Table 1
TEST PIT DATA AND FIELD DENSITY TEST RESULTS

Test Pit	Location	Depth (ft)	Sand Cone Density Test Results			
			Test Depth (ft)	Natural Moisture Content (%)	Wet Density (pcf)	Dry Density (pcf)
TPSS-01	South Spoils	14	3.5	9	118	108
			2	8	117	108
TPSS-02	South Spoils	11	2.5	8	118	109
			4	6	Void encountered, lost sand, test not valid	
TPSS-03	South Spoils	10	3	8	119	111
TPSS-04	South Spoils	12	2	6	101	95
			4.5	8	124	115
TPSS-05	South Spoils	14	4	9	119	110
TPSS-06	South Spoils	11	4.5	11	138	124
TPHD-01	Hillside Dump	12	3	7	61	57
			4.5	8	119	111
TPHD-02	Hillside Dump	11.5	3.5	6	110	104
			5	6	111	105
TPHD-03	Hillside Dump	12	3.5	11	125	113
			5	9	121	111

Table 2
TEST HOLE DATA AND GROUNDWATER OBSERVATIONS

Test Hole	Location	Date Drilled	Northing (ft)	Easting (ft)	Surface Elevation (ft)	Depth (ft)	Waste Rock Thickness (Estimated) (ft)	Groundwater Depth	
								Measured in Test Holes during Drilling (ft)	Measured in Piezometers in Aug. 2001 (ft)
THSS-01	South Spoils	Oct. 6, 2000	353,116.02	2,671,722.29	2,690.22	147.5	140	Not Encountered	None
THSS-02	South Spoils	Oct. 26, 2000	352,866.39	2,671,569.24	2,589.44	90.5	86	Not Encountered	None
THSS-03	South Spoils	Oct. 11, 2000	352,983.53	2,670,983.41	2,678.86	123	118	Not Encountered	None
THSS-04	South Spoils	Oct. 24, 2000	352,763.93	2,671,024.31	2,586.57	101.5	89	Not Encountered	None
THSS-05	South Spoils	Oct. 10, 2000	353,148.53	2,670,673.92	2,711.93	144	134	Not Encountered	None
THSS-06	South Spoils	Oct. 14, 2000	353,141.83	2,670,366.22	2,679.16	77	NE	Not Encountered	None
THHD-01	Hillside Dump	Oct. 16, 2000	357,145.66	2,670,476.81	3,227.08	99	96	Not Encountered	None
THHD-02	Hillside Dump	Oct. 23, 2000	356,784.46	2,670,676.21	3,118.23	100.5	75	99	None
THHD-03	Hillside Dump	Oct. 18, 2000	356,735.87	2,670,311.82	3,125.32	102	85	Not Encountered	None

NE = Not encountered; natural soil not encountered during drilling

Table 3

SUMMARY OF LABORATORY TEST RESULTS ON WASTE ROCK MATERIAL FROM SOUTH SPOILS

Test Hole/ Test Pit	Depth (ft)	Natural Moisture Content (%)	Gradation			Atterberg Limits		USCS Symbol[2]
			Gravel (%)	Sand (%)	Fines (%)	Liquid Limit (%)	Plasticity Index (%)	
THSS-01	10 - 15	17.1	53	26	21	43	19	GC
THSS-01	30 - 35	7.7	72	16	12	35	12	GP - GC
THSS-01	35 - 40	4.8	49	30	21	38	12	GM
THSS-01	50 - 55		48	30	22	37	14	GC
THSS-01	55 - 60	3.2	45	42	13	25	6	GC - GM
THSS-01	65 - 70	4.7	49	35	16	26	7	GC - GM
THSS-01	75 - 80	6.7	5	55	40	27	7	SC - SM
THSS-01	85 - 90	2.6	64	25	11	28	7	GP - GC
THSS-01	100 - 105	5.9	44	32	24	35	12	GC - GM
THSS-01	115 - 120	4.2	23	52	25	28	6	SM
THSS-01	120 - 125	8.9	15	55	30	28	8	SC
THSS-01	140 - 145	5.1	11	41	48	32	17	SC
THSS-02	0 - 15	7.7	55	29	16	28	8	GC
THSS-02	15 - 30	4.2	41	39	20	30	10	GC
THSS-02	30 - 40	4.0	45	34	21	34	12	GC
THSS-02	55 - 70	3.1	44	34	22	23	6	GC - GM
THSS-02	75 - 90	2.7	51	29	20	31	12	GC
THSS-03	0 - 20	2.2	53	28	19	28	8	GC
THSS-03	40 - 65	4.1	37	43	20	31	10	SC
THSS-03	65 - 85	1.9	51	30	19	NP[1]	NP	GM
THSS-03	95 - 120	1.5	39	42	19	22	4	SC - SM
THSS-03	120 - 123	3.3	8	63	29	26	7	SC - SM
THSS-04	0 - 5	3.0	19	49	32	26	8	SC
THSS-04	30 - 40	5.1	37	43	20	30	10	SC
THSS-04	40 - 50	2.0	54	34	12	24	7	GP - GC
THSS-04	50 - 60	1.6	51	33	16	NP	NP	GM
THSS-04	60 - 70	1.2	47	37	16	20	2	GM

