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Our Ref: PSM3759-005L

30 July 2019

Carmichael Tompkins Property Group Pty Ltd
28/2 Chifley Square
SYDNEY NSW 2000

gcarmichael@pepper.com.au

Attention: Greg Carmichael

Dear Greg

RE: KAMBALA GIRLS HIGH, ROSE BAY, NSW
ADDITIONAL GEOTECHNICAL INVESTIGATION

1. Introduction

This letter presents the logs of boreholes drilled on 11 and 12 July 2019 by Pells Sullivan Meynink (PSM) at Kambala Girls School, Rose Bay, NSW. PSM has previously undertaken a geotechnical investigation at the site on 8 and 9 January 2019 and this is reported in geotechnical investigation report (Ref. PSM3759-002L dated 29 January 2019). Figure 1 presents a locality plan of the site.

The work was completed in accordance with the PSM proposal dated 9 April 2019 (Ref. PSM3759-003L), as approved by email on 14 June 2019.

Prior to the work, PSM was supplied with the following documents:

- Allen Jack + Cottier Architects drawings and sketches “Kambala Sports Precinct Summary”.
- Allen Jack + Cottier Architects drawings SK_181130-1 and SK_181130-2 “Site Plan and Sections”.
- RPS Group survey plan sheets 1 – 7.
- Douglas Partners Geotechnical Report (Ref. 37034.04), dated June 2012 (Douglas Partners Report).

2. Geotechnical Investigation

2.1 Fieldwork

The fieldwork was undertaken on 11 and 12 July 2019 under the full-time supervision of a PSM geotechnical engineer who undertook the following tasks:

- Directing the testing locations and drilling
- Preparing engineering logs of the materials encountered
- Conducting point load testing on recovered rock samples

Prior to testing, on-site service location “scans” were undertaken by a service locator in the presence of a PSM geotechnical engineer to assess if the locations were free from buried utilities.

A total of six (6) boreholes were drilled using 1.3 tonne a track mounted drill rig. Track-mats were used while moving and operating the rig to minimise ground disturbance. All boreholes (BH101 to BH106) were first augered to V-bit refusal and some continued with a TC-bit in rock until refusal. NMLC coring techniques were undertaken in bedrock. The boreholes were terminated at depths between 7.0 m and 7.46 m from the existing ground surface. Appendix A presents geotechnical engineering borehole logs.

The test locations were specified by others; the locations were recorded with a hand-held GPS unit with a horizontal accuracy of approximately +/- 5 m. Figure 1 presents the test locations. The existing ground levels at the borehole locations were based on the survey plan provided by Allen Jack + Cottier Architects.

At the completion of the fieldwork, the boreholes were backfilled with excavated spoil and sand and lightly tamped with a shovel. Figures 2 and 3 present selected photos of the fieldwork.

2.2 Testing

Point load tests on the core were performed at approximately one metre intervals. Results are tabulated in Appendix B.

2.3 Groundwater

We noted that the cuttings were wet at the following locations and depths from the ground surface:

- BH101 – 4.0 m
- BH103 – 1.5 m
- BH104 – 1.2 m
- BH105 – 2.5 m
- BH106 – 3.3 m

Water ponding was observed at the base of BH104 prior to rock coring. Water within the soil layers was further observed within SPT samples, refer to Figure 3 photo 4. This is consistent with our previous investigation on 8 and 9 November 2018 in which water was observed in four different holes at depths of 0.8 m to 5.2 m from the ground surface (Ref. PSM3759-002L).

Please note that based on the Douglas Partners Report (Ref. 37034.04), no ground water was observed within the depth of augering. This suggests a variability of the groundwater conditions on the site.

Partial water loss of drilling water was observed during rock coring in BH103, BH105 and BH106. This occurs when open defects are encountered during the coring procedure.

3. General

If at any time, the conditions are found to vary from those described in this report, further advice should be sought.

Should there be any queries, please do not hesitate to contact the undersigned.

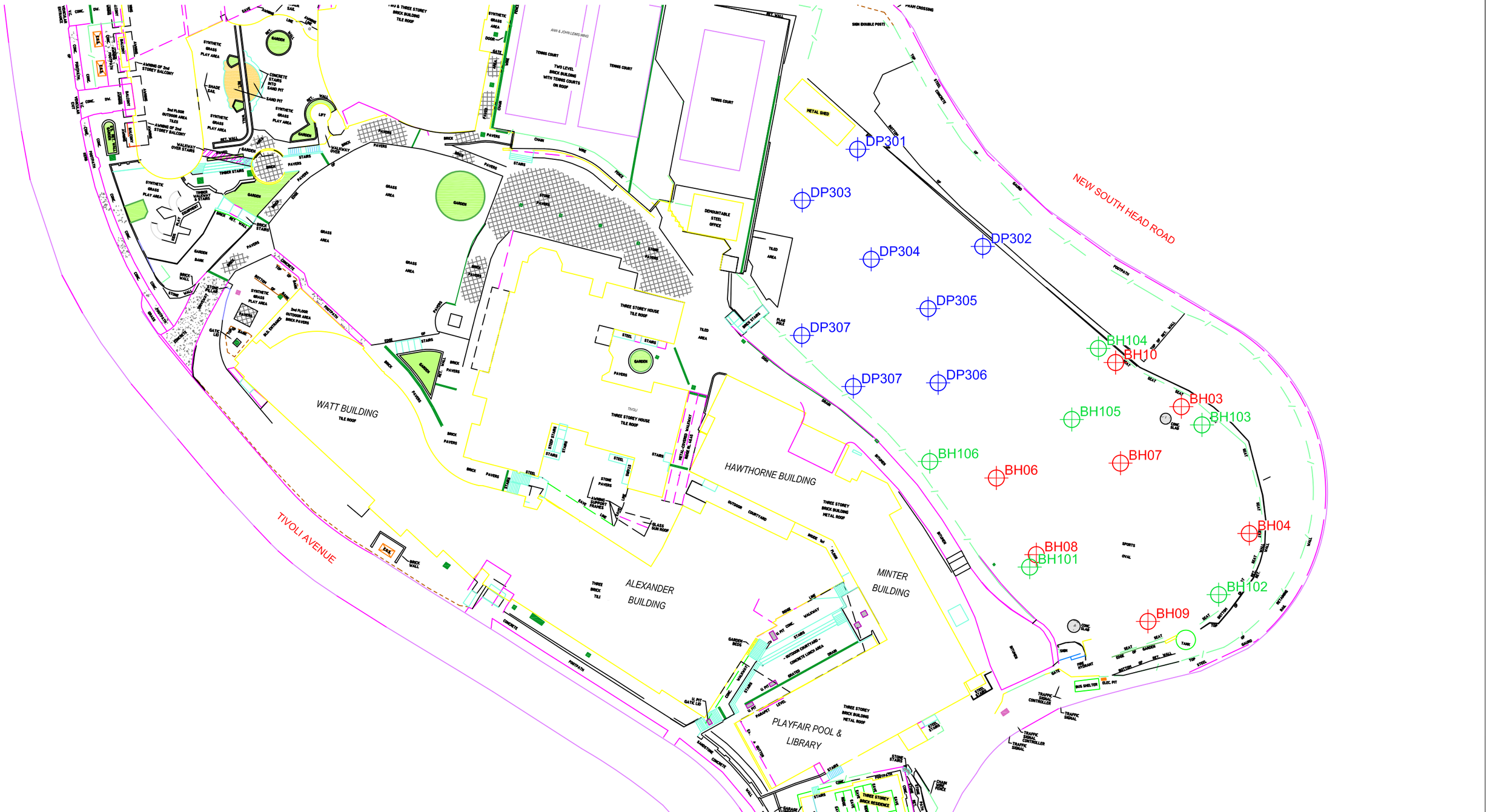
For and on behalf of
PELLS SULLIVAN MEYNINK

MATIAS BRAGA
GEOTECHNICAL ENGINEER

GARRY MOSTYN
PRINCIPAL

Encl.

