

# Engineering Log - Borehole

 Client: **THIESS PTY LTD**

 Date started: **5.9.2008**

Principal:

 Date completed: **8.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

 Logged by: **AVS**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

drill model and mounting: P160 Truck	Easting: 332596.863	slope: -90°	R.L. Surface: 90.3
hole diameter: 100 mm	Northing 6256102.714	bearing:	datum: AHD

drilling information				material substance									
method	penetration	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/density index	pocket penetrometer	structure and additional observations
1 2 3									soil type: plasticity or particle characteristics, colour, secondary and minor components.			100 200 300 400	
ADV					90				<b>ASPHALT</b> <b>FILL: SILTY CLAY:</b> High plasticity, red, white with some fine grained sand.	M			ASPHALT FILL
ADT				None observed while augering		1			<b>SHALE:</b> extremely weathered, very low strength, red brown and light grey, with ironstone gravels, remoulds to a high plasticity clay.				
				SPT 10,22,23 N=45		2							
						3							
				SPT N=R		4							
						5			Borehole BH202 continued as cored hole				
						6							
						7							
						8							

<b>method</b> AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	<b>support</b> M mud N nil C casing <b>penetration</b> 1 2 3 4  no resistance ranging to refusal <b>water</b>  10/1/98 water level on date shown  water inflow  water outflow	<b>notes, samples, tests</b> U <sub>50</sub> undisturbed sample 50mm diameter U <sub>63</sub> undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	<b>classification symbols and soil description</b> based on unified classification system <b>moisture</b> D dry M moist W wet Wp plastic limit W <sub>L</sub> liquid limit	<b>consistency/density index</b> VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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Borehole No. **BH202**

# Engineering Log - Cored Borehole

Sheet 2 of 5  
Project No: **GEOTLCOV23589AA**

Client: **THIESS PTY LTD**

Date started: **5.9.2008**

Principal:

Date completed: **8.9.2008**

Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**










Logged by: **AVS**

Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

Checked by: **PJW**

drill model & mounting: P160 Truck	Easting: 332596.863	slope: -90°	R.L. Surface: 90.3
hole diameter: 100 mm	Drilling fluid: Water	Northing: 6256102.714	bearing: datum: AHD

drilling information				material substance				rock mass defects					
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	Is <sub>(50)</sub> MPa	D- diam- etral A- axial	RQD %	defect spacing mm	defect description
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH			30 100 300 1000 3000		type, inclination, planarity, roughness, coating, thickness
													particular
													general
			90	1									
			89	2									
			88	3									
			87	4									
			86	5		Continued from non-cored borehole							
NMLC			86	5		<b>CLAY:</b> High plasticity, white, thinly interbedded, ironbands and clay, flat bedded.	XW						Fractured Shale
			85	6		<b>SHALE:</b> Fine grained, pale grey, dark grey, brown, interlaminated at 0-5°, about 70% Shale and 30% Sandstone with siderite band.							Gravel seam of Iron and Shale
			85	6		<b>SHALE:</b> Fine grained, pale grey, dark grey, 80% Shale 20% Sandstone, interlaminated at 0° with rare bands of Sandstone.	HW		D A 0.13 0.13				JT, 50°, PL, RO, SN, Iron
			84	7									JT, 30-40°, PL, RO, CN
			84	7					A 0.05				JT, 30°, IR, RO, CN
			83	7									JT, 65°, IR, RO, CN
			83	7									JT, 40-50°, PL-IR, RO, CN
			83	7									SM, XW Shale, 5mm, 0°
			83	8					A 0.11				JT, 70-90°, IR, RO, CN

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b>  casing used  barrel withdrawn <b>graphic log/core recovery</b>  core recovered - graphic symbols indicate material  no core recovered	<b>water</b>  10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss  water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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CORED BOREHOLE GEOTLCOV23589AA.GPJ COFFEY.GDT 12.9.08

Form GEO 5.5 Issue 3 Rev. 3

Fractured Shale PT, 0-10°, PL, SO-RO, CN unless otherwise noted



# Engineering Log - Cored Borehole

 Client: **THIESS PTY LTD**

 Date started: **5.9.2008**

Principal:

 Date completed: **8.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**










 Logged by: **AVS**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

drill model & mounting: P160 Truck	Easting: 332596.863	slope: -90°	R.L. Surface: 90.3
hole diameter: 100 mm	Drilling fluid: Water	Northing: 6256102.714	bearing: datum: AHD