[1]NP = Non-Plastic

[2]USCS = Unified Soil Classification System

Table 3

SUMMARY OF LABORATORY TEST RESULTS ON WASTE ROCK MATERIAL FROM SOUTH SPOILS

Test Hole/ Test Pit	Depth (ft)	Natural Moisture Content (%)	Gradation			Atterberg Limits		USCS Symbol[2]
			Gravel (%)	Sand (%)	Fines (%)	Liquid Limit (%)	Plasticity Index (%)	
THSS-04	75 - 90	1.6	48	38	14	NP	NP	GM
THSS-05	10 - 20	4.0	40	46	14	24	7	SC - SM
THSS-05	25 - 30	2.1	56	35	9	23	3	GP - GM
THSS-05	35 - 40	8.4	38	41	21	37	17	SC
THSS-05	55 - 60	22.5	38	28	34	46	19	GC - GM
THSS-05	70 - 75	13.5	19	45	36	38	14	SC
THSS-05	85 - 90	10.2	44	31	25	37	15	GC
THSS-05	95 - 100	7.1	53	24	23	39	18	GC
THSS-05	105 - 110	9.7	32	37	31	37	16	SC
THSS-05	110 - 115	5.2	24	41	35	30	8	SC
THSS-05	115 - 130	4.2	30	46	24	24	5	SC - SM
THSS-06	0 - 30	4.0	39	37	24	22	2	GM
THSS-06	45 - 50	1.9	50	35	15	25	5	GC - GM
THSS-06	55 - 60	1.5	53	32	15	19	2	GM
THSS-06	65 - 70	1.6	63	27	10	24	5	GP - GC
THSS-06	65 - 70	1.3	59	28	13	19	2	GM
TPSS-01	0 - 8	22.7	35	30	35	52	29	GC
TPSS-01	8 - 14	9.5	65	23	12	34	8	GP - GM
TPSS-02	0 - 11	9.1	50	31	19	35	9	GM
TPSS-03	0- 10	6.6	57	29	14	27	6	GC - GM
TPSS-04	0 - 12	6.8	60	29	11	32	11	GP - GC
TPSS-05	0 - 4	5.8	54	31	15	NP	NP	GM
TPSS-05	10 - 14	6.8	56	33	11	30	9	GP - GC
TPSS-06	0 - 11	7.3	64	21	15	NP	NP	GM

[1]NP = Non-Plastic

[2]USCS = Unified Soil Classification System

Group names provided in Appendix D.

Table 4

SUMMARY OF LABORATORY TEST RESULTS ON WASTE ROCK MATERIAL FROM HILLSIDE DUMP

Test Hole/ Test Pit	Depth (ft)	Natural Moisture Content (%)	Gradation			Atterberg Limits		USCS Symbol
			Gravel (%)	Sand (%)	Fines (%)	Liquid Limit (%)	Plasticity Index (%)	
THHD-01	0 - 10	1.1	58	24	18	27	5	GC - GM
THHD-01	15 - 45	0.7	61	28	11	24	6	GP - GC
THHD-01	55 - 80	1.6	51	35	14	23	3	GM
THHD-01	80 - 95	2.7	52	31	17	27	9	GC
THHD-01	95 - 100	1.5	35	44	21	23	6	SC - SM
THHD-02	0 - 10	3.4	40	43	17	25	4	SC - SM
THHD-02	15 - 25	4.8	47	42	11	22	1	GP - GM
THHD-02	35 - 45	1.9	45	38	17	26	5	GC - GM
THHD-02	60 - 65	3.9	32	42	26	26	6	SC - SM
THHD-02	75 - 80	7.6	22	47	31	NP	NP	SM
THHD-02	80 - 85	5.1	25	50	25	23	4	SC - SM
THHD-02	90 - 95	6.6	24	47	29	26	7	SC - SM
THHD-02	95 - 100	9.9	33	46	21	24	6	SC - SM
THHD-03	0 - 40	2.8	44	37	19	26	7	GC - GM
THHD-03	40 - 50	1.3/1.6	29	53	18	NP	NP	SM
THHD-03	50 - 70	2.4	25	48	27	25	6	SC - SM
THHD-03	85 - 100	3.9	25	43	32	26	4	SM
TPHD-01	0 - 12	4.0	58	26	16	NP	NP	GM
TPHD-02	0 - 11.5	4.8	55	30	15	NP	NP	GM
TPHD-03	0 - 12	7.9	41	43	16	29	8	SC

[1]NP = Non-Plastic

[2]USCS = Unified Soil Classification System
Group names provided in Appendix D.