Figure 1	Locality Plan
Figure 2	Selected Site Photographs (1 of 2)
Figure 3	Selected Site Photographs (2 of 2)
Appendix A	Engineering Borehole Logs
Appendix B	Geotechnical and Analytical Laboratory Testing Results



LEGEND:

- PREVIOUS PSM BOREHOLE LOCATION (BH)
  (REFERENCE: PSM3759-002L)
- DOUGLAS PARTNERS BOREHOLE LOCATION (DP)
  (REFERENCE : DOUGLAS PARTNERS REPORT 37034.04)
- ADDITIONAL PSM BOREHOLE LOCATION (BH)

REFERENCE DRAWING : CAD FILE G219SW A02a

0 10 20 30 40 50

Scale(m)
1:1000 @ A4

PSM

Carmichael Tompkins Property Group Pty Ltd
Kambala Girls School
794 New South Head Rd, Rose Bay

BOREHOLE LOCALITY
SITE PLAN

PSM3759-005L	Figure 1

Photo 1 - General site condtions and service locating (11/07/2019)

Photo 2 - Soil profile of BH105 (11/07/2019)

Carmichael Tompkins Property Group Pty Ltd	
Kambala Girls School	
794 New South Head Rd, Rose Bay	
SELECTED SITE PHOTOGRAPHS (1 of 2)	
PSM3759-005L	**Figure 2**

Pells Sullivan Meynink

Photo 3 - Fill from BH106, rig set-up with track mats (11/07/2019)

Photo 4 - Standard Pennetration Test displaying groundwater in BH103 (12/07/2019)

Carmichael Tompkins Property Group Pty Ltd

Kambala Girls School

794 New South Head Rd, Rose Bay

SELECTED SITE PHOTOGRAPHS (2 of 2)

Pells Sullivan Meynink

PSM3759-005L	Figure 3

Appendix A
Engineering Borehole Logs

Borehole ID

BH101

Page 1 of 3

Engineering Log - Non Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	12/07/2019
Project Name:	Kambala Girls School	Completed:	12/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340210.0 m E 6251444.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.30 m		
Hole Diameter:	80 mm	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Hand Penetrometer UCS (kPa) 100 200 300 400 500	Structure, Zoning, Origin, Additional Observations
AD/V		N							OL	Silty SAND: medium grained, dark brown; grass and roots.				0.00: TOPSOIL 0.05: FILL
										Silty SAND trace gravel: medium grained, dark brown and grey; gravel angular up to 20 mm.				
				SPT - 2, 2, 1 N = 3 0.50 m		38.3	1							0.50: SPT recovery 450 mm.
										Silty SAND: fine to medium grained, yellow brown and grey.				
				SPT - 1, 0, 2 N = 2 2.00 m		37.3	2				M	VL		2.00: SPT recovery 450 mm.
						36.3	3			Becomes dark brown.				
				SPT 2, 2, 2 N = 4 3.50 m					SM	Silty SAND: fine to medium grained, dark brown and grey.				3.50: SPT recovery 150 mm. 3.51: Inferred residual.
			12/07/19			35.3	4				W			

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger Screwing

Penetration
No resistance
Refusal

Water
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Non Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	12/07/2019
Project Name:	Kambala Girls School	Completed:	12/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340210.0 m E 6251444.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.30 m		
Hole Diameter:	80 mm	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information								Soil Description						Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Hand Penetrometer UCS (kPa) 100 200 300 400 500	Structure, Zoning, Origin, Additional Observations
AD/V		N		SPT - Refusal 5.00 m					SM	Silty SAND: fine to medium grained, dark brown and grey. *(continued)*	W	VL		5.00: SPT recovery 260 mm. 5.25: SPT - refusal.
										Continued on cored borehole sheet				
						33.3	6							
						32.3	7							
						31.3	8							
						30.3	9							

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger Screwing

Penetration
No resistance
Refusal

Water
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	12/07/2019
Project Name:	Kambala Girls School	Completed:	12/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340210.0 m E 6251444.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.30 m		
Barrel Type and Length:	NMLC - 1.5 m	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information / Rock Substance / Rock Mass Defects

Column headings: Method | Water | RQD (%) | Samples and Field Tests | WPT (Lugeons) | RL (m) | Depth (m) | Graphic Log | Material Description (ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration) | Weathering (XW HW MW SW FR) | Strength Is(50) (● - Axial, ○ - Diametral; VL 0.1 L 0.3 M 1 H 3 VH 10 EH) | Defect Spacing (mm) (<20 60 200 600 1000) | Defect Descriptions / Comments (Description, alpha/beta, infilling or coating, shape, roughness, thickness, other)

Method: NMLC

RQD (%): 68; 99

RL (m)	Depth (m)
33.3	6
32.3	7
31.3	8
30.3	9

Samples and Field Tests:
- Is(50) d=0.2 a=0.2 MPa
- Is(50) d=1.3 a=1.4 MPa
- Is(50) d=0.7 a=0.6 MPa

Material Description:
- Continued from non-cored borehole sheet
- SANDSTONE: medium to coarse grained, orange and yellow grey, poorly-developed to developed bedding, thinly bedded, inclined up to 6°.
- Becomes dark grey with carbonatious bedding.
- Becomes light grey.
- Bedding inclined at 10°.
- Hole Terminated at 7.36 m

Defect Descriptions / Comments:
- BP, 5°, KL, PR, VR
- BP, 5°, KL, PR, VR
- BP, 5°, FE SN, IR, VR
- BP, 5°, FE SN, PR, VR
- BP, 5°, CL, PR, S
- BP, 5°, FE SN, PR, VR
- BP, 5°, FE SN, PR, RF
- BP, 0°, KL, IR, VR
- BP, 5°, FE SN, PR, VR
- BP, 5°, KL, PR, VR
- BP, 10°, KL, PR, VR
- BP, 10°, X VN, IR, VR

Legend

Method
- AD/T - Auger drilling TC bit
- AD/V - Auger drilling V bit
- WB - Washbore
- HQ3- Wireline core (63.5 mm)
- PQ3- Wireline core (85.0 mm)
- SPT- Standard penetration test
- PT - Push tube
- WPT - Water pressure test

Water
- Inflow
- Partial Loss
- Complete Loss

Graphic Log/Core Loss
- Core recovered (hatching indicates material)
- No core recovery

Weathering
- XW - Extremely Weathered
- HW - Highly Weathered
- MW - Moderately Weathered
- SW - Slightly Weathered
- FR - Fresh

Strength
- VL - Very Low
- L - Low
- M - Medium
- H - High
- VH - Very High
- EH - Extremely High

Defect Type
- FT - Fault
- SS - Shear Surface
- SZ - Shear Zone
- BP - Bedding parting
- SM - Seam
- IS - Infilled Seam
- JT - Joint
- CO - Contact
- CZ - Crushed Zone
- VN - Vein
- FZ - Fracture Zone
- BSH - Bedding Shear
- DB - Drilling Break

Infilling/Coating
- CN - Clean
- SN - Stain
- VN - Veneer
- CO - Coating
- RF - Rock fragments
- G - Gravel
- S - Sand
- Z - Silt
- CA - Calcite
- CL - Clay
- FE - Iron
- QZ - Quartz
- X - Carbonaceous

Roughness
- SL - Slickensided
- POL - Polished
- S - Smooth
- RF - Rough
- VR - Very Rough

Shape
- PR - Planar
- CU - Curved
- UN - Undulating
- ST - Stepped
- IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Pells Sullivan Meynink

