Jeffery and Katauskas Pty Ltd

CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS
ABN 17 003 550 801

AS/NZS ISO 9001 Certified
Davis Langdon Certification Services

PO BOX 976, NORTH RYDE BC NSW 1670
Tel: 02 9888 5000 • Fax: 02 9888 5003
Email: engineers@jkgroup.net.au

27 September 2010
Ref: 24287WHlet

Health Infrastructure
C/- Taylor Thomson Whitting
48 Chandos Street
ST LEONARDS NSW 2065

ATTENTION: Mr Darren Jeffree

Dear Sirs

PART 3A SUBMISSION FOR
PROPOSED SCH CLINICAL AND CAMHS INPATIENT UNIT
SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW

This letter confirms that Jeffery and Katauskas Pty Ltd have been commissioned by Health Infrastructure to carry out a geotechnical investigation for the proposed Sydney Childrens Hospital (SCH) Clinical and CAMHS Inpatient Unit at the above site. The proposed development comprises a multi-storey building, with moderate to high column loads expected.

A Stage 1 Preliminary Site Assessment was also carried out concurrently with the geotechnical investigation by Environmental Investigation Services (EIS), who are the environmental engineering consulting division of the Jeffery and Katauskas Group.

The final reports are currently being prepared and will be finalised once the laboratory test results have been received and are expected to be completed by mid-October 2010.

SCOPE OF WORK

The fieldwork for the geotechnical investigation was completed on 22 September 2010 and comprised the auger drilling of four boreholes (BH1 to BH4) to depths between 0.88m (BH4) and 5.72m (BH3) using our track mounted JK250 drill rig. These four boreholes were extended into the underlying sandstone bedrock using diamond coring techniques to final depths of between 4.00m (BH4) and 9.00m. A hand excavated test pit (TP5) was dug to a depth of 0.85m for the purpose of attempting to assess the existing footing detail and foundation materials of the existing adjacent building. A fifth borehole (BH6) was drilled to a refusal depth of 1.0m, using a hand auger. Dynamic Cone Penetrometer (DCP) tests were carried out adjacent to TP5 and BH5 (ie. DCP5 and DCP6 to refusal depths of 3.35m and 1.68m, respectively). The 'Draft' borehole logs, TP5 cross sectional sketch and DCP test results are attached, along with Figure 1, which presents a 'Test Location Plan'.

SUMMARY OF RESULTS

The site may be subdivided into two portions. The upper portion comprises the existing carpark and landscaped gardens at about RL56m which is just below the existing walkway floor level. The upper portion forms an 'L' shape across the western and northern sides.

The lower portion comprises the part of the footpath and driveway areas sloping down from Hospital Road, which forms the western site boundary, to the loading dock area at about RL51m. There are sandstone outcrops evident at the base of the block retaining wall which supports the upper portion of the site.

In summary, the boreholes encountered pavements and shallow fill overlying aeolian sands with weathered sandstone bedrock either inferred or encountered at shallow to moderate depth. The sands were found to be of loose to medium dense relative density. BH1, BH2 and BH3 encountered the sandstone bedrock at depths varying from about 3.4m (BH2 at RL52.6m) to 5.1m (BH3 at RL50.9m), which are consistent

with the outcrops at the base of the retaining wall. These outcrops were assessed to be of at least medium strength. At BH4 located in the lower portion, the sandstone was encountered at 0.5m depth below the pavement. The sandstone has been assessed to be of Low to Moderate rock strengths subject to confirmation by point load index strength tests. The augered portions of the boreholes were 'dry' during drilling.

ASSESSMENT OF SITE CONDITIONS

Based on the investigation results and our site observations, we consider that the proposed development is feasible for the subject site from a geotechnical perspective, provided the comments and recommendations to be outlined in our forthcoming geotechnical report are adopted in their entirety. Due to expected moderate to high column loads and relatively shallow sandstone bedrock, our advice will be to support the proposed new building on piled and pad footings (depending on location) which will be taken down to, and uniformly supported by, the underlying sandstone bedrock. Conventional design and construction will be suitable.

