

PROJECT: Rail Tunnel CLIENT: ABC Transport Authority PROJECT NO: ABC-123 LOCATION: Singapore DRILLING DATE STARTED: 10/11/2005 DRILLING DATE COMPLETED: 21/11/2005 PREPARED BY: CHECKED BY:	DRILLING RIG: Gemco23 BOREHOLE DIA: CORE DIA: DRILLING METHOD: DRILLED BY: Contractor Ltd/ Subramanya	<h2 style="margin: 0;">BORING LOG:</h2> <h3 style="margin: 0;">MCE/28</h3> <p>NORTHING: 29954.42 m EASTING: 32996.2 m REDUCED LEVEL: 105.34 m GWL: m dated</p>
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Scale	Reduced Level (m)	Depth (m) (Thickness)	Graphic Log	Legend	Type & No.	Description	SPT N blows/30cm				SPT N blows/30cm	Rock		Geological Classification	British Soil Classification	Grain Size Analysis G/SA/S/C	Shear Strength		PL WC LL				
							20	40	60	80		TCR (%)	RQD (%)				C (kN/m ²)	φ (°)	20	40	60	80	
		(1.00)				Installation of Casagrande Piezometer @ 60.00m & 70.00m bgl Stiff Dark greyish brown Sandy CLAY (FILL)																	
1	104.34	1.00				Loose Yellowish and greenish grey Silty fine to coarse SAND (FILL)								FILL	CS								
2		(3.00)												FILL	SM								
3					3.00 TWTW1											0/54/26/0							
4	101.34	4.00			4.00																		
5		(2.00)				Very loose Reddish brown mottled grey Clayey fine to coarse SAND (FILL)					1,0/1,0,0,1 N=2			FILL	SC								
6	99.34	6.00																					
7					6.00 TWTW2	Very loose Yellowish brown Clayey fine to coarse SAND (FILL)					1,1/1,0,1,1 N=3			FILL	SC								
8		(4.00)																					
9					9.00 TWTW3											0/54/30/0							
10	95.34	10.00			10.00						1,1/1,1,1,2 N=5												
11						Loose Yellowish to reddish brown Clayey fine to coarse SAND (FILL)																	
12		(5.10)			12.00 TWTW4									FILL	SC								
13					13.00						1,1/1,2,1,2 N=6												
14																							
15	90.24	15.10			15.00 TWTW5	Very soft to soft Bluish grey Marine CLAY with traces of shell fragments (Kallang Marine)					0,0/0,0,0,0 N=0					0/3/49/48							
16					16.00																		
17																							
18					17.00 PP1									M	CS	0/1/46/53	3 (UUP)						
19					18.00																		
20					18.50 PP2						0,0/0,0,0,0 N=0					0/1/44/55							
					19.50																		

SG AGS 3. 1 04 GJB Log SINGAPORE BOREHOLE SG AGS 3. 1 04 GPJ <<DrawingFile>> 07/12/2009 13:16 8.2.005 Developed by Datgel



- Sample
- Pressuremeter Test (PRM)
- Core Run
- Vane Shear Test (VST)
- Permeability / Packer Test (PKT)
- SPT N Value
- Attempt TW/P/MZ/U
- Piston Sample
- Thin Wall Push
- MZ - Mazier
- U - Thick Wall Open Drive
- CR - Core Run
- SPTLS - SPT Liner
- W - Water
- T* - Push + Hammer
- PZS - Cassagrande Piezometer
- WSP - Water Standpipe

REMARKS:
 Install PZS at 60.00m & 70.00m. PRM @ 53.58, 63, 68, 73m

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Scale	Reduced Level (m)	Depth (m) (Thickness)	Graphic Log	Legend	Type & No.	Description	SPT N blows/30cm		Rock	Geological Classification	British Soil Classification	Grain Size Analysis	Shear Strength		PL WC LL			
							20	40					60	80	TCR (%)	RQD (%)	G/S/A/S/C	C (kN/m ²)
		(12.40)			20.00 PP3 21.00	Very soft to soft Bluish grey Marine CLAY with traces of shell fragments (Kallang Marine) (continued)						0/1/47/52	19	0	1.5	1.8	2.1	2.4
					22.50 PP4 23.50		x					0/1/50/49	13	0				
					25.00 PP5 26.00					M	CS	0/1/41/58	8	24				
	77.84	27.50			27.50 TWTW6 28.50	Firm Dark grey Peaty CLAY with some sand (Kallang Transitional)				E	Cpt	0/23/47/30	0	0				
	76.84	28.50				Very loose Light grey Clayey fine SAND (Kallang Alluvial)				F1	SC							
	75.34	30.00			30.00 TWTW7 31.00	Firm Dark grey Peaty CLAY with sand (Kallang Transitional)				E	Cpt	0/28/42/30	6	25				
		(2.50)																
	72.84	32.50			32.50 TWTW8 33.50	Firm dark grey to grey Slightly fine sandy CLAY with traces of peat (Kallang Alluvial)				F2	CS	0/3/47/50						
		(2.50)																
	70.34	35.00			35.00 TWTW9 36.00	Very soft Dark grey to grey Marine CLAY with traces of peat (Kallang Marine)				M	C	0/1/44/55	6	24				
		(2.50)																
	67.84	37.50			37.50 TWTW10 38.50	Stiff Light greenish grey Slightly fine sandy CLAY (Kallang Alluvial)				F2	CS	0/5/48/47	0	20				
		(3.00)																