Carmichael Tompkins Property Group Pty Ltd	
Kambala Girls School	
794 New South Head Rd, Rose Bay	
CORE PHOTO BH101	
(PHOTO 1 OF 1)	
PSM3759-005L	**Figure A1**

Borehole ID

BH102

Page 1 of 3

Engineering Log - Non Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	12/07/2019
Project Name:	Kambala Girls School	Completed:	12/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340244.0 m E 6251440.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.70 m		
Hole Diameter:	80 mm	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information								***Soil Description***				***Observations***
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Hand Penetrometer UCS (kPa) 100 200 300 400 500	Structure, Zoning, Origin, Additional Observations
AD/V		N	Not Encountered	SPT - 3, 4, 3, N = 7 0.50 m		38.7	1		OL	Silty SAND: fine to medium grained, dark brown,.				0.00: TOPSOIL 0.05: FILL
										Silty SAND: fine grained, dark brown and grey.				
										Becomes mostly grey.				0.50: Recovery 430 mm.
										Silty SAND: fine grained, orange brown.	M	VL		
										Becomes yellow-orange.				
				SPT - Refusal 2.00 m		37.7	2							2.00: Recovery 100 mm. 2.10: SPT - refusal.
										Continued on cored borehole sheet				
						36.7	3							
						35.7	4							

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger Screwing

Penetration
No resistance
Refusal

Water
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	12/07/2019
Project Name:	Kambala Girls School	Completed:	12/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340244.0 m E 6251440.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.70 m		
Barrel Type and Length:	NMLC - 1.5 m	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information							***Rock Substance***			***Rock Mass Defects***	
Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering XW HW MW SW FR	Strength Is(50) ● - Axial ○ - Diametral VL 0.1 L 0.3 M 1 H 3 VH 10 EH	Defect Spacing (mm) <20 60 200 600 1000	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
					38.7	1						
					37.7	2		Continued from non-cored borehole sheet				
NMLC	Not Encountered	100	Is(50) d=0.3 a=0.6 MPa		36.7	3		SANDSTONE: medium to coarse grained, orange brown, poorly developed bedding.				BP, 0°, FE SN, PR, RF
												BP, 0°, FE SN, PR, VR
								No core, 100 mm loss.				BP, 0°, FE SN, PR, VR
		77										SM, 0°, CL, PR, S, 5 mm BP, 0°, FE SN, PR, VR BP, 0°, FE SN, PR, VR BP, 0°, FE SN, PR, VR BP, 0°, FE SN, PR, VR BP, 0°, FE SN, PR, VR
			Is(50) d=1.1 a=0.9 MPa		35.7	4		SANDSTONE: medium grained, pale grey, developed bedding, laminated.				
		92	Is(50) d=1.4 a=1 MPa					Becomes inclined up to 10°.				BP, 0°, KL, PR, VR BP, 0°, KL, PR, VR

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
HQ3- Wireline core (63.5 mm)
PQ3- Wireline core (85.0 mm)
SPT- Standard penetration test
PT - Push tube
WPT - Water pressure test

Water
Inflow
Partial Loss
Complete Loss

Graphic Log/Core Loss
Core recovered (hatching indicates material)
No core recovery

Weathering
XW - Extremely Weathered
HW - Highly Weathered
MW - Moderately Weathered
SW - Slightly Weathered
FR - Fresh

Strength
VL - Very Low
L - Low
M - Medium
H - High
VH - Very High
EH - Extremely High

Defect Type
FT - Fault
SS - Shear Surface
SZ - Shear Zone
BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

Infilling/Coating
CN - Clean
SN - Stain
VN - Veneer
CO - Coating
RF - Rock fragments
G - Gravel
S - Sand
Z - Silt
CA - Calcite
CL - Clay
FE - Iron
QZ - Quartz
X - Carbonaceous

Roughness
SL - Slickensided
POL - Polished
S - Smooth
RF - Rough
VR - Very Rough

Shape
PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	12/07/2019
Project Name:	Kambala Girls School	Completed:	12/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340244.0 m E 6251440.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.70 m		
Barrel Type and Length:	NMLC - 1.5 m	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information							***Rock Substance***				***Rock Mass Defects***	
Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering XW HW MW SW FR	Strength Is(50) ● - Axial ○ - Diametral VL L M H VH EH 0.1 0.3 1 3 10	Defect Spacing (mm) <20 60 200 600 1000	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
NMLC	Not Encountered	92						SANDSTONE: medium grained, pale grey, developed bedding, laminated.*(continued)*				
								Carbonaceous inclusions up to 6.0 m.				
			Is(50) d=1.7 a=1 MPa		33.7	6		Shale clast 50 mm. Becoming horizontally bedded.				BP, 10°, X VN, PR, VR CO, 10°, CL VN, CU, S CO, 15°, CL VN, CU, S
		92						SANDSTONE: medium to coarse grained, orange brown, developed bedding, thinly bedded, inclined up to 10°.				BP, 0°, X VN, PR, S SM, 0°, CL, PR, S, 20 mm BP, 0°, KL, PR, RF
			Is(50) d=0.5 a=0.7 MPa		32.7	7		Becomes bedded with carbonaceous bands.				
								Hole Terminated at 7.45 m				
					31.7	8						
					30.7	9						

Method
- AD/T - Auger drilling TC bit
- AD/V - Auger drilling V bit
- WB - Washbore
- HQ3- Wireline core (63.5 mm)
- PQ3- Wireline core (85.0 mm)
- SPT- Standard penetration test
- PT - Push tube
- WPT - Water pressure test

Water
- Inflow
- Partial Loss
- Complete Loss

Graphic Log/Core Loss
- Core recovered (hatching indicates material)
- No core recovery

Weathering
- XW - Extremely Weathered
- HW - Highly Weathered
- MW - Moderately Weathered
- SW - Slightly Weathered
- FR - Fresh

Strength
- VL - Very Low
- L - Low
- M - Medium
- H - High
- VH - Very High
- EH - Extremely High

Defect Type
- FT - Fault
- SS - Shear Surface
- SZ - Shear Zone
- BP - Bedding parting
- SM - Seam
- IS - Infilled Seam
- JT - Joint
- CO - Contact
- CZ - Crushed Zone
- VN - Vein
- FZ - Fracture Zone
- BSH - Bedding Shear
- DB - Drilling Break

Infilling/Coating
- CN - Clean
- SN - Stain
- VN - Veneer
- CO - Coating
- RF - Rock fragments
- G - Gravel
- S - Sand
- Z - Silt
- CA - Calcite
- CL - Clay
- FE - Iron
- QZ - Quartz
- X - Carbonaceous

Roughness
- SL - Slickensided
- POL - Polished
- S - Smooth
- RF - Rough
- VR - Very Rough

Shape
- PR - Planar
- CU - Curved
- UN - Undulating
- ST - Stepped
- IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Pells Sullivan Meynink

Carmichael Tompkins Property Group Pty Ltd

Kambala Girls School

794 New South Head Rd, Rose Bay

CORE PHOTO BH102

(PHOTO 1 OF 1)

PSM3759-005L	**Figure A2**

Borehole ID

BH103

Engineering Log - Non Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	12/07/2019
Project Name:	Kambala Girls School	Completed:	12/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340243.0 m E 6251469.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.70 m		
Hole Diameter:	80 mm	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information								Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Hand Penetrometer UCS (kPa) 100 200 300 400 500	Structure, Zoning, Origin, Additional Observations
AD/V		N	12/07/19	SPT - 2, 3, 3, N = 6 0.50 m		38.7	1		OL	Silty SAND: medium grained, dark brown; roots and grass.				0.00: TOPSOIL 0.05: FILL
										Silty SAND: medium grained, pale orange brown.	M			0.50: Recovery 450 mm.
										Silty SAND: medium grained, dark brown.	W	L		
				SPT - 3, 6, 10, 2.00 m		37.7	2							2.00: Recovery 350 mm.
										Continued on cored borehole sheet				2.34: SPT refusal.
						36.7	3							
						35.7	4							