Provided the building is supported by footings within the underlying bedrock, we consider that the likelihood of site instability will be 'Rare' to 'Barely Credible' with an associated 'Low' to 'Very Low' risk to life and property (using the qualitative terminology in AGS 2007c), which would be considered to be acceptable in accordance with the recommendations in AGS 2007c.

Should you require any further information regarding the above please do not hesitate to contact the undersigned.

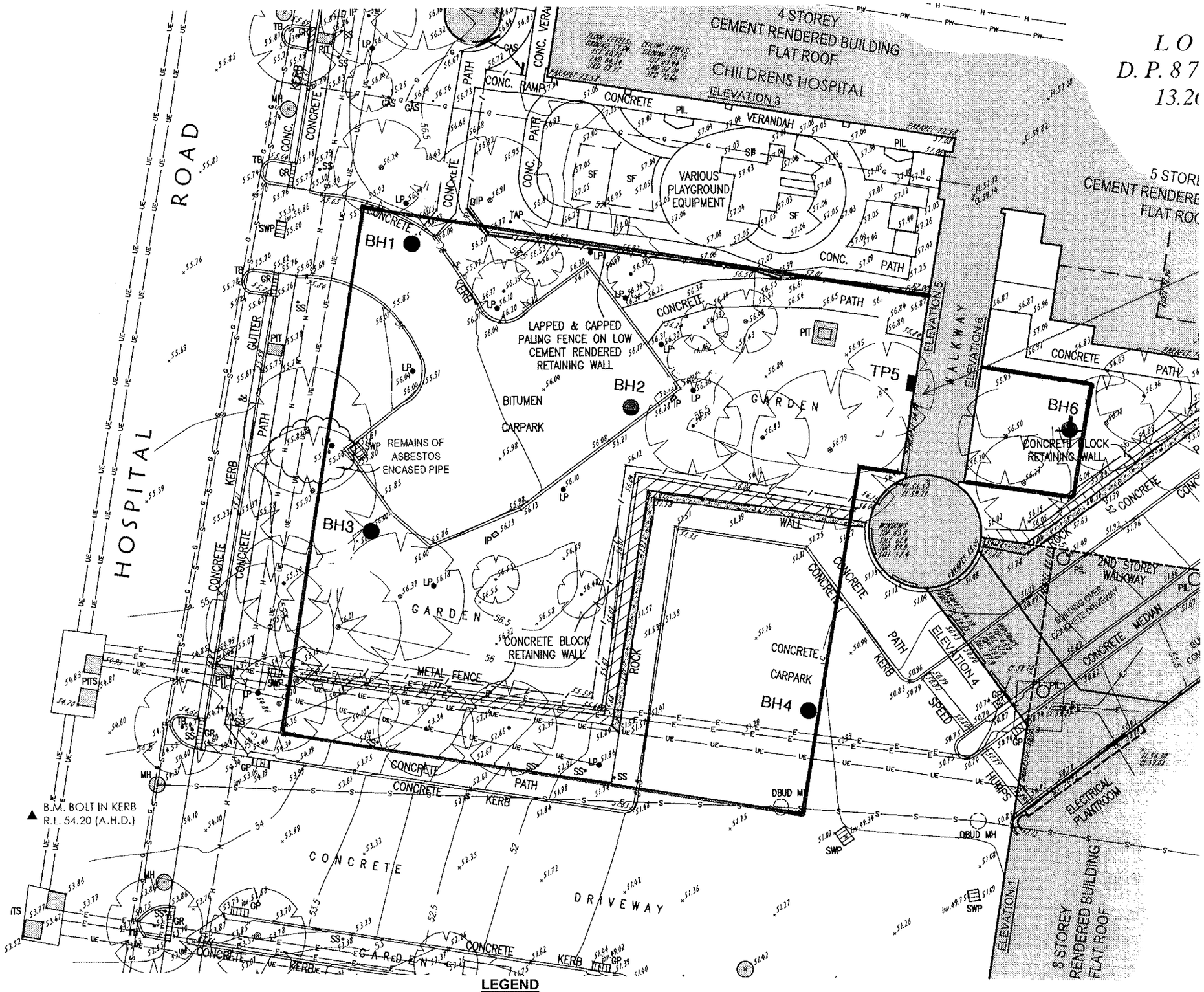
Yours faithfully
For and on behalf of
JEFFERY AND KATAUSKAS PTY LTD

