



Douglas Partners

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Report on
Geotechnical Investigation

Proposed Flight Training Centre
King Street, Mascot

Prepared for
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Table of Contents

	Page
1. Introduction.....	1
2. Site Description	1
3. Regional Geology.....	2
4. Field Work Methods	2
5. Fieldwork Results.....	4
6. Laboratory Testing	5
7. Geotechnical Model	5
8. Proposed Development.....	6
9. Comments	6
9.1 Ground Preparation	6
9.2 Excavation	7
9.3 Foundations	7
9.3.1 General	7
9.3.2 Bored and CFA Piles	9
9.3.3 Driven Piles	10
9.3.4 Soil Moduli.....	10
9.3.5 Raft Slab	11
9.4 Aggressivity.....	11
9.5 Acid Sulphate Soils	11
9.6 Seismic Loading.....	12
9.7 Pavements	12
10. Limitations	12
Appendix A: About This Report	
Appendix B: Drawings	
Appendix C: Borehole Logs	
Appendix D: Cone Penetration Tests	
Appendix E: Laboratory Tests Results	

Report on Geotechnical Investigation

Proposed Flight Training Centre

King Street, Mascot

1. Introduction

This report presents the results of a geotechnical investigation undertaken for a new proposed flight training centre at 295-297 King Street, Mascot. The work was carried out under instructions from Enstruct Group, structural engineers, acting for Qantas Airways Ltd and was performed generally in accordance with DP's proposal No. SYD181191 dated 13 December 2018.

It is understood that the proposed development of the site includes construction of a five storey building to house the proposed new flight training centre, a multi-storey car park in the northern part of the site, and at-grade car parking areas and associated access roads over the rest of the site. No excavation is expected for the construction of either building, other than for local footings or services.

The geotechnical investigation comprised:

- 12 boreholes drilled to into bedrock to positively identify the depth and strength of the bedrock and to obtain samples for strength testing;
- 24 cone penetration tests taken to virtual refusal at depths of 23 m to 30 m to obtain detailed strength profiles of the soils above the bedrock;
- Installation of four groundwater monitoring wells for the measurement of groundwater levels;
- Testing of four selected soil samples for California bearing ratio; and
- Testing of two selected soil samples for particle size distribution.

Details of the field work are provided in this report, together with comments on foundations, earthworks, excavations, groundwater and CBR values for design of pavements.


2. Site Description


The site is located on the northern side of King Street and is bounded to the west by the Port Botany rail line and Qantas Drive. A range of different warehouses and office buildings occupy the properties to the north and east. The site is an irregular shape with maximum north-south and east-west dimensions of about 240 m by 220 m respectively.

The site is mostly currently occupied by ground level car parks and is surrounded by large commercial and industrial type buildings. There is an existing metal coated warehouse building in the centre of the southern part of the site.

The existing ground surfaces are relatively flat, although the northern portion of the site (about RL 4 m) is about 1 m lower than the main southern portion of the site (about RL 5 m). There is an open concrete lined stormwater channel crossing the middle of the site from west to east.

3. Regional Geology

Reference to the Sydney 1:100,000 Geological Series Sheet indicates that the site is underlain by Quaternary sediments comprising medium to fine grained marine sands. Experience in the Mascot area suggests these sediments are underlain by alluvial and residual clay soils over Ashfield Shale bedrock. The geological mapping was confirmed by investigations which encountered deep sands and clays overlying laminite and siltstone bedrock 

The 1:25,000 Acid Sulphate Soil Risk Map indicates that the site is underlain by disturbed terrain (filling) for which no specific information is available on acid sulphate soils. An area approximately 150 m to the west of the site is mapped as having a low probability of acid sulphate soils occurring below 4 m depth. The results of previous investigations around the airport have identified some potential acid sulphate soils (ASS) below the groundwater table. 

