medium dense to dense, brown and gray, slightly sandy, cobbly GRAVEL, trace of silt; dry; (Fill) GW.
	2.5 – 3.0	Medium dense, gray, crushed GRAVEL; dry; (Fill) GP.
	3.0 – 4.5	Medium dense, brown, silty, sandy GRAVEL; moist; (Fill) GM.
	4.5 – 8	Medium dense, brown to gray, gravelly, silty SAND; moist; (Fill) SM.
	Terminated test pit at the maximum reach of the backhoe.	
	No seepage observed. Moderate caving occurred during excavation.	
TP-7	0 – 3.5	Medium dense, gray to brown, slightly silty to silty GRAVEL; moist; approximate 6-inch layers, angular; (Crushed Gravel) GM.
	3.5 – 5	Medium dense, gray, silty, gravelly SAND; moist; (Weathered Bedrock) SM.
	Terminated test pit on probable bedrock.	
	No seepage observed. Moderate caving occurred during excavation.	
TP-8	0 – 2.7	Loose to medium dense, light brown, slightly gravelly, silty SAND; (Fill) SM.
	2.7 – 3	Stiff, mottled gray and brown, sandy clayey SILT grading to medium dense, gray, silty, gravelly SAND; moist; (Weathered Bedrock) CL and SM.
	3+	Backhoe refusal on probable bedrock.
	No seepage observed. Minor caving occurred during excavation.	

File: h:\drafting\21-1-09814-002\21-1-09814-002.dwg Date: 05-16-2003 Author: LR



LEGEND

- Existing Ground Surface Contour
- Proposed Ground Surface Contour
- Proposed Retaining Wall Location with Approximate Wall Height in Feet
- Proposed Temporary Silt Fence Location
- Stormwater Line
- Test Pit Designation and Approximate Location
- Generalized Subsurface Profile (See Figures 4 through 6)



NOTE

Figure adapted from electronic files provided by SVR Design Company, dated 5-23-2003.

Trash to Treasures Facility San Juan County Public Works San Juan Island, Washington	
SITE AND EXPLORATION PLAN	
June 2003	21-1-09814-002
SHANNON & WILSON, INC. <small>Geotechnical and Environmental Consultants</small>	FIG. 2

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-1

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 222 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale				
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>	None Observed		S-1	0 2 4 6 8 10 12					
<p style="text-align: center;"><u>NOTES</u></p> <ol style="list-style-type: none"> 1. Bottom of test pit at 4.0 feet. 2. Refusal possibly at top of bedrock. 3. No seepage observed. 4. No caving observed. 									

FIG. A-2

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-2

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 214 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale				
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>	None Observed			0 2 4 6 8 10 12					
<p style="text-align: center;"><u>NOTES</u></p> <ol style="list-style-type: none"> 1. Bottom of test pit at 2.0 feet. 2. Refusal at top of bedrock. 3. No seepage observed. 4. No caving observed. 									

FIG. A-3

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-3

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 209.5 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale				
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>	None Observed			0 2 4 6 8 10 12					
<p style="text-align: center;"><u>NOTES</u></p> <ol style="list-style-type: none"> 1. Bottom of test pit at 4.5 feet. 2. Bedrock not encountered. 3. No seepage observed. 4. No caving observed. 									

FIG. A-4

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-4

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 213.5 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale				
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Medium dense to very dense, brown-gray, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>	None Observed			0 2 4 6 8 10 12					
<p style="text-align: center;"><u>NOTES</u></p> <p>1. Bottom of test pit at 6.0 feet.</p> <p>2. Bedrock not encountered.</p> <p>3. No seepage observed.</p> <p>4. No caving observed.</p>									

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-5

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 197 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale				
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Very dense, dark brown and dark gray GRAVEL; trace sand and silt; dry; gravel and sand are angular; (Weathered Bedrock).</p>	None Observed			0 2 4 6 8 10 12					
<p style="text-align: center;"><u>NOTES</u></p> <ol style="list-style-type: none"> 1. Bottom of test pit at 1.0 feet. 2. Top of bedrock at 0.5 feet. 3. Refusal in bedrock at 1.0 feet. 4. No seepage observed. 5. No caving observed. 									

FIG. A-6

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-6

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 170 Ft.