A HULSKAMP
Associate

Reviewed by:

B F WALKER
Principal.

Enclosed: Figure 1: Test Location Plan
'Draft' Borehole Logs, BH1 to BH4 and BH6
Field TP5 Cross Sectional Sketch.
AGS 2007c: *'Practice Note Guidelines for Landslide Risk Management'*, Australian Geomechanics, Vol 42, No 1, March 2007, pp63-114.



LEGEND

- Borehole
- Hand Augered Borehole & DCP Test
- Test Pit & DCP Test

SCALE (m)

0 12.5

TEST LOCATION PLAN

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL & ENVIRONMENTAL ENGINEERS

Report No. 24287WH **Figure No. 1**

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

DRAFT

Borehole No. 1
1/2

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SCH CLINICAL SERVICES AND CAMHS INPATIENT UNIT

Location: SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW

Job No. 24287WH
Date: 22-9-10

Method: SPIRAL AUGER
JK250

Logged/Checked by: A.P.C./

R.L. Surface: ≈ 55.8m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION OF AUGERING					N = 11 5,6,5	0			ASPHALTIC CONCRETE: 50mm.t over FILL: Silty sandy gravel, fine to coarse grained, grey, igneous.	D			
								SM	SILTY SAND: fine to coarse grained, brown, with a trace of ash.	M	MD	-	AEOLIAN
ON COMPLETION OF CORING					N = 12 5,6,6	1		SP	SAND: fine to coarse grained, yellow brown.				
					N = 22 8,10,12	2							
						3							
					SPT 5/100mm REFUSAL	4		-	SANDSTONE: fine to coarse grained, grey, with iron indurated laminae. REFER TO CORED BOREHOLE LOG	DW	L	-	MODERATE TO HIGH 'TC' BIT RESISTANCE
						5							
						6							
						7							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

CORED BOREHOLE LOG

DRAFT

Borehole No. 1 2/2

Client: HEALTH INFRASTRUCTURE
Project: PROPOSED SCH CLINICAL SERVICES AND CAMHS INPATIENT UNIT
Location: SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW

Job No. 24287WH | **Core Size:** NMLC | **R.L. Surface:** ≈ 55.8m
Date: 22-9-10 | **Inclination:** VERTICAL | **Datum:** AHD
Drill Type: JK250 | **Bearing:** - | **Logged/Checked by:** A.P.C./

Water Loss/Level	Barrel Lift	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, structure, minor components.)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_S(50)$ (EL VL L M H VH EH)	DEFECT DETAILS: DEFECT SPACING (mm) (600 300 100 50 30 10)	DEFECT DETAILS: DESCRIPTION (Type, inclination, thickness, planarity, roughness, coating.) Specific / General
		4		START CORING AT 4.65m					
				CORE LOSS 0.130m					
75% RET-URN		5		SANDSTONE: fine to coarse grained, orange brown.	DW	L			- J, 80°, Un, R
				SANDSTONE: fine to coarse grained, grey, with iron indurated bands.	SW-DW				- J, 20°, P, HEALED
		6		SANDSTONE: fine to coarse grained, grey, with ironstained cross bedding.	DW				
		7		SANDSTONE: fine to coarse grained, grey.	FR-SW	L-M			
				END OF BOREHOLE AT 7.71m					
		8							
		9							
		10							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