4. Field Work Methods

The field work for the investigation included:

- Twenty four cone penetration tests (CPT101 to CPT124) taken to practical refusal at depths of between 24.2 m and 31.2 m; and
- The drilling of twelve rock cored boreholes (BH1 to BH12) adjacent to the CPT locations to depths of between 32 m and 35.5 m.

The test locations are shown on Drawing 1 in Appendix B. Some of the tests were moved from their original proposed locations due to the presence of underground services or due to vehicles which remained parked over the proposed test locations for the duration of the fieldwork.

The CPTs were undertaken using a ballasted truck-mounted test rig to push a 35 mm diameter instrumented cone tipped probe into the soil with a hydraulic ram system. Continuous measurements are made of the end-bearing pressure on the cone tip and the friction on a 135 mm long sleeve located immediately behind the cone. The cone tip resistance and friction readings are displayed during the test and stored on a computer for subsequent plotting of results and interpretation.

The boreholes were drilled from the surface level down to bedrock at depths of about 25 m using rotary mud flush drilling techniques. When rock levels were reached the drilling was continued using NMLC sized diamond coring equipment to obtain 50 mm diameter continuous core samples of the rock. Standpipe piezometers were installed in four of the boreholes to allow for measurement of groundwater levels.

The depth of the groundwater was observed on the completion of core penetration testing in the holes left after the testing rods were withdrawn and in boreholes where wells were not installed the groundwater was measured during the drilling processes by observing water levels on the SPT rods.

A summary of the locations and details of the boreholes and CPTs is given in Table 1.

Table 1: Summary of Tests

Test No	Easting (m)	Northing (m)	Reduced Level (m AHD)	Total Depth (m)	Well installed	Ground Water Depth (m)	Ground Water Level (m)
BH1	332,213	6,244,341	5.61	34.0	Yes	3.3	2.3
BH2	332,258	6,244,337	5.08	32.2		2.1	
BH3	332,158	6,244,401	5.19	35.4		3.2	
BH4	332,223	6,244,388	5.06	34.9		2.7	
BH5	332,262	6,244,382	4.94	35.5		1.9	
BH6	332,160	6,244,443	4.84	35.3	Yes	3.2	1.6
BH7	332,220	6,244,433	4.90	34.4		2.8	
BH8	332,275	6,244,413	4.94	35.2	Yes	2.5	2.7
BH9	332,240	6,244,500	3.81	34.6		1.4	
BH10	332,297	6,244,497	3.98	33.8		0.9	
BH11	332,247	6,244,540	3.79	33.8		1.2	
BH12	332,299	6,244,531	4.03	32.0	Yes	1.2	2.8
CPT101	332,213	6,244,341	5.61	28.0		3.2	2.4
CPT102	332,258	6,244,337	5.08	27.6		-	-
CPT103	332,158	6,244,401	5.19	29.4		3.0	2.2
CPT104	332,223	6,244,388	5.06	28.2		2.9	2.1
CPT105	332,262	6,244,382	4.94	26.8		2.4	2.5
CPT106	332,160	6,244,443	4.84	29.7		3.4	1.4
CPT107	332,220	6,244,433	4.90	28.6		-	-
CPT108	332,275	6,244,413	4.94	29.4		2.4	2.5
CPT109	332,240	6,244,500	3.81	29.1		-	-
CPT110	332,297	6,244,497	3.98	24.9		1.0	3.0
CPT111	332,247	6,244,540	3.79	28.0		-	-
CPT112	332,299	6,244,531	4.03	24.3		1.0	3.0
CPT113	332,219	6,244,364	5.30	28.5		2.6	2.7
CPT114	332,262	6,244,359	5.07	27.3		2.7	2.4
CPT115	332,198	6,244,408	5.09	30.4		3.5	1.6
CPT116	332,161	6,244,418	5.02	31.2		3.0	2.0
CPT117	332,225	6,244,414	4.91	29.0		2.7	2.2
CPT118	332,274	6,244,404	4.97	29.1		1.2	3.8
CPT119	332,200	6,244,437	4.80	27.8		-	-
CPT120	332,279	6,244,503	3.57	24.2		1.1	2.5
CPT121	332,245	6,244,521	3.81	29.5		1.6	2.2
CPT122	332,279	6,244,520	3.61	24.8		0.7	2.9
CPT123	332,293	6,244,518	3.89	25.5		0.9	3.0
CPT124	332,269	6,244,538	3.71	22.8		1.0	2.7