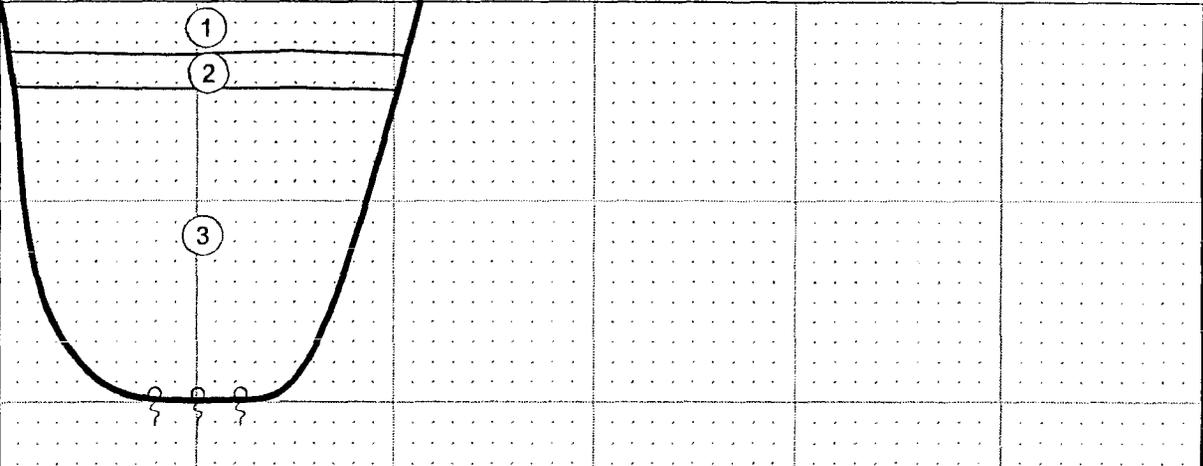
SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale				
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>									
<p style="text-align: center;"><u>NOTES</u></p> <ol style="list-style-type: none"> 1. Bottom of test pit at 4.0 feet. 2. Refusal at top of bedrock. 3. Seepage observed at 4.0 feet. - Standing water in base of excavation after 40 minutes. 4. No caving observed. 									

FIG. A-7

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-7

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 170 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>	None Observed			0 2 4 6 8 10 12	
<p style="text-align: center;"><u>NOTES</u></p> <ol style="list-style-type: none"> 1. Bottom of test pit at 9.0 feet. 2. Boulder at bottom. 3. Refusal in Glacial Till. 4. Bedrock not encountered. 5. No seepage observed. 6. No caving observed. 					D-11

FIG. A-8

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-8

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 151 Ft.

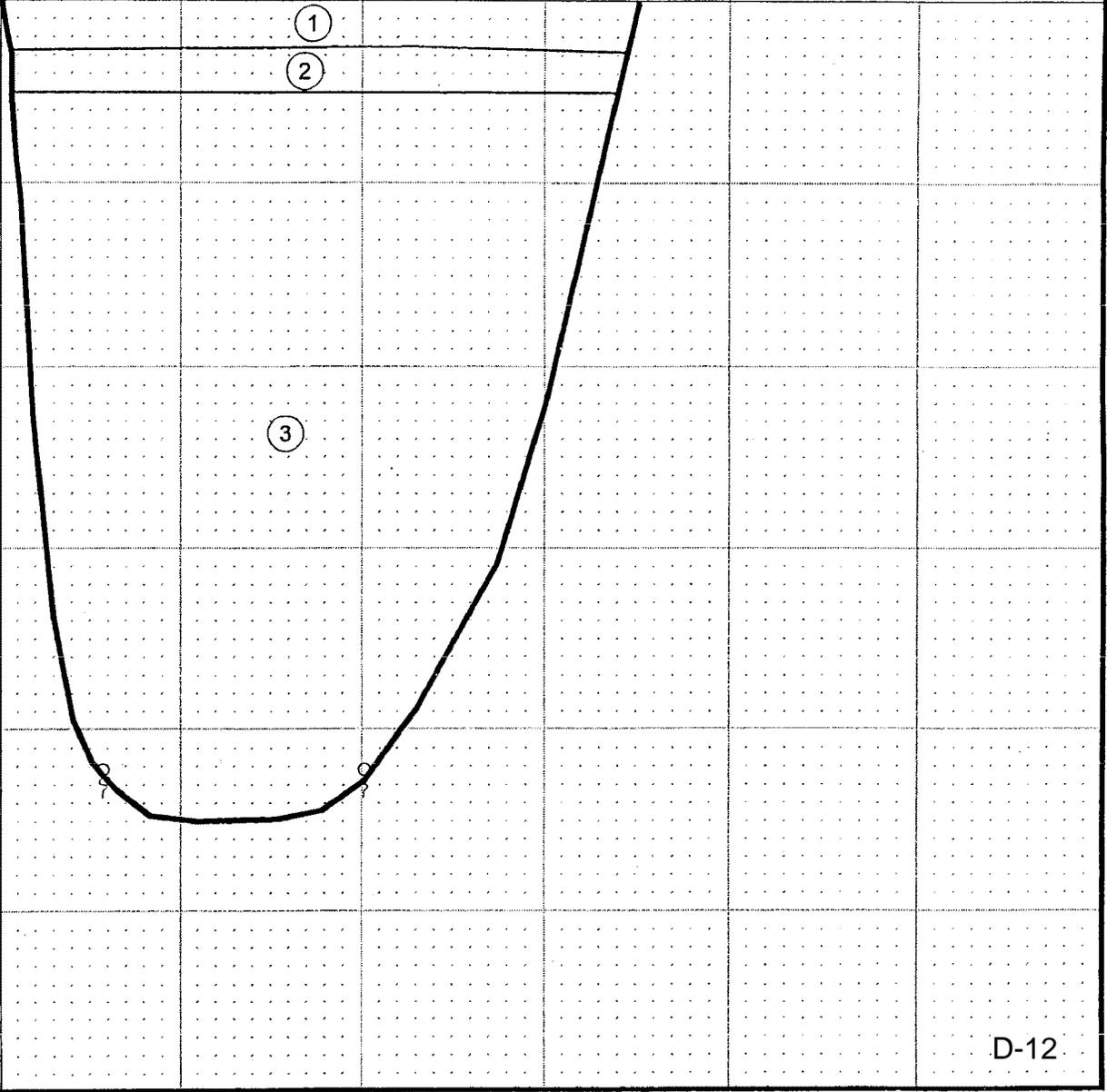
SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>			S-1	<p>0</p> <p>2</p> <p>4</p> <p>6</p> <p>8</p> <p>10</p> <p>12</p>	
<p><u>NOTES</u></p> <ol style="list-style-type: none"> Bottom of test pit at 9.0 feet. Bedrock not encountered. Seepage observed at 8.5 feet from $\frac{1}{2}$" thick clean sand seam. No caving observed. 					

