G3 56 Delhi Road
North Ryde NSW 2113
P +61-2 9812 5000
F +61-2 9812 5001
E mailbox@psm.com.au
www.psm.com.au

Our Ref: PSM4637-003L REV4

4 October 2022

LOGOS Development Management Pty Ltd
L29, Aurora Place,
88 Phillip Street,
SYDNEY NSW 2000
CraigThomas@logosproperty.com.au

Attention: Athlene Kyle

Dear Athlene

RE: 28 - 30 BURROWS ROAD, ST PETERS
RESULTS OF GEOTECHNICAL INVESTIGATION

1. Introduction

PSM has been commissioned by LOGOS Development Management Pty Ltd to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the State Significant Development Application **(SSD-47601708)** for the proposed flight training centre (Sydney Flight Training Centre) at 28-30 Burrows Road, St Peters.

This report presents the results of the following investigations undertaken by PSM at 28 – 30 Burrows Road, St Peters (the **Site**).

1. The due diligence stage – geotechnical investigation in December 2021
2. Additional geotechnical investigations in July 2022

The work has been undertaken in accordance with PSM proposals (Ref: PSM4637-001L dated 2 November 2021 and PSM4637-005L 19 April 2022).

This report has been revised to contain the results of the additional geotechnical investigation in July 2022 undertaken by PSM and to address the SEARs commentary required from the Department of Planning and Environment.

2. DESCRIPTION OF THE SITE AND LOCALITY

The site is located at 28-30 Burrows Road, St Peters and comprises land known as Lot 2 of DP 212652 and Lot 15 of DP 32332. The site is identified in the figure below.

Key features of the site are as follows:

- The site is approximately 7,961sqm and is rectangular in shape. The primary frontage to Burrows Road is approximately 123m in length and the site maintains a depth of approximately 63.5m.
- The site has a fall of 0.5 m from the northern boundary to the southern boundary. The site is currently occupied by two industrial / warehouse buildings with a large hardstand area for vehicle parking and deliveries. Alexandra Canal runs along the southern boundary of the site. A Site Survey Plan accompanies the application which details the topographic characteristics of the site.
- Limited vegetation is located along both the road frontage and the canal. The proposed development is to include a setback of 10m along the southern boundary to align with the City of Sydney's vision for a pedestrian and cycling network along the water's edge.
- Vehicular access to the site from the local road network is available from Burrows Road which links the site to the WestConnex road network in the north and Sydney Airport to the west.
- Industrial land uses extend along Burrows Road and Euston Road. St Peters railway station is approximately 1.5km from the site. The nearest residential neighbours south of the site are about 300m away and are separated by industrial warehouse buildings and the Alexandra Canal.
- The site is located within the City of Sydney LGA.

Key features of the locality are:

The site is approximately 6km south-west of the Sydney CBD. It is close to Sydney Airport (1km north) and the Gateway Project which will link the new St Peters Interchange with Sydney Airport domestic and international terminals and Port Botany. A new bridge will be constructed over Canal Road.

The site is surrounded by a variety of uses, including:

- North: The site has a direct road frontage to Burrows Road, close to the intersection with Campbell Road. Directly opposite the site to the north is the Westconnex Transurban MCC Main Office which comprises car parking facilities for motorists at the St Peters interchange. Sydney Park is further north on the opposite side of Campbell Parade.

- East: The immediately adjoining site to the east comprises industrial development. Campbell Road and Campbell Road Bridge are further east, with additional industrial land uses on the opposite side of Alexandra Canal, including Alexandria and Rosebery. Campbell Road connects the site to the broader Westconnex road network.
- South: The site is bound to the south by Alexandra Canal, a State Significant Heritage Item. Additional industrial land uses are located across the canal to the south, primarily comprising warehouse and distribution centres. Gardeners Road and Bourke Street provide access to Mascot and Eastlakes. Sydney Kingsford Smith Airport is further south.
- West: The immediately adjoining land comprises industrial development. The St Peters WestConnex Interchange is located to the north-west, with the Princes Highway beyond. Further west is low density residential and industrial land uses in the suburb of Sydenham. Sydenham Train Station is approximately 1.5km west of the site, providing services to the Sydney CBD.

2.1 PROJECT DESCRIPTION

The proposed flight training centre will enable pilots and flight crews from Qantas and other airlines to undertake periodic training and testing to meet regulatory requirements by simulating both aircraft and emergency procedural environments. The flight training centre will be situated within a three-storey industrial warehouse and will include:

- Flight simulator hall:
  - 8 x simulator bays – State of the art full motion flight simulators with visual fidelity, motion and sound. This allows crew to be trained in all aspects of normal and non-normal operations, including instrument approaches and landings in all weather conditions.
  - The proposed simulators will complement the flight training facilities in other states.
- Emergency procedures component including:
  - Cabin evacuation emergency trainer – Full-scale cabin mock-up is used as practical training device. These facilities allow emergency situations to be accurately portrayed and allow pilots and cabin crew to handle emergency situations in both wide and narrow-bodied aircraft.
  - Slide descent tower – Enables realistic training of deployment and use of slides to evacuate aircraft for pilots and cabin crew.
  - Door trainers – Enables realistic training of use of emergency exits to evacuate aircraft for pilots and cabin crew.
- Ancillary spaces (administration and training areas) including:
  - Equipment room – Storage of emergency equipment (oxygen tanks, defibrillators etc.) that supports the training and assessment of cabin crew and pilots of aviation medicine.
  - Pilots lounge – Area for pilots to wait prior to simulator sessions.
  - Meeting rooms and lunch room.
  - Reception area.
  - Toilets, plant, loading dock.
- Parking for 35 cars is proposed to the rear of the building with separate entry and exit points from Burrows Road. This access will also facilitate deliveries to the loading areas throughout the site, including the installation and replacement of the simulators.
- The proposal involves the construction of a new stormwater pipe and outlet to the Alexandria Canal.

2.2 Background

We have been provided with the following drawings and reports:

- Pace Architects drawings – Site Plan (Ref. 220507-CT100 Issue 16, dated 20 September 2022).
- Detailed Site Investigation by JBS&G (Ref. 62126/142,245 Rev 0, dated 2 August 2022).
- LOGOS Indicative Plans & Sections – “28 – 30 Burrows Road, St Peters, NSW”.

- Northrop drawings – “Caverstock Flight Training School Foundation Loads” (Ref. S220298 SSK-10 Rev 1, dated 28/2/2022).
- Existing survey of the Site – “Detail survey of Lot 2 in DP212652 and Lot 15 in DP32332 (Ref. SY075517.000.1.1, dated 25 March 2022).
- Bulk Earthworks Plan by Costin Roe Consulting (Ref. CO14585.00-DA30 Rev B dated 30 September 2022.).

On the basis of the provided documentation and the transmittal email, we understand the following about the proposed development:

- The Site currently comprises warehouse facilities, wash bay facilities, carparking and hardstand areas.
- The proposed development of a three-storey warehouse which will be used as a flight simulation and training centre.
- The site is proposed to undergo minor cut and fill works with up to 1.0 m of fill and 0.5 m in cut. The majority of the site is in fill. Areas in cut will not involve excavation below the noted water table.

3. Geotechnical Investigation

3.1 Due Diligence investigation in December 2021

3.1.1 Fieldwork (20 December 2021)

The fieldwork was undertaken on 20 December 2021 under the full-time supervision of a PSM geotechnical engineer who undertook the following tasks:

- Directing service locating and testing locations of CPTs and borehole.
- Preparing field logs of material encountered.
- Collecting bulk soil samples for laboratory testing.
- Undertaking Point Load Testing on the recovered core.

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

The investigation locations were recorded with a hand-held GPS unit with a horizontal accuracy of approximately +/- 5 m.

Figure 1 presents a site locality plan of the geotechnical investigation.

Figures 2 to 4 present selected photos of the fieldwork.

3.1.1.1 CPTs

A total of 4 CPTs (CPT01 to CPT04) were completed on 20 December 2021 to refusal depths between 12.05 m to 15.17 m. The CPTs were carried out using a 24-tonne truck mounted rig from JK Drilling. At the completion of each test, the holes were backfilled with sand fill and cement.

The results of the CPTs including interpreted subsurface profiles are included in Appendix A.

3.1.1.2 Boreholes

A total of one (1) borehole (BH01) was drilled to a depth of 17.1 m using a truck mounted drill rig at the location shown in Figure 1 Augering was undertaken through the soil above the groundwater level and then continued with wash boring. NMLC triple tube coring was then used to recover bedrock.

Point load index tests were undertaken on the retrieved rock cores.

The borehole log is presented in Appendix B.

A standpipe piezometer was also installed in BH01 to monitor groundwater level. Details of the piezometer construction in presented in Appendix E.

3.1.2 Laboratory Testing

Two (2) bulk soil samples were recovered for CBR testing.

The following samples preparation was undertaken prior to CBR testing:

- Compact to 98% standard MDD, at optimum moisture content (OMC).
- Four (4) day-soaked sample; and
- 4.5 kg surcharge.

Table 1 presents a summary of the CBR test results. The CBR test results are included in Appendix BC.

Table 1 – Summary of CBR test results

Sample ID	Depth (m)	Material Description	Soaked CBR* (%)	OMC (%)	Standard Maximum Dry Density (t/m^3)	Swell (%)
BH01	0.5 – 1.5	SAND	8	17.1	1.67	0.0
CPT02	0.2 – 1.3	Silty SAND	11.0	15.9	1.75	0.0

Notes: * Indicates Soaked CBR value at 5.0 mm penetration

3.2 Additional Investigation in 2022

3.2.1 Fieldwork in 2022

The fieldwork was undertaken on 25 July 2022 and 26 July 2022 under the full-time supervision of a PSM geotechnical engineer. It comprised the following:

- Drilling additional boreholes (BH02 to BH04).
- Soil sampling for analytical testing.

Figure 1 presents a site locality plan of the geotechnical investigation.

3.2.1.1 Boreholes

Three boreholes (BH02 to BH04) were drilled to a maximum depth of 17.48 m. BH02 to BH04 were drilled using a track mounted drill rig.

An additional standpipe piezometer was also installed in BH02 to monitor groundwater level. Details of the piezometer construction in presented in Appendix E.

3.2.2 Analytical Laboratory Testing

Three (3) disturbed soil samples were recovered for testing by a NATA accredited laboratory.

The following tests were undertaken on the disturbed samples:

- Field moisture content.
- Soil pH.
- Cation Exchange Capacity (CEC) of calcium, magnesium, potassium, and sodium.
- Electrical conductivity at 25°C (E 1:5 – one part soil to five parts water).
- Saturated resistivity at 25°C.
- Chlorides.
- Soluble sulfates.

Appendix D presents the results of the laboratory testing.

Table 2 – Laboratory Testing Results

Sample ID (Depth)	pH	Electrical Conductivity [µS/cm]	Resistivity (ohm cm)	Moisture Content [%]	Chloride by Discrete Analyser [mg/kg]	Soluble Sulfate by ICPAES [mg/kg]	Exchangeable Cations [meq/100g]					ESP [%]
							Ca	Mg	K	Na	CEC	
BH02 (1.5 m)	6.1	90	11100	31.5	30	100	-	-	-	0.2	7.2	2.8
BH03 (2.0 m)	6.4	50	20000	13.7	20	40	-	-	-	0.1	3.5	2.9
BH04 (3.5 m)	6.1	35	28600	20.1	20	50	-	-	-	<0.1	2.5	4.0

4. Site Conditions

4.1 Geological Setting

The 1:100,000 Sydney Geological Map (1983) indicates that the site is underlain by:

- Peat, sandy peat and mud (Qhs).

Inset 1 presents the geological map of the site.

Inset 1: Geological setting as shown on 1:100,000 Sydney Geological Map

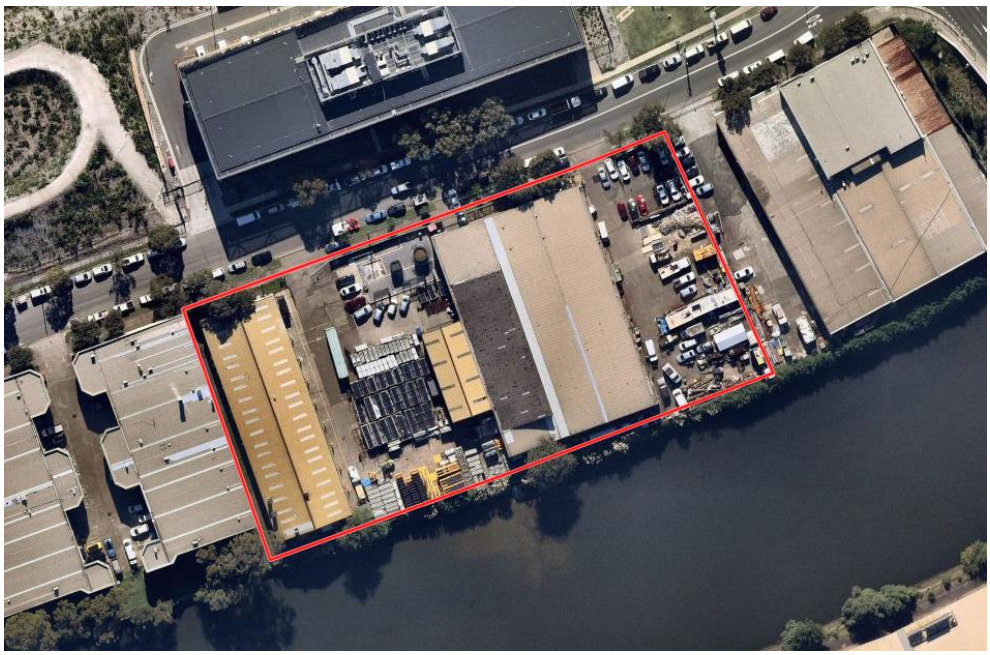
4.2 Surface Conditions

The site is bounded by Burrows Road to the North, Alexandra Canal to the South and existing industrial warehouses to the East and West.

At the time of the fieldworks, the following observations were made:

- The site is occupied by two industrial/ warehouse buildings and hardstand areas.
- The Alexandra Canal is located next to the southern boundary of the site (Photo 1 on Figure 2).

Inset 2 shows the current surface conditions at the site.