Table 5

SPECIFIC GRAVITY TEST RESULTS

Test Hole/ Test Pit	Depth (ft)	Specific Gravity		USCS Symbol[2]
		(- 3/4")	(- No. 4)	
TPHD-01	0 - 12		2.76	GM
TPHD-02	0 - 11.5	2.75		GM
TPSS-01	8 - 14		2.84	GP - GM
TPSS-02	0 - 11	2.82		GM
TPSS-05	0 - 4		2.83	GM

[1]NP = Non-Plastic

[2]USCS = Unified Soil Classification System
Group names provided in Appendix D.

Table 6

SUMMARY OF LABORATORY TEST RESULTS ON WASTE ROCK MATERIAL COMPOSITED FOR TRIAXIAL TESTING

Composite Sample No.	Test Pit	Depth (ft)	Location	Gradation			Atterberg Limits		Standard Proctor		Triaxial Tests		USCS Symbol
				Gravel (%)	Sand (%)	Fines (%)	Liquid Limit (%)	Plasticity Index (%)	Optimum Moisture Content (%)	Maximum Dry Density (pcf)	Cohesion, c' (psf)	Friction, Angle (O) (deg)	
A	TPSS-01	8 - 14	South Spoils	47	30	23	40	20	10.6	129.5	600	32.6	GC
	TPSS-03	0 - 10											
B	TPSS-04	0 - 12	South Spoils	49	38	13	30	11	6.8	141.4	0	43.7	GC
	TPSS-05	10 - 14											
C	TPSS-05	0 - 4	South Spoils	62	28	10	NP	NP	7.7	138.8	650	37.0	GP - GM
	TPSS-06	0 - 11											
D	TPHD-01	0 - 12	Hillside Dump	57	32	12	28	8	5.8	140.6	400	35.1	GP - GC
	TPHD-03	0 - 12											

NP = Non-Plastic

Notes:

1. Test specimens were remolded to dry densities at approximately 90% of the Standard Proctor maximum dry density and near the natural moisture content.

2. Test specimen diameter was 6 inches (-1 1/2" max. particle size) for Composite Sample C and 4 inches (max. -3/4" particle size) for the other composite samples.

3. USCS = Unified Soil Classification System

Table 7

SUMMARY OF PIT HIGHWALL CONDITIONS

Location		Rock Type	Weathering and Alteration	Fracturing	Joint Set Orientations								Bedding Orientation		Additional Geologic Notes
					Set 1		Set 2		Set 3		Set 4				
Pit	Area				Strike	Dip	Strike	Dip	Strike	Dip	Strike	Dip	Strike	Dip	
Adit	1	Phyllite	MW	CF-MF	N50W	65NE	N15W	75SW	N80E	85SE	N30W	15SW	N05W	45NE	Numerous Random Joints
Pit	2	Phyllite	MW	CF-MF	N10E	35NW	N80W	85NE					N10E	65SE	Blast Loosened Rock
	3	Phyllite	MW	CF-MF	N05E	40NW	N75E	85SE					N15E	50SE	Set 1 Dips Out of Slope
	4	Phyllite	MW-HW	CF-MF	N40E	60NW	N60W	45NE	N05W	60SW					Set 3 is Parallel to Contact
	5	Monzonite	CW-HW	IF-MF	N15W	60NE	N80E	90	N30E	70SE	N10W	85SW			Numerous Random Joints
Pit 3	1	Monzonite	SW-MW	CF-MF	N70E	70SE	N20W	45NE	N-S	60E	N45W	40SW			Numerous Random Joints
	2	Monzonite	SW-MW	CF	N75E	70NW	N05E	70NW	N10E	40SE					Some Random Joints
	3	Monzonite	SW-HW	CF-MF	N75E	85SE	N05W	20NE	N-S	30W					Some Random Joints
	4	Monzonite	SW-HW	MF	N45E	80NW	N05W	40SW	N10E	30SE					Some Random Joints
	5	Phyllite	SW-HW	MF	N05E	85NW	N85E	80NW	N35W	65SW			N15E	45SE	Some Random Joints
	6	Phyllite	MW-HW	CF-MF	N80W	85NE	N10E	80NW	N10W	85NE	N15W	15SW	N05E	50SE	Large Shear Zone
	7	Phyllite	MW-HW	MF	N55E	75NW	N10E	75NW	N20W	55SW	N65W	85SW	N20E	60SE	Mineralized Zone
	8	Phyllite	SW-HW	CF-MF	N70W	80NE	N60W	30SW	N75E	30SE			N10E	70SE	
	9	Calc-Silicate	SW	WF-VWF	N75E	75SE	N10E	40NW					N15E	60SE	Thick beds, Massive
	10	Calc-Silicate	SW	WF-VWF	N65W	85NE	N15E	25NW					N30E	60SE	Thick Beds, Massive
	11	Calc-Silicate	MW-RS	WF-CF									N20E	55SE	Soil and Weathered Rock
Pit 4	1	Monzonite	SW-MW	CF-MF	N15W	80SW	N70W	85SW	N20E	05SE	N30E	35NW			Numerous Random Joints
	2	Monzonite	SW-MW	MF-WF	N40E	65SE	N55W	85SW	N85E	75NW	N30E	15SE	N35E*	50SE*	Shear, N10w, 85NE
	3	Phyllite	SW-HW	CF-MF	N80E	85SE	N30W	45SW	N10E	50SE	N45E	65NW	N20E	50SE	Set 4 continuity is 100+feet
	4	Phyllite	SW-MW	CF-MF	N10E	50NW	N85W	85NE					N20E	50SE	