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger Screwing

Penetration
No resistance
Refusal

Water
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	12/07/2019
Project Name:	Kambala Girls School	Completed:	12/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340243.0 m E 6251469.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.70 m		
Barrel Type and Length:	NMLC - 1.5 m	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information							***Rock Substance***			***Rock Mass Defects***	
Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering XW HW MW SW FR	Strength Is(50) ● - Axial ○ - Diametral VL 0.1 L 0.3 M 1 H 3 VH 10 EH	Defect Spacing (mm) <20 60 200 600 1000	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
NMLC	◁	88	Is(50) d=1 a=0.8 MPa		38.7	1						
					37.7	2		Continued from non-cored borehole sheet				
								No core, 110 mm.				SM, 0°, CL CO, PR, RF, 10 mm
								SANDSTONE: medium to coarse grained, orange brown and pale grey, developed bedding, thinly bedded, trace gravel, bedding inclined up to 5°.				BP, 0°, KL, PR, RF BP, 0°, KL, IR, RF BP, 5°, FE SN, PR, RF
					36.7	3		Becomes pale grey.				BP, 0°, FE SN, PR, RF BP, 5°, X VN, PR, RF
		97	Is(50) d=0.7 a=0.7 MPa		35.7	4		SANDSTONE: medium grained, pale grey, developed to well-developed bedding, laminated.				BP, 0°, KL, PR, RF BP, 0°, KL, PR, RF
		93	Is(50) d=0.8 a=1.7 MPa									

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
HQ3- Wireline core (63.5 mm)
PQ3- Wireline core (85.0 mm)
SPT- Standard penetration test
PT - Push tube
WPT - Water pressure test

Water
Inflow
Partial Loss
Complete Loss

Graphic Log/Core Loss
Core recovered (hatching indicates material)
No core recovery

Weathering
XW - Extremely Weathered
HW - Highly Weathered
MW - Moderately Weathered
SW - Slightly Weathered
FR - Fresh

Strength
VL - Very Low
L - Low
M - Medium
H - High
VH - Very High
EH - Extremely High

Defect Type
FT - Fault
SS - Shear Surface
SZ - Shear Zone
BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

Infilling/Coating
CN - Clean
SN - Stain
VN - Veneer
CO - Coating
RF - Rock fragments
G - Gravel
S - Sand
Z - Silt
CA - Calcite
CL - Clay
FE - Iron
QZ - Quartz
X - Carbonaceous

Roughness
SL - Slickensided
POL - Polished
S - Smooth
RF - Rough
VR - Very Rough

Shape
PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	12/07/2019
Project Name:	Kambala Girls School	Completed:	12/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340243.0 m E 6251469.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.70 m	
Barrel Type and Length:	NMLC - 1.5 m	Bearing:		Datum:	AHD	Operator: BM

Drilling Information							Rock Substance						Rock Mass Defects	
Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering XW HW MW SW FR	Strength Is(50) ● - Axial ○ - Diametral VL 0.1 L 0.3 M 1 H 3 VH 10 EH	Defect Spacing (mm) <20 60 200 600 1000	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
NMLC		93			33.7	6		SANDSTONE: medium grained, pale grey, developed to well-developed bedding, laminated.*(continued)* Becomes thinly bedded and inclined up to 10° at 5.02 m.				BP, 10°, KL, PR, RF BP, 10°, KL, PR, RF
			Is(50) d=0.9 a=1.7 MPa					Becomes horizontally bedded.				BP, 10°, FE SN, PR, RF
		81						Becomes inclined up to 5°.				BP, 0°, KL, PR, RF BP, 0°, CL, PR, S
			Is(50) d=0.1 a=0.1 MPa		32.7	7		SANDSTONE: medium grained, pale grey to dark red brown, poorly developed bedding. No core, 30 mm.				SM, 0°, CL VN, PR, S SM, 0°, Fe & Clay VN, PR, S SM, 0°, Fe & Clay VN, PR, S BP, 0°, FE SN, PR, RF BP, 0°, FE SN, PR, RF
					31.7	8		Hole Terminated at 7.08 m				
					30.7	9						

Method

AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
HQ3- Wireline core (63.5 mm)
PQ3- Wireline core (85.0 mm)
SPT- Standard penetration test
PT - Push tube

WPT - Water pressure test

Water

Inflow
Partial Loss
Complete Loss

Graphic Log/Core Loss

Core recovered (hatching indicates material)
No core recovery

Weathering

XW - Extremely Weathered
HW - Highly Weathered
MW - Moderately Weathered
SW - Slightly Weathered
FR - Fresh

Strength

VL - Very Low
L - Low
M - Medium
H - High
VH - Very High
EH - Extremely High

Defect Type

FT - Fault
SS - Shear Surface
SZ - Shear Zone
BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

Infilling/Coating

CN - Clean
SN - Stain
VN - Veneer
CO - Coating
RF - Rock fragments
G - Gravel
S - Sand
Z - Silt
CA - Calcite
CL - Clay
FE - Iron
QZ - Quartz
X - Carbonaceous

Roughness

SL - Slickensided
POL - Polished
S - Smooth
RF - Rough
VR - Very Rough

Shape

PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Pells Sullivan Meynink

Carmichael Tompkins Property Group Pty Ltd

Kambala Girls School

794 New South Head Rd, Rose Bay

CORE PHOTO BH103

(PHOTO 1 OF 1)

PSM3759-005L	**Figure A3**

Borehole ID

BH104

Engineering Log - Non Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	11/07/2019
Project Name:	Kambala Girls School	Completed:	11/07/2019
Hole Location:	Rose Bay	Logged By:	MB
Hole Position:	346228.0 m E 6251481.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.80 m		
Hole Diameter:	80 mm	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information							Soil Description					Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Hand Penetrometer UCS (kPa) 100 200 300 400 500	Structure, Zoning, Origin, Additional Observations
AD/V		N		SPT - 4, 8, 9, N = 17 0.50 m		38.8	1		OL	Silty SAND: medium to coarse grained, dark brown.				0.00: TOPSOIL 0.05: FILL
										Silty SAND: medium grained, dark orange brown.		L		
										Silty SAND: medium grained, red brown and yellow brown.	M			0.50: SPT recovery 450 mm.
										Sandstone fragments up to 40 mm, sub rounded, extremely weathered, loose.		MD		
AD/T		N	11/07/19	SPT refusal 1.20 m						SANDSTONE: coarse grained, red-brown, extremely weathered.	W	D		1.20: V-Bit refusal 1.21: SPT recovery 100 mm. 1.30: TC-Bit refusal.
										Continued on cored borehole sheet				
						37.8	2							
						36.8	3							
						35.8	4							

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger Screwing

Penetration
No resistance
Refusal

Water
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	11/07/2019
Project Name:	Kambala Girls School	Completed:	11/07/2019
Hole Location:	Rose Bay	Logged By:	MB
Hole Position:	346228.0 m E 6251481.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting: CE180 Track | Inclination: -90° | RL Surface: 39.80 m
Barrel Type and Length: NMLC - 1.5 m | Bearing: | Datum: AHD | Operator: BM