Inset 2: Recent aerial image of the site (source: Nearmap dated 17 May 2022)

4.3 Subsurface Conditions

The subsurface conditions inferred from the CPT results and the borehole undertaken are summarised in Table 3 and Table 4. With regards to Bedrock unit, we have inferred CPT refusal depths as the top of the unit.

Table 3 - Summary of Inferred Subsurface Conditions Encountered in the CPTs and BHs

Inferred Unit		Approximate Depth to Top of Inferred Unit (m)	Description
Pavement		0	Concrete – up to 200 mm thick
FILL		0.1 – 0.12	SAND with gravel: dark grey, fine to coarse grained, loose; gravel sub-rounded to sub-angular up to 10 mm, dry to wet
NATURAL SOIL (Interbedded Clay, Silt and Sand)	CLAY A	1.0 – 1.5	Sandy CLAY trace gravel: dark grey, low to medium plasticity; sand coarse grained; gravel sub-angular up to 5 mm, soft to firm consistency
	SAND A	0.5 – 2.9	SAND to Silty SAND with lenses of CLAY up to 500 mm thick: grey, fine to coarse grained, low plasticity silt, loose to medium dense
	CLAY B	2.8 – 4.6	CLAY to Silty CLAY with lenses of SAND up to 1500 mm: soft to stiff consistency
	SAND B	4.0 – 7.5	SAND to Silty SAND with lenses of CLAY up to 1000 mm: grey, fine to coarse grained, low plasticity silt, medium dense to very dense
	CLAY C	9.0 – 10.8	CLAY to Silty CLAY with lenses of SAND up to 250 mm: stiff to hard consistency
BEDROCK A		12.0 – 15.1	SHALE: dark grey, very low to low strength, extremely to highly weathered
BEDROCK B		14.3 - 16.9	SHALE: dark grey, low strength, moderately weathered

Table 4A – Elevation of Top of Inferred Geotechnical Units Encountered in the CPTs

STG	TEST ID	Elevation to Top of Inferred Unit (RL m AHD)									END OF HOLE (m)
		PAVEMENT	FILL	NATURAL SOIL (Interbedded Clay, Silt and Sand)					BEDROCK A[1]	BEDROCK B	
				CLAY A	SAND A	CLAY B	SAND B	CLAY C			
2021	CPT01	2.67	2.52	1.17	0.17	-1.53	-3.53	-8.13	-9.33	NE[2]	-9.38
	CPT02	2.73	2.58	NE[3]	1.73	-1.57	-2.07	-6.67	-10.97	NE[2]	-10.98
	CPT03	2.78	2.66	1.78	-0.12	-1.82	-2.02	-6.82	-10.32	NE[2]	-10.37
	CPT04	2.7	2.55	NE[3]	2.2	-0.5[2]	-4.8	-6.3	-12.4	NE[2]	-12.47

1 These levels are inferred from CPT resistance analysis.

2 NE = Not Encountered

3 Clay of soft consistency was encountered between -0.5 to -1.2 RL m AHD, -2.7 to -3.8 RL m AHD and -4.5 to -4.8 RL m AHD at CPT04.

Table 5B – Elevation of Top of Inferred Geotechnical Units Encountered in the BHs

STG	TEST ID	Elevation to Top of Inferred Unit (RL m AHD)					END OF HOLE (m)
		PAVEMENT	FILL	NATURAL SOIL (Interbedded Clay, Silt and Sand)	BEDROCK A[1]	BEDROCK B	
2021	BH01	2.76	2.58	1.26	-9.84[2]	-13.24	-14.34
2022	BH02	2.78	2.68	1.78	-10.52	-11.52	-13.52
	BH03	2.73	2.53	0.23	-10.27	NE[3]	-12.87
	BH04	2.75	2.6	1.75	-9.35	-14.15	-14.73

1 These levels are inferred from BH rock cores visual inspection.

2 No core was retrieved between -9.24 to -9.84 RL m AHD for BH01.

3 NE = Not Encountered

4 Refer to CPT data for interbedded clay, silt and sand within NATURAL SOIL unit.

4.4 Groundwater

Groundwater was detected in the boreholes between a depth of 1.5 m to 1.7 m (approximately 1.28 RL m AHD to 1.03 RL m AHD). This is consistent with PSM previous local experience. Two standpipe piezometers were installed in BH01 and BH02.

No long-term continuous monitoring of the water table was undertaken. However, groundwater monitoring could be undertaken on the installed piezometers if required.

It is likely that the groundwater level is somewhat influenced by tidal fluctuations within the Alexandra Canal and potentially the seasonal variation with periods of increased rainfall resulting in higher ground water levels.

5. Assessment of Analytical Laboratory Testing

5.1 Soil Chemistry

The salinity and aggressivity test results, summarised indicate the following:

- pH of the soil samples analysed was in the range of 6.1 to 6.4.
- The 1:5 soil to water extraction and subsequent electrical conductivity (EC1:5) of the soil samples analysed to be in the range of 35 µS/cm to 90 µS/cm.
- Concentrations of chlorides in samples analysed was in the range of 20 mg/kg to 30 mg/kg.
- Concentrations of soluble sulphate in samples analysed was in the range of 40 mg/kg to 100 mg/kg.
- Cation Exchange Capacity (CEC) in samples analysed was in the range 2.5 meq/100g to 7.2 meq/100g.
- Exchange Sodium Percentage (ESP) in samples analysed was in the range of 2.8% to 4.0%.

5.2 Salinity Assessment

Site Investigations for Urban Salinity (DLWC 2002) classify soil salinity based on electrical conductivity (EC_e) as per Richards (1954). The method of conversion from $EC_{1:5}$ to EC_e (electrical conductivity of saturated extract) is based on DLWC (2002) and given by $EC_e = EC_{1:5} \times M$, where M is the multiplication factor based on "Soil Texture Group".

The "Soil Texture Group" of the samples tested has been assessed during our investigation. The salinity classification for the soil samples that were tested are presented in Table 6.

Table 6 – Salinity Classification

Sample ID (Depth)	EC1:5 (dS/m)	Soil Type	M	ECe (dS/m)	Salinity Class
BH02 (1.5 m)	0.090	Sandy Loam	14	1.26	Non-saline
BH03 (2.0 m)	0.050	Sandy Loam	14	0.70	Non-saline
BH04 (3.5 m)	0.035	Sandy Loam	14	0.49	Non-saline

It is assessed that the majority of the soils on Site are classified as "Non- saline".

We have referred to Clause 4.8.2 of Australian Standard AS3600-2018 "Concrete Structures" and note that the assessed soil electrical conductivity (EC_e) is less than the upper limit of the "A2" exposure classification.

5.2.1 Salinity Management Plan

With regards to salinity, PSM has prepared a salinity management plan (SMP) for the site, refer to PSM4637-006L, dated 10 August 2022; in Appendix F.

5.3 Corrosivity / Aggressivity

Table 4.8.1 of AS3600-2018 "Concrete Structures" provides criteria for exposure classification for concrete in sulphate soils based on sulphates in soil and groundwater, and pH of soil. On the basis of the sulphate and pH testing completed we assess the exposure classification for concrete in sulphate soils to be "A2".

Similarly, Table 6.4.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for concrete piles in soil, and here the exposure classification for concrete piles in soils is "Mild".

Table 6.5.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for steel piles based on resistivity, soil and groundwater pH, and chlorides in soil and

groundwater. On the basis of the resistivity, pH and chloride testing completed we assess the exposure classification for steel piles in the soil to be “Non-aggressive”.

5.4 Sodicity

Sodicity provides a measure of the likely dispersion on wetting and to shrink/swell properties of a soil. Soil sodicity is classified based on the Exchangeable Sodium Percentage (ESP) which is the amount of exchangeable sodium as a percentage of the Cation Exchange Capacity (DLWC, 2002).

The Exchangeable Sodium Percentages calculated from these laboratory results, ranging from 2.8% to 4.0%, indicates that the soils on Site are non-sodic when compared to criteria listed in “Site Investigations for Urban Salinity”, DLWC (2002).

6. General discussion of effect of subsurface conditions on proposed development

The investigation has identified the presence of an interbedded clay and sand alluvium between 1 m and 6 m depth which include layers of clay up to 2 m thick in places and varying in consistency between soft (Su 20 kPa) and firm (Su 30 kPa). These layers are compressible layers that can undergo significant settlement when loaded.

On this basis, we consider that:

- The proposed three storey warehouse facility is likely to need to be supported on piles founded on the underlying bedrock unit which was encountered 12.0 m and 15.1 m depth. The working load of the foundation is up to 1000 kN (e.g. P1).
- Carpark and layout areas typically subject to lesser loads, and loads similar to those experience to date, may be able to be supported on a slab on ground, but will require careful consideration for the interbedded alluvium on total and differential settlements.

7. Preliminary Geotechnical Design Advice

7.1 General

The design advice in the following sections is provided on the basis that:

- The subsurface conditions are as those encountered in the geotechnical investigation reported in Section 4 of this letter.
- Minor filling and subgrade preparation will be undertaken in accordance with the PSM bulk earthworks specification PSM4637-004S. LOGOS to review and confirm filling and subgrade preparation is still relevant.

If any of those bases are not applicable, PSM should be requested to confirm that the design advice below is still applicable.

7.2 Site Classification

We note that the proposed development (i.e., multi storey warehouse for flight training and offices) is outside the scope of AS2870-2011 “Residential slabs and footings”. Notwithstanding, we have classified the site in accordance with AS2870-2011.

Based on our geotechnical investigation and previous investigations conducted at the Site, approximately up to 1 m of fill is present across the Site. Details of the placement and testing of the existing fill are not known to PSM and could be variable, e.g., “uncontrolled fill”. Due to the presence of the existing fill and soft clay identified within the NATURAL SOIL units, we classify the site as Class “P”.

7.3 Permanent and Temporary Batters

Where site constraints permit, batters and other retention systems could be considered to support the soil units. The batter slope angles shown in Table 6 are recommended for design of batters up to 3 m height and above the groundwater table. The design should also comply with the following recommendations:

- All batters shall be protected from erosion.
- Permanent batters shall be drained.
- Temporary batters shall not be left unsupported for more than 1 months without further advice, and inspection by a geotechnical engineer should be undertaken following significant rain events.
- No buildings, loads, or services should be located within 1 batter height of the crest.

If the conditions above cannot be met, further advice should be sought.

Steeper batters may be possible subject to further advice, probably including inspection during construction

Table 7 - Batter slope angles

Unit name	Temporary	Permanent
SOIL UNITS, e.g., FILL, SAND & CLAY	2H : 1V	2.5H : 1V

The batters should be inspected by an experienced geotechnical engineer or engineering geologist during excavation to confirm the batter advice provided (including existing fill) and assess the need for localised support.

Proper and suitable safe work method statements and OHS documents need to be developed for works to be undertaken in the vicinity of the crest and toe of batters.

7.4 Excavation Support

Cuts in the soil steeper than the recommended permanent batter slopes in Table 7 will need to be supported by some form of retaining structure.

The design of these structures should be based on the following geotechnical properties:

- Effective soil strength parameters in Table 8.
- Surcharge loads behind the retention.
- Water pressure (depending on the type of structure).

Note that design of retention systems may be based on either K_a or K_o earth pressures. Design using active earth pressures (K_a) provides the minimum lateral earth pressure that must be supported to avoid failure and requires a wall that can rotate or translate to allow the pressures to reduce to these values (vertical and lateral movements up to 2% of height may occur, typical movements will be much less).

Where the design is based on K_o pressures, construction should be carefully controlled to avoid unwanted effects. It should be noted that designing for K_o pressures does not, of itself, ensure that movement does not occur. Movements are controlled by the construction method, especially sequence.

Both surface and sub-surface drainage needs to be designed and constructed properly to prevent pore water pressures from building up behind the retaining walls or appropriate water pressures must be included in the design.

Where excavations are proposed in the vicinity of existing structures designers shall consider the effects of the excavation including horizontal and vertical deflections on the neighbouring structures. Excavation near existing building should not undermine the existing footings and structures.

7.5 Footings

7.5.1 Shallow footings

Pad footings can be proportioned on the basis of an allowable bearing pressure (ABP) for centric vertical loads provided in Table 7. Due to the variable nature of the existing fill and the presence of interbedded clay and sand alluvium layer directly below the fill at the Site, we recommend that the ABP values provided in Table 7 are used as a guide only and specific advice is sought once details of the footings are known. Further advice should be sought if the footings are located adjacent to a batter or wall.

We note that an allowable bearing pressure (ABP) is not a soil property. It depends on many factors such as the size of the footings, the embedment depth, the load direction and eccentricity, the stiffness of the footing, the adopted factor of safety (FOS), as well as the soil properties. As footings get bigger or deeper the capacity increases rapidly, as the load gains eccentricity or becomes inclined, the capacity reduces rapidly.

Settlements can be estimated using the elastic parameters provided in Table 7. When assessing the settlement of the shallow footings, the designer needs to consider the additional ground settlement due to the total building load on both shallow and deeper units. The differential settlement due to the building load shall also be assessed.

Foundation conditions at the proposed shallow pad locations should be inspected by a suitably qualified geotechnical engineer prior to the pouring of concrete.

7.5.2 Piles

It is recommended that piled foundations be founded within the BEDROCK unit.

Targeting the SAND and CLAY unit for floating pile design is not recommended for the multistorey building. There are risks associated with the uncertainly of the pile toe level, exact location and thickness of the SAND and CLAY units. If this option is considered, advice from a specialist pile contractor should be sought. We have not provided design parameters for piles founded in this unit as this will depend on pile type and size, installation methodology, etc. The parameters provided in Table 7 may be adopted in the design of piles founded in the BEDROCK units.

The foundation designer should note the following with regards to the pile design:

- The ABP needs to be confirmed by a geotechnical engineer through pile inspections prior to pouring concrete.
- Under permanent load, where piles are founded in the BEDROCK unit, the contribution of side adhesion for soil units should be ignored.
- Pile settlement can be checked using the recommended elastic parameters in Table 8.
- Where adjacent foundation details differ (e.g., pile and pad, differing loads or ground conditions), differential settlement should also be assessed.