drilling information				material substance				rock mass defects						
method	core-lift	water	RL	depth metres	graphic log core recovery	material rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength				defect spacing mm	defect description type, inclination, planarity, roughness, coating, thickness	
								VL	L	M	H			VH
NMLC			74			<b>SANDSTONE:</b> Medium to coarse grained, pale grey, cross bedded at 15-25°. (continued)	SW							JT, 20-25°
						<b>SANDSTONE:</b> Fine grained, pale grey, wavy bedding, some Shaley bands.	FR					D A 1.19 1.12		SM, 40mm carbonaceous Sandy Clay
			17			<b>SANDSTONE:</b> Medium to coarse grained, pale grey, cross bedded at 15-25°, with some carbonaceous laminae defining cross bedding.						D A 1.21 1.3		
			73									D A 1.1 1.07		SM, 30mm, Sandy Clay
			18									D A 1.41 1.44		
			72			<b>SANDSTONE:</b> Medium grained, pale grey, cross bedded at 20°, with some carbonaceous laminae defining cross bedding and rare coal lenticles.						D A 0.31 1.13		
			19									D A 0.87 1.91		
			71			Some coaly lenticles up 30mm.						D A 1.01 0.96		
			20			<b>SANDSTONE AND SHALE:</b> Fine grained, 80% Shale 20% Sandstone, pale grey, dark grey, interlaminated at 0-10°.						D A 1.22 1.35		
			70											
		21			<b>CONGLOMERATE:</b> Medium to coarse grained, pale grey, pebbly band. Pebbles up to 30mm. Pebble of Shale and Quartz.									
		69			<b>SANDSTONE:</b> Fine to medium grained, pale grey, flat bedded 0-10°, carbonaceous laminae.									
		22			<b>SANDSTONE:</b> Medium to coarse grained, pale grey cross bedded at 15-20° with carbonaceous laminae.									
		68												
		23												
		67											PT, 0-5°, UN, RO, carbonaceous	
		24												

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b>  casing used  barrel withdrawn <b>graphic log/core recovery</b>  core recovered - graphic symbols indicate material  no core recovered	<b>water</b>  10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss  water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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CORED BOREHOLE GEOTLCOV23589AA.GPJ COFFEY.GDT 12.9.08

Borehole No. **BH202**

# Engineering Log - Cored Borehole

Sheet 5 of 5  
Project No: **GEOTLCOV23589AA**

Client: **THIESS PTY LTD**

Date started: **5.9.2008**

Principal:

Date completed: **8.9.2008**

Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

Logged by: **AVS**

Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

Checked by: **PJW**

drill model & mounting: P160 Truck	Easting: 332596.863	slope: -90°	R.L. Surface: 90.3
hole diameter: 100 mm	Drilling fluid: Water	Northing: 6256102.714	bearing: datum: AHD

drilling information				material substance				rock mass defects									
method	core-lift	water	RL	depth metres	graphic log core recovery	material rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength				defect spacing mm	defect description type, inclination, planarity, roughness, coating, thickness				
								VL	L	M	H			VH	EH	A-axial	D-diam-eteral
NMLC			66			<b>SANDSTONE:</b> Medium to coarse grained, pale grey cross bedded at 15-20° with carbonaceous laminae. <i>(continued)</i>  3mm thick carbonaceous bands	FR										
			65	25													
			64	26													
			63	27													
			62	28													
			61	29													
			60	30													
			60	31		BH202 terminated at 30.18m											
			59	32													

DEFECTS ARE PT, 0-25°, PL, RO, CN UNLESS NOTED OTHERWISE

JT, 20-30°, PL, RO was infilled with clay

CORED BOREHOLE GEOTLCOV23589AA.GPJ COFFEY.GDT 12.9.08

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b> casing used barrel withdrawn <b>graphic log/core recovery</b> core recovered - graphic symbols indicate material no core recovered	<b>water</b> 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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drawn	MT	 SPECIALISTS MANAGING THE EARTH	client: <b>THIESS PTY LTD</b>	
approved	DS		project: <b>ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT, ST LEONARDS</b>	
date	09/09/2008		title: <b>ROCK CORE PHOTOGRAPH – BH202</b>	
scale	Not to scale		project no: <b>GEOTLCOV23589AA</b>	
original size	A4		Photo no: <b>BH202</b> 1 of 3	



Job No. GEOTLCOV23589AA  
 BH202  
 DEPTH: 13m - 23m



drawn	MT		client: <b>THIESS PTY LTD</b>	
approved	DS		project: <b>ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT, ST LEONARDS</b>	
date	09/09/2008		title: <b>ROCK CORE PHOTOGRAPH - BH202</b>	
scale	Not to scale		project no: <b>GEOTLCOV23589AA</b>	
original size	A4		Photo no: <b>BH202 2 of 3</b>	



Job No. GEOTLCOV23589AA  
BH202  
DEPTH: 23m – 30.18m



drawn	MT		client: <b>THIESS PTY LTD</b>	
approved	DS		project: <b>ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT, ST LEONARDS</b>	
date	09/09/2008		title: <b>ROCK CORE PHOTOGRAPH – BH202</b>	
scale	Not to scale		project no: <b>GEOTLCOV23589AA</b>	Photo no: <b>BH202 3 of 3</b>
original size	A4			

Borehole No. **BH203**

# Engineering Log - Borehole

Sheet 1 of 4  
Project No: **GEOTLCOV23589AA**

Client: **THIESS PTY LTD**

Date started: **1.9.2008**

Principal:

Date completed: **1.9.2008**




Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**





Logged by: **RF**

Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

Checked by: **PJW**

drill model and mounting: Pioneer Mole P160 Truck	Easting: 332680.556	slope: -90°	R.L. Surface: 89.15
hole diameter: 110 mm	Northing 6256190.631	bearing:	datum: AHD

drilling information				material substance								
method	penetration	support	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/density index	pocket penetrometer	structure and additional observations
	1 2 3							soil type: plasticity or particle characteristics, colour, secondary and minor components.			100 200 300 400	
Poaholed		C	None observed while augering	89	1		FILL		M			FILL
ADT				87	2		CL/CH <b>CLAY:</b> Medium to high plasticity, dark grey.		M			RESIDUAL SOIL
				86	3		<b>SHALE:</b> Extremely weathered, very low strength, dark grey.					ROCK
			Not monitored while coring	85	4		Borehole BH203 continued as cored hole					
				84	5							
				83	6							
				82	7							
					8							

<b>method</b> AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	<b>support</b> M mud N nil C casing <b>penetration</b> 1 2 3 4  no resistance ranging to refusal <b>water</b>  10/1/98 water level on date shown  water inflow  water outflow	<b>notes, samples, tests</b> U <sub>50</sub> undisturbed sample 50mm diameter U <sub>63</sub> undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	<b>classification symbols and soil description</b> based on unified classification system  <b>moisture</b> D dry M moist W wet W <sub>p</sub> plastic limit W <sub>L</sub> liquid limit	<b>consistency/density index</b> VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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# Engineering Log - Cored Borehole

 Client: **THIESS PTY LTD**

 Date started: **1.9.2008**

Principal:

 Date completed: **1.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

 Logged by: **RF**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

 drill model & mounting: Pioneer Mole P160 Truck      Easting: 332680.556      slope: -90°      R.L. Surface: 89.15  
 hole diameter: 110 mm      Drilling fluid: Water      Northing: 6256190.631      bearing:      datum: AHD

drilling information				material substance				rock mass defects			
method	core-lift	water	RL	depth metres	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa	D-diam- etral A- axial	defect spacing mm	defect description
					rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH			30 100 300 1000 3000	type, inclination, planarity, roughness, coating, thickness
		None observed while augering	89	1							
		None observed while augering	88	2							
		None observed while augering	87	3							
		None observed while augering	86	3							
NMLC		Not monitored while coring	85	4	Continued from non-cored borehole <b>SHALE:</b> Dark grey to black, distinctly bedded at 0-5° with pale grey sandstone (20%) laminations (1-10mm).	XW			D 0.08 A 0.05	0	JT, PL, 60°, SO, CN
		Not monitored while coring	84	5					D 0.04 A 0.06		
		Not monitored while coring	83	6	<b>SHALE:</b> Dark grey to black distinctly bedded at 0-10° with pale grey sandstone (<10%) laminations (1-3mm).				D 0.06 A 0.12 D 0 A 0.04	0	
		Not monitored while coring	82	7		MW-SW			D 0.59 A 0.76	84	XW, SM, 10mm JT, PL, 30°, PL, SO XW, SM 10mm JT, IR, 70°, VR, SN - iron oxides JT, PL, 60°, RO, SN - iron oxides JT, PL, 30°, SO, SN - iron oxides JT, PL, 5-30°, SO/RO, SN - iron oxides CS, IR, SO, 30mm
		Not monitored while coring	81	8							

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b> casing used barrel withdrawn <b>graphic log/core recovery</b> core recovered - graphic symbols indicate material no core recovered	<b>water</b> 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular	<b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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# Engineering Log - Cored Borehole

 Client: **THIESS PTY LTD**

 Date started: **1.9.2008**

Principal:

 Date completed: **1.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

 Logged by: **RF**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

 drill model & mounting: Pioneer Mole P160 Truck      Easting: 332680.556      slope: -90°      R.L. Surface: 89.15  
 hole diameter: 110 mm      Drilling fluid: Water      Northing: 6256190.631      bearing:      datum: AHD

drilling information				material substance				rock mass defects			
method	core-lift	water	RL	depth metres	material	weathering alteration	estimated strength	Is <sub>(50)</sub> MPa	D- diam- A- axial	defect spacing mm	defect description
					rock type; grain characteristics, colour, structure, minor components						type, inclination, planarity, roughness, coating, thickness
NMLC			81		SHALE: Dark grey to black distinctly bedded at 0-10° with pale grey sandstone (<10%) laminations (1-3mm). (continued)	FR					
			80								
			79								
			78								
			77								
			76		12.76m. Pyrite lense up to 8mm thick.						
			75		INTERLAMINATED SHALE (50%) AND SANDSTONE (50%): Dark grey, distinctly laminated shale (bedding at 0-20°), and fine to medium grained pale grey sandstone, mostly laminated. One sandstone bed 100mm thick.						
			74		SHALE: Dark grey to black distinctly bedded at 0-10° with fine to medium grained pale grey sandstone (30%) beds (10 to 30mm) and laminations (1-10mm).						
			16								

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b> casing used barrel withdrawn <b>graphic log/core recovery</b> core recovered - graphic symbols indicate material no core recovered	<b>water</b> 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular	<b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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CORED BOREHOLE GEOTLCOV23589AA.GPJ COFFEY.GDT 12.9.08

Form GEO 5.5 Issue 3 Rev. 3

Defects are JT, PL/IR, RO/SO, CN or CO, clay unless noted otherwise.