Drilling Information							Rock Substance				Rock Mass Defects	
Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering XW HW MW SW FR	Strength Is(50) ● - Axial ○ - Diametral VL 0.1 L 0.3 M 1 H 3 VH 10 EH	Defect Spacing (mm) <20 60 200 600 1000	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
					38.8	1		Continued from non-cored borehole sheet				
NMLC		100	Is(50) d=0.4 a=0.5 MPa		37.8	2		SANDSTONE: medium to coarse grained, orange brown, developed bedding, laminated. Becomes inclined up to 20°.				BP, 20°, X, PR, RF
		98	Is(50) d=1 a=0.9 MPa Is(50) d=1.3 a=1.3 MPa		36.8	3		SANDSTONE: medium to coarse grained, grey, developed to well-developed bedding, laminated.				BP, 5°, X, IR, RF SM, 5°, X, PR, S, 5 mm SM, 0°, X, PR, S, 2 mm
		97	Is(50) d=0.9 a=1 MPa		35.8	4		No core, 50 mm. Some gravel up to 5 mm, sub rounded.				SM, 5°, CL, PR, S, 3 mm

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
HQ3- Wireline core (63.5 mm)
PQ3- Wireline core (85.0 mm)
SPT- Standard penetration test
PT - Push tube
WPT - Water pressure test

Water
Inflow
Partial Loss
Complete Loss

Graphic Log/Core Loss
Core recovered (hatching indicates material)
No core recovery

Weathering
XW - Extremely Weathered
HW - Highly Weathered
MW - Moderately Weathered
SW - Slightly Weathered
FR - Fresh

Strength
VL - Very Low
L - Low
M - Medium
H - High
VH - Very High
EH - Extremely High

Defect Type
FT - Fault
SS - Shear Surface
SZ - Shear Zone
BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

Infilling/Coating
CN - Clean
SN - Stain
VN - Veneer
CO - Coating
RF - Rock fragments
G - Gravel
S - Sand
Z - Silt
CA - Calcite
CL - Clay
FE - Iron
QZ - Quartz
X - Carbonaceous

Roughness
SL - Slickensided
POL - Polished
S - Smooth
RF - Rough
VR - Very Rough

Shape
PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	11/07/2019
Project Name:	Kambala Girls School	Completed:	11/07/2019
Hole Location:	Rose Bay	Logged By:	MB
Hole Position:	346228.0 m E 6251481.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.80 m		
Barrel Type and Length:	NMLC - 1.5 m	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information							***Rock Substance***				***Rock Mass Defects***	
Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering XW HW MW SW FR	Strength Is(50) ● - Axial ○ - Diametral VL L M H VH EH 0.1 0.3 1 3 10	Defect Spacing (mm) <20 60 200 600 1000	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
NMLC		97	Is(50) d=1.2 a=1.5 MPa		33.8	6		Becomes thinly laminated.				
		94	Is(50) d=0.8 a=1.2 MPa		32.8	7		SANDSTONE: coarse grained, orange brown, developed bedding. SANDSTONE: medium to coarse grained, grey, developed bedding.				BP, 0°, FE SN, PR, RF BP, 0°, FE SN, PR, RF
					31.8	8		Hole Terminated at 7.00 m				
					30.8	9						

Method

AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
HQ3- Wireline core (63.5 mm)
PQ3- Wireline core (85.0 mm)
SPT- Standard penetration test
PT - Push tube

WPT - Water pressure test

Water

Inflow
Partial Loss
Complete Loss

Graphic Log/Core Loss

Core recovered (hatching indicates material)
No core recovery

Weathering

XW - Extremely Weathered
HW - Highly Weathered
MW - Moderately Weathered
SW - Slightly Weathered
FR - Fresh

Strength

VL - Very Low
L - Low
M - Medium
H - High
VH - Very High
EH - Extremely High

Defect Type

FT - Fault
SS - Shear Surface
SZ - Shear Zone
BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

Infilling/Coating

CN - Clean
SN - Stain
VN - Veneer
CO - Coating
RF - Rock fragments
G - Gravel
S - Sand
Z - Silt
CA - Calcite
CL - Clay
FE - Iron
QZ - Quartz
X - Carbonaceous

Roughness

SL - Slickensided
POL - Polished
S - Smooth
RF - Rough
VR - Very Rough

Shape

PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Pells Sullivan Meynink

Carmichael Tompkins Property Group Pty Ltd

Kambala Girls School

794 New South Head Rd, Rose Bay

CORE PHOTO BH104

(PHOTO 1 OF 1)

PSM3759-005L	Figure A4

Borehole ID

BH105

Engineering Log - Non Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	11/07/2019
Project Name:	Kambala Girls School	Completed:	11/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340219.0 m E 6251470.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.70 m		
Hole Diameter:	80 mm	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information								Soil Description				Observations
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Hand Penetrometer UCS (kPa) 100 200 300 400 500	Structure, Zoning, Origin, Additional Observations
AD/V		N	12/07/19	SPT - 2, 2, 3, N = 5 0.50 m		38.7	1		OL	Silty SAND: medium grained, dark brown; grass and roots.				0.00: TOPSOIL 0.05: FILL
										SAND: fine to medium grained, dark brown-grey.	M	VL		0.50: SPT recovery 420 mm.
										SAND: medium grained, pale grey.				
				SPT - 1, 2, 2, N = 4 2.00 m		37.7	2			Becomes yellow brown.				2.00: SPT recovery 150 mm.
									SM	Silty SAND: medium grained, orange brown.	W			2.50: Inferred residual.
						36.7	3			Continued on cored borehole sheet				2.75: V-Bit refusal
						35.7	4							

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger Screwing

Penetration
No resistance
Refusal

Water
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	11/07/2019
Project Name:	Kambala Girls School	Completed:	11/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340219.0 m E 6251470.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting: CE180 Track | Inclination: -90° | RL Surface: 39.70 m

Barrel Type and Length: NMLC - 1.5 m | Bearing: | Datum: AHD | Operator: BM

Drilling Information							Rock Substance				Rock Mass Defects	
Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering XW HW MW SW FR	Strength Is(50) ● - Axial ○ - Diametral VL 0.1 L 0.3 M 1 H 3 VH 10 EH	Defect Spacing (mm) <20 60 200 600 1000	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
					38.7	1						
					37.7	2		Continued from non-cored borehole sheet				
NMLC					36.7	3		SANDSTONE: medium to coarse grained, dark red-brown and orange, poorly developed bedding, massive.				BP, 0°, FE SN, PR, VR BP, 0°, FE SN, IR, VR BP, 0°, FE SN, IR, VR
								No core 180 mm.				SM, 0°, CL, PR, S, 20 mm
								SANDSTONE: coarse grained, orange-brown, poorly developed bedding, trace gravel and clay.				BP, 0°, FE SN, PR, RF BP, 0°, FE SN, PR, VR
		65	Is(50) d=3.3 a=2.7 MPa					SANDSTONE: medium to coarse grained, orange-brown and pale grey, poorly-developed to developed, thinly laminated.				BP, 0°, FE SN, PR, VR BP, 0°, FE SN, PR, RF BP, 5°, FE SN, PR, RF BP, 5°, CL CO, PR, S, 2 mm BP, 5°, FE SN, PR, RF
					35.7	4		Trace sub-angular gravel up to 5 mm.				
		99	Is(50) d=1.1 a=0.9 MPa					SANDSTONE: medium grained, pale grey and dark grey, well-developed bedding, thinly laminated to laminated.				BP, 0°, FE SN, PR, RF

Method

AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
HQ3- Wireline core (63.5 mm)
PQ3- Wireline core (85.0 mm)
SPT- Standard penetration test
PT - Push tube

WPT - Water pressure test

Water

Inflow
Partial Loss
Complete Loss

Graphic Log/Core Loss

Core recovered (hatching indicates material)
No core recovery

Weathering

XW - Extremely Weathered
HW - Highly Weathered
MW - Moderately Weathered
SW - Slightly Weathered
FR - Fresh

Strength

VL - Very Low
L - Low
M - Medium
H - High
VH - Very High
EH - Extremely High

Defect Type

FT - Fault
SS - Shear Surface
SZ - Shear Zone
BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