The bearing capacities provided are contingent on piles or footings being vertically and centrally loaded. Further advice should be sought if the footings are not vertically centrically loaded.

With regards to the pile design, we recommend that:

- A basic geotechnical strength reduction factor, Φgb = 0.60 (AS2159 CL. 4.3.2) be adopted for a high redundancy system for an assessed average risk rating (ARR) between 2.5 and 3.0. This should be reviewed to suit the specific design and appropriate pile testing proposed by the structural / pile designers in accordance with the requirements of AS2159.
- It may be possible to increase the pile reduction factors, if the details of the proposed pile installation procedures indicate a high level of quality control with regards to concrete placement, base cleanliness, etc.
- If a geotechnical strength reduction factor, Φg = 0.40 is adopted then no pile testing will be required (AS2159 Clause 8.2.4 (b)).

Where the pile is sized using the allowable bearing capacity in Table 7 (i.e., assuming all serviceability load is carried by the base), the settlement would be expected to be less than 1% of the pile diameter plus elastic shortening of the pile itself.

Table 8 – Engineering parameters of inferred geotechnical units

Inferred Unit	Bulk Unit Weight (kN/m3)	Soil Effective Strength Parameters		Ultimate Bearing Pressure under Vertical Centric Loading [2] (kPa)	Allowable Bearing Pressure (ABP) under Vertical Centric Loading [3] (kPa)	Ultimate Shaft Adhesion (kPa)	Elastic Parameters	
		c' (kPa)	φ' (deg)				Long Term Youngs Modulus (MPa)	Poisson's Ratio
FILL	18	0	28	250	100[1]	N/A	10	0.3
CLAY A [4]	18	0	27	N/A	N/A	N/A	1.5	0.3
SAND A [4]	18	0	32	N/A	N/A	N/A	10	0.3
CLAY B [4]	18	0	27	N/A	N/A	N/A	3	0.3
SAND B [4]	18	0	32	N/A	N/A	N/A	20	0.3
CLAY C [4]	18	0	30	N/A	N/A	N/A	20	0.3
BEDROCK A	22	N/A	N/A	3,000	750	75	100	0.25
BEDROCK B	22	N/A	N/A	10,000	3,000	350	500	0.25

1 Pad footings should have a minimum horizontal dimension of 1.0 m and a minimum embedment depth of 0.5 m.

2 Ultimate values occur at large settlement (>5% of minimum footing / pile dimensions).

3 ABP is an end bearing pressure to cause settlement of <1% of minimum footing / pile dimension.

4 Bearing pressures for SAND and CLAY units not provided as this will depend on pile type and size, installation methodology, etc.

7.6 Slab on ground

The design of slabs on ground can be based on a subgrade with a long-term Young's Modulus I presented in Table 7.

We note that the presence of an interbedded clay and sand alluvium unit comprising some discontinuous soft clay layers may result in additional total and differential settlements. These can be estimated based on the moduli provided in Table 7 and thicknesses of units presented in Table 4.

7.7 Pavements

Two (2) soaked CBR tests were undertaken on samples of the existing fill. The results (refer to Table 1) indicated a CBR of between 8% and 11%.

We advise that a design subgrade CBR of 5% be adopted for pavement design. Subgrade CBR for pavement design depends on the material at the finished subgrade levels.

We recommend that specific CBR testing be undertaken at subgrade level when pavement layouts are finalised. CBR testing shall be undertaken for any new imported material within the pavement subgrade (e.g., within 1 m below pavement).

8. Assessment of SEARs – Geotechnical items

This section presents PSM response on some of Item 12 of the SEARs from geotechnical point of view.

8.1 Point 1 – *Provide an assessment of the potential impacts on soil resources, including related infrastructure and riparian lands on and near the site.*

We have been provided with the bulk earthworks drawing. From the plan, PSM understands the following:

- The proposed pad bulk earthworks levels (BEL) will be at RL 3.40 m AHD
- The proposed earthworks will comprise:
  - Cut to a maximum depth of 0.5 m.
  - Fill to a maximum depth of 1.5 m.

With regards to this clause and the potential impacts of the proposed developments on soil resources, we consider that the proposed development has close to no impact on the soil resource on and near the Site. This assessment is based on the following considerations:

- The proposed development will not alter the site use given that the proposed development is of industrial nature and has been for decades.
- Any additional earthworks to raise the pad level will require importing fill.

With regards to the impact on existing infrastructures, we note the following:

- All existing structures and buildings on site will be demolished.

We understand that the civil designer will design the stormwater system, surface gradients and landscaping requirements to control surface flows and minimise soil erosion and the effects of soil erosion on adjacent waterways.

We assume that most of the Site will be sealed by the proposed development and appropriate surface runoff collection and disposal system will be included in the design. We understand that riparian lands / areas are not present at the site.

Further comments / inputs from other disciplines (e.g., civil designer, ecologist, etc.) should be requested if required.

8.2 Point 2 – *Provide an assessment of the potential impacts on surface and groundwater resources (quality and quantity), including related infrastructure, hydrology, aquatic and groundwater dependent ecosystems, drainage lines, downstream assets and watercourses*

We have reviewed the bulk earthworks drawing for the site and the observed groundwater levels during the site investigations. We note the following:

- Groundwater level ranges from 1.5 m to 1.7 m below existing ground (i.e. RL 1.28 RL m AHD to 1.03 RL m AHD).
- The majority of the Site in the proposed development is in fill, which does not intercept the groundwater.

We consider the potential impact on groundwater resource is minimal as the pad levels is above the groundwater level.

We note that impacts on surface water are not considered by PSM and should be addressed by the civil / drainage designer. We understand that the civil designer has designed or will design the stormwater system, surface gradients and landscaping requirements to control surface flows and minimise soil erosion and the effects of soil erosion on adjacent waterways. We note that the vast majority of the site will be sealed by the proposed development.

We understand that appropriate erosion control will also be included during construction.

With regards to the quality of water, impacts on groundwater dependent ecosystems, drainage lines, downstream assets and watercourses, these items could be addressed by a suitably qualitied person(s), (e.g., ecologist, drainage/civil designer and environmental consultant or other suitably qualified persons).

8.3 Point 3 – *Identify predicted water discharge points to surface/groundwater and consider discharge quality against relevant water quality*.

These items regarding water discharge points to surface and discharge quality should be addressed by a suitably qualitied person(s), (e.g., drainage/civil designer and environmental consultant / hydrologist).

8.4 Point 4 – *Provide a detailed site water balance including identification of water requirements for the life of the development, and measures to ensure an adequate and secure water supply*.

These is not geotechnical item and should be addressed by a suitably qualitied person(s), (e.g., drainage/civil designer or hydrologist).

8.5 Point 5 – *Provide an assessment of salinity and acid sulfate soil impacts*

With regards to salinity, PSM have prepared an assessment of the salinity in this report Section 5.2 and prepared the salinity management plan (SMP) for the site.

Based on the NSW Government SEED (Sharing and Enabling Environmental Data), the risk of acid sulfate soil is not assessed for the site. We understand that further assessment and an acid sulfate soil management plan has been prepared by the environmental consultants, JBS&G for this Site.

In general, we understand the proposed development does not include bulk excavation / cut of the insitu material and reusing it for the development. On this basis, we consider the proposed development will have minimum impact on site salinity and acid sulfate soil.

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

For and on behalf of
PELLS SULLIVAN MEYNINK

KEN TONG LEE
GEOTECHNICAL ENGINEER

AGUSTRIA SALIM
PRINCIPAL

Encl.

Figure 1	Locality Plan
Figure 2	Selected Site Photos (1 of 5)
Figure 3	Selected Site Photos (2 of 5)
Figure 4	Selected Site Photos (3 of 5)
Figure 5	Selected Site Photos (4 of 5)
Figure 6	Selected Site Photos (5 of 5)
Appendix A	CPT Results
Appendix B	Borehole Log
Appendix C	CBR Results
Appendix D	Laboratory Testing Results
Appendix E	Piezometer Construction Record
Appendix F	Salinity Management Plan

Legend

- Approximate Site Boundary
- Previous Site Investigation (2021)
- Additional Site Investigation (2022)

Notes

Aerial image sourced from Nearmap.com dated 17 May 2022.

Scale 1:400

N 0 10 20 m

Map Projection:
Horizontal Datum:
Grid: EPSG:7856

P S M	Created By: PSM	Revision: A	
	Date: 02 Aug 2022	Paper Size: A3	

LOGOS
28-30 Burrows Road
St Peters

GEOTECHNICAL INVESTIGATION LOCATIONS

PSM4637-003L REV2 | FIGURE 1

N:\PSM4637\Eng\GIS\PSM4637.qgz Layout: Figure XX

Photo 1 - Alexandra Canel near the southern boundary of the site (20/12/2021)

Photo 2 - General site conditions near BH01 facing north west (20/12/2021)

LOGOS Property Group Ltd

28 - 30 Burrows Road, St Peters

Geotechnical Investigation

SELECTED SITE PHOTOGRAPHS (1 of 5)
20/12/2021, 25/07/2022 and 26/07/2022

PSM4637-003L	FIGURE 2

Photo 3 - Drill rig setup on BH01 (20/12/2021)

Photo 4 - CPT rig set up on CPT02 (1/10/2021)

LOGOS Property Group Ltd

28 - 30 Burrows Road, St Peters

Geotechnical Investigation

SELECTED SITE PHOTOGRAPHS (2 of 5)
20/12/2021, 25/07/2022 and 26/07/2022

PSM4637-003L	FIGURE 3

Photo 5 - Typical NATURAL unit encountered in BH01 (20/12/2021)

Photo 6 - Typical BEDROCK unit encountered in BH01 (20/12/2021)

LOGOS Property Group Ltd

28 - 30 Burrows Road, St Peters

Geotechnical Investigation

SELECTED SITE PHOTOGRAPHS (3 of 5)
20/12/2021, 25/07/2022 and 26/07/2022

PSM4637-003L	FIGURE 4

Photo 7 - General site photo looking North (26/07/2022)

Photo 8 - Rig used for drilling on 25/07/2022 and 26/07/2022

LOGOS Property Group Ltd

28 - 30 Burrows Road, St Peters

Geotechnical Investigation

SELECTED SITE PHOTOGRAPHS (4 of 5)
20/12/2021, 25/07/2022 and 26/07/2022

PSM4637-003L	FIGURE 5

Photo 9 - Typical FILL unit encountered (25/07/2022)

Photo 10 - Materials stored on site observed on 25/07/2022

LOGOS Property Group Ltd

28 - 30 Burrows Road, St Peters

Geotechnical Investigation

SELECTED SITE PHOTOGRAPHS (5 of 5)
20/12/2021, 25/07/2022 and 26/07/2022

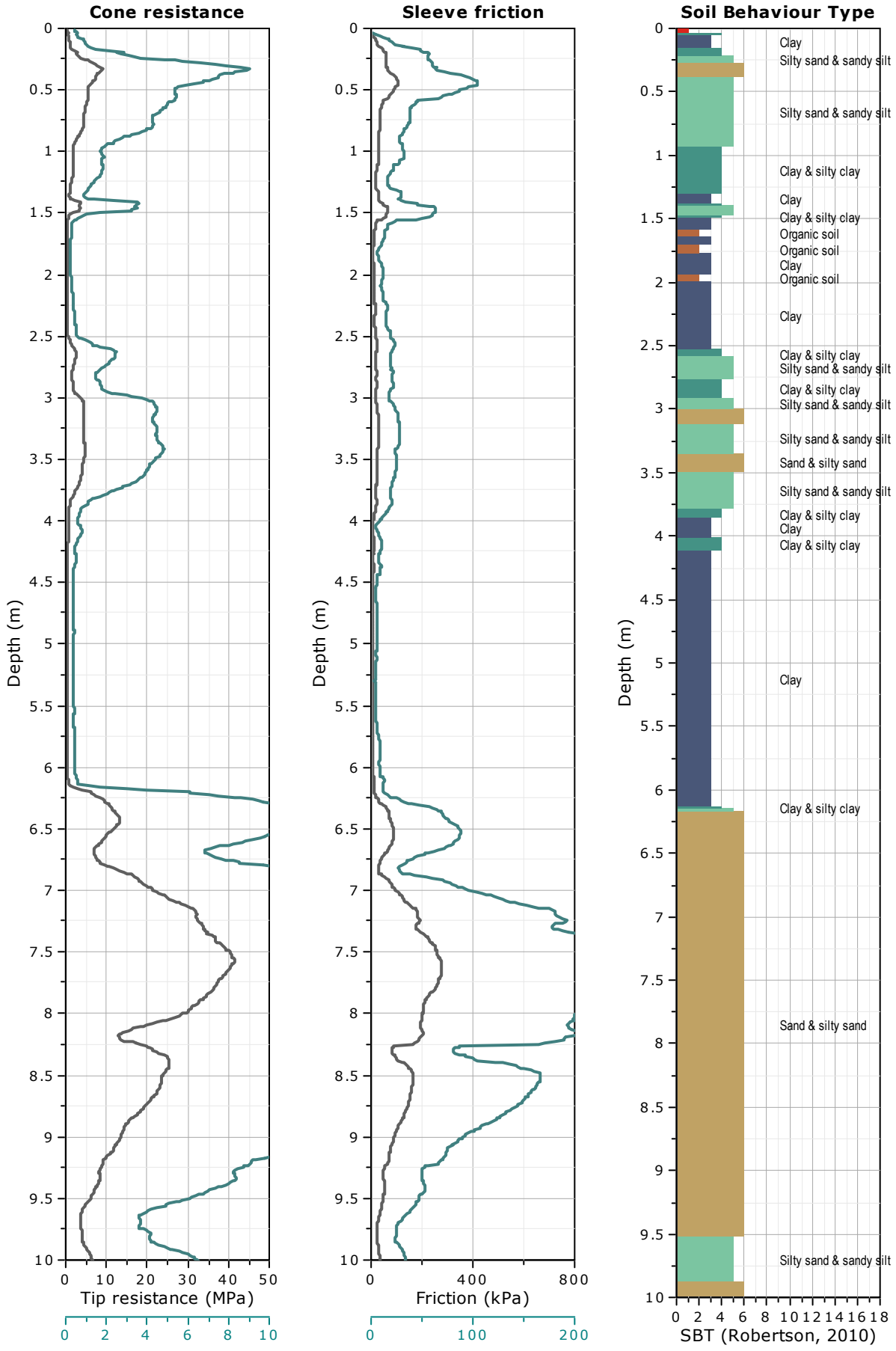
PSM4637-003L	FIGURE 6

Appendix A
CPT Results

Pells Sullivan Meynink
Engineering Consultants | Rock Soil Water
G3 56 Delhi Road, North Ryde NSW 2133 Australia
www.psm.com.au