# Engineering Log - Cored Borehole

 Client: **THIESS PTY LTD**

 Date started: **1.9.2008**

Principal:

 Date completed: **1.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

 Logged by: **RF**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

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hole diameter: 110 mm	Drilling fluid: Water	Northing: 6256190.631	bearing: datum: AHD

drilling information				material substance				rock mass defects								
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								VL	L	M	H			VH	EH	IS <sub>(50)</sub> MPa
NMLC			73			<b>SANDSTONE:</b> Medium grained pale grey to yellow, indistinctly bedded at 20-30°, with dark grey shale (<10%) laminations (1mm). Rare carbonaceous laminae and shale clasts. <i>(continued)</i> 16.60 - 16.73m: Shale bed with fine to medium grained pale grey sandstone.	FR									
			72	17												
			71	18												
			70	19												
			69	20												
			68	21												
			67	22		BH203 terminated at 21.95m										
			66	23												
			65	24												

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b> casing used barrel withdrawn <b>graphic log/core recovery</b> core recovered - graphic symbols indicate material no core recovered	<b>water</b> 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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CORED BOREHOLE GEOTLCOV23589AA.GPJ COFFEY.GDT 12.9.08




Job No. GEOTLCOV23589AA  
 BH203  
 DEPTH: 3.36 – 13.0m

drawn	MT	 <p><b>coffey</b> geotechnics SPECIALISTS MANAGING THE EARTH</p>	client: <b>THIESS PTY LTD</b>	
approved	DS		project: <b>ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT, ST LEONARDS</b>	
date	09/09/2008		title: <b>ROCK CORE PHOTOGRAPH – BH203</b>	
scale	Not to scale		project no: <b>GEOTLCOV23589AA</b>	
original size	A4		Photo no: <b>BH203 1 of 2</b>	



Job No. GEOTLCOV23589AA  
 BH203  
 DEPTH: 13.0 – 21.0m

drawn	<b>MT</b>		client: <b>THIESS PTY LTD</b>	
approved	<b>DS</b>		project: <b>ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT, ST LEONARDS</b>	
date	<b>09/09/2008</b>		title: <b>ROCK CORE PHOTOGRAPH – BH203</b>	
scale	<b>Not to scale</b>		project no: <b>GEOTLCOV23589AA</b>	
original size	<b>A4</b>		Photo no: <b>BH203 2 of 2</b>	

Borehole No. **BH204**

# Engineering Log - Borehole

Sheet 1 of 4  
Project No: **GEOTLCOV23589AA**

Client: **THIESS PTY LTD**

Date started: **2.9.2008**

Principal:

Date completed: **2.9.2008**

Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

Logged by: **RF**

Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

Checked by: **PJW**

drill model and mounting: Pioneer Mole P160 Truck	Easting: 332636.364	slope: -90°	R.L. Surface: 92.08
hole diameter: 110 mm	Northing 6256222.952	bearing:	datum: AHD

drilling information				material substance									
method	penetration	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/density index	pocket penetrometer	structure and additional observations
	1 2 3								soil type: plasticity or particle characteristics, colour, secondary and minor components.			100 200 300 400	
Poaholed		C		None observed while augering	91	1			<b>FILL</b>	M			FILL
ADT					90	2		CL-CH	<b>CLAY:</b> Medium to high plasticity, brown, with some silt, and some fine to coarse grained sand and gravel of highly weathered to fresh shale.				RESIDUAL SOIL
					89	3			Borehole BH204 continued as cored hole				
					88	4							
					87	5							
					86	6							
					85	7							
						8							

<b>method</b> AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	<b>support</b> M mud N nil C casing <b>penetration</b> 1 2 3 4  no resistance ranging to refusal <b>water</b> 10/1/98 water level on date shown water inflow water outflow	<b>notes, samples, tests</b> U <sub>50</sub> undisturbed sample 50mm diameter U <sub>63</sub> undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	<b>classification symbols and soil description</b> based on unified classification system  <b>moisture</b> D dry M moist W wet Wp plastic limit W <sub>L</sub> liquid limit	<b>consistency/density index</b> VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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# Engineering Log - Cored Borehole

 Client: **THIESS PTY LTD**

 Date started: **2.9.2008**

Principal:

 Date completed: **2.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

 Logged by: **RF**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

drill model & mounting: Pioneer Mole P160 Truck	Easting: 332636.364	slope: -90°	R.L. Surface: 92.08
hole diameter: 110 mm	Drilling fluid: Water	Northing: 6256222.952	bearing: datum: AHD

drilling information				material substance				rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	Is <sub>(50)</sub> MPa	D- diam- etral A- axial	defect spacing mm	defect description
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH			30 100 300 1000 3000	type, inclination, planarity, roughness, coating, thickness
												particular
												general
		None observed while augering	91	1								
			90	2								
						Continued from non-cored borehole						
NMLC		Not monitored while coring	89	3		SHALE: Pale grey to dark grey to orange, distinctly bedded at 0-10°, with fine grained, pale grey sandstone (30%) laminations (1-5mm). Iron stained and indurated in places.	XW HW		D A 0 0			XW ZONE
			88	4					D A 0.06 0.07			Jt, PL, 60°, SO, CN Jt, PL, 0-10°, SO, CO, iron oxides XW ZONE 240mm
			87	5		NO CORE			D A 0.25 0.03			Core barrel jammed with clay.
			86	6		SHALE: Pale grey to dark grey to orange, distinctly bedded at 0-10°, with fine grained, pale grey sandstone (30%) laminations (1-5mm). Iron stained and indurated in places.			A 0.34			
			85	7					D A 0.32 0.05			CS, 70mm
									D A 0.25 0.04	76		
									D A 0.03 0.02			
				8								

Defects are extremely weathered seams, 5-50mm thick (most 10-20mm), unless otherwise stated.