FIG. A-9

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-9

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 179 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>	None Observed			0 2 4 6 8 10 12	
<p style="text-align: center;"><u>NOTES</u></p> <ol style="list-style-type: none"> 1. Bottom of test pit at 9.0 feet. 2. Refusal at top of bedrock. 3. No seepage observed. 4. No caving observed. 					

FIG. A-10

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-10

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 190.5 Ft.

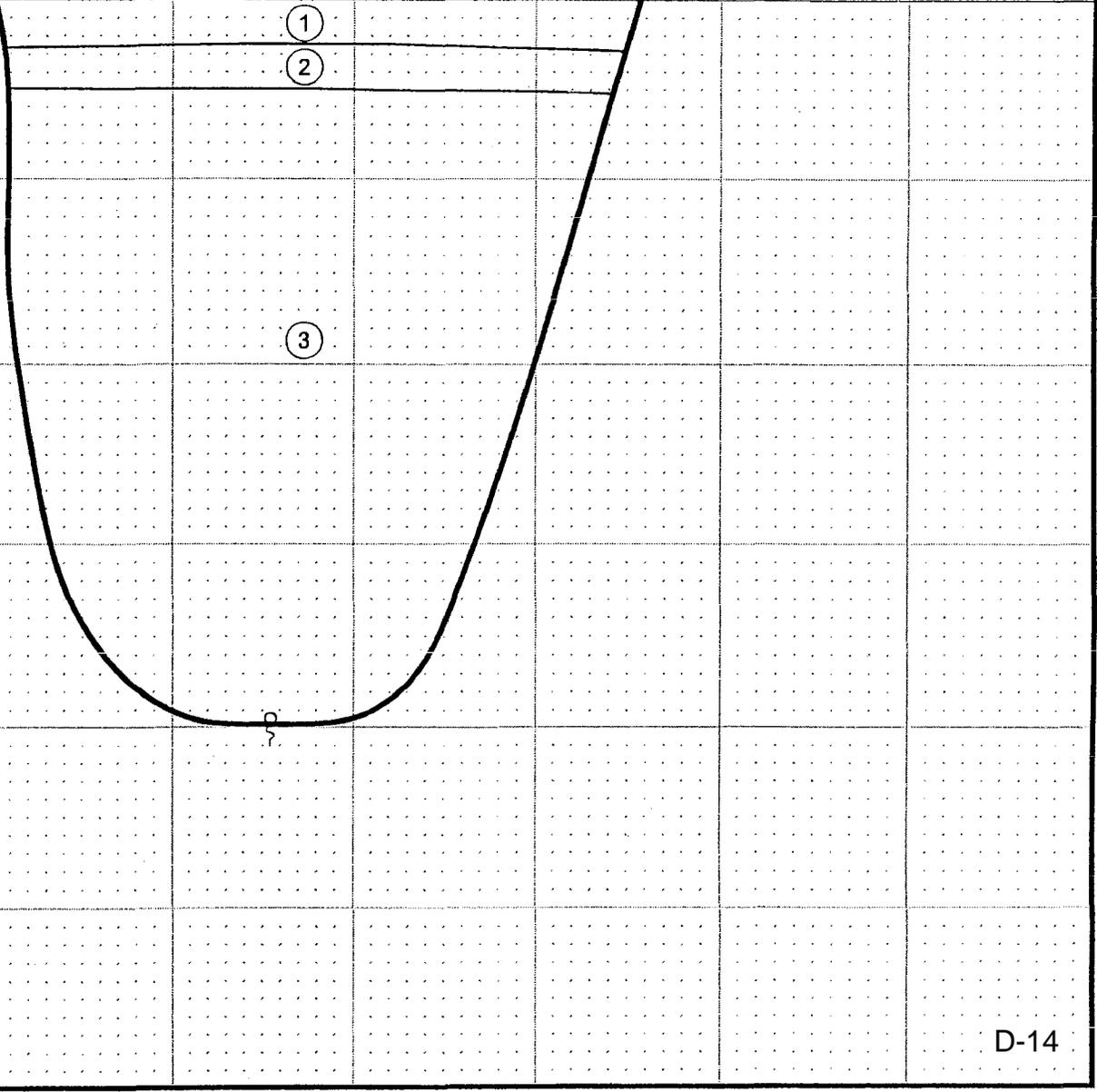
SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale				
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>				<p>0</p> <p>2</p> <p>4</p> <p>6</p> <p>8</p> <p>10</p> <p>12</p>					
<p><u>NOTES</u></p> <p>1. Bottom of test pit at 8.0 feet.</p> <p>2. Refusal at top of bedrock.</p> <p>3. Seepage observed at base of excavation.</p> <p>4. No caving observed.</p>									