Project: 28-30 Burrows Road, St Peters
Location: 28-30 Burrows Road, St Peters

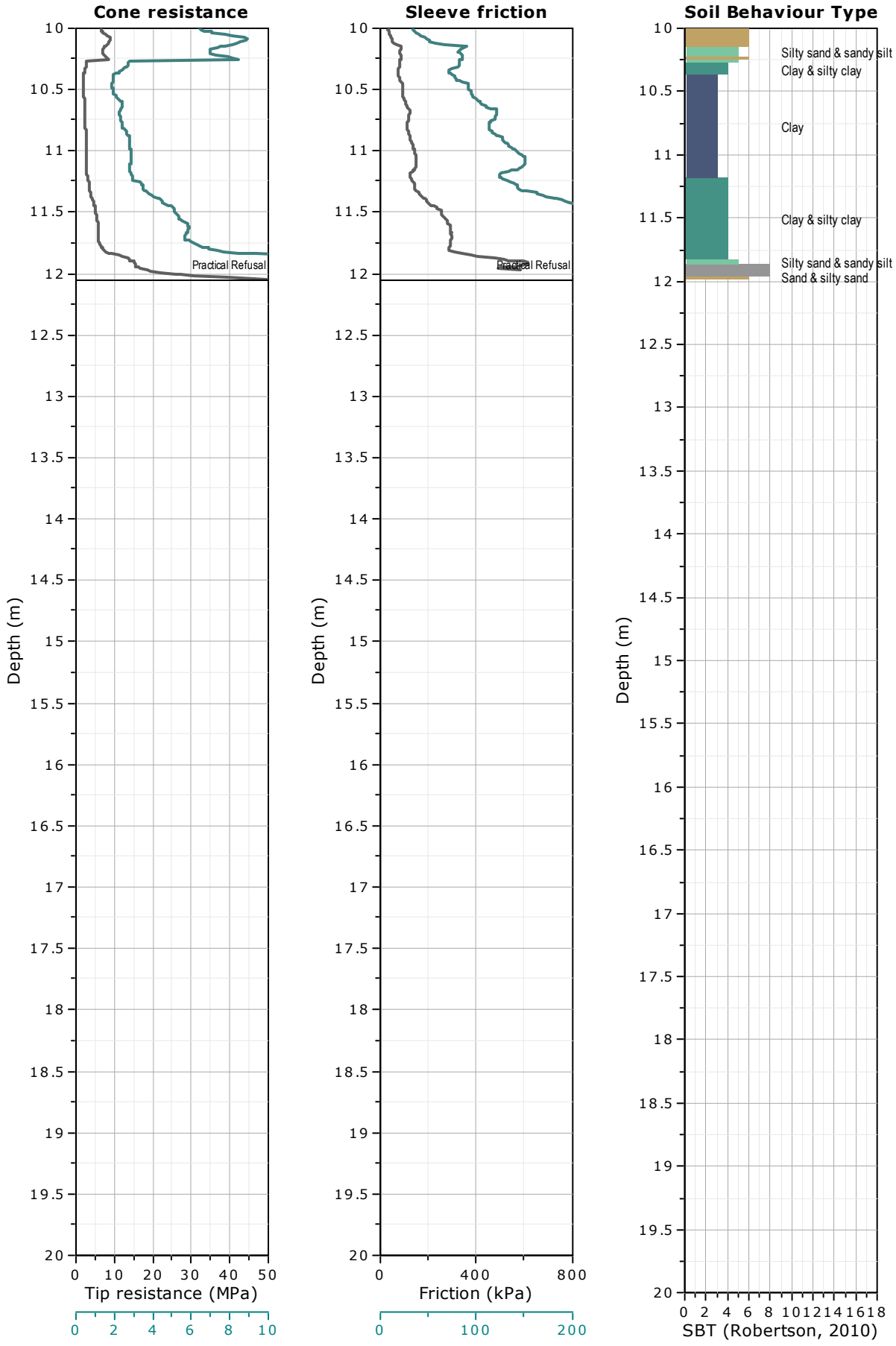
CPT: CPT01
Total depth: 12.05 m, Date: 20/12/2021
Coords: N 332116, E 6245537
Cone Operator: JK Drilling



Pells Sullivan Meynink
Engineering Consultants | Rock Soil Water
G3 56 Delhi Road, North Ryde NSW 2133 Australia
www.psm.com.au

Project: 28-30 Burrows Road, St Peters
Location: 28-30 Burrows Road, St Peters

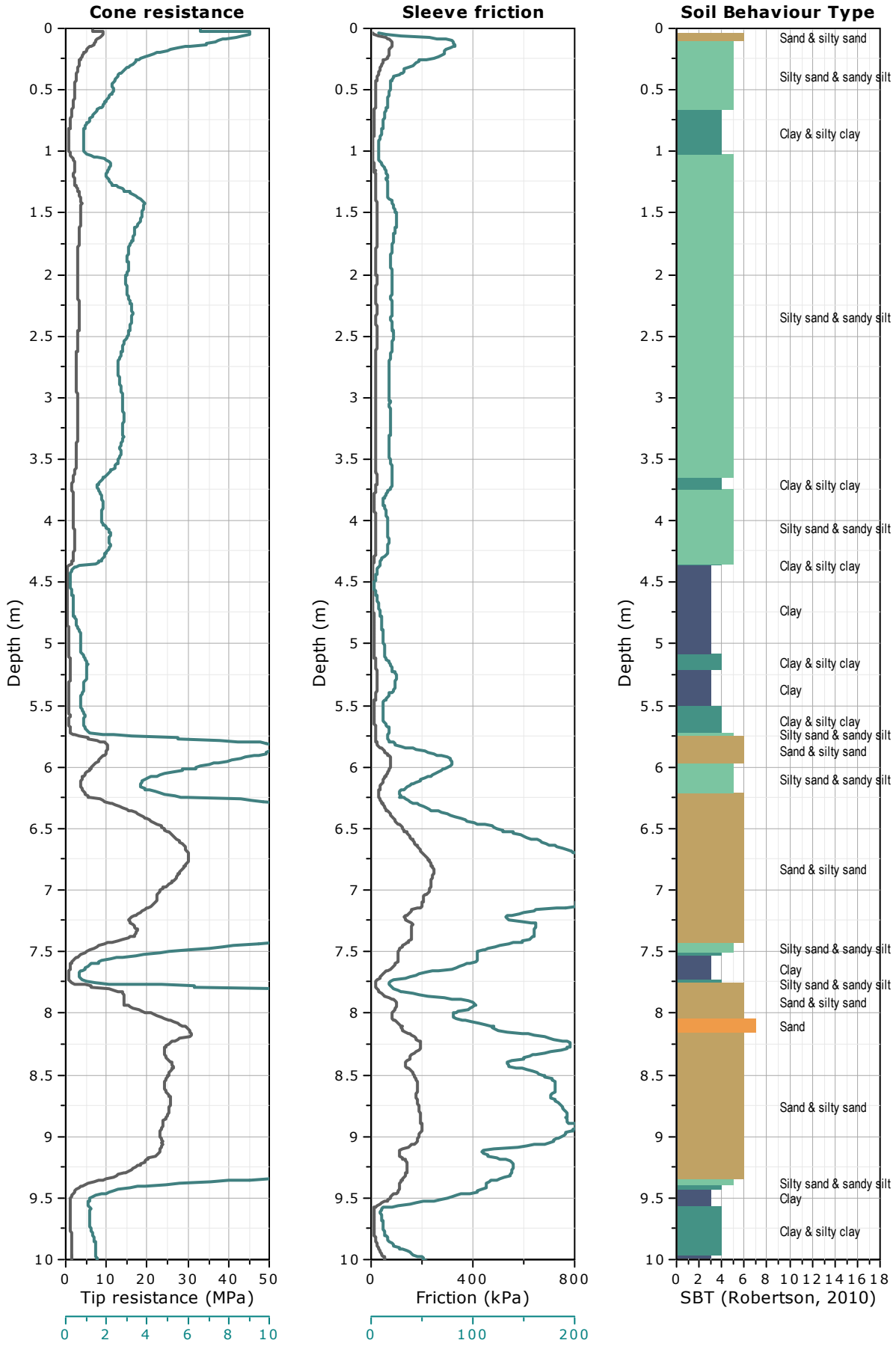
CPT: CPT01
Total depth: 12.05 m, Date: 20/12/2021
Coords: N 332116, E 6245537
Cone Operator: JK Drilling



Pells Sullivan Meynink
Engineering Consultants | Rock Soil Water
G3 56 Delhi Road, North Ryde NSW 2133 Australia
www.psm.com.au

Project: 28-30 Burrows Road, St Peters
Location: 28-30 Burrows Road, St Peters

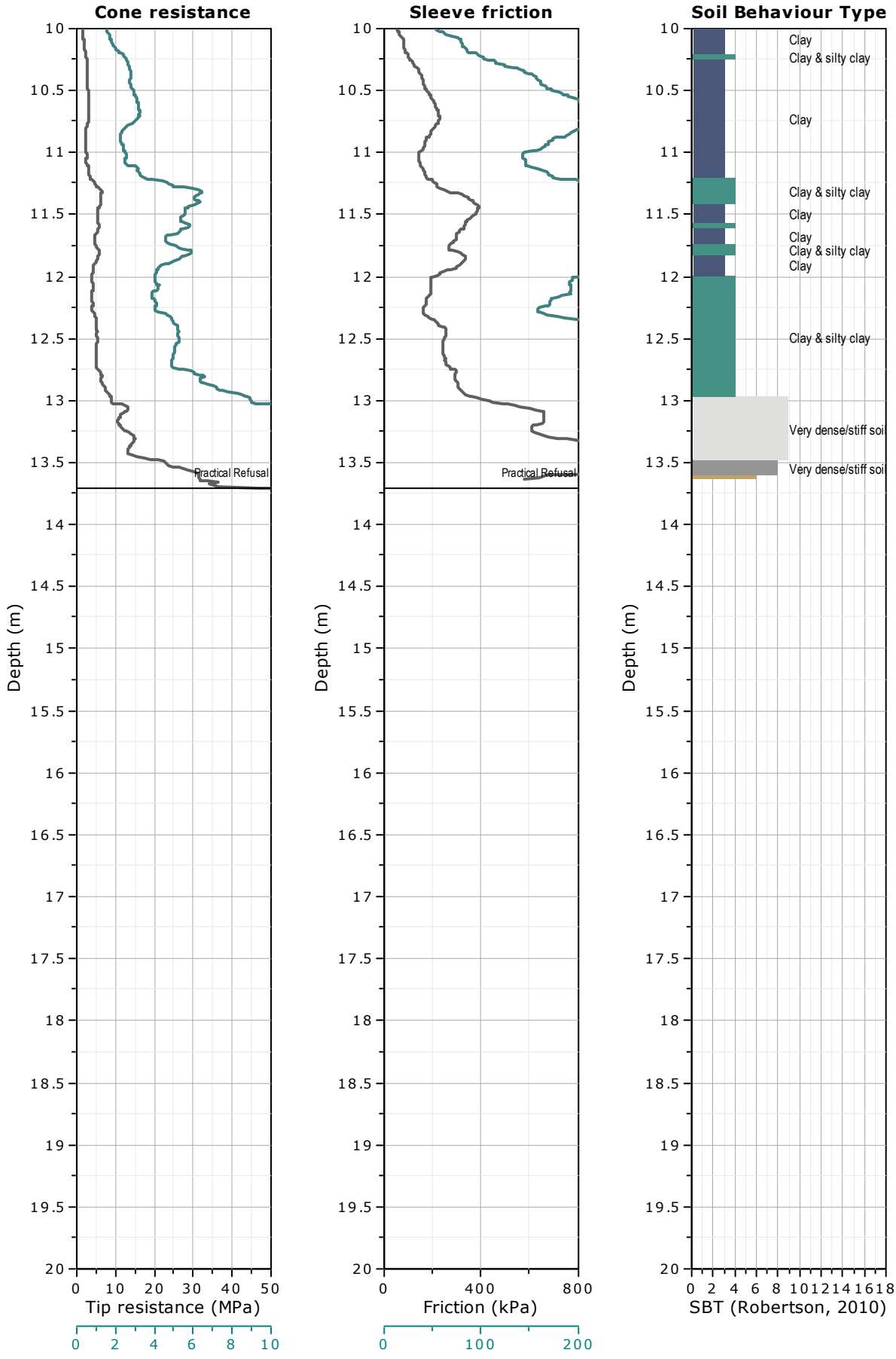
CPT: CPT02
Total depth: 13.71 m, Date: 20/12/2021
Coords: N 332119, E 6245563
Cone Operator: JK Drilling



Pells Sullivan Meynink
Engineering Consultants | Rock Soil Water
G3 56 Delhi Road, North Ryde NSW 2133 Australia
www.psm.com.au

CPT: CPT02
Total depth: 13.71 m, Date: 20/12/2021
Coords: N 332119, E 6245563
Cone Operator: JK Drilling