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b> casing used barrel withdrawn <b>graphic log/core recovery</b> core recovered - graphic symbols indicate material no core recovered	<b>water</b> 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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# Engineering Log - Cored Borehole

 Client: **THIESS PTY LTD**

 Date started: **2.9.2008**

Principal:

 Date completed: **2.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

 Logged by: **RF**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

drill model & mounting: Pioneer Mole P160 Truck	Easting: 332636.364	slope: -90°	R.L. Surface: 92.08
hole diameter: 110 mm	Drilling fluid: Water	Northing: 6256222.952	bearing: datum: AHD

drilling information				material substance				rock mass defects				
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	Is <sub>(50)</sub> MPa	D- diam- A- axial	defect spacing mm	defect description
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH			30 100 300 1000 3000	particular
												general
NMLC				83	9	SHALE: Dark grey to black, distinctly bedded at 0-10°, with fine grained pale grey sandstone (<10%) laminations (1-2mm).	HW				76	Jt, PL, 40°, SO, CN CS, 50mm Jt, PL, 20°, SO, CN
				82	10		SW-FR					72
				81	11	11.00-12.00m. Bedding at 10-45°.						CS, 40mm SZ, 50mm Jt, IR, 30-90°, RO, CN SZ, 70mm SZ, 180mm XW, SM, 20mm Jt, PL, 5°, SO, CN Jt, PL, 0-10°, SO, CN, clay SZ, PL, 20-30°, 100mm Jt, PL, 40°, RO, CN
				80	12							Jt, PL, 80°, SO, VN, pyrite
				79	13							Jt, CU, 0 - 80°, SO, CN SZ, 30mm
				78	14	SHALE: Dark grey to black, indistinctly bedded at 0-10°.	FR					Pt, PL, 10°, SO, CN CS, 20mm Pt, PL, 0°, SO, CN XW, SM, 20mm Pt, PL, 0-10°, SO, CO, clay
				77	15							
					16							

Defects are extremely weathered seams, 1-10mm, unless otherwise stated.

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b> casing used barrel withdrawn <b>graphic log/core recovery</b> core recovered - graphic symbols indicate material no core recovered	<b>water</b> 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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Job No. GEOTLCOV23589AA  
 BH204  
 DEPTH: 2.5m – 12m



drawn	MT		client: <b>THIESS PTY LTD</b>	
approved	DS		project: <b>ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT, ST LEONARDS</b>	
date	09/09/2008		title: <b>ROCK CORE PHOTOGRAPH – BH204</b>	
scale	Not to scale		project no: <b>GEOTLCOV23589AA</b>	
original size	A4		Photo no: <b>BH204</b> 1 of 2	



Job No. GEOTLCOV23589AA  
 BH204  
 DEPTH: 12m - 22.07m



drawn	MT		client: <b>THIESS PTY LTD</b>	
approved	DS		project: <b>ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT, ST LEONARDS</b>	
date	09/09/2008		title: <b>ROCK CORE PHOTOGRAPH - BH204</b>	
scale	Not to scale		project no: <b>GEOTLCOV23589AA</b>	
original size	A4		Photo no: <b>BH204 2 of 2</b>	

Borehole No. **BH205**

# Engineering Log - Borehole

Sheet 1 of 4  
Project No: **GEOTLCOV23589AA**

Client: **THIESS PTY LTD**

Date started: **3.9.2008**

Principal:

Date completed: **3.9.2008**




Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**





Logged by: **AVS**

Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

Checked by: **PJW**

drill model and mounting: P160 Truck	Easting: 332700.969	slope: -90°	R.L. Surface: 88.46
hole diameter: 100 mm	Northing 6256260.024	bearing:	datum: AHD

drilling information				material substance										
method	penetration	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/density index	pocket penetrometer	structure and additional observations	
1 2 3									soil type: plasticity or particle characteristics, colour, secondary and minor components.			100 200 300 400		
Pothead		C		None observed while augering	88	1		CL/CH	<b>ASPHALT</b> <b>SILTY CLAY:</b> Medium to high plasticity, pale grey with a trace of fine grained sand.	M			RESIDUAL SOIL	
ADT			87		2				<b>SHALE:</b> Extremely weathered, very low strength, dark grey, grey.				ROCK	
			86		3									
			85		4				Borehole BH205 continued as cored hole					
			84		5									
			83		6									
			82		7									
			81		8									