FIG. A-11

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-11

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 195.5 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale				
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>	None Observed			0 2 4 6 8 10 12					
<p style="text-align: center;"><u>NOTES</u></p> <p>1. Bottom of test pit at 6.0 feet.</p> <p>2. Refusal at top of bedrock.</p> <p>3. No seepage observed.</p> <p>4. No caving observed.</p>									

FIG. A-12

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-12

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 202 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>	None Observed			0 2 4 6 8 10 12	
<p style="text-align: center;"><u>NOTES</u></p> <ol style="list-style-type: none"> 1. Bottom of test pit at 7.0 feet. 2. Refusal at top of bedrock. 3. No seepage observed. 4. No caving observed. 					

FIG. A-13

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-13

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 206 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p>	None Observed			0	
<p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p>		2			
<p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>		4			
<p>④ Very dense, dark brown and dark gray GRAVEL; trace sand and silt; dry; (Weathered Bedrock).</p>		6			
<p style="text-align: center;"><u>NOTES</u></p> <p>1. Bottom of test pit at 6.5 feet.</p> <p>2. Refusal in bedrock.</p> <p>3. No seepage observed.</p> <p>4. No caving observed.</p>				8	
				10	
				12	

FIG. A-14

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

LOG OF TEST PIT TP-15

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 220.5 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Medium dense to very dense, brown-gray, silty, gravelly SAND; moist; iron-oxide staining and stratified from approximately 2 to 5 feet; gravel and cobbles encountered in upper 6.5 feet, subrounded; granite and other rock types.</p>	None Observed			0 2 4 6 8 10 12	
<p style="text-align: center;"><u>NOTES</u></p> <p>1. Bottom of test pit at 6.75 feet.</p> <p>2. Refusal at top of bedrock.</p> <p>3. No seepage observed.</p> <p>4. No caving observed.</p>					

FIG. A-15

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

LOG OF TEST PIT TP-16

JOB NO: 21-1-09814-002 DATE: 5-14-03

LOCATION: See Figure 2

PROJECT: Trash to Treasures Facility

Surface Elevation: Approx. 181 Ft.

SOIL DESCRIPTION	Ground Water	% Water Content	Samples	Depth, Ft.	Not to Scale			
<p>① Loose, dark brown, silty SAND; organics; (Topsoil/Duff).</p> <p>② Soft to stiff, brown and red, slightly sandy and gravelly, silty CLAY to clayey SILT; moist; scattered cobbles; gravel and cobbles subrounded; (Weathered Glacial Till).</p> <p>③ Very dense, brown, silty, gravelly SAND; moist; scattered cobbles; gravel and cobbles subrounded; (Glacial Till).</p>	None Observed			0 2 4 6 8 10 12				
<p style="text-align: center;"><u>NOTES</u></p> <ol style="list-style-type: none"> 1. Bottom of test pit at 3.75 feet. 2. Refusal at top of bedrock. 3. No seepage observed. 4. No caving observed. 								

FIG. A-16

APPENDIX E
PREVIOUS SUBSURFACE EXPLORATIONS
(SCS Engineers, 2007)

WELL MW-5 (Page 1 of 1)