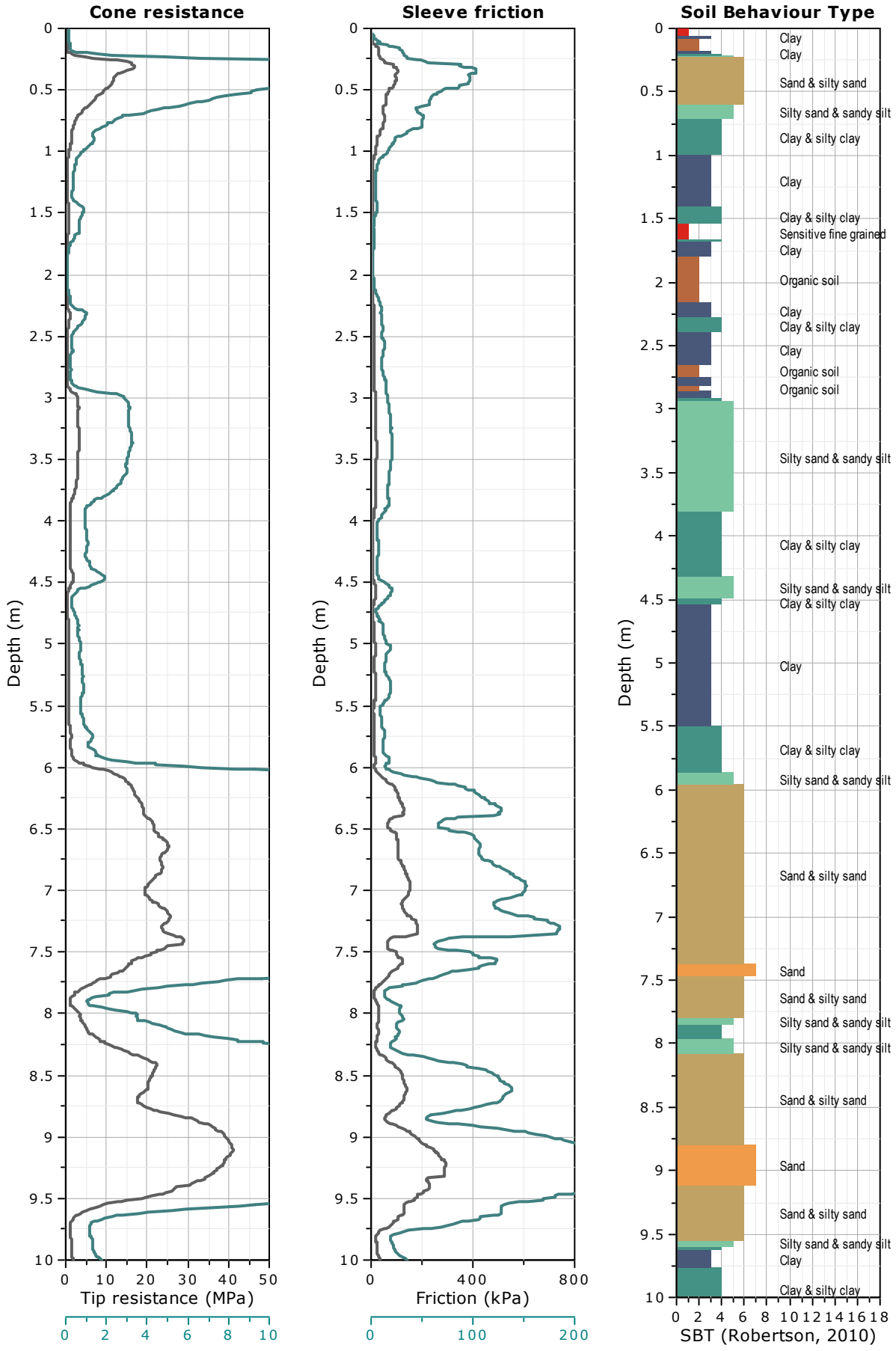
Project: 28-30 Burrows Road, St Peters
Location: 28-30 Burrows Road, St Peters



Pells Sullivan Meynink
Engineering Consultants | Rock Soil Water
G3 56 Delhi Road, North Ryde NSW 2133 Australia
www.psm.com.au

Project: 28-30 Burrows Road, St Peters
Location: 28-30 Burrows Road, St Peters

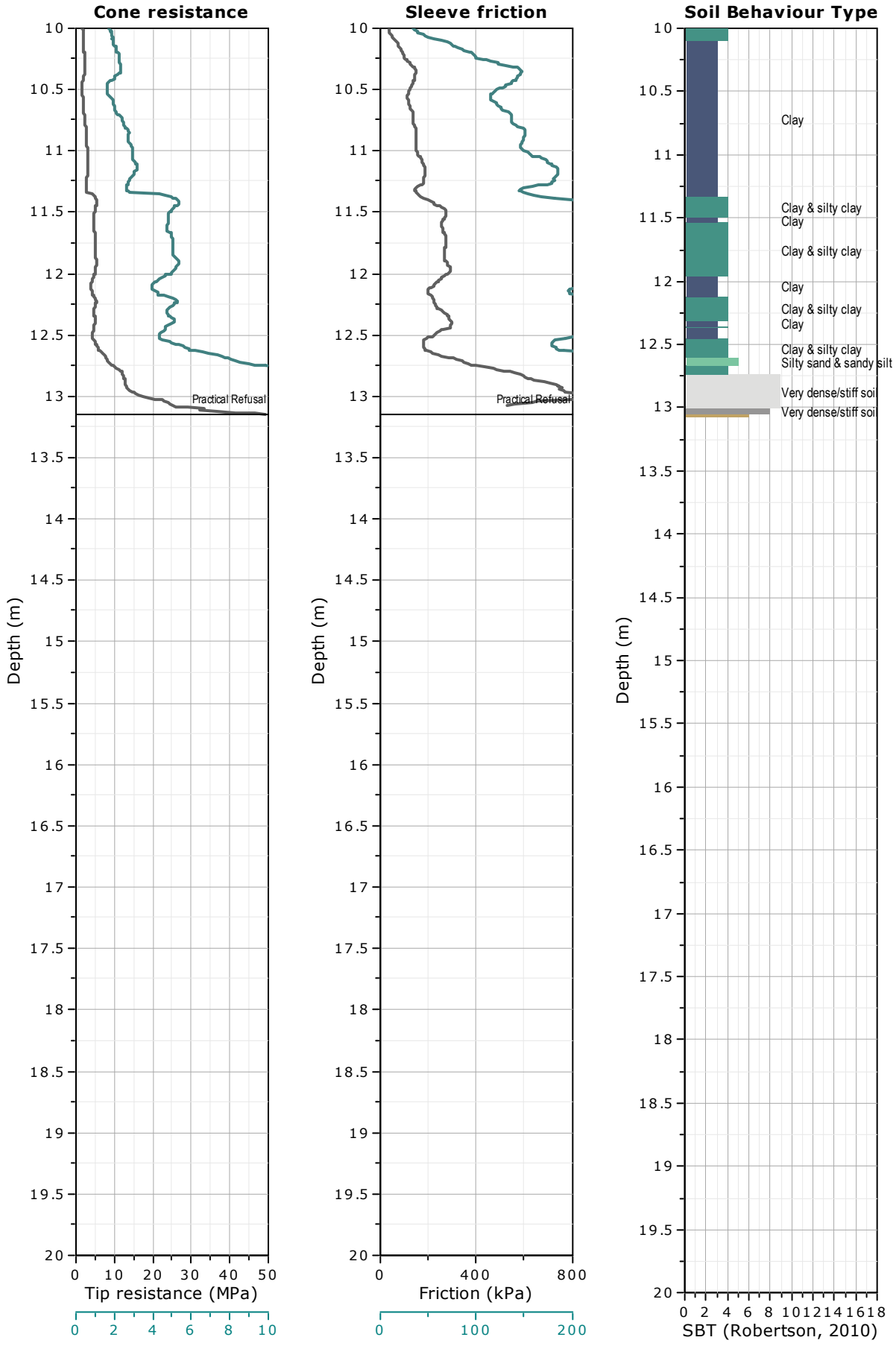
CPT: CPT03
Total depth: 13.15 m, Date: 20/12/2021
Coords: N 332096, E 6245555
Cone Operator: JK Drilling



Pells Sullivan Meynink
Engineering Consultants | Rock Soil Water
G3 56 Delhi Road, North Ryde NSW 2133 Australia
www.psm.com.au

CPT: CPT03
Total depth: 13.15 m, Date: 20/12/2021
Coords: N 332096, E 6245555
Cone Operator: JK Drilling

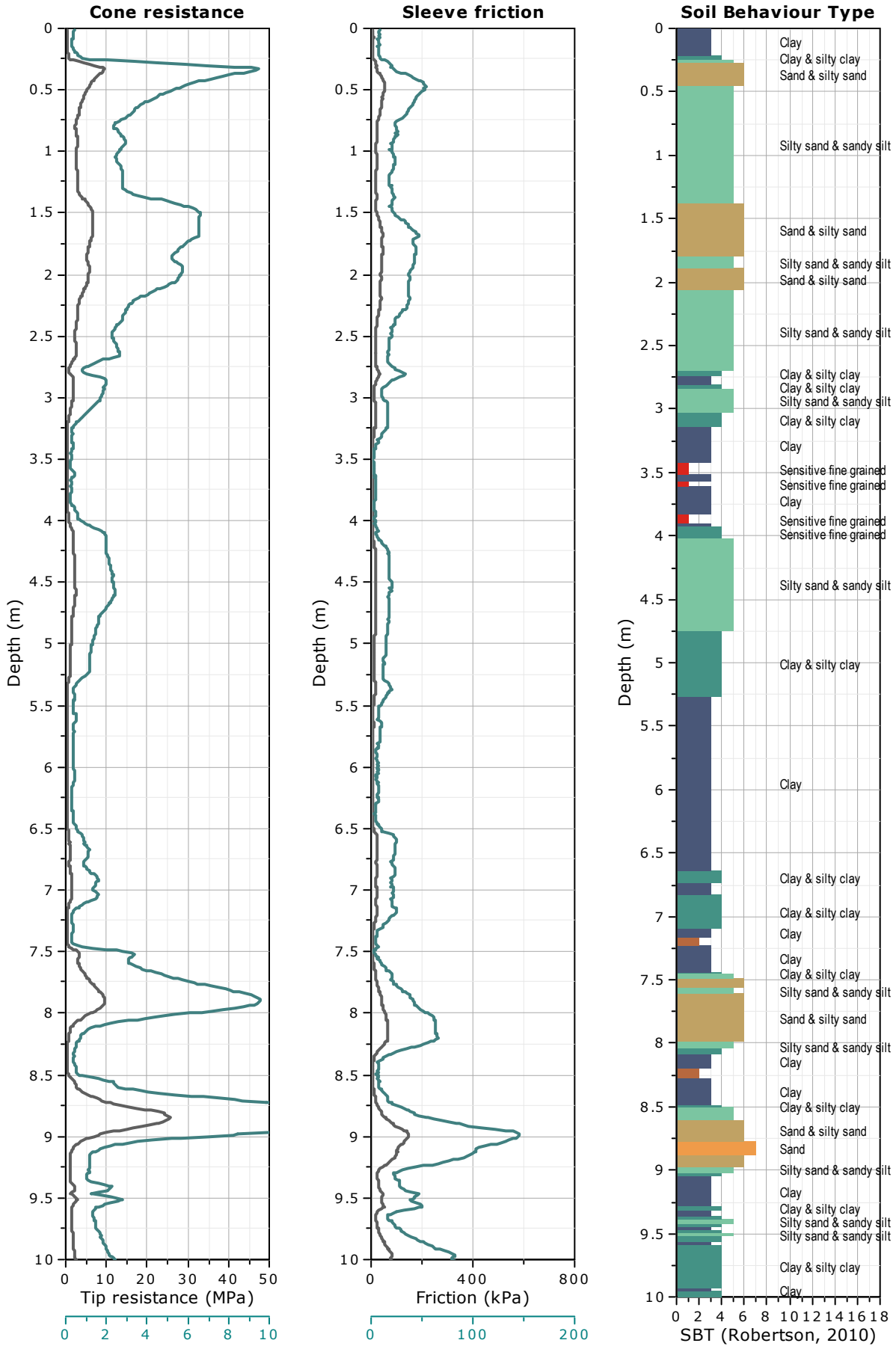
Project: 28-30 Burrows Road, St Peters
Location: 28-30 Burrows Road, St Peters



Pells Sullivan Meynink
Engineering Consultants | Rock Soil Water
G3 56 Delhi Road, North Ryde NSW 2133 Australia
www.psm.com.au

CPT: CPT04
Total depth: 15.17 m, Date: 20/10/2021
Coords: N 332172, E 6245569
Cone Operator: JK Drilling

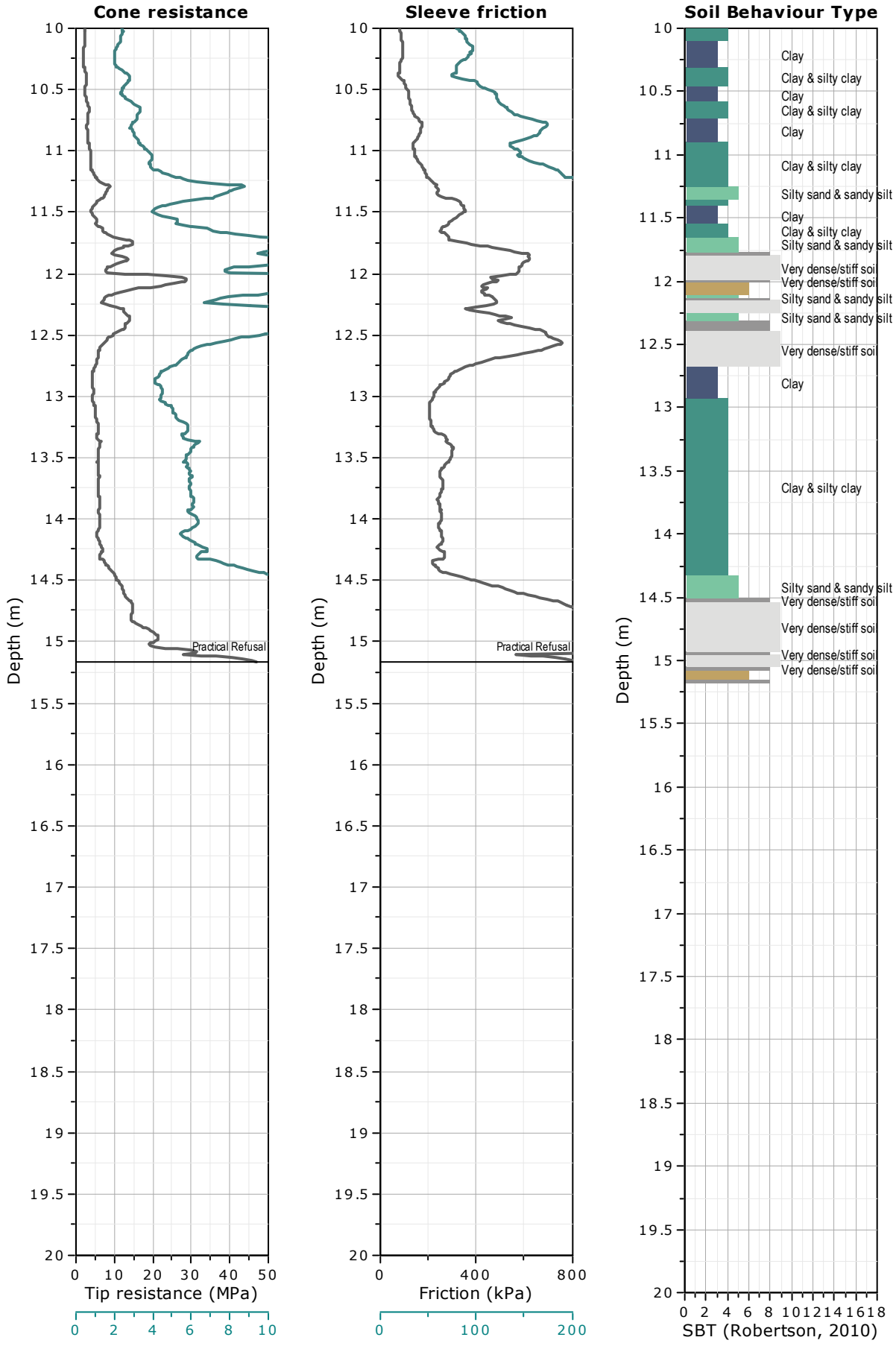
Project: 28-30 Burrows Road, St Peters
Location: 28-30 Burrows Road, St Peters