* Joint set parallel to bedding in phyllite

LEGEND:

Weathering and Alteration

RS - Residual Soil, decomposed rock with original fabric not apparent, easily broken by hand
CW - Completely Weathered and or Altered, decomposed rock, fabric may be apparent, can be crushed by hand
HW - Highly Weathered and or Altered, more than half decomposed, 2-inch diameter sample can be broken by hand
MW - Moderately Weathered and or Altered, rock is discolored, less than half decomposed, 2-inch sample cannot be broken by hand
SW - Slightly Weathered and or Altered, rock is discolored along fractures, rock strength not noticeably lower than fresh rock

Fracturing

IF - Intensely Fractured, Joint spacing of less than 3 inches
CF - Closely Fractured, Joint spacing ranges from 3 to 6 inches
MF - Moderately Fractured, Joint spacing ranges from 6 inches to 3 feet
WF - Widely Fractured, Joint spacing ranges from 3 to 6 feet
VWF - Very Widely Fractured, Joint spacing is greater than 6 feet

Table 8

MATERIAL PROPERTIES USED IN THE STABILITY ANALYSES

Material	Total Unit Weight (pcf)	Effective Shear Strength	
		Cohesion, c' (psf)	Friction Angle, O (degrees)
Waste Rock	135	0	38
Weathered Bedrock Foundation	130	0	41

Table 9

SUMMARY OF CURRENT SLOPE STABILITY ANALYSIS RESULTS

Cross-Section	Figure	Static Factor of Safety		Pseudo-Static (Seismic) Factor of Safety (a = 0.1 g)					
		Shallow Plane	Shallow Non-Plane	Intermediate	Deep	Shallow Plane	Shallow Non-Plane	Intermediate	Deep
South Spoils SS1	18	1.3 – 1.8	1.1 – 1.5	1.3 – 1.7	1.8 – 2.1	1.1 – 1.6	0.9 – 1.2	1.0 – 1.4	1.5 – 1.7
South Spoils SS2	19	1.7 – 2.4	1.7	1.8 – 2.5	1.9 – 2.0	1.4 – 2.0	1.3	1.3 – 1.9	1.5
South Spoils SS3	20	1.8 – 2.5	1.7 - 2.0	2	2.2 – 2.4	1.5 – 2.1	1.3 – 1.5	1.6	1.7 – 1.8
Hillside Dump HD1	21	1.4 – 2.0	1.3 – 1.9	1.9 – 2.1	2.3 – 2.7	1.2 – 1.7	1.1 – 1.5	1.5 – 1.6	1.8 – 2.1
Hillside Dump HD2	22	1.5 – 2.1	1.3 – 2.2	1.6 – 2.5	2.2 – 2.4	1.3 – 1.8	1.0 – 1.6	1.3 – 1.9	1.7 – 1.9

Notes:

1- The values shown are the minimum theoretical values based on numerous searches conducted by the automatic search routines of UTEXAS3. There is generally a range in the minimum values because multiple modes of failure were calculated, as indicated by the many different surfaces shown on the figures.
2- Pseudo-static analyses were conducted by applying a horizontal acceleration of 0.1 g to the slide mass defined by the surface having the lowest static factor of safety.