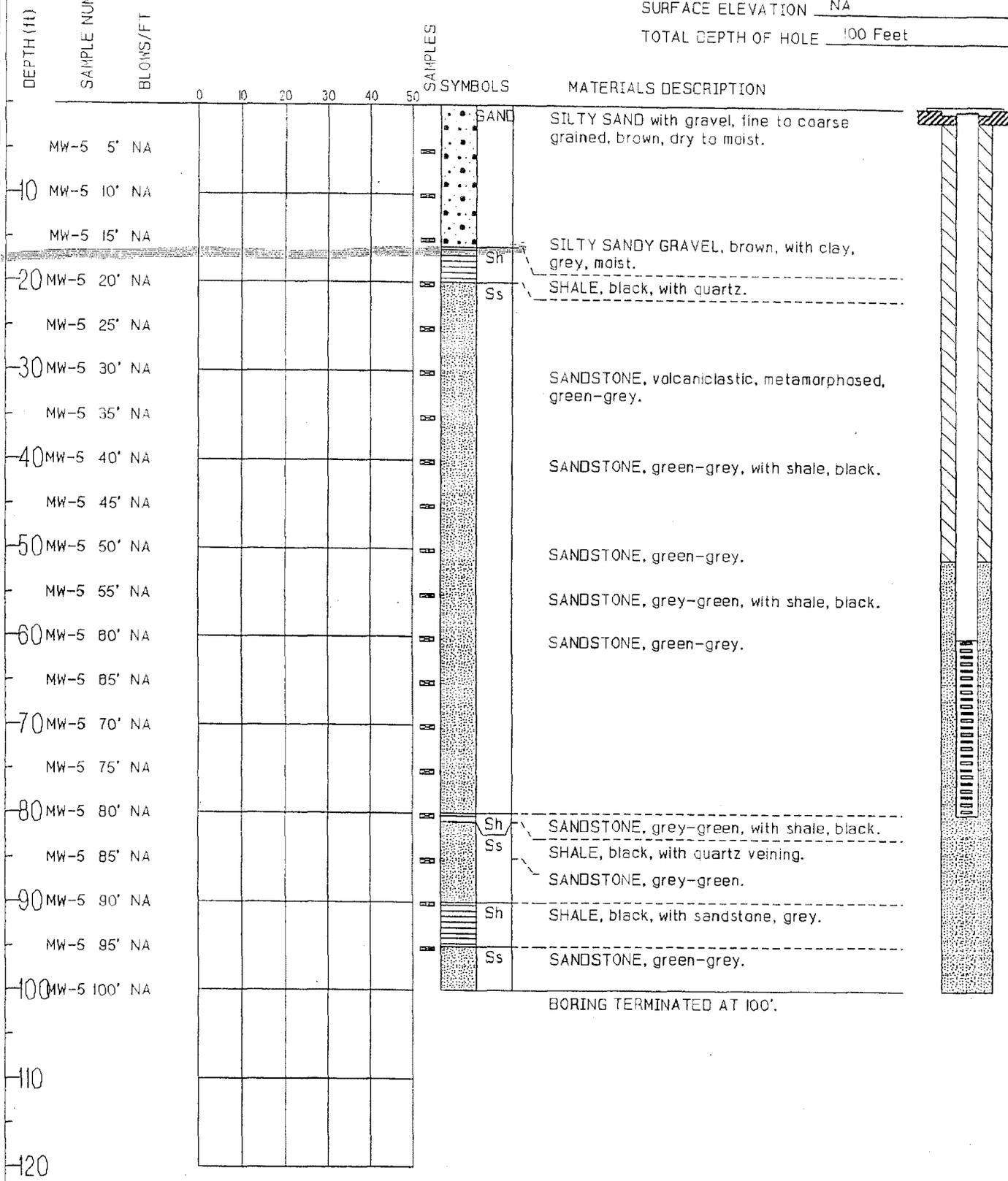
CLIENT NAME Friday Harbor Landfill

DATE DRILLED 05/23/95

SURFACE ELEVATION NA

TOTAL DEPTH OF HOLE 100 Feet

RELATIVE SENSITIVITY (values equivalent to ppm)



WELL MW-6 (Page 1 of 1)

CLIENT NAME Friday Harbor Landfill

DATE DRILLED 05/23/95

SURFACE ELEVATION NA

TOTAL DEPTH OF HOLE 100 Feet

RELATIVE SENSITIVITY (values equivalent to ppm)

DEPTH (ft)	SAMPLE NUMBER	BLOWS/FT	RELATIVE SENSITIVITY (values equivalent to ppm)					SYMBOLS	MATERIALS DESCRIPTION
			0	10	20	30	40		
5	MW-6 5' NA							SAND	SILTY SAND with gravel, fine to coarse grained, brown, dry to moist.
10	MW-6 10' NA							Ss	SANDSTONE, volcanoclastic, metamorphosed, grey-green.
15	MW-6 15' NA								SANDSTONE, green-grey, oxidized red-brown.
20	MW-6 20' NA								SILTSTONE/SANDSTONE, brown-grey, relatively soft, fractured.
25	MW-6 25' NA								SANDSTONE, grey, with siltstone, brown.
30	MW-6 30' NA								SANDSTONE, green-grey, with quartz.
35	MW-6 35' NA								
40	MW-6 40' NA								
45	MW-6 45' NA								
50	MW-6 50' NA								SANDSTONE, grey-green, with quartz and shale, black.
55	MW-6 55' NA							Sh	SHALE, black.
60	MW-6 60' NA							Ss	SANDSTONE, grey-green.
65	MW-6 65' NA								
70	MW-6 70' NA								
75	MW-6 75' NA								
80	MW-6 80' NA								
85	MW-6 85' NA								
90	MW-6 90' NA								
95	MW-6 95' NA								SANDSTONE, grey-green.
100	MW-6 100' NA								BORING TERMINATED AT 100'.
110									
120									

WELL MW-7 (Page 1 of 1)