Pells Sullivan Meynink
Engineering Consultants | Rock Soil Water
G3 56 Delhi Road, North Ryde NSW 2133 Australia
www.psm.com.au

CPT: CPT04
Total depth: 15.17 m, Date: 20/10/2021
Coords: N 332172, E 6245569
Cone Operator: JK Drilling

Project: 28-30 Burrows Road, St Peters
Location: 28-30 Burrows Road, St Peters



Appendix B
Borehole Log

Borehole ID

BH01

Page 1 of 5

Engineering Log - Non Cored Borehole

Project No.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	20/12/2021
Project Name:	28-30 Burrows Road, St Peters	Completed:	20/12/2021
Hole Location:	Refer to Figure 1	Logged By:	BT/BG
Hole Position:	332116.0 m E 6245546.0 m N GDA2020	Checked By:	DP

Drill Model and Mounting:	JK 500	Inclination:	-90°	RL Surface:	2.76 m		
Hole Diameter:	120 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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: 6,5,4 N=9 CBR 0.50 m		1.8	1			CONCRETE: 180 mm				0.00: CONCRETE
										SAND with gravel: dark grey, fine to coarse grained; gravel sub-rounded to sub-angular up to 10 mm	D	L		0.18: Inferred FILL
										Silty SAND: pale and dark grey, coarse grained	M	L		
						0.8	2			Sandy CLAY trace gravel: low to medium plasticity, dark grey; sand coarse grained; gravel sub-angular up to 5 mm		L		1.50: Inferred NATURAL
						-0.2	3			SAND: grey, coarse grained	W	L		
WB		C		SPT: 1,2,1 N=3		-1.2	4			CLAY: grey				

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
CT - Continuous push tube 1.5m long 76mm diameter

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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	20/12/2021
Project Name:	28-30 Burrows Road, St Peters	Completed:	20/12/2021
Hole Location:	Refer to Figure 1	Logged By:	BT/BG
Hole Position:	332116.0 m E 6245546.0 m N GDA2020	Checked By:	DP

Drill Model and Mounting:	JK 500	Inclination:	-90°	RL Surface:	2.76 m		
Hole Diameter:	120 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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
WB		C				-3.2	6			CLAY: grey *(continued)*				
						-4.2	7			SAND: grey CLAY band; dark grey, 200 mm thick	W			
						-5.2	8							
						-6.2	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
CT - Continuous push tube 1.5m long 76mm diameter

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
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Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Non Cored Borehole

Project No.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	20/12/2021
Project Name:	28-30 Burrows Road, St Peters	Completed:	20/12/2021
Hole Location:	Refer to Figure 1	Logged By:	BT/BG
Hole Position:	332116.0 m E 6245546.0 m N GDA2020	Checked By:	DP

Drill Model and Mounting:	JK 500	Inclination:	-90°	RL Surface:	2.76 m		
Hole Diameter:	120 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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
WB		C				-8.2	11			SAND: grey *(continued)*	W			11.50: Driling resistance increased
						-9.2	12			CLAY: dark grey				
						-10.2	13			Continued on cored borehole sheet				
						-11.2	14							

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
CT - Continuous push tube 1.5m long 76mm diameter

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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	20/12/2021
Project Name:	28-30 Burrows Road, St Peters	Completed:	20/12/2021
Hole Location:	Refer to Figure 1	Logged By:	BT/BG
Hole Position:	332116.0 m E 6245546.0 m N GDA2020	Checked By:	DP

Drill Model and Mounting: JK 500 Inclination: -90° RL Surface: 2.76 m
Barrel Type and Length: NMLC 3 m Bearing: Datum: AHD Operator: JK Drilling

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					-8.2	11						
					-9.2	12		Continued from non-cored borehole sheet NO CORE: 600 mm				
		64	Is(50) d=0.1 a=0.1 MPa		-10.2	13		SHALE: dark brown or dark grey, very low strength, extremely weathered		●		
			Is(50) d=0.1 a=0.3 MPa		-11.2	14		Becomes very low to low strength, highly weathered		○		JT, 90°, CL, CU, Healed FZ, G, IR, 60 mm BP, 5°, CL, PR, S BP, 0°, CL, CU, S BP, 0°, CN, PR, S BP, 2°, CN, PR, S BP, 2°, CL, 1 mm
		88	Is(50) d=0 a=0.2 MPa					Becomes low strength, moderately weathered		●		SM, CL, 20 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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	20/12/2021
Project Name:	28-30 Burrows Road, St Peters	Completed:	20/12/2021
Hole Location:	Refer to Figure 1	Logged By:	BT/BG
Hole Position:	332116.0 m E 6245546.0 m N GDA2020	Checked By:	DP

Drill Model and Mounting:	JK 500	Inclination:	-90°	RL Surface:	2.76 m		
Barrel Type and Length:	NMLC 3 m	Bearing:		Datum:	AHD	Operator:	JK Drilling

Method	Water	RQD (%)	Samples and Field Tests	WPT (Lugeons)	RL (m)	Depth (m)	Material Description	Defect Descriptions / Comments
NMLC		88	Is(50) d=0 a=0.2 MPa; Is(50) d=0.1 a=0.1 MPa		-13.2; -14.2	16; 17	SHALE: dark brown or dark grey, very low strength, extremely weathered *(continued)*	BP, 0°, CN, PR, S BP, 0°, CN, PR, S BP, 0°, CN, PR, S BP, 0°, CN, PR, S BP, 0°, CN, ST, S BP, 0°, CN, PR, S IS, CL, 10 mm BP, 3°, CL, PR, S, 1 mm BP, 3°, CN, PR, S BP, 1°, CN, ST, S BP, 0°, CN, ST, S
					-15.2; -16.2	18; 19	Hole Terminated at 17.10 m Target depth	

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

LOGOS

28-30 Burrows Road

St Peters

CORE PHOTOS BH01

(Core Photo 1 OF 1)

PSM4637-003L	Appendix B

Borehole ID

BH02

Engineering Log - Non Cored Borehole

Project No.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	25/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	25/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332106.0 m E 6245533.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting:	JK 309	Inclination:	-90°	RL Surface:	2.78 m		
Hole Diameter:	125 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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/T										CONCRETE: 110 mm				
										Silty SAND with gravel: dark brown, fine to medium grained, well sorted, gravel is sub-angular up to 50mm				0.10: INFERRED FILL
				SPT - 0.5 m 10, 7, 6 N = 13							D to M	MD		
				ES 1.00 m		1.8	1			Clayey SAND: dark grey, fine to coarse grained, well sorted				1.00: INFERRED NATURAL
		N	▽	SPT - 1.5 m 1, 0, 1 N = 1							M			
										Becomes dark and light grey		L		
						0.8	2				W			
										Silty SAND: light grey, fine to medium grained, poorly graded				
				SPT - 3.0 m 1, 1, 2 N = 3		-0.2	3				W	L		
WB		C								CLAY trace silt: light grey				
						-1.2	4							
				SPT - 4.5 m 2, 1, 1 N = 2							W	S		

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
CT - Continuous push tube 1.5m long 76mm diameter

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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	25/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	25/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332106.0 m E 6245533.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting:	JK 309	Inclination:	-90°	RL Surface:	2.78 m		
Hole Diameter:	125 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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
WB		C		SPT - 6.0 m 0, 0, 0 N = 0		-3.2	6			CLAY trace silt: light grey *(continued)*	W	S		6.00: SPT settled full length under self-weight
										Silty SAND: dark grey				
						-4.2	7							
						-5.2	8				W	VL		
						-6.2	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
CT - Continuous push tube 1.5m long 76mm diameter

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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	25/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	25/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332106.0 m E 6245533.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting:	JK 309	Inclination:	-90°	RL Surface:	2.78 m		
Hole Diameter:	125 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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
WB		C				-8.2	11			Silty SAND: dark grey *(continued)*	W	VL		
										CLAY: dark grey and brown				
						-9.2	12							
						-10.2	13							
										Continued on cored borehole sheet				
						-11.2	14							

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
CT - Continuous push tube 1.5m long 76mm diameter

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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	25/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	25/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332106.0 m E 6245533.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting: JK 309 | Inclination: -90° | RL Surface: 2.78 m
Barrel Type and Length: | Bearing: | Datum: AHD | Operator: JK Drilling

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
					-8.2	11						
					-9.2	12						
					-10.2	13		Continued from non-cored borehole sheet				
NMLC	100% Water RETURN	93.7	Is(50) d=0.1 a=0.1 MPa Is(50) d=0.1 a=0.2 MPa		-11.2	14		SHALE: light grey, ironstained		● ○		BP, 1°, CN, PR, RF CZ, 50 mm BP, 3°, RF, IR, RF, 20 mm BP, 6°, RF, UN, RF, 20 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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	25/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	25/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332106.0 m E 6245533.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting: JK 309 | Inclination: -90° | RL Surface: 2.78 m
Barrel Type and Length: | Bearing: | Datum: AHD | Operator: JK Drilling

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	100% Water RETURN	93.7	Is(50) d=0.1 a=0.2 MPa Is(50) d=0.1 a=0.1 MPa		-13.2	16		SHALE: light grey, ironstained*(continued)*				BP, 9°, CN, PR, RF BP, 2°, CN, PR, RF
								Hole Terminated at 16.30 m Target depth				
					-14.2	17						
					-15.2	18						
					-16.2	19						

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

PSM

LOGOS	
28-30 Burrows Road	
St Peters	
CORE PHOTOS BH02	
(Core Photo 2 OF 2)	
PSM4637-003L	Appendix B

Borehole ID

BH03

Engineering Log - Non Cored Borehole

Project No.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	25/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	25/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332117.0 m E 6245562.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting:	JK 309	Inclination:	-90°	RL Surface:	2.73 m		
Hole Diameter:	125 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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/T		N	▽	ES 2.00 m		1.7	1			CONCRETE				
										Gravelly SAND with silt: dark grey, medium to coarse grained, gravel is sub-angular up to 50mm	D to M			0.20: INFERRED FILL
										Silty CLAY with gravel: light grey and dark grey, gravel is sub-angular up to 40mm	D to M			
										Silty SAND trace gravel: dark grey, fine to medium grained, gravel is sub-angular up to 20mm	M			
						0.7	2				W			
										Silty SAND: dark grey, fine to medium grained	W			2.50: INFERRED NATURAL
WB		C				-0.3	3							
						-1.3	4			CLAY with silt: light grey and dark grey	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
CT - Continuous push tube 1.5m long 76mm diameter

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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	25/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	25/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332117.0 m E 6245562.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting:	JK 309	Inclination:	-90°	RL Surface:	2.73 m		
Hole Diameter:	125 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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
WB		C								CLAY with silt: light grey and dark grey *(continued)*	W			
						-3.3	6			Silty SAND: grey				
						-4.3	7				W			
						-5.3	8							
						-6.3	9			CLAY trace silt: grey and brown	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
CT - Continuous push tube 1.5m long 76mm diameter

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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	25/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	25/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332117.0 m E 6245562.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting:	JK 309	Inclination:	-90°	RL Surface:	2.73 m		
Hole Diameter:	125 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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
WB		C				-8.3	11			CLAY trace silt: grey and brown *(continued)*	W			10.00: Increased resistance
						-9.3	12							
						-10.3	13			Continued on cored borehole sheet				
						-11.3	14							

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
CT - Continuous push tube 1.5m long 76mm diameter

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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	25/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	25/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332117.0 m E 6245562.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting: JK 309 | Inclination: -90° | RL Surface: 2.73 m
Barrel Type and Length: | Bearing: | Datum: AHD | Operator: JK Drilling

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
					-8.3	11						
					-9.3	12		Continued from non-cored borehole sheet				
NMLC	100% Water RETURN	17	Is(50) d=0 a=0 MPa		-10.3	13		CLAY: brown and grey, high plasticity SHALE: grey				BP, 5°, CN, PR, RF BP, 1°, CN, PR, RF BP, 2°, CN, PR, RF BP, 26°, CN, PR, RF BP, 3°, CN, UN, RF BP, 2°, CN, PR, RF BP, 3°, CN, PR, RF
					-11.3	14						BP, 5°, CN, PR, RF CZ, 160 mm JT, 89°, RF, 170 mm BP, 3°, RF, PR, RF CZ, 330 mm JT, 86°, RF, 100 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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	25/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	25/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332117.0 m E 6245562.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting: JK 309 Inclination: -90° RL Surface: 2.73 m
Barrel Type and Length: Bearing: Datum: AHD Operator: JK Drilling