The details of the four groundwater monitoring wells are provided on the borehole logs. The wells were developed by pumping and groundwater levels were measured on 24 January 2019.

5. Fieldwork Results

Details of the subsurface conditions encountered on the site are given in the borehole logs and the CPT test results in Appendices C and D respectively. Colour photographs of the core samples from the bores are also provided in Appendix C. Standard notes defining terms used to classify strata and descriptive terms are provided in Appendix A.

The tests generally encountered a relatively uniform profile across the site which can be broadly defined as summarised in Table 2 below.

Table 2: Summary of Ground Conditions

Description		Typical Thickness (m)	Typical Level of Top of Layer (RL m)
Filling	Mostly gravelly sand or clayey sand with included building rubble	0.5 to 2	4 to 5
Sand	Loose to medium dense - with clayey or peaty layers	5 to 7	2 to 4
Sand	Medium dense to dense – with some clayey or peaty layers	6 to 8	-2 to -4
Clay	Stiff to very stiff (probably alluvial)	6 to 9	-8 to -9
Silty Clay	Very stiff to hard (probably residual) – includes some ironstone bands	6 to 10	-16 to -18
Bedrock	Laminite or siltstone - initially extremely low strength but mostly medium to high strength within 2-5 metres		-20 to -26

The near surface gravelly sand filling encountered at many test locations is not necessarily imported material but may simply be natural colluvium deposited during flooding of Shae's Creek (Alexandra Canal) that has been disturbed and redistributed over the site by general site operations.

Exceptions to the general soil profile given in Table 2 were found in five CPTs which encountered a soft to firm clay layer or very loose sandy silt just below the surficial filling. These layers may have a significant impact on site earthworks and will have to be treated while preparing the site for building platforms or pavement subgrades. The CPTs which intersected softer layers are:

- CPT103 - from 1.1 m to 3.4 m depth
- CPT106 - from 1.7 m – 3.9 m depth;
- CPT109 - from 1.0 m to 2.0 m depth;
- CPT110 - from 1.4 m to 2.5 m depth; and
- CPT121 - from 1.0 m to 2.2 m depth.

Groundwater observations made during drilling of the boreholes and within the holes left after completion and withdrawal of the CPT rods are shown on the individual test result sheets. These records show that groundwater is at depths ranging from about 0.9 m to 3.5 m or at levels of RL 1.4 m to RL 3.8 m AHD.

6. Laboratory Testing

Samples of the rock core were tested in the laboratory to determine the point load strength index ($Is_{(50)}$) value to assist with the rock strength classification.

The results of the testing are show on the borehole logs at the appropriate depths. The point load strength values for the rock ranged from 0.09 MPa to 2.8 MPa indicating that the rock samples tested ranged between very low strength and high strength.

Two soil samples were tested for particle size distribution (grading) and four bulk samples of the near surface soils were tested for compaction and CBR. The detailed results of the testing are given in Appendix E and the results of the CBR tests are summarised in Table 3.