Infilling/Coating

CN - Clean
SN - Stain
VN - Veneer
CO - Coating
RF - Rock fragments
G - Gravel
S - Sand
Z - Silt
CA - Calcite
CL - Clay
FE - Iron
QZ - Quartz
X - Carbonaceous

Roughness

SL - Slickensided
POL - Polished
S - Smooth
RF - Rough
VR - Very Rough

Shape

PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	11/07/2019
Project Name:	Kambala Girls School	Completed:	11/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340219.0 m E 6251470.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.70 m	
Barrel Type and Length:	NMLC - 1.5 m	Bearing:		Datum:	AHD	Operator: BM

Drilling Information							Rock Substance					Rock Mass Defects	
Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering XW HW MW SW FR	Strength Is(50) ● - Axial ○ - Diametral VL L M H VH EH 0.1 0.3 1 3 10	Defect Spacing (mm) <20 60 200 600 1000	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
NMLC		99	Is(50) d=1.2 a=1 MPa		33.7	6		SANDSTONE: medium grained, pale grey and dark grey, well-developed bedding, thinly laminated to laminated.*(continued)*				BP, 0°, CL VN, PR, S BP, 0°, CL VN, PR, S BP, 0°, X VN, PR, RF
		87	Is(50) d=1.5 a=0.5 MPa					No core 150 mm.				
					32.7	7		Becomes inclined up to 10°.				BP, 10°, CL VN, PR, S
			Is(50) d=0.6 a=1 MPa					SANDSTONE: medium grained, orange brown, poorly-developed to developed bedding, thinly laminated.				BP, 0°, FE SN, PR, RF BP, 0°, FE SN, PR, RF BP, 0°, FE SN, PR, RF
					31.7	8		Hole Terminated at 7.46 m				
					30.7	9						

Method
- AD/T - Auger drilling TC bit
- AD/V - Auger drilling V bit
- WB - Washbore
- HQ3- Wireline core (63.5 mm)
- PQ3- Wireline core (85.0 mm)
- SPT- Standard penetration test
- PT - Push tube
- WPT - Water pressure test

Water
- Inflow
- Partial Loss
- Complete Loss

Graphic Log/Core Loss
- Core recovered (hatching indicates material)
- No core recovery

Weathering
- XW - Extremely Weathered
- HW - Highly Weathered
- MW - Moderately Weathered
- SW - Slightly Weathered
- FR - Fresh

Strength
- VL - Very Low
- L - Low
- M - Medium
- H - High
- VH - Very High
- EH - Extremely High

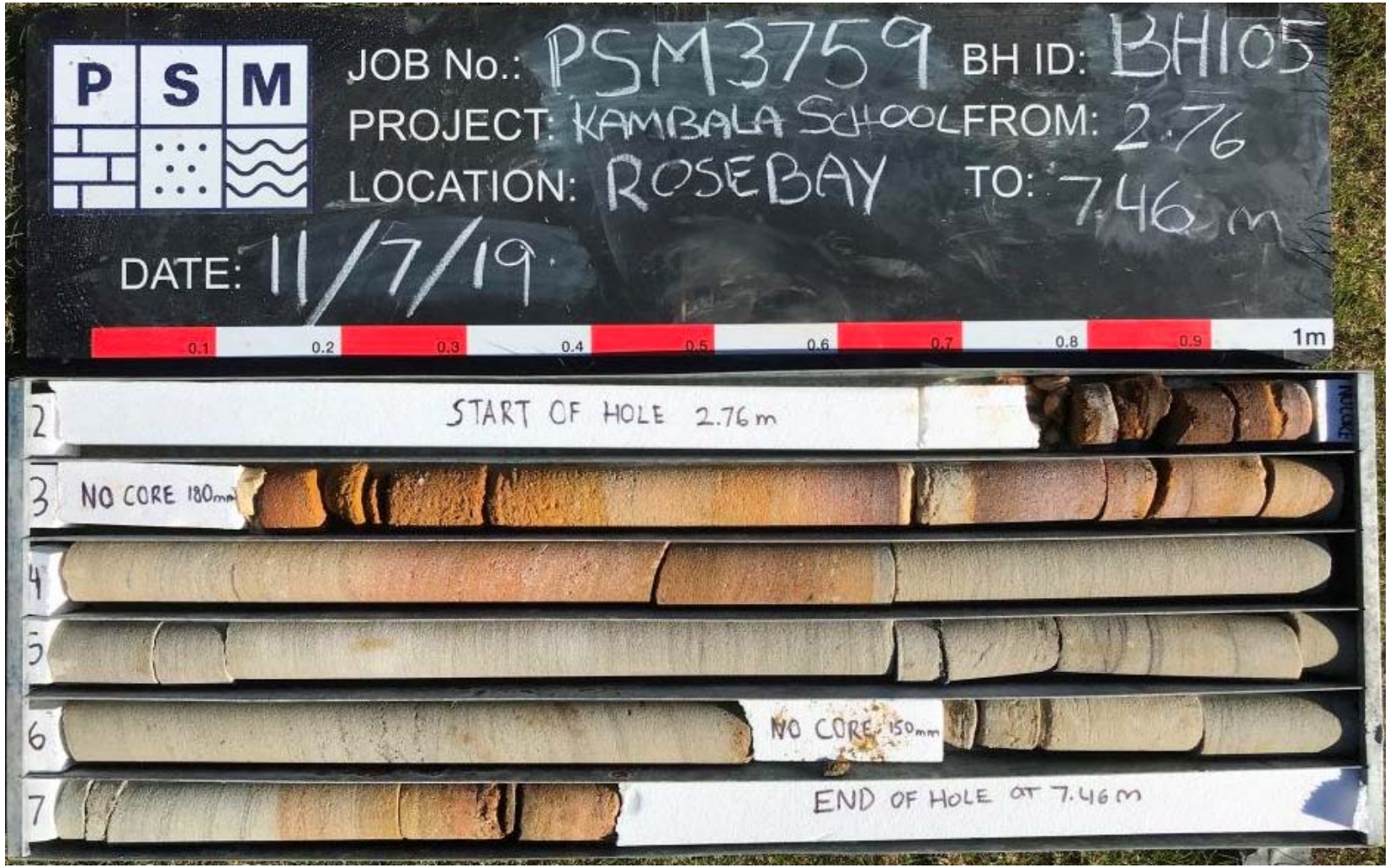
Defect Type
- FT - Fault
- SS - Shear Surface
- SZ - Shear Zone
- BP - Bedding parting
- SM - Seam
- IS - Infilled Seam
- JT - Joint
- CO - Contact
- CZ - Crushed Zone
- VN - Vein
- FZ - Fracture Zone
- BSH - Bedding Shear
- DB - Drilling Break

Infilling/Coating
- CN - Clean
- SN - Stain
- VN - Veneer
- CO - Coating
- RF - Rock fragments
- G - Gravel
- S - Sand
- Z - Silt
- CA - Calcite
- CL - Clay
- FE - Iron
- QZ - Quartz
- X - Carbonaceous

Roughness
- SL - Slickensided
- POL - Polished
- S - Smooth
- RF - Rough
- VR - Very Rough

Shape
- PR - Planar
- CU - Curved
- UN - Undulating
- ST - Stepped
- IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations



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Carmichael Tompkins Property Group Pty Ltd

Kambala Girls School

794 New South Head Rd, Rose Bay

CORE PHOTO BH105

(PHOTO 1 OF 1)