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		17	Is(50) d=0.1 a=0 MPa					SHALE: grey*(continued)*				BP, 2°, RF, PR, RF BP, 1°, RF, PR, RF BP, 6°, CN, PR, RF
					-13.3	16		Hole Terminated at 15.60 m Target depth				
					-14.3	17						
					-15.3	18						
					-16.3	19						

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

LOGOS

28-30 Burrows Road

St Peters

CORE PHOTOS BH03

(Core Photo 2 OF 2)

PSM4637-003L	Appendix B

Borehole ID

BH04

Page 1 of 5

Engineering Log - Non Cored Borehole

Project No.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	26/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	26/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332167.0 m E 6245589.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting:	JK 309	Inclination:	-90°	RL Surface:	2.75 m		
Hole Diameter:	125 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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/T		N	▽	SPT - 0.5 m 3, 3, 3 n = 6		1.8	1			CONCRETE: 150mm				
										Gravelly CLAY with sand: dark brown, medium plasticity, sand is fine to coarse grained, gravel is sub-angular up to 40mm	D	L		0.15: INFERRED FILL
										SAND with gravel trace silt: dark and light grey, fine to coarse grained, gravel is sub-angular up to 40mm	M to W	VL		0.80: INFERRED NATURAL
				SPT - 1.5 m 1, 1, 2 n = 3		0.8	2			Silty SAND: dark and light grey, fine to coarse grained	W	VL		
				SPT - 3.0 m 0, 0.5, 0.5 n = 1		-0.3	3			CLAY trace silt: dark grey, medium plasticity	W	VS		
WB		C		ES 3.50 m		-1.3	4			Silty SAND: dark and light grey	W	VL		
										Silty CLAY: dark grey	W	S		

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
CT - Continuous push tube 1.5m long 76mm diameter

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.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	26/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	26/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332167.0 m E 6245589.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting:	JK 309	Inclination:	-90°	RL Surface:	2.75 m		
Hole Diameter:	125 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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
WB		C				-3.3	6			Silty CLAY: dark grey *(continued)*	W	S		
						-4.3	7			Silty SAND: grey	W			
						-5.3	8			Silty CLAY: grey	W			
										Silty SAND: grey	W			
						-6.3	9			CLAY trace silt trace sand: grey	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
CT - Continuous push tube 1.5m long 76mm diameter

Penetration
No resistance
Refusal

Water
Inflow
Partial Loss
Complete Loss

Samples and Tests
U - Undisturbed Sample
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Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Non Cored Borehole

Project No.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	26/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	26/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332167.0 m E 6245589.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting:	JK 309	Inclination:	-90°	RL Surface:	2.75 m		
Hole Diameter:	125 mm	Bearing:		Datum:	AHD	Operator:	JK Drilling

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
WB		C				-8.3	11			CLAY trace silt trace sand: grey *(continued)*	W			
						-9.3	12			Continued on cored borehole sheet				
						-10.3	13							
						-11.3	14							

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
CT - Continuous push tube 1.5m long 76mm diameter

Penetration
No resistance
Refusal

Water
Inflow
Partial Loss
Complete Loss

Samples and Tests
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Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	26/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	26/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332167.0 m E 6245589.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting: JK 309 Inclination: -90° RL Surface: 2.75 m

Barrel Type and Length: Bearing: Datum: AHD Operator: JK Drilling

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
					-8.3	11						
					-9.3	12		Continued from non-cored borehole sheet				
NMLC	100% Water RETURN	97			-10.3	13		CLAYSTONE: pale grey, ironstained				BP, 1°, CN, PR, RF CZ, RF, 40 mm BP, 1°, CN, CU, RF
								LAMINITE: pale grey and yellow, 50% shale, 50% sandstone				BP, 2°, CN, PR, RF
			Is(50) d=0.1 a=0 MPa		-11.3	14						IS, CL, 50 mm IS, CL, 20 mm
		75	Is(50) d=0 a=0 MPa									BP, 2°, CN, 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
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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
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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
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Logged in accordance with AS 1726:2017 Geotechnical site investigations

Engineering Log - Cored Borehole

Project No.: PSM4637

Client:	LOGOS Property Group Ltd	Commenced:	26/07/2022
Project Name:	28-30 Burrows Road, St Peters	Completed:	26/07/2022
Hole Location:	Refer to Figure 1	Logged By:	KTL
Hole Position:	332167.0 m E 6245589.0 m N GDA2020	Checked By:	AS

Drill Model and Mounting: JK 309 Inclination: -90° RL Surface: 2.75 m
Barrel Type and Length: Bearing: Datum: AHD Operator: JK Drilling

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	100% Water RETURN	75	Is(50) d=0 a=0 MPa Is(50) d=0.1 a=0.2 MPa Is(50) d=0.1 a=0 MPa		-13.3 -14.3 -15.3 -16.3	16 17 18 19		LAMINITE: pale grey and yellow, 50% shale, 50% sandstone*(continued)* LAMINITE: dark grey and pale yellow, 80% shale, 20% sandstone Hole Terminated at 17.48 m Target depth				JT, 84°, RF, RF, 90 mm BP, 2°, CN, PR, RF BP, 1°, CN, UN, RF BP, 2°, CN, UN, RF CZ, 70 mm JT, 88°, RF, 130 mm BP, 2°, RF, IR, RF, 20 mm CZ, 100 mm BP, 1°, CN, PR, RF BP, 0°, RF, PR, RF BP, 0°, CN, PR, RF, 20 mm BP, 2°, CN, PR, RF BP, 2°, CN, CU, RF BP, 1°, CN, CU, 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

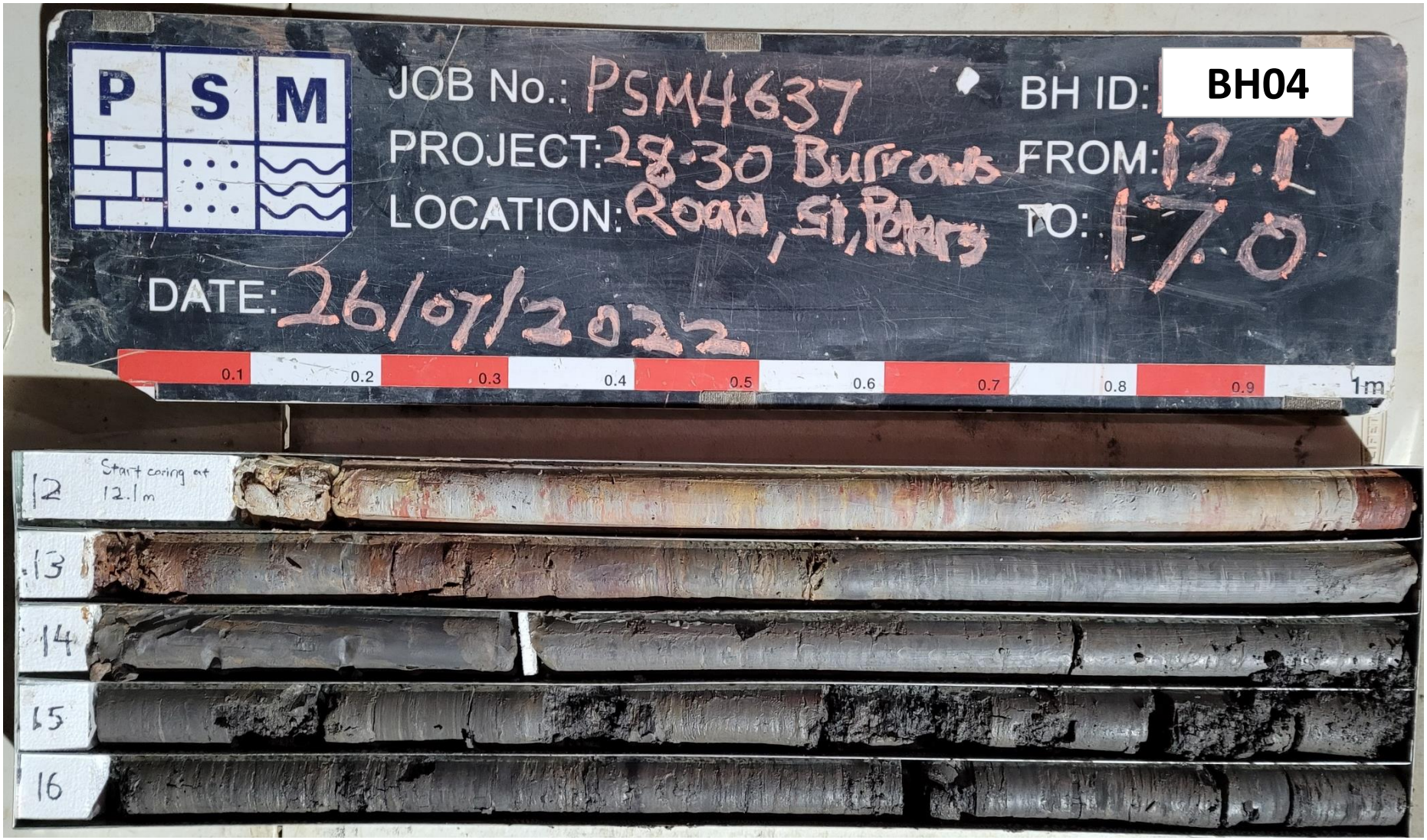
Defect Type
FT - Fault
SS - Shear Surface
SZ - Shear Zone
BP - Bedding parting
SM - Seam
IS - Infilled Seam
JT - Joint
CO - Contact
CZ - Crushed Zone
VN - Vein
FZ - Fracture Zone
BSH - Bedding Shear
DB - Drilling Break

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



LOGOS 28-30 Burrows Road St Peters CORE PHOTOS BH04 (Core Photo 2 OF 2)	
PSM4637-003L	Appendix B

LOGOS

28-30 Burrows Road

St Peters

CORE PHOTOS BH04

(Core Photo 2 OF 2)

PSM4637-003L	Appendix B

Appendix C
CBR Results

115 Wicks Road
Macquarie Park, NSW 2113
PO Box 976
North Ryde, Bc 1670
Telephone: 02 9888 5000
Facsimile: 02 9888 5001

SOIL TEST SERVICES

ABN 43 002 145 173

FOUR DAY SOAKED CALIFORNIA BEARING RATIO TEST REPORT

Client: Pells Sullivan Meynink
PSM Job No.: PSM4637

Report No.: L4730E - 1
Report Date: 11/01/2022
Page 1 of 1

SAMPLE NUMBER	BH 1	CPT02
DEPTH (m)	0.50 - 1.50	0.20 - 1.30
Surcharge (kg)	4.5	4.5
Maximum Dry Density (t/m^3)	1.67 STD	1.75 STD
Optimum Moisture Content (%)	17.1	15.9
Moulded Dry Density (t/m^3)	1.63	1.71
Sample Density Ratio (%)	98	98
Sample Moisture Ratio (%)	102	99
Moisture Contents		
Insitu (%)	24.3	11.9
Moulded (%)	17.5	15.8
After soaking and		
After Test, Top 30mm(%)	20.0	18.5
Remaining Depth (%)	19.4	16.9
Material Retained on 19mm Sieve (%)	0	0
Swell (%)	0.0	0.0
C.B.R. value:		
@5.0mm penetration	8	11

NOTES: Sampled and supplied by client. Samples tested as received.

- Refer to appropriate Borehole logs for soil descriptions
- Test Methods : AS 1289 6.1.1, 5.1.1 & 2.1.1.
- Date of receipt of sample: 21/12/2021.
- BH 1 dried back prior to testing as the sample was too saturated.

NATA

NATA Accredited Laboratory Number:1327

11/01/2022
Authorised Signature / Date
(D. Treweek)

Appendix D
Laboratory Testing Results

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2226458**	Page	: 1 of 2
Client	: **PELLS SULLIVAN MEYNINK T/A PSM Admin PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Ken Tong Lee	Contact	: Customer Services ES
Address	: G3, 56 DELHI ROAD NORTH RYDE NSW, AUSTRALIA 2113	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: PSM4637	Date Samples Received	: 27-Jul-2022 12:30
Order number	: ----	Date Analysis Commenced	: 29-Jul-2022
C-O-C number	: ----	Issue Date	: 04-Aug-2022 09:28
Sampler	: Ken Tong Lee		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 3		
No. of samples analysed	: 3		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).