Table 3: Summary of CBR Test Results

Bore	Sample Depth (m)	Description	Field Moisture Content (%)	Maximum Dry Density (t/m^3)	Optimum Moisture Content (%)	CBR (%)
BH2	0.2 – 1.5	Sand	8.2	1.76	9.5	20
BH3	0.2 – 1.5	Slightly silty gravelly sand	10.8	1.91	13.0	40
BH6	0.1 – 1.2	Gravelly sand	7.1	1.97	11.0	20
BH8	0.4 – 3.0	Sand	14.9	1.82	12.5	18

7. Geotechnical Model

Based on the investigation results, the interpreted conceptual geotechnical model for the site, in increasing depth order from the surface level, may be described as follows:

- Filling –sandy filling with some gravel and clay (0.3 – 2 m thick);
- Sand – loose to medium dense with clayey and peaty layers (5 – 7 m thick);
- Sand – medium dense to very dense with some clayey and peaty layers (6 – 8 m thick);
- Clay – stiff to very stiff (6 – 9 m thick);
- Silty Clay – very stiff to hard, probably residual clay with some ironstone bands (6 – 10 m thick); and
- Bedrock – below depths of 25-30 m, comprising laminite or siltstone - initially extremely low to very low strength becoming consistently medium and/or high strength after 2-5 m.

Groundwater is typically at depths of 2 – 3 m over the site but this will change and fluctuate as a result of rainfall and tides in Alexandra Canal.

Three geotechnical cross-sections (Sections A-A', B-B' and C-C'), showing the interpreted subsurface profile between the boreholes and CPTs, are presented as Drawings 2 to 4 in Appendix B. The sections show interpreted geotechnical divisions of soil and rock.

It should be noted that the interpreted boundaries shown on the sections are accurate at the borehole locations only and layers shown diagrammatically on these drawings are based on inferred strata boundaries. Reference should be made to the borehole logs and CPT plots for more detailed information and descriptions of the soil and rock.

8. Proposed Development

It is understood that the development comprises:

- A five storey flight training centre with no basement level, containing simulator bays, training rooms, class rooms, offices, canteen and other facilities;
- A multistorey car park on the northern part of the site, to be constructed from existing ground level;
- Some at grade car parking areas and associated road works for bus and delivery vehicle access; and
- In-ground services.

The preliminary drawings of the proposed works indicate that no bulk excavation is proposed on the site, with excavations limited to local areas as required for installation of services or footings. Details of the likely foundation loads have not been provided.

9. Comments

9.1 Ground Preparation

The proposed development will probably require minimal earthworks to prepare the site for building foundation construction and for floor slabs and pavements. But the relatively shallow water table may cause trafficability problems for heavy equipment so it may be necessary to do local dewatering to help assist with compaction of the existing site materials at subgrade level.

In order to prepare the site for building and pavement construction it will be necessary to ensure that the existing materials are well compacted and that any soft or very loose materials are removed and replaced with good quality, well compacted granular material.

For subgrade preparation, it is suggested that the exposed soil surface should be thoroughly rolled with a minimum of eight passes using an appropriately sized smooth drum roller (say 15 tonne static weight). The final pass (proof roll) should be inspected by a geotechnical engineer to help identify any soft or heaving areas.

Engineered filling for replacement of soft spots or raising site levels should be placed in layers and compacted to a dry density ratio of at least 98% relative to standard compaction (or equivalent density index of 75%) with moisture contents within 2% of optimum moisture content (OMC). The density ratio should be increased to 100% relative to standard compaction within 0.5 m of the subgrade surface.

For a fully suspended floor slab, the exposed surface and any filling used to raise site levels will effectively be used as formwork to support the slab until it has reached sufficient strength to span

between the piles. In this case, compaction of the subgrade and filled platform is unlikely to be critical and therefore a nominal density ratio of 95% relative to standard compaction may be adopted.

If heavy plant such as piling rigs are required to operate on the site a working platform may need to be constructed. The platform should be constructed from good quality granular material with low fines, such as recycled concrete or high strength crushed rock. The thickness of the platform should be assessed once specific details of the heavy plant that will operate on the site are known.

9.2 Excavation

Although excavations on the site are expected to be minimal, any excavation is expected to be within filling and sandy soils and should be readily achievable using conventional earthmoving equipment such as a hydraulic excavator with bucket attachment.