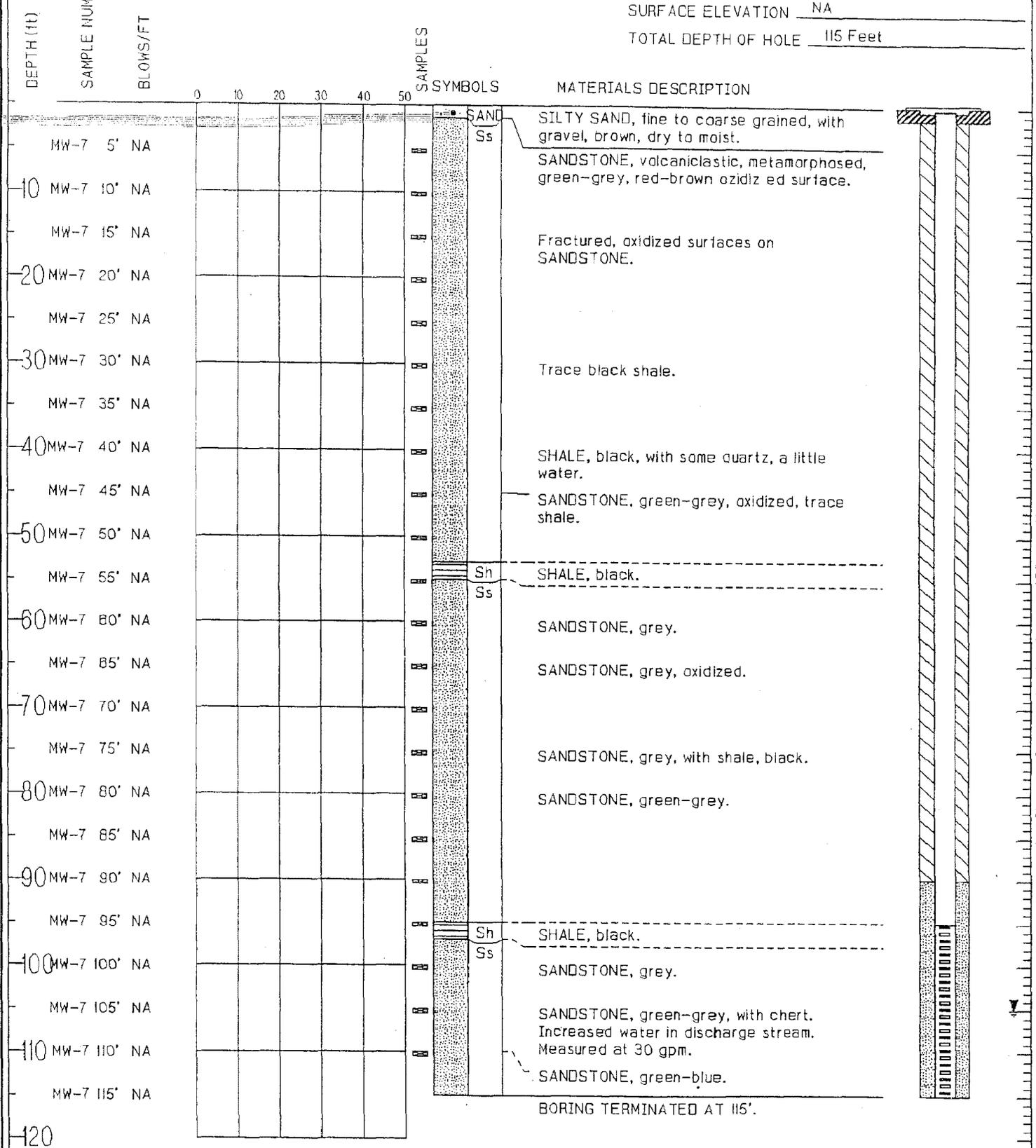
CLIENT NAME Friday Harbor Landfill

DATE DRILLED 05/22/95

SURFACE ELEVATION NA

TOTAL DEPTH OF HOLE 115 Feet

RELATIVE SENSITIVITY (values equivalent to ppm)