Analytical Results

Sub-Matrix: **SOIL** (Matrix: **SOIL**)			Sample ID	**BH01@1.5m**	**BH02@2.0m**	**BH03@3.5m**	**----**	**----**
			Sampling date / time	25-Jul-2022 00:00	25-Jul-2022 00:00	26-Jul-2022 00:00	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES2226458-001**	**ES2226458-002**	**ES2226458-003**	**--------**	**--------**
				Result	Result	Result	----	----
EA002: pH 1:5 (Soils)								
pH Value	----	0.1	pH Unit	**6.1**	**6.4**	**6.1**	**----**	**----**
EA010: Conductivity (1:5)								
Electrical Conductivity @ 25°C	----	1	µS/cm	**90**	**50**	**35**	**----**	**----**
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	0.1	%	**31.5**	**13.7**	**20.1**	**----**	**----**
EA080: Resistivity								
Resistivity at 25°C	----	1	ohm cm	**11100**	**20000**	**28600**	**----**	**----**
ED007: Exchangeable Cations								
Exchangeable Sodium	----	0.1	meq/100g	**0.2**	**0.1**	<0.1	**----**	**----**
Cation Exchange Capacity	----	0.1	meq/100g	**7.2**	**3.5**	**2.5**	**----**	**----**
ED040S : Soluble Sulfate by ICPAES								
Sulfate as SO4 2-	14808-79-8	10	mg/kg	**100**	**40**	**50**	**----**	**----**
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	10	mg/kg	**30**	**20**	**20**	**----**	**----**

Appendix E
Piezometer Construction Record

Pells Sullivan Meynink
Engineering Consultants
Rock - Soil - Water

JOB no.: PSM4637

PROJECT:28-30 Burrows Road, St Peters

PIEZOMETER CONSTRUCTION RECORD

HOLE NUMBER: BH01
PIEZOMETER: PZ_BH01
COLLAR EASTING: 332116
COLLAR NORTHING: 6245546
COLLAR RL(m): -
DATUM: AHD

DRILLING CONTRACTOR: JK Drilling
RIG: JK 500 truck mounted
DEPTH OF HOLE (m): 5.9
BOREHOLE INCLINATION: -90
PIEZO INSTALLATION DATE: 20/12/2021
SUPERVISED BY: BT/BG

Tick boxes

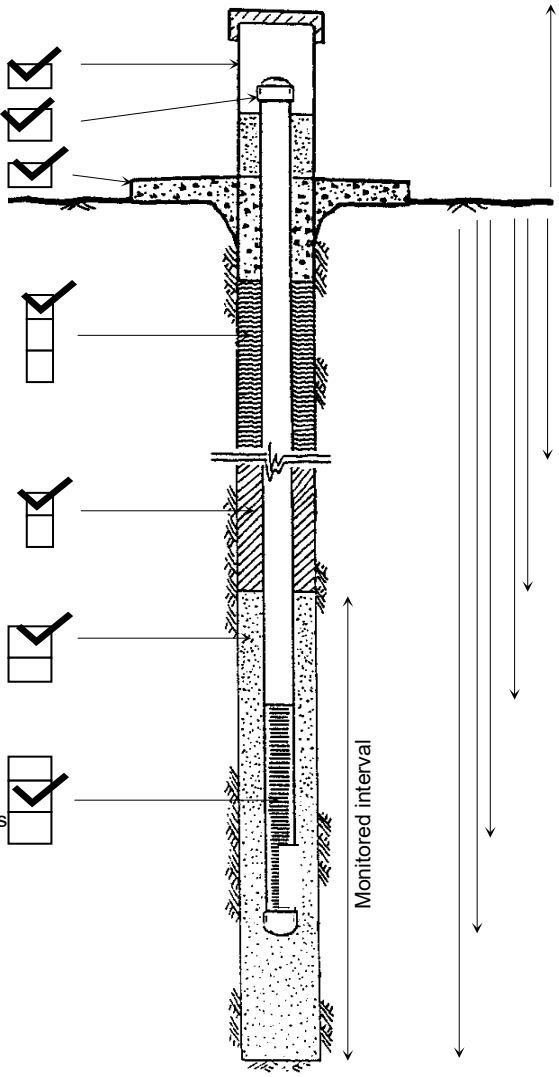
Steel protective well cover ☑
PVC cap ☑
Concrete collar ☑

Back fill type:
Cement bentonite ☑
Soil ☐
None ☐

Seal:
Bentonite pellets ☑
Other ☐

Gravel type:
2-5mm gravel ☑
Other ☐

Perforation type:
Drill holes ☐
Hack saw cuts ☑
40um machine slots ☐



Complete dimensions if appropriate

Height of stickup (m)	0 m
Diameter of PVC (mm)	55 mm
Depth to top of seal	0.15 m
Depth to top of gravel pack	1.5 m
Depth to top of screen	1.5 m
Depth to base of screen	5.85 m
Depth to base of piezo	5.9 m
Depth to base of gravel	5.9 m

COMMENTS:

Pells Sullivan Meynink
Engineering Consultants
Rock - Soil - Water

JOB no.: PSM4637

PROJECT:28-30 Burrows Road, St Peters

PIEZOMETER CONSTRUCTION RECORD

HOLE NUMBER: BH02
PIEZOMETER: PZ_BH02
COLLAR EASTING: 332106
COLLAR NORTHING: 6245533
COLLAR RL(m): -
DATUM: AHD

DRILLING CONTRACTOR: JK Drilling
RIG: JK 309 TRACK MOUNTED
DEPTH OF HOLE (m): 16.30
BOREHOLE INCLINATION: -90
PIEZO INSTALLATION DATE: 25/07/2022
SUPERVISED BY: KTL

Tick boxes

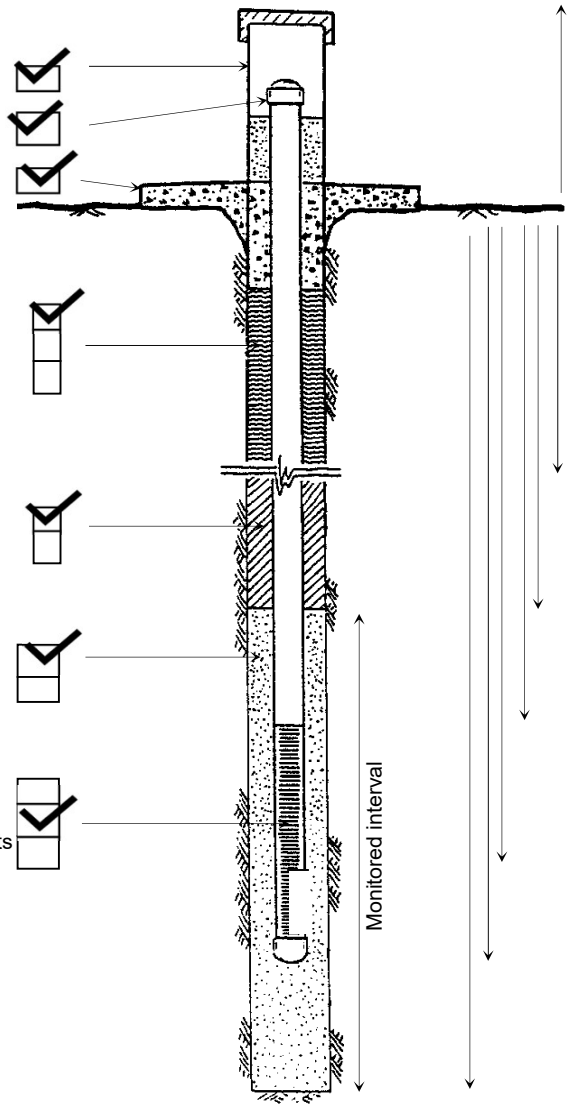
Steel protective well cover ☑
PVC cap ☑
Concrete collar ☑

Back fill type:
Cement bentonite ☑
Soil ☐
None ☐

Seal:
Bentonite pellets ☑
Other ☐

Gravel type:
2-5mm gravel ☑
Other ☐

Perforation type:
Drill holes ☐
Hack saw cuts ☑
40um machine slots ☐



Complete dimensions if appropriate

Height of stickup (m)	0 m
Diameter of PVC (mm)	55 mm
Depth to top of seal	2.0 m
Depth to top of gravel pack	3.0 m
Depth to top of screen	4.0 m
Depth to base of screen	9.8 m
Depth to base of piezo	10 m
Depth to base of gravel	10 m

COMMENTS:

Appendix F
Salinity Management Plan

G3 56 Delhi Road
North Ryde NSW 2113
P +61-2 9812 5000
F +61-2 9812 5001
E mailbox@psm.com.au
www.psm.com.au

Our Ref: PSM4637-006L REV2

4 October 2022

Senior Development Manager
LOGOS Development Management Pty Ltd
L29, Aurora Place
88 Phillip Street
SYDNEY NSW 2000
AthleneKyle@logosproperty.com.au

Attention: Athlene Kyle

Dear Athlene

RE: 28-30 BURROWS ROAD, ST PETERS
SALINITY MANAGEMENT PLAN

1. Introduction

This letter presents salinity management advice for the proposed development at 28-30 Burrows Road, St Peters (the Site). This work has been undertaken in accordance with PSM proposal PSM4637-005L dated 19 April 2022.

Inset 1 presents the site aerial photograph.

Inset 1: Nearmap Aerial Photograph of the site conditions on 17 May 2022 (Site boundary in Red)

2. Objective

The objective of this salinity management plan (SMP) is to effectively manage site salinity, to minimise the effect of the proposed development on the salinity processes and to protect the proposed development from salinity damage.

We have reviewed the bulk earthworks drawing for the site (ref: CO14585.00-DA30 Rev B dated 30 September 2022). We note that the earthworks on site have proposed up to 1.0 m in fill depth and 0.5 m in cut depths. With regards to the potential impacts of salinity damage on the proposed development, we expect site salinity will have minimal impact on the proposed development.

- The proposed development does not include bulk excavations.

3. Salinity and Sodicity Assessment

PSM have undertaken a salinity and sodicity investigation at the Site as part of our geotechnical site investigation (ref: PSM4637-003L REV2, dated 10 August 2022).

The investigation included a total of 4 boreholes, from which 3 samples were taken for salinity and sodicity testing. Figure 1 presents the locality plan of the site.

It is assessed that the soil units tested (as follows) are classified as “Non-saline”.

- Three (3) samples from EXISTING FILL and NATURAL SOIL units.

Furthermore, it is assessed that the soil units on the site are classified as “Non-sodic”.

The report also presented laboratory test results for soil aggressivity assessment as follows:

- pH of the soil samples analysed was in the range of 6.1 to 6.4
- The 1:5 soil to water extraction and subsequent electrical conductivity (EC1:5) of the soil samples analysed to be in the range of 35 µS/cm to 90 µS/cm
- Concentrations of chlorides in samples analysed was in the range of 20 mg/kg to 30 mg/kg
- Concentrations of soluble sulphate in samples analysed was in the range of 40 mg/kg to 100 mg/kg
- Cation Exchange Capacity (CEC) in samples analysed was in the range 2.5 meq/100g to 7.2 meq/100g
- Exchange Sodium Percentage (ESP) in samples analysed was in the range of 2.8% to 4.0%.

4. Discussion

4.1 Development Components

This Salinity Management Plan (SMP) addresses the components of the proposed development at construction stage for the permanent works. Recommendations regarding the following development components are provided in the following sections:

- Importation of soil
- Roads, footpaths and paved areas
- Landscaped area
- Surface water, stormwater and drainage
- Durability of concrete structures in contact with the ground
- Durability of steel structures in contact with the ground.

4.1.1 Importation of Soil

It may be required to import topsoil or other soil onto site. Materials to be imported to site should be assessed for suitability for the intended use. Highly saline or contaminated soils should not be imported to site.

4.1.2 Roads, Footpaths and Paved Areas

The proposed development will result in the majority of the site comprising roads, footpaths and paved areas for warehouse buildings. The design and construction of roads, footpaths and paved areas should consider the following recommendations:

- Roads, footpath and paved surfaces should be graded, and the grades maintained at all times to prevent ponding of surface water at locations where this can result in infiltration into the underlying soils (e.g., pavement joints)
- Connections between the roads, footpath and paved surfaces and the surface water and stormwater drainage infrastructure should be designed, constructed and maintained to restrict infiltration into underlying soils
- Services that are to be located below the roads, footpath and paved surfaces should be installed, where practical at the time of construction
- Provision for a damp-proof course or membrane beneath slabs should be considered by the slab designer.

4.1.3 Landscaped Areas

The proposed development will include two landscaped areas, one setback to Alexandra Canal and the other along the street frontage along Burrows Road. The design and construction of the landscaped areas should consider the following recommendations:

- Selection of plant species should consider the soil conditions, including moderate salinity, relatively poor fertility and clayey low permeability soil profiles. Promotion of successful revegetation is likely to require use of nutrient rich topsoil. Saline topsoils should not be imported to site.
- Potential for water logging should be minimised by:
  - Adopting plant species with minimal watering requirements
  - Adopting ‘waterwise’ gardening principles
  - Minimising use of potable water in landscaped areas
  - Properly designed and implemented irrigation systems
  - Establishment of perennial species and deep-rooted trees.

4.1.4 Surface Water, Stormwater and Drainage

Surface water, stormwater and drainage design should aim at restricting infiltration into the ground resulting in groundwater recharge. The design and construction of surface water, stormwater and drainage measures should thus consider the following recommendations:

- Disturbance of natural drainage patterns should be reduced. Where these are disturbed or altered appropriate artificial drainage should be installed
- Stormwater and surface water should be managed to restrict infiltration
- Temporary water retaining structures used during construction should be managed to restrict infiltration
- Stormwater and surface water infrastructure should be designed and constructed to minimise the likelihood of leakage
- Guttering and down pipes should be connected and maintained
- Surface water runoff should be directed around all exposed surfaces, temporary stockpiles and landscaped areas.

4.1.5 Durability of Concrete Structures in Contact with The Ground

In designing structural concrete elements in contact with the ground the design should consider the results of the salinity assessment and the durability requirements in AS2159:2009 Piling “Design and Installation” and AS3600:2018 “Concrete Structures”.

Both these standards provide guidance on minimum concrete grade/strength and minimum cover requirements.

Based on the salinity and aggressivity test results (ref. PSM4637-003L REV4, dated 4 October 2022), it is recommended that:

1. The design of structural concrete members in contact with the ground (excluding piles) adopt an “A2” exposure classification as defined in AS3600:2018.
2. The design of concrete cast in situ piles adopt a “mild” classification as defined in AS2159:2009.

4.1.6 Durability of Steel Structures in Contact with The Ground

Table 6.5.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for steel piles based on resistivity, soil and groundwater pH, and chlorides in soil and groundwater. On the basis of soil chlorides, resistivity and pH testing completed we assess the exposure classification for steel piles in the soil to be “non-aggressive”.

5. Sign off

We recommend the following:

- The designer(s) and contractor(s) responsible for construction of the various development components be required to sign-off their design and the as built, certifying that:

  “The works have been designed/constructed having given appropriate consideration to the recommendations in the SMP (Ref. PSM4637-006L REV2)”.

The designer and contractors should contact PSM during the works if they have any queries with regards to the requirements in the SMP or if conditions significantly differ from those described in this SMP.

Yours Sincerely

KEN TONG LEE
GEOTECHNICAL ENGINEER

AGUSTRIA SALIM
PRINCIPAL

Encl.

Figure 1 Site Locality Plan

Legend

- Approximate Site Boundary
- Previous Site Investigation (2021)
- Additional Site Investigation (2022)

Notes

Aerial image sourced from Nearmap.com dated 17 May 2022.

Scale 1:400

N 0 10 20 m

Map Projection:
Horizontal Datum:
Grid: EPSG:7856

P S M	Created By: PSM	Revision: A	
	Date: 11 Aug 2022	Paper Size: A3	PSM4637-006L FIGURE 1

LOGOS
28-30 Burrows Road
St Peters

SITE LOCALITY PLAN

N:\PSM4637\Eng\GIS\PSM4637.qgz Layout: SMP Fig 1