If any trenches required for services extend to near the groundwater levels then it will be necessary to undertake local dewatering during excavation of these trenches.

Any vertical excavations within the sand will require retaining structures both during construction and in the long-term. Where excavations are set well back from boundaries and adjacent structures it may be possible to temporarily batter the soils above the groundwater at 1.5H:1V (Horizontal : Vertical), for slopes up to 3 m high. Where there is potential for groundwater to enter the excavation a temporary batter slope of 3H:1V may be required. Surcharge loads should be kept well clear from the crest of batters.

All excavated materials will need to be disposed of in accordance with the provisions of the current legislation and guidelines including the Waste Classification Guidelines (EPA 2014). Excavations below the water table and pile spoil may include potential acid sulphate soil and treatment of these soils should be undertaken prior to disposal as necessary.

9.3 Foundations

9.3.1 General

For any major new structures it is likely that heavy column loads will need to be supported by piles.

Ideally the piles should be founded on or in medium or high strength rock, but shorter piles may also be considered, provided the structures can tolerate settlements which may occur due to the clays within the soil profile. If shorter piles are to be considered further, then detailed analysis of the settlement of individual piles or pile groups would need to be undertaken once the pile loads are known.

Raft slabs may also be considered, however detailed analysis will be required once column loads are defined to assess the viability of this option.

Suitable pile types that could be considered to support heavy loads include:-

(a) Continuous Flight Auger Piles

For heavy column loads for any new buildings, it would be prudent to carry the loads on piles socketed into bedrock. Continuous flight auger (CFA) piles are well suited to the conditions on this site as these piles do not need to utilise temporary casing or for the pile shaft to be drilled under bentonite, so drilling and concreting the piles is relatively straight forward. Also continuous flight auger piles can be easily drilled to depths of about 25 - 35 m and can be socketed for a limited depth into high strength rock.

One disadvantage of CFA piles is the large volume of spoil that will need to be transported off site and treated as acid sulphate soil.

(b) Bored Piles

Large diameter conventional bored piles drilled under bentonite or polymer mud may be more economical, particularly if long rock sockets are needed to carry expected loads or there are major uplift loads. The disadvantage of bored piles is also the large amount of spoil that needs to be treated for acid sulphate soils and transported off site.

(c) Driven Steel Piles

It is technically feasible to use driven tube piles or steel H piles to support the foundation loads and most of the original international terminal building is supported on these types of piles driven down to rock. In the current environment, however, conventional driven piles may be considered unacceptable because of the noise and vibrations generated during driving.

(d) Driven Enlarged Based Piles

Driven enlarged base piles were used extensively on part of the international terminal complex for support of major column loads. These piles are constructed by driving a steel tube with a gravel or dry concrete plug by dropping a heavy weight onto the plug which then draws the tube down to foundation level where an expanded base is created. Piles founding at 10 - 12 m depth on a medium dense or dense sand layer were designed for ultimate compression loads of up to 250 tonnes and uplift loads of about 80 to 100 tonnes. These piles however require a consistent 3 m to 4 m thick layer of medium dense or dense sand band in order to carry the loads on the expanded base without significant settlement. They do, however, offer an economical pile alternative, with the enlarged base being manufactured according to the local surrounding soil conditions and the design working load. The advantage of using enlarged based pile is that there is no spoil and hence no requirement to treat acid sulphate soils or contaminated sediments. Care needs to be taken in manufacturing the shaft so that the steel reinforcing cage is not damaged as the piling tube is withdrawn.

(e) Driven Precast Concrete Piles

These piles have been used on the airport for loads of up to about 1000 kN and have performed satisfactorily. Similar to other driven piles, they have the advantage of not producing any spoil but noise and vibration during driving can limit their usage.

(f) Atlas or Omega Piles

Atlas or Omega piles are similar to CFA piles but they have the added advantage of compressing the soil around the pile shaft thus increasing the shaft resistance and hence the overall pile capacity. They are drilled into the soil and when reaching the design founding level are back screwed while concrete is pumped into the void left by the pile augers. They are able to carry a higher load than the equivalent size CFA pile and have been used extensively for pile support of structures in alluvial areas.