E-3

SCS Engineers

Solid and Hazardous Waste Consultants

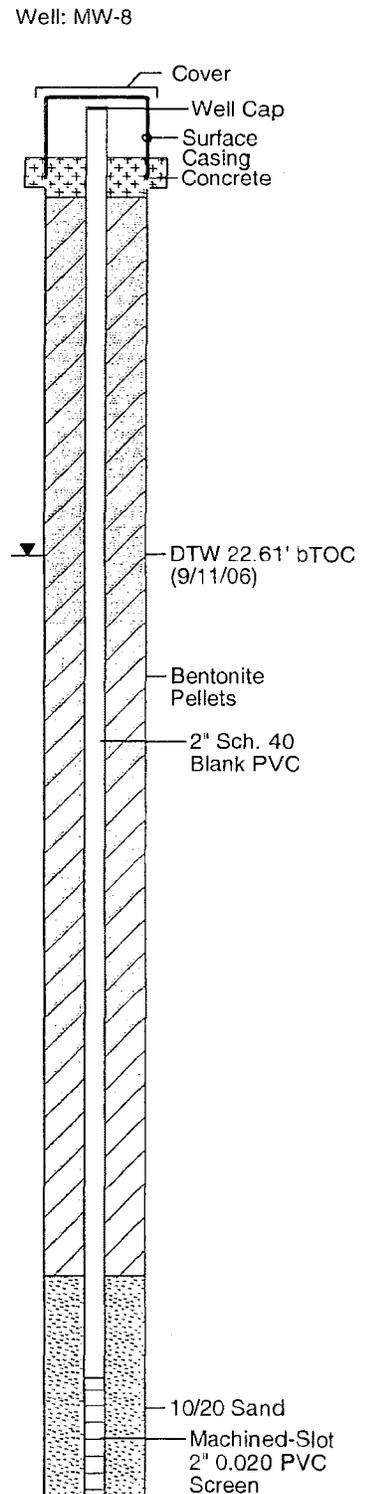
JOB NUMBER: 0492030.00
 LOCATION: Friday Harbor, WA

Friday Harbor Landfill
04206012.00

Started/Completed : 9/5/06 - 9/6/06
 Drilling Method : Air Rotary
 Diameter : 6"
 Sampling Device : Cuttings Only
 Drilled By : Holt / Boart Longyear

Total Depth : 105.5'
 Logged By : Elaine Dilley
 Reviewed By : Mark Varlien

Depth (ft)	USCS	Graphic	Sample Type	Remarks	Sample ID	Sample
			<input type="checkbox"/> Cuttings Sample DESCRIPTION			
0			Gravel, weeds at ground surface; edge of gravel driveway			
5	SW		Dry, black, gravelly, fine to coarse-grained SAND - ash-fill material	Driller comments "soft drilling"	MW-8 5'	
10			BEDROCK: Dry, brown/grey, weathered bedrock; cuttings are retrieved as chips, largest are size of fingernail; volcanic-clastic sandstone and mudstone is preliminary identification	Driller notes change in drilling at 9-10' bgs to harder feel; indicates bedrock	MW-8 10'	
15					MW-8 15'	
20			BEDROCK: Color changes to grey, bedrock appears to be metamorphic, most likely a schist (green); Notable minerals are quartz (banding) and mica; possibly part of the Constitution Formation		MW-8 20'	
25					MW-8 25'	
30			Cuttings appear to be the same material and moisture content as at 25' bgs	Driller notes change at ~30' bgs possible moisture	MW-8 30'	
35					MW-8 35'	
40					MW-8 40'	
45				Driller notes some moisture in cuttings	MW-8 45'	
50					MW-8 50'	
55				Driller notes moisture at 57-58' bgs (dust sticks to side of cuttings container)	MW-8 55'	
60					MW-8 60'	
65					MW-8 65'	



12-01-2006 G:\04206012.00\Figures\Well Logs\MW-8 Well Log.bor

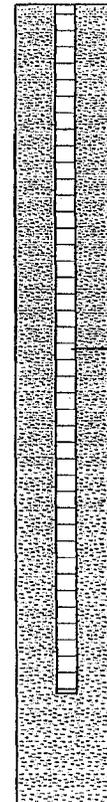
Friday Harbor Landfill
04206012.00

Started/Completed : 9/5/06 - 9/6/06
 Drilling Method : Air Rotary
 Diameter : 6"
 Sampling Device : Cuttings Only
 Drilled By : Holt / Boart Longyear

Total Depth : 105.5'
 Logged By : Elaine Dilley
 Reviewed By : Mark Varljen

Depth (ft)	USCS	Graphic	Sample Type	Remarks	Sample ID	Sample
			<input type="checkbox"/> Cuttings Sample DESCRIPTION			
66						
71				Left borehole open w/ temp. casing to 9' bgs and open to 75' bgs for ~25 minutes; ~2' water in bottom upon continued drilling	MW-8 70'	
76					MW-8 75'	
81				Left borehole open to 85' bgs for ~10 mins. while we pulled rod; ~1 ft. water in bottom of hole and rising ~0.10' per min.	MW-8 80'	
86					MW-8 85'	
91					MW-8 90'	
96					MW-8 95'	
101					MW-8 100'	
106					MW-8 105'	
111						
116						
121						
126						
131						