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| <ul style="list-style-type: none"> - Sample - Pressuremeter Test (PRM) - Core Run - Vane Shear Test (VST) | <ul style="list-style-type: none"> - Permeability / Packer Test (PKT) - SPT N Value - Attempt TW/P/MZ/U - Piston Sample - Thin Wall Push | <ul style="list-style-type: none"> - Mazier - Thick Wall Open Drive - Core Run - SPT Liner - Water - Push + Hammer |
| | <ul style="list-style-type: none"> - Cassagrande Piezometer - Water Standpipe | |

REMARKS:
 Install PZS at 60.00m & 70.00m. PRM @ 53.58, 63.68, 73m

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Scale	Reduced Level (m)	Depth (m) (Thickness)	Graphic Log	Legend	Type & No.	Description	SPT N blows/30cm		SPT N blows/30cm	Rock		Geological Classification	British Soil Classification	Grain Size Analysis G/S/A/S/C	Shear Strength		PL WC LL			
							20	40		60	80				TCR (%)	RQD (%)	C (kN/m ²)	φ (°)	20	40
41	64.84	40.50			40.50 TWTW11 41.50	Firm Light brownish and greenish grey CLAY (Kallang Alluvial)	●		2,1/1,2,2,2 N=7			F2	CS	0/1/51/48			○	△	●	●
42		(3.00)										F2	C							
44	61.84	43.50			43.50 TWTW12 44.50	Stiff Dark greenish grey SILT (Kallang Alluvial)	●		3,2/3,3,4,4 N=14			F2	M	0/1/55/44	8 (UUP)	27	○	△	●	●
45		(3.00)										F2	M							
47	58.84	46.50			46.50 TWTW13 47.50	Firm Dark grey to grey Peaty CLAY with decomposed wood (Kallang Transitional)	●		1,1/1,1,2,2 N=6			E	CPT							
48	57.84	47.50				Firm Dark grey to grey Peaty CLAY with some decomposed wood and leaf (Kallang Transitional)	●					E	CPT							
49		(2.00)										E	CPT							
50	55.84	49.50				Dense Grey Silty fine to coarse SAND (Kallang Alluvial)		●	9,10/10,11,11,10 N=42			F1	SM							
51		(3.00)										F1	SM							
53	52.84	52.50			52.50 TWTW14 53.50	Stiff Light grey Slightly fine sandy SILT (Kallang Alluvial)	●		1,1/2,2,2,3 N=9			F2	MS	0/24/40/36			○	●	■	■
54		(3.00)										F2	MS							
56	49.84	55.50			55.50 TWTW15 56.50	Very dense Greenish grey speckled white Silty fine to coarse SAND (Old Alluvium)		●	10,13/17,21,23,23 N=84			O(B)	SM	0/75/23/0			△	■	■	■
57		(6.60)										O(B)	SM				△	■	■	■
59					58.50 MM1 59.50			●	11,13/17,19,18,25 N=79			O(B)	SM	0/84/16/0			△	■	■	■
60												O(B)	SM				△	■	■	■

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|------------------------------|--------------------------------------|---------------------------|------------------------------|
| ⊗ - Sample | ▲ - Permeability / Packer Test (PKT) | MZ - Mazier | PZS - Cassagrande Piezometer |
| ■ - Pressuremeter Test (PRM) | ● - SPT N Value | U - Thick Wall Open Drive | WSP - Water Standpipe |
| ▬ - Core Run | □ - Attempt TW/P/MZ/U | CR - Core Run | |
| ⊕ - Vane Shear Test (VST) | P - Piston Sample | SPTLS - SPT Liner | |
| | TW - Thin Wall Push | W - Water | |
| | | T* - Push + Hammer | |

REMARKS:
 Install PZS at 60.00m & 70.00m. PRM @ 53.58,63.68,73m

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							20	40	60	80		TCR (%)	RQD (%)				C (kN/m ²)	φ (°)	PL	WC	LL	20	40	60	80		
						Very dense Greenish grey speckled white Silty fine to coarse SAND (Old Alluvium) (continued)																					
61																											
62	43.24	62.10				Hard Greyish and greenish grey Slightly fine sandy CLAY (Old Alluvium)					8	2/14,18,20,27															
63		(2.40)																									
64																											
65	40.84	64.50				Hard Greenish grey mottled brown Slightly fine to medium sandy SILT (Old Alluvium)					11	12/13,16,20,22															
66		(2.50)																									
67	38.34	67.00																									
68						Very dense Greenish grey speckled white Silty fine to coarse SAND (Old Alluvium)																					
69											12	4/22,30,37,11															
70																											
71		(7.50)																									
72											10	16/25,38,47															
73																											
74																											
75	30.84	74.50				Hard Brownish grey mottled with pink Slightly fine sandy CLAY (Old Alluvium)					10	12/29,42,89															
76		(4.33)																									
77											14	11/24,22,25,39															
78																											
79	26.51	78.83				Borehole terminated at 78.83m					8	8/25,32,43															
80																											

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 Install PZS at 60.00m & 70.00m. PRM @ 53.58,63,68,73m