PSM3759-005L	**Figure A5**

Borehole ID

BH106

Engineering Log - Non Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	11/07/2019
Project Name:	Kambala Girls School	Completed:	11/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340202.0 m E 6251463.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.40 m		
Hole Diameter:	80 mm	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information								***Soil Description***				***Observations***
Method	Penetration	Support	Water	Samples Tests Remarks	Recovery	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations	Moisture Condition	Consistency / Relative Density	Hand Penetrometer UCS (kPa) 100 200 300 400 500	Structure, Zoning, Origin, Additional Observations
AD/V		N	11/07/19	SPT - 2, 3, 3, N = 6 0.50 m		38.4	1		OL	Silty SAND: medium grained, dark brown; grass and roots.				0.00: TOPSOIL 0.05: FILL
										Silty SAND: medium grained, dark brown.				0.50: SPT recovery 400 mm.
										Silty SAND: fine to medium grained, dark brown and grey.	M	L		
				SPT - 2, 1, 2, N = 3 2.00 m		37.4	2							2.00: SPT recovery 450 mm.
						36.4	3					VL		
									SM	Silty SAND: fine to medium grained, orange-brown.	W			3.30: Inferred residual.
						35.4	4			Continued on cored borehole sheet				3.61: V-Bit refusal

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger Screwing

Penetration
No resistance
Refusal

Water
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

Moisture Condition
D - Dry
M - Moist
W - Wet

Consistency/Relative Density
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	11/07/2019
Project Name:	Kambala Girls School	Completed:	11/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340202.0 m E 6251463.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.40 m		
Barrel Type and Length:	NMLC - 1.5 m	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information							***Rock Substance***				***Rock Mass Defects***	
Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering XW HW MW SW FR	Strength Is(50) ● - Axial ○ - Diametral VL 0.1 L 0.3 M 1 H 3 VH 10 EH	Defect Spacing (mm) <20 60 200 600 1000	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
					38.4	1						
					37.4	2						
					36.4	3		Continued from non-cored borehole sheet				
NMLC		28	Is(50) d=0.7 a=0.3 MPa		35.4	4		SANDSTONE: medium to coarse grained, red-brown and pale grey, poorly developed bedding.				BP, 0°, FE SN, PR, RF BP, 0°, FE SN, PR, RF BP, 0°, CL VN, PR, S BP, 0°, KL, PR, RF SM, 0°, CL CO, PR, S, 10 mm
		91										BP, 0°, CL VN, PR, S BP, 0°, CL VN, PR, S BP, 0°, FE SN, PR, RF BP, 5°, FE SN, PR, RF BP, 5°, KL, PR, RF BP, 5°, KL, PR, RF
								No core 130 mm.				BP, 0°, FE SN, PR, RF

Method

AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
HQ3- Wireline core (63.5 mm)
PQ3- Wireline core (85.0 mm)
SPT- Standard penetration test
PT - Push tube

WPT - Water pressure test

Water

Inflow
Partial Loss
Complete Loss

Graphic Log/Core Loss

Core recovered (hatching indicates material)
No core recovery

Weathering

XW - Extremely Weathered
HW - Highly Weathered
MW - Moderately Weathered
SW - Slightly Weathered
FR - Fresh

Strength

VL - Very Low
L - Low
M - Medium
H - High
VH - Very High
EH - Extremely High

Defect Type

FT - Fault
SS - Shear Surface
SZ - Shear Zone
BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

Infilling/Coating

CN - Clean
SN - Stain
VN - Veneer
CO - Coating
RF - Rock fragments
G - Gravel
S - Sand
Z - Silt
CA - Calcite
CL - Clay
FE - Iron
QZ - Quartz
X - Carbonaceous

Roughness

SL - Slickensided
POL - Polished
S - Smooth
RF - Rough
VR - Very Rough

Shape

PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM3759

Client:	Carmichael Tompkins Property Group Pty Ltd	Commenced:	11/07/2019
Project Name:	Kambala Girls School	Completed:	11/07/2019
Hole Location:	Rose Bay	Logged By:	LR
Hole Position:	340202.0 m E 6251463.0 m N MGA94 Zone 56	Checked By:	AS

Drill Model and Mounting:	CE180 Track	Inclination:	-90°	RL Surface:	39.40 m		
Barrel Type and Length:	NMLC - 1.5 m	Bearing:		Datum:	AHD	Operator:	BM

Drilling Information							***Rock Substance***			***Rock Mass Defects***	
Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Graphic Log	Material Description ROCK NAME: particle/grain characteristics, colour, fabric/texture, inclusions or minor components, moisture, mineral composition, alteration	Weathering XW HW MW SW FR	Strength Is(50) ● - Axial ○ - Diametral VL 0.1 L 0.3 M 1 H 3 VH 10 EH	Defect Spacing (mm) <20 60 200 600 1000	Defect Descriptions / Comments Description, alpha/beta, infilling or coating, shape, roughness, thickness, other
NMLC		91	Is(50) d=0.5 a=0.7 MPa		33.4	6		SANDSTONE: medium grained, pale grey and orange, developed bedding, thinly laminated, dark grey banding.*(continued)*				BP, 0°, FE SN, PR, RF BP, 0°, CL VN, PR, S
		59	Is(50) d=1.3 a=0.4 MPa					Becomes dark red brown.				BP, 0°, FE SN, UN, RF
								No core 410 mm.				BP, 0°, FE SN, UN, RF BP, 0°, FE SN, PR, RF
												BP, 0°, FE SN, IR, RF
			Is(50) d=0.5 a=0.4 MPa		32.4	7		Becomes pale grey. Becomes dark red-brown.				SM, 5°, Fe & Clay, PR, S, 15 mm BP, 0°, FE SN, PR, VR
					31.4	8		Hole Terminated at 7.21 m				BP, 0°, KL, IR, VR
					30.4	9						

Method
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
HQ3- Wireline core (63.5 mm)
PQ3- Wireline core (85.0 mm)
SPT- Standard penetration test
PT - Push tube
WPT - Water pressure test

Water
Inflow
Partial Loss
Complete Loss

Graphic Log/Core Loss
Core recovered (hatching indicates material)
No core recovery

Weathering
XW - Extremely Weathered
HW - Highly Weathered
MW - Moderately Weathered
SW - Slightly Weathered
FR - Fresh

Strength
VL - Very Low
L - Low
M - Medium
H - High
VH - Very High
EH - Extremely High

Defect Type
FT - Fault
SS - Shear Surface
SZ - Shear Zone
BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

Infilling/Coating
CN - Clean
SN - Stain
VN - Veneer
CO - Coating
RF - Rock fragments
G - Gravel
S - Sand
Z - Silt
CA - Calcite
CL - Clay
FE - Iron
QZ - Quartz
X - Carbonaceous

Roughness
SL - Slickensided
POL - Polished
S - Smooth
RF - Rough
VR - Very Rough

Shape
PR - Planar
CU - Curved
UN - Undulating
ST - Stepped
IR - Irregular

Logged in accordance with AS 1726:2017 Geotechnical site investigations

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Carmichael Tompkins Property Group Pty Ltd Kambala Girls School 794 New South Head Rd, Rose Bay CORE PHOTO BH106 (PHOTO 1 OF 1)	
PSM3759-005L	Figure A6

Appendix B
Geotechnical and Analytical Laboratory Testing Results

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POINT LOAD STRENGTH INDEX TEST RESULTS

Job No.	***PSM3759***	**Sheet**	**1 of 2**
Project	***Kambala Girls School***		

Test Method	*AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Purposes, Determination of Point Load Strength Index*	Sampling Technique	*NLMC*	Sampling Date	*11-12/07/2019*
		Storage History	*North Ryde office indoor core storage area*	Testing Date	*11-12/07/2019*
Test Machine	*GSA 6500*	Moisture Condition	*Natural*	Tested By	*MB*
Calibration Date	*3/12/2012*	Loading Rate	*< 30 seconds*		