Well: MW-8



Machined-Slot
2" 0.020 PVC
Screen
10/20 Sand

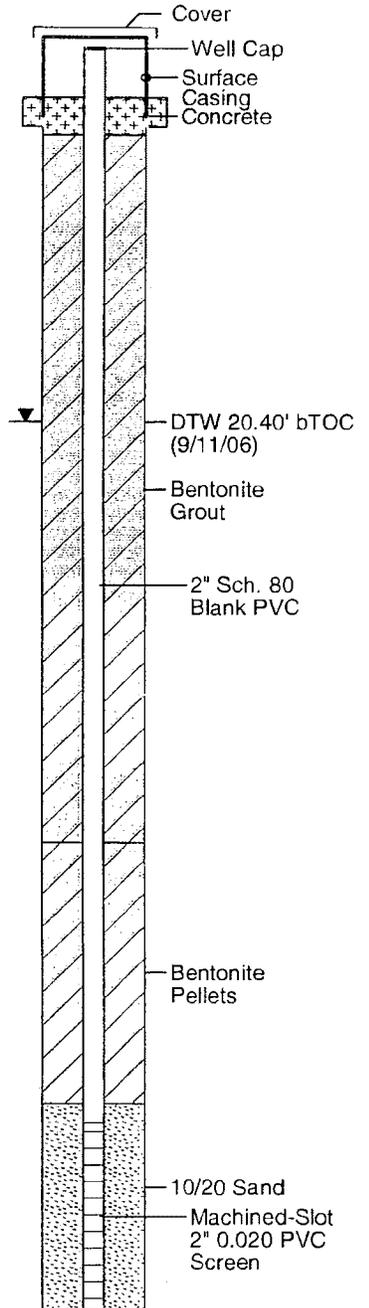
Friday Harbor Landfill
04206012.00

Started/Completed : 9/7/06 - 9/7/06
 Drilling Method : Air Rotary
 Diameter : 6" Temporary Casing
 Sampling Device : Cuttings Only
 Drilled By : Holt / Boart Longyear

Total Depth : 65' bgs
 Logged By : Elaine Dilley
 Reviewed By : Mark Varljen

Depth (ft)	USCS	Graphic	Sample Type	Remarks	Sample ID	Sample
			<input type="checkbox"/> Cuttings Sample DESCRIPTION			
0			Gravel at ground surface			
2						
4						
6			Damp, dark brown organic material with woody debris		MW-9 5'	<input type="checkbox"/>
8						
10			BEDROCK: Weathered bedrock	Driller notes change in drilling at 9-10' bgs to harder feel; indicates bedrock	MW-9 10'	<input type="checkbox"/>
12						
14			BEDROCK: metamorphic bedrock, most likely a schist (green/blue); notable minerals include quartz (bands) and mica; possibly part of the Constitution Formation		MW-9 15'	<input type="checkbox"/>
16						
18						
20					MW-9 20'	<input type="checkbox"/>
22						
24					MW-9 25'	<input type="checkbox"/>
26						
28					MW-9 30'	<input type="checkbox"/>
30						
32					MW-9 35'	<input type="checkbox"/>
34						
36					MW-9 40'	<input type="checkbox"/>
38						
40					MW-9 45'	<input type="checkbox"/>
42						
44					MW-9 50'	<input type="checkbox"/>
46						
48					MW-9 55'	<input type="checkbox"/>
50						
52					MW-9 60'	<input type="checkbox"/>
54						
56				Rested ~10-15 mins. and had 3-4 ft. of water in borehole; open to 65' bgs, pulled rod, blew out hole at 09:15; 3' water in borehole at 09:45, rising at ~0.10' per min.	MW-9 65'	<input type="checkbox"/>
58			BEDROCK: Cuttings color change (darker); rock chips are smaller; possible gneiss (black w/ quartz banding)			
60						
62						
64			BEDROCK: Back to schist			
66						
68						
70						
72						

Well: MW-9



12-01-2006 G:\04206012.00\Figures\Well Logs\MW-9 Well Log bor

Friday Harbor Landfill
04206012.00

Started/Completed : 9/6/06 - 9/6/06
Drilling Method : Air Rotary
Diameter : 6" Temporary Casing
Sampling Device : Cuttings Only
Drilled By : Holt / Boart Longyear

Total Depth : 35' bgs
Logged By : Elaine Dilley
Reviewed By : Mark Varljen

Depth (ft)	USCS	Graphic	Sample Type	Remarks	Sample ID	Sample
			 Cuttings Sample DESCRIPTION			
0						
1						
2						
3						
4	SW		Gravel and weeds at ground surface			
5			Damp, brown, medium to coarse SAND with fine to coarse gravel (fill)		MW-10 5'	
6						
7						
8				Organic odor		
9						
10	SP		Moist, very dark brown, very silty, fine-grained SAND with fine gravel and woody debris; organic-rich		MW-10 10'	
11						
12				Driller notes change in drilling at 12-13' bgs to harder feel; indicates bedrock		
13						
14			BEDROCK: Volcaniclastic sandstone and mudstone is preliminary identification		MW-10 15'	
15						
16	QU				MW-10 15'	
17						
18						
19						
20			BEDROCK: Metamorphic bedrock, most likely a schist (green); notable minerals include quartz and mic (banding); possibly part of the Constitution Formation		MW-10 20'	
21						
22						
23						
24						
25					MW-10 25'	
26						
27				Driller notes moisture at 32' bgs; discharge from hose w/ hole open to 35' bgs		
28						
29						
30					MW-10 30'	
31				Blew out hole at 11:43; 10' water column at 11:53; water continues to rise at 10.10' per 15 secs.		
32			Moisture apparent in cuttings			
33						
34						
35					MW-10 35'	
36						
37						
38						
39						
40						

Well: MW-10