Borehole No. 2 1/2

BOREHOLE LOG

DRAFT

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SCH CLINICAL SERVICES AND CAMHS INPATIENT UNIT

Location: SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW

Job No. 24287WH **Method:** SPIRAL AUGER JK250 **R.L. Surface:** ≈ 56.0m

Date: 22-9-10 **Datum:** AHD

Logged/Checked by: A.P.C./

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION OF AUGERING					N = 9 6,5,4	0			ASPHALTIC CONCRETE: 25mm.t over FILL: Silty sandy gravel, fine to coarse grained, grey, igneous.	D			
									FILL: Silty sand, fine to coarse grained, light grey, with sub angular to sub rounded sandstone gravel.	M			APPEARS MODERATELY COMPACTED
					N = 9 4,4,5	1		SP	SAND: fine to coarse grained, yellow brown.	M	L	-	AEOLIAN
▼ ON COMPLETION OF CORING					N > 16 5,6,9/ 140mm	2					MD		
					REFUSAL	3		-	SANDSTONE: fine to coarse grained, grey yellow brown.	SW	L	-	LOW 'TC' BIT RESISTANCE
									REFER TO CORED BOREHOLE LOG				
						4							
						5							
						6							
						7							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

Borehole No. **2** 2/2

CORED BOREHOLE LOG

DRAFT

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SCH CLINICAL SERVICES AND CAMHS INPATIENT UNIT

Location: SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW

Job No. 24287WH **Core Size:** NMLC **R.L. Surface:** ≈ 56.0m

Date: 22-9-10 **Inclination:** VERTICAL **Datum:** AHD

Drill Type: JK250 **Bearing:** - **Logged/Checked by:** A.P.C./

Water Loss/Level	Barrel Lift	Depth (m)	Graphic Log	CORE DESCRIPTION Rock Type, grain characteristics, colour, structure, minor components.	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_S(50)$ EL VL L M H VH EH	DEFECT DETAILS DEFECT SPACING (mm) 600 300 100 60 30 10	DESCRIPTION Type, inclination, thickness, planarity, roughness, coating. Specific / General
		3		START CORING AT 3.46m					
NO RETURN		4		SANDSTONE: grey, with iron indurated laminae.	DW	L			
				CORE LOSS 0.06m	SW-DW	L-M			
				SANDSTONE: fine to coarse grained, grey.					
		5		SANDSTONE: fine to coarse grained, grey, with iron indurated laminae, bedded at 10°.			DRAFT		
		6		END OF BOREHOLE AT 6.46m					
		7							
		8							
		9							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

DRAFT

Borehole No. 3 1/2

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SCH CLINICAL SERVICES AND CAMHS INPATIENT UNIT

Location: SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW

Job No. 24287WH **Method:** SPIRAL AUGER JK250 **R.L. Surface:** ≈ 56.0m

Date: 18-9-10 **Datum:** AHD

Logged/Checked by: A.P.C./

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■					0			FILL: Silty sand, fine to coarse grained, brown, with fine to coarse grained angular and sub angular igneous and sandstone gravel and root fibres.				
								SM	SILTY SAND: fine to coarse grained, orange brown.	M	-	-	
				■	N = 8 3,4,4	1			SILTY SAND: fine to coarse grained, light grey.				
						2			as above, but yellow brown.				
				■	N = 17 6,7,10	3							
				■	N = 22 10,10,12	4							
						5		-	SANDSTONE: fine to coarse grained.	-	-	-	LOW 'TC' BIT RESISTANCE MODERATE RESISTANCE
						6			REFER TO CORED BOREHOLE LOG				
						7							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