Rock Type	Location	Depth	Diametral Tests					Axial, Block, and Irregular Lump Tests							AS 1726 Strength Class
			D	L	P	$I_{s(50)}$	Failure Mode	W	D	L	P	I_s	$I_{s(50)}$	Failure Mode	
		(m)	(mm)	(mm)	(kN)	(MPa)		(mm)	(mm)	(mm)	(kN)	(MPa)	(MPa)		
Sandstone	***BH101***	***5.78***	*50*	*75*	*0.4*	***0.2***	*Parallel to bedding*	*50*	*39*	*N/A*	*0.4*	*0.2*	***0.2***	*Through substance*	***L***
Sandstone	***BH101***	***6.88***	*50*	*66*	*3.3*	***1.3***	*Parallel to bedding*	*50*	*35*	*N/A*	*3.3*	*1.5*	***1.4***	*Through substance*	***H***
Sandstone	***BH101***	***7.30***	*50*	*55*	*1.8*	***0.7***	*Parallel to bedding*	*50*	*41*	*N/A*	*1.6*	*0.6*	***0.6***	*Through substance*	***M***
Sandstone	***BH102***	***2.89***	*50*	*68*	*0.8*	***0.3***	*Parallel to bedding*	*50*	*34*	*N/A*	*1.3*	*0.6*	***0.6***	*Through substance*	***M***
Sandstone	***BH102***	***3.92***	*50*	*75*	*2.7*	***1.1***	*Parallel to bedding*	*50*	*43*	*N/A*	*2.4*	*0.9*	***0.9***	*Through substance*	***M / H***
Sandstone	***BH102***	***4.98***	*50*	*95*	*3.6*	***1.4***	*Parallel to bedding*	*50*	*37*	*N/A*	*2.5*	*1*	***1***	*Through substance*	***H***
Sandstone	***BH102***	***5.88***	*50*	*85*	*4.4*	***1.7***	*Parallel to bedding*	*50*	*45*	*N/A*	*2.8*	*1*	***1***	*Through substance*	***H***
Sandstone	***BH102***	***6.91***	*50*	*73*	*1.3*	***0.5***	*Parallel to bedding*	*50*	*33*	*N/A*	*1.5*	*0.7*	***0.7***	*Through substance*	***M***
Sandstone	***BH103***	***2.83***	*50*	*80*	*2.6*	***1***	*Parallel to bedding*	*50*	*38*	*N/A*	*1.9*	*0.8*	***0.8***	*Through substance*	***M / H***
Sandstone	***BH103***	***3.92***	*50*	*73*	*1.6*	***0.7***	*Parallel to bedding*	*50*	*25*	*N/A*	*1.2*	*0.7*	***0.7***	*Through substance*	***M***
Sandstone	***BH103***	***4.94***	*50*	*58*	*2.1*	***0.8***	*Parallel to bedding*	*50*	*30*	*N/A*	*3.5*	*1.8*	***1.7***	*Through substance*	***M / H***
Sandstone	***BH103***	***5.87***	*50*	*95*	*2.2*	***0.9***	*Parallel to bedding*	*50*	*45*	*N/A*	*4.7*	*1.6*	***1.7***	*Through substance*	***M / H***
Sandstone	***BH103***	***6.92***	*50*	*80*	*0.1*	***0.1***	*Parallel to bedding*	*50*	*38*	*N/A*	*0.1*	*0.1*	***0.1***	*Through substance*	***L***
Sandstone	***BH104***	***1.33***	*50*	*90*	*1.1*	***0.4***	*Parallel to bedding*	*50*	*33*	*N/A*	*1.1*	*0.5*	***0.5***	*Through substance*	***M***
Sandstone	***Bh104***	***2.55***	*50*	*84*	*2.5*	***1***	*Parallel to bedding*	*50*	*37*	*N/A*	*2.2*	*1*	***0.9***	*Through substance*	***M / H***
Sandstone	***BH104***	***3.41***	*50*	*92*	*3.2*	***1.3***	*Parallel to bedding*	*50*	*44*	*N/A*	*3.5*	*1.3*	***1.3***	*Through substance*	***H***
Sandstone	***BH104***	***4.58***	*50*	*87*	*2.3*	***0.9***	*Parallel to bedding*	*50*	*36*	*N/A*	*2.4*	*1.1*	***1***	*Through substance*	***M / H***
Sandstone	***BH104***	***5.53***	*50*	*68*	*3.1*	***1.2***	*Parallel to bedding*	*50*	*34*	*N/A*	*3.3*	*1.5*	***1.5***	*Through substance*	***H***
Sandstone	***BH104***	***6.66***	*50*	*77*	*2.1*	***0.8***	*Parallel to bedding*	*50*	*31*	*N/A*	*2.5*	*1.3*	***1.2***	*Through substance*	***M / H***
Sandstone	***BH105***	***3.84***	*50*	*85*	*8.3*	***3.3***	*Parallel to bedding*	*50*	*25*	*N/A*	*4.7*	*2.9*	***2.7***	*Through substance*	***H / VH***
Sandstone	***BH105***	***4.46***	*50*	*58*	*2.8*	***1.1***	*Parallel to bedding*	*50*	*32*	*N/A*	*2*	*1*	***0.9***	*Through substance*	***M / H***
Sandstone	***BH105***	***5.69***	*50*	*90*	*2.9*	***1.2***	*Parallel to bedding*	*50*	*36*	*N/A*	*2.3*	*1*	***1***	*Through substance*	***M / H***
Sandstone	***BH105***	***6.48***	*50*	*63*	*3.7*	***1.5***	*Parallel to bedding*	*50*	*32*	*N/A*	*1.2*	*0.6*	***0.5***	*Through substance*	***M / H***
Sandstone	***BH105***	***7.35***	*50*	*50*	*1.4*	***0.6***	*Parallel to bedding*	*50*	*40*	*N/A*	*2.6*	*1*	***1***	*Through substance*	***M***
Sandstone	***BH106***	***4.12***	*50*	*80*	*1.7*	***0.7***	*Parallel to bedding*	*50*	*28*	*N/A*	*0.7*	*0.4*	***0.3***	*Through substance*	***M***

By:	***MB/LR***	**Checked:**	***GM***	**Date:**	***17/7/2019***

Pells Sullivan Meynink

POINT LOAD STRENGTH INDEX TEST RESULTS

Job No. ***PSM3759*** **Sheet 2 of 2**

Project ***Kambala Girls School***

Test Method	*AS 4133.4.1 - 1993 Methods of Testing Rocks for Engineering Purposes, Determination of Point Load Strength Index*	Sampling Technique	*NLMC*	Sampling Date	*11-12/07/2019*
		Storage History	*North Ryde office indoor core storage area*	Testing Date	*11-12/07/2019*
Test Machine	*GSA 6500*	Moisture Condition	*Natural*	Tested By	*MB*
Calibration Date	*3/12/2012*	Loading Rate	*< 30 seconds*		

Rock Type	Location	Depth	Diametral Tests					Axial, Block, and Irregular Lump Tests							AS 1726 Strength Class
			D	L	P	$I_{s(50)}$	Failure Mode	W	D	L	P	I_s	$I_{s(50)}$	Failure Mode	
		(m)	(mm)	(mm)	(kN)	(MPa)		(mm)	(mm)	(mm)	(kN)	(MPa)	(MPa)		
Sandstone	***BH106***	***5.26***	*50*	*63*	*1.3*	***0.5***	*Parallel to bedding*	*50*	*33*	*N/A*	*1.6*	*0.8*	***0.7***	*Through substance*	***M***
Sandstone	***BH106***	***6.22***	*50*	*50*	*3.2*	***1.3***	*Parallel to bedding*	*50*	*24*	*N/A*	*0.7*	*0.4*	***0.4***	*Through substance*	***M / H***
Sandstone	***BH106***	***6.92***	*50*	*80*	*1.2*	***0.5***	*Parallel to bedding*	*50*	*35*	*N/A*	*0.9*	*0.4*	***0.4***	*Through substance*	***M***

By: ***MB/LR*** **Checked:** ***GM*** **Date:** ***17/7/2019***