<b>method</b> AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	<b>support</b> M mud N nil C casing <b>penetration</b> 1 2 3 4  no resistance ranging to refusal <b>water</b>  10/1/98 water level on date shown  water inflow  water outflow	<b>notes, samples, tests</b> U <sub>50</sub> undisturbed sample 50mm diameter U <sub>63</sub> undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	<b>classification symbols and soil description</b> based on unified classification system  <b>moisture</b> D dry M moist W wet W <sub>p</sub> plastic limit W <sub>L</sub> liquid limit	<b>consistency/density index</b> VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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# Engineering Log - Cored Borehole

 Client: **THIESS PTY LTD**

 Date started: **3.9.2008**

Principal:

 Date completed: **3.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**










 Logged by: **AVS**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

drill model & mounting: P160 Truck	Easting: 332700.969	slope: -90°	R.L. Surface: 88.46
hole diameter: 100 mm	Drilling fluid: Water	Northing: 6256260.024	bearing: datum: AHD

drilling information				material substance				rock mass defects					
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength	IS <sub>(50)</sub> MPa	D- diam- etral A- axial	RQD %	defect spacing mm	defect description
						rock type; grain characteristics, colour, structure, minor components		VL L M H VH EH			30 100 300 1000 3000		type, inclination, planarity, roughness, coating, thickness
													particular general
	None observed while augering		88	1									
	None observed while augering		87	2									
	None observed while augering		86	3									
	None observed while augering		85	3		Continued from non-cored borehole							
NMLC	Not monitored while coring		84	4		<b>SHALE INTERLAMINATED WITH SANDSTONE (20%):</b> Dark grey, flat bedded with some iron staining.	MW			D 0.26 A 0.71	55		Jt, 60-70°, PL, RO-SO, SN
	Not monitored while coring		83	5		<b>SHALE:</b> Dark grey, interlaminated (10% fine sand), distinctly bedded between 0 - 5°.				D 0.17 A 0.84			CS, 0-10°, Silty Clay Jt, 45-60°, PL, RO, SN CS, 0-10 Shale 10mm
	Not monitored while coring		82	6						D 1.05 A 1.06	0		CS, 0-10, Shale 30mm Jt, 30-40, UN, RO, SN, IRON Jt, 40-50°, UN, RO, SN, IRON Jt, 40-50°, PL, infilled clay, SN Jt, 40-50, PL, RO, CN
	Not monitored while coring		81	7			SW			D 0.84 A 1.79	57		Jt, 50-70°, PL, RO, SN, Iron Jt, 80-90°, PL, SO, SN, Iron
	Not monitored while coring			8			FR						CS, Clay, 5mm

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b>  casing used  barrel withdrawn <b>graphic log/core recovery</b>  core recovered - graphic symbols indicate material  no core recovered	<b>water</b>  10/1/98 water level on date shown  water inflow  partial drill fluid loss  complete drill fluid loss  water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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# Engineering Log - Cored Borehole

 Client: **THIESS PTY LTD**

 Date started: **3.9.2008**

Principal:

 Date completed: **3.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

 Logged by: **AVS**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

drill model & mounting: P160 Truck	Easting: 332700.969	slope: -90°	R.L. Surface: 88.46
hole diameter: 100 mm	Drilling fluid: Water	Northing: 6256260.024	bearing: datum: AHD

drilling information				material substance				rock mass defects								
method	core-lift	water	RL	depth metres	graphic log core recovery	material rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength				defect spacing mm		defect description type, inclination, planarity, roughness, coating, thickness		
								VL	L	M	H	VH	EH		D	A
NMLC				80		SHALE: Dark grey, interlaminated (10% fine sand), distinctly bedded between 0 - 5°. (continued)	FR									Jt, 20-40°, ST, RO, CN Jt, 20-40°, CU, SO-RO, CN Jt, 60-70°, PL, SO-RO, CN Jt, 60-70°, PL, SO-RO, CN Fractured Rock. Jt, 30-50°, UN-IR, 50-RO, CN
				79		SHALE: Dark grey to black, distinct bedding.										Jt, 30°, PL, SO, CN
				78												Jt, 70°, PL, SO, CN Jt, 50-60°, PL, SO-RO, CN Jt, 10-20°, PL, SO-RO, gravel SM, Clay, 4mm. SM, XW Shale, 3mm, 0°. SM, XW Shale, 3mm, 0°. SM, XW Shale, 2mm, 0°.
				77												Jt, 30-50°, PL, SO-RO, CN Jt, 10-30°, PL, SO-RN, CN SM, XW Shale, 2mm Jt, 10-20°, PL, SO-RO, CN Jt, 30-40°, PL, SO-RO, CN
				76												SM, 6mm, 0-5° Jt, 30-40°, PL, SO-RO, CN Jt, 20-30°, PL, SO, CN Jt, 40-50°, PL, SO, CN Fractured Rock
				75												SM, 0°, 4mm, clayey gravel Jt, 90°, PL, SO, CN
				74		SANDSTONE: Fine to medium grained, pale grey, sideritic laminae, flaser bedding.	MW									Jt, 60-70°, PL, SO, CN SM, 3mm, Clay, 0° SM 10mm - Gravelly Silt SM 10mm - Gravelly Silt Jt, 10-20°, UN, SO-RO, CN Seam of fine grained Sandy Clay 35mm.
				73		LAMINITE: SANDSTONE AND SHALE: 60% Shale, 40% fine grained Sandstone, interlaminated, flat bedded 0-5°.										Jt, 45-50°, UN, PL, CO, CN
				73		SANDSTONE: Medium grained, grey, massive.										
				73		LAMINITE: SANDSTONE AND SHALE: Grey to dark grey, thinly interbedded (35% Sandstone), Flat bedded 0-5°, some sideritic staining and laminae.										Jt, 30-40°, UN, PL, SO, CN
				73		Becoming 50% Sandstone.										
				73		Becoming cross bedded.										