Borehole No. **3** 2/2

CORED BOREHOLE LOG

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SCH CLINICAL SERVICES AND CAMHS INPATIENT UNIT

Location: SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW

Job No. 24287WH **Core Size:** NMLC **R.L. Surface:** ≈ 56.0m

Date: 18-9-10 **Inclination:** VERTICAL **Datum:** AHD

Drill Type: JK250 **Bearing:** - **Logged/Checked by:** A.P.C./

Water Loss/Level	Barrel Lift	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, structure, minor components.)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_S(50)$ (EL VL L M H VH EH)	DEFECT DETAILS: DEFECT SPACING (mm) (500 300 100 50 30 10)	DEFECT DETAILS: DESCRIPTION (Type, inclination, thickness, planarity, roughness, coating.) Specific / General
		5		START CORING AT 5.72m					
				CORE LOSS 0.14m					
75% RET-URN		6		SANDSTONE: fine to coarse grained, grey, with ironstaining.	DW	L-M			
		7		SANDSTONE: fine to coarse grained, grey, with cross bedding.	SW-FR	L-M			
		8							
		9		END OF BOREHOLE AT 9.0m					
		10							
		11							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

Borehole No. **4** 1/2

BOREHOLE LOG

DRAFT

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SCH CLINICAL SERVICES AND CAMHS INPATIENT UNIT

Location: SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW

Job No. 24287WH **Method:** SPIRAL AUGER JK250 **R.L. Surface:** ≈ 51.1m

Date: 18-9-10 **Datum:** AHD

Logged/Checked by: A.P.C./

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
ON COMPLETION OF CORING	■			■		0			CONCRETE: 200mm.t				8mm DIAMETER REINFORCEMENT, 30 & 50mm TOP COVER
								-	FILL: Silty sand, fine to coarse grained, dark grey, with fine to coarse grained angular and sub angular igneous gravel, concrete, brick and tile fragments and with a trace of root fibres.	D	-	-	
				■				-		DW	L		MODERATE TO HIGH RESISTANCE
						1			SANDSTONE: fine to coarse grained grey red brown.				
									REFER TO CORED BOREHOLE LOG				
						2							
						3							
						4							
						5							
						6							
						7							

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

Borehole No. 4 2/2

CORED BOREHOLE LOG

DRAFT

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SCH CLINICAL SERVICES AND CAMHS INPATIENT UNIT

Location: SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW

Job No. 24287WH **Core Size:** NMLC **R.L. Surface:** ≈ 51.1m

Date: 18-9-10 **Inclination:** VERTICAL **Datum:** AHD

Drill Type: JK250 **Bearing:** - **Logged/Checked by:** A.P.C./

Water Loss/Level	Barrel Lift	Depth (m)	Graphic Log	CORE DESCRIPTION (Rock Type, grain characteristics, colour, structure, minor components.)	Weathering	Strength	POINT LOAD STRENGTH INDEX $I_S(50)$ EL VL L M H VH EH	DEFECT SPACING (mm) 500 300 100 50 30 10	DEFECT DETAILS: DESCRIPTION Type, inclination, thickness, planarity, roughness, coating. Specific / General
		0		START CORING AT 0.88m					
80% RET-URN		1		SANDSTONE: fine to coarse grained, grey red brown.	DW	L			
				CORE LOSS 0.08m	DW	L-M			
				SANDSTONE: fine to coarse grained, grey red brown.					
		2		SANDSTONE: fine to coarse grained, orange brown and red brown.					
				CORE LOSS 0.3m					
				SANDSTONE: fine to coarse grained, orange brown, red brown, with organic deposits.	DW	L-M			
		3		CORE LOSS 0.15m					
				SANDSTONE: fine to coarse grained, orange brown, red brown, with organic deposits.	DW	L-M			- Be, 0-5°, Un, R
		4		END OF BOREHOLE AT 4.00m					
		5							
		6							
		7							

DRAFT

Jeffery and Katauskas Pty Ltd
CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