9.3.2 Bored and CFA Piles

For design of deep rock socketed bored or CFA piles the recommended maximum pressures for the various rock strata are presented in Table 4. Shaft adhesion values for uplift (tension) may be taken as being equal to 50% of the values for compression.

Table 4: Recommended Design Parameters for Piles socketed into Rock

Foundation Stratum	Maximum Allowable Pressure		Maximum Ultimate Pressure		Field Elastic Modulus (MPa)
	End Bearing (kPa)	Shaft Adhesion (Compression) (kPa)	End Bearing (kPa)	Shaft Adhesion (Compression) (kPa)	
Very Low, Low and Low to Medium strength laminite or siltstone, (Pells Class IV)	1,000	100	5,000	200	150
Medium and Medium to High strength laminite or siltstone (Pells Class II)	3,500	350	30,000	700	700

It should be noted that the serviceability limit-state is likely to govern the design of the piles and the ultimate bearing pressures provided in Table 4 are unlikely to be achieved within the limits of serviceability. An appropriate geotechnical strength reduction factor should be applied when using the limit-state approach as outlined in AS 2159 – 2009 *Piling – Design and installation*. For a project where there is a reasonable amount of geotechnical data available to support the design it is normally recommended that a geotechnical strength reduction factor of 0.5 – 0.6 would be applicable for piles drilled to bedrock.

Settlement of a pile is dependent on the loads applied to the pile and the foundation conditions in the socket zone and below the pile toe. The total settlement of a bored or CFA pile designed using the 'allowable' parameters provided in Table 4 would be expected to experience total settlements of less than 1% of the pile diameter under the applied working load.

Bored piles or CFA piles with permanent or temporary casing may be used on this site. It is expected that large single bored piles founded within the sandstone bedrock could be used to support most structural loads. Due to the high groundwater level and the thick layers of alluvial soils overlying the rock it will be necessary to use casing for all standard bored piles, together with the use of tremmie pouring of concrete to the bottom of the pile.

Grout-injected piles (or CFA piles) are generally better suited to the soil conditions on this site; however, they typically have lower structural capacities than similar dimensioned bored piles. There is also a risk that, if the piles are required to socket into medium strength or better bedrock, the over-rotation of the drill string may cause some of the softer layers to collapse into the pile requiring large volumes of concrete to be used to form the pile shaft. This over-rotation will also produce larger quantities of spoil and may result in undermining of the surrounding pavements in close proximity to the pile head. Most experienced piling contractors are aware of this potential issue and have adapted their work practices to suit.

9.3.3 Driven Piles

Driven precast concrete piles or steel piles can be used to found structures on rock. Driven steel piles taken to bedrock at estimated depths of mostly 25 to 30 m could be designed for the full structural capacity of the steel section. On other projects in the local area, driven steel tube piles have been used successfully when founding on bedrock.

Installation of driven piles will cause some vibration and noise which may be unacceptable if piling needs to be done at nights. Pre-drilling through dense sand layers at isolated locations may be needed to facilitate penetration through these layers and to reduce vibrations.

9.3.4 Soil Moduli

For design of piles in soils to withstand lateral loads, typical Young's Modulus (E) values for soil have been derived from correlations with CPT data and are shown in Table 5 below. The horizontal modulus of subgrade reaction (K_h) values are based on the relationship of $K_h = 0.7E/d$ (where d is equal to the pile diameter in metres). The K_h values assume that the pile lateral loads are within the elastic limit (yield stress) of the soil. The E and K_h values provided for the soil in Table 5 can be used for preliminary design of the piles.