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b> casing used barrel withdrawn <b>graphic log/core recovery</b> core recovered indicate material no core recovered	<b>water</b> 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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# Engineering Log - Cored Borehole

 Client: **THIESS PTY LTD**

 Date started: **3.9.2008**

Principal:

 Date completed: **3.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

 Logged by: **AVS**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

drill model & mounting: P160 Truck	Easting: 332700.969	slope: -90°	R.L. Surface: 88.46
hole diameter: 100 mm	Drilling fluid: Water	Northing: 6256260.024	bearing: datum: AHD

drilling information				material substance				rock mass defects						
method	core-lift	water	RL	depth metres	graphic log core recovery	material	weathering alteration	estimated strength				defect spacing mm	defect description	
								VL	L	M	H			EH
NMLC				72		Becoming 50% Sandstone. (continued)	MW							
				71		<b>SANDSTONE:</b> Fine to medium grained, pale grey, sidentic laminae, flat bedded.								
				70		<b>SANDSTONE:</b> Medium to coarse grained, pale grey sideritic laminae, cross bedded 20-30°, with rare carbonaceous beds.								
				69		30mm band of interlaminated Sandstone and Shale with rare carbonaceous laminae.								
				68		<b>SHALE:</b> Black, indistinct bedding.								
				67		<b>SANDSTONE:</b> Medium to coarse grained, pale grey, cross bedded 10-20°, Sideritic laminae.								
				66		<b>SANDSTONE:</b> Coarse grained, pale grey, massive.								
				65		<b>SANDSTONE:</b> Medium to coarse grained, pale grey, cross bedded 10-30°, Sideritic laminae with rare carbonaceous bands 2-5mm.								
				64										
				63										
				62										
				61										
				60										
				59										
				58										
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				9										
				8										
				7										
				6										
				5										
				4										
				3										
				2										
				1										
				0										

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b> casing used barrel withdrawn <b>graphic log/core recovery</b> core recovered - graphic symbols indicate material no core recovered	<b>water</b> 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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Job No. GEOTLCOV23589AA  
 BH205  
 DEPTH: 3.7m – 9m



drawn	MT		client: THIESS PTY LTD	
approved	DS		project: ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT, ST LEONARDS	
date	09/09/2008		title: ROCK CORE PHOTOGRAPH – BH205	
scale	Not to scale		project no: GEOTLCOV23589AA	
original size	A4		Photo no: BH205 1 of 3	



Job No. GEOTLCOV23589AA  
 BH205  
 DEPTH: 9m – 15m



drawn	MT		client: <b>THIESS PTY LTD</b>	
approved	DS		project: <b>ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT, ST LEONARDS</b>	
date	09/09/2008		title: <b>ROCK CORE PHOTOGRAPH – BH205</b>	
scale	Not to scale		project no: <b>GEOTLCOV23589AA</b>	
original size	A4		Photo no: <b>BH205 2 of 3</b>	



Job No. GEOTLCOV23589AA  
 BH205  
 DEPTH: 15m - 22m



drawn	MT		client: <b>THIESS PTY LTD</b>	
approved	DS		project: <b>ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT, ST LEONARDS</b>	
date	09/09/2008		title: <b>ROCK CORE PHOTOGRAPH - BH205</b>	
scale	Not to scale		project no: <b>GEOTLCOV23589AA</b>	
original size	A4		Photo no: <b>BH205 3 of 3</b>	

# Engineering Log - Borehole

 Client: **THIESS PTY LTD**

 Date started: **4.9.2008**

Principal:

 Date completed: **4.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

 Logged by: **AVS**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

drill model and mounting: P160 Truck	Easting: 332772.381	slope: -90°	R.L. Surface: 81.35
hole diameter: 100 mm	Northing 6256195.203	bearing:	datum: AHD

drilling information				material substance									
method	penetration	support	water	notes samples, tests, etc	RL	depth metres	graphic log	classification symbol	material	moisture condition	consistency/density index	pocket penetrometer	structure and additional observations
1 2 3									soil type: plasticity or particle characteristics, colour, secondary and minor components.			100 200 300 400 kPa	
Pothead		C			81	1			<b>CONCRETE SLAB</b> FILL: SILTY SAND: Fine to coarse grained, brown, some medium to coarse grained gravel.				FILL
			None observed while augering		80	2			SILTY CLAY: Medium to high plasticity, grey.	M			RESIDUAL SOIL
				SPT 3,7,12 N=19	79	3			SILTY CLAY: High plasticity, grey, orange, iron staining. Rare ironstone from 2.7m.		VSt	X	
					78				Borehole BH206 continued as cored hole				
					77	4							
					76	5							
					75	6							
					74	7							
						8							