BOREHOLE LOG

DRAFT

Borehole No. 6
1/1

Client: HEALTH INFRASTRUCTURE

Project: PROPOSED SCH CLINICAL SERVICES AND CAMHS INPATIENT UNIT

Location: SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW

Job No. 24287WH
Date: 22-9-10

Method: SPIRAL AUGER
JK250

Logged/Checked by: A.P.C./

R.L. Surface: ≈ 56.4m
Datum: AHD

Groundwater Record	SAMPLES ES	SAMPLES U50	SAMPLES DB	SAMPLES DS	Field Tests	Depth (m)	Graphic Log	Unified Classification	DESCRIPTION	Moisture Condition/ Weathering	Strength/ Rel. Density	Hand Penetrometer Readings (kPa.)	Remarks
DRY ON COMPLETION	■			■	REFER TO DCP TEST RESULTS	0			FILL: Silty sand, fine to coarse grained, brown, with fine to coarse grained sandstone and igneous gravel, concrete and timber fragments and roots and root fibres.	D M			
						1			FILL: Silty sand, fine to coarse grained, yellow brown, with fine to coarse grained sandstone and igneous gravel, and a trace of slag and roots. END OF BOREHOLE AT 1.0m				
						2							
						3							
						4							
						5							
						6							
						7							

Jeffery and Katauskas Pty Ltd

CONSULTING GEOTECHNICAL AND ENVIRONMENTAL ENGINEERS

DRAFT

DYNAMIC CONE PENETRATION TEST RESULTS

Client:	HEALTH INFRASTRUCTURE		
Project:	PROPOSED SCH CLINICAL SERVICES AND CAMHS INPATIENT UNIT		
Location:	SYDNEY CHILDRENS HOSPITAL, HOSPITAL ROAD, RANDWICK, NSW		
Job No.	24287WH	Hammer Weight & Drop:	9kg/510mm
Date:	22-9-10	Rod Diameter:	16mm
Tested By:	A.P.C.	Point Diameter:	20mm

Number of Blows per 100mm Penetration

Test Location	RL ~56.8m	RL ~56.4m		Test Location			
Depth (mm)	**5**	**6**		Depth (mm)	**5**		
0 - 100	2	SUNK		3000-3100	11		
100 - 200	1	2		3100-3200	12		
200 - 300	3	3		3200-3300	14		
300 - 400	2	5		3300-3400	12/50mm		
400 - 500	1	1		3400-3500	REFUSAL		
500 - 600	2	1		3500-3600			
600 - 700	1	2		3600-3700			
700 - 800	1	3		3700-3800			
800 - 900	2	6		3800-3900			
900 - 1000	1	8		3900-4000			
1000 - 1100	2	15		4000-4100			
1100 - 1200	3	12		4100-4200			
1200 - 1300	4	14		4200-4300			
1300 - 1400	3	16		4300-4400			
1400 - 1500	5	19		4400-4500			
1500 - 1600	4	12		4500-4600			
1600 - 1700	3	15/80mm		4600-4700			
1700 - 1800	4	REFUSAL		4700-4800			
1800 - 1900	3			4800-4900			
1900 - 2000	4			4900-5000			
2000 - 2100	6			5000-5100			
2100 - 2200	8			5100-5200			
2200 - 2300	6			5200-5300			
2300 - 2400	5			5300-5400			
2400 - 2500	8			5400-5500			
2500 - 2600	8			5500-5600			
2600 - 2700	9			5600-5700			
2700 - 2800	9			5700-5800			
2800 - 2900	10			5800-5900			
2900 - 3000	10			5900-6000			

Remarks:
1. The procedure used for this test is similar to that described in AS1289.6.3.2-1997, Method 6.3.2.
2. Usually 8 blows per 20mm is taken as refusal
3. Survey datum is AHD.

Test pit 5
Section A-A
Looking North

APC
24287GH
22/09/10

DRAFT