<b>method</b> AS auger screwing* AD auger drilling* RR roller/tricone W washbore CT cable tool HA hand auger DT diatube B blank bit V V bit T TC bit *bit shown by suffix e.g. ADT	<b>support</b> M mud N nil C casing <b>penetration</b> 1 2 3 4  no resistance ranging to refusal <b>water</b> 10/1/98 water level on date shown water inflow water outflow	<b>notes, samples, tests</b> U <sub>50</sub> undisturbed sample 50mm diameter U <sub>63</sub> undisturbed sample 63mm diameter D disturbed sample N standard penetration test (SPT) N* SPT - sample recovered Nc SPT with solid cone V vane shear (kPa) P pressuremeter Bs bulk sample E environmental sample R refusal	<b>classification symbols and soil description</b> based on unified classification system <b>moisture</b> D dry M moist W wet Wp plastic limit W <sub>L</sub> liquid limit	<b>consistency/density index</b> VS very soft S soft F firm St stiff VSt very stiff H hard Fb friable VL very loose L loose MD medium dense D dense VD very dense
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# Engineering Log - Cored Borehole

 Client: **THIESS PTY LTD**

 Date started: **4.9.2008**

Principal:

 Date completed: **4.9.2008**

 Project: **ROYAL NORTH SHORE HOSPITAL REDEVELOPMENT**

 Logged by: **AVS**

 Borehole Location: **ST LEONARDS (SEE SITE PLAN)**

 Checked by: **PJW**

drill model & mounting: P160 Truck	Easting: 332772.381	slope: -90°	R.L. Surface: 81.35
hole diameter: 100 mm	Drilling fluid: Water	Northing: 6256195.203	bearing: datum: AHD

drilling information				material substance				rock mass defects						
method	core-lift	water	RL	depth metres	graphic log core recovery	material rock type; grain characteristics, colour, structure, minor components	weathering alteration	estimated strength				defect spacing mm	defect description type, inclination, planarity, roughness, coating, thickness	
								VL	L	M	H			VH
			80	2										
			79	3										
			78			Continued from non-cored borehole								
NMLC	Not monitored while coring		77	4		<b>SILTY CLAY:</b> High plasticity, white, indistinct bedding and some ironstone clasts. <b>SHALE:</b> Dark grey, indistinct bedding.	XW						Jt, 50-60°, PL, SO, Clay Fractured Shale	
			76	5		<b>SHALE:</b> Dark grey, flat bedded, between 0-10°, with rare sidentic bands.	HW				0.03 0.01	36	Fractured, XW Shale, ironband	
			75	6		<b>MUDSTONE:</b> High plasticity, pale grey, indistinct bedding with some iron staining.	XW						Jt, 60° Thinly laminated Shale and Sandstone bands	
			74	7		<b>SHALE AND SANDSTONE:</b> Fine to medium grained, pale grey, light grey, interlaminated at 0-5° (70% Shale, 30% Sandstone). <b>SANDSTONE:</b> Medium to coarse grained, pale grey, ironstained. <b>SHALE:</b> Dark grey, indistinct bedding. <b>SANDSTONE:</b> Fine to medium grained, grey, indistinct bedding, rare carbonaceous band.	HW				0.03 0.05	89	Fractured, XW Shale Fractured, XW Shale Jt, 20-30°, PL, SO-RO, SN iron PT Jt, 20-90°, ST, RO, SN iron Jt, 20-30°, ST, RO, SO iron	General: PT, 0-10°, PL, SO-RO, IRON
			73	8		<b>SANDSTONE:</b> Coarse grained, orange, brown, indistinct bedding. <b>SHALE AND SANDSTONE:</b> (70% Shale) Dark grey, pale grey, churned bedding.					0.26 0.29		Jt, 40-50°, PL, SO-RO, SN, iron	
				9		<b>INTERBEDDED SANDSTONE AND SHALE:</b> Medium to coarse grained. Sandstone is orange, Shale - pale grey. <b>SANDSTONE:</b> Medium to coarse grained, grey, crossbedded. BH206 terminated at 8m					0.56 1.02		Jt, 70-80°, PL-VN, RO-SN, IRON	

<b>method</b> DT diatube AS auger screwing AD auger drilling RR roller/tricone CB claw or blade bit NMLC NMLC core NQ, HQ, PQ wireline core	<b>core-lift</b> casing used barrel withdrawn <b>graphic log/core recovery</b> core recovered - graphic symbols indicate material no core recovered	<b>water</b> 10/1/98 water level on date shown water inflow partial drill fluid loss complete drill fluid loss water pressure test result (lugeons) for depth interval shown	<b>weathering</b> FR fresh SW slightly weathered MW moderately weathered HW highly weathered XW extremely weathered DW distinctly weathered (covers MW and HW) <b>strength</b> VL very low L low M medium H high VH very high EH extremely high	<b>defect type</b> JT joint PT parting SM seam SZ sheared zone SS sheared surface CS crushed seam <b>planarity</b> PL planar CU curved UN undulating ST stepped IR irregular <b>roughness</b> VR very rough RO rough SO smooth SL slickensided <b>coating</b> CN clean SN stained VN veneer CO coating
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