Table 5: Typical Moduli Values for Pile Design

Soil Type	Young's Modulus, E (kPa)	Horizontal Modulus of Subgrade Reaction, K_h (kN/m ³)
Loose to Medium Dense Sand	10,000 to 15,000	7,000/d to 10,500/d
Medium Dense to Dense Sand	15,000 to 30,000	10,500/d to 21,000/d
Stiff to Very Stiff Clay	8,000 to 15,000	5,600/d to 10,500/d
Very Stiff to Hard Clay	15,000 to 25,000	10,500/d to 17,500/d

Note: d is pile diameter in metres

9.3.5 Raft Slab

Consideration may be given to the use of a raft slab foundation. However, this would require detailed review and analysis of bearing pressures and settlements once more specific details of the column layout and slab loadings have been confirmed.

Very loose silty sands and soft to firm peaty/clayey soils were encountered in the upper levels of some CPTs. The presence of these weaker soils should be considered in the design of a raft slab, particularly for the concentrated column loadings. It will probably be necessary to remove any peaty soils and replace with compacted clean sand or imported granular material. This potential over excavation must be considered in the design and planning of the earthworks.

As a guide, for raft slab foundations, preliminary settlement analyses have been carried out assuming a distributed slab load of 60 kPa to 100 kPa, with a loaded area of 20 m by 20 m. Based on the results of the analyses, preliminary design of raft slabs to support column and floor loadings may be based on a modulus of subgrade reaction (k_s) value of the order of 2 kPa/mm to 3 kPa/mm for the broadly loaded area. Settlements of between 20 mm to 30 mm could therefore be expected for a 60 kPa distributed load and 35 mm to 50 mm for a 100 kPa distributed load. It is noted that the k_s value (which is not strictly a soil parameter) is very dependent on the size of the loaded area and the rigidity of the raft system.

Construction of the raft slabs should incorporate subgrade preparation. It is also suggested that a 150 mm thick layer of good quality granular material such as recycled concrete or crushed rock should be placed and compacted over the prepared surface, particularly at the more heavily loaded areas. The granular layer will help to confine the sandy soils and improve the compaction and density of the surface soils.

A piled raft foundation may also be considered to reduce differential settlements, if required, particularly below higher concentrated loadings.

Further geotechnical analysis and advice will be required in relation to the design and construction of both raft slabs and piled raft slabs, if these are to be considered.

9.4 Aggressivity

Based on previous investigations by DP on nearby sites it is anticipated that the soils would generally be consistent with a “moderate” classification with respect to buried, reinforced concrete, structural elements (referring to Table 6.4.2(C) of AS 2159 – 2009). It is also expected that potential acid sulphate soils are likely to be present below the water table and this should also be considered by the pile designer.

9.5 Acid Sulphate Soils

The results of previous investigations around the airport have identified potential acid sulphate soils (ASS) below the groundwater table. There is likely to be some variability in the vertical and lateral

extent of the acid sulphate soils across the site. It is likely that the deeper soil profile comprises residual clay soils which are not acid sulphate soils, however, testing would be required to confirm the vertical extent of the acid sulphate soils. At this stage it is recommended that all material that is disturbed or brought to the surface from below the groundwater table should be treated as acid sulphate soil until proven otherwise.

It is anticipated that acid sulphate soils will only be disturbed by piling activities and therefore the need for an Acid Sulphate Soil Management Plan will depend on the types of piles chosen to support the structure. Displacement type piles such as driven piles will result in a minimal amount of spoil. Bored piles will disturb a considerable volume of soil which will need to be treated before being disposed.

9.6 Seismic Loading

In accordance with AS1170-2007 "Structural Design Actions, Part 4: Earthquake Actions in Australia" a hazard factor (Z) of 0.08 and a site subsoil Class C_e is considered to be appropriate for the site. The site subsoil Class C_e has been selected on the basis that while the soils extend to depths of 25-30 M most of the soils are either medium dense sands or stiff clays or better.

9.7 Pavements

Based on the results of the laboratory testing and previous experience in the area, it is suggested that new pavements on the site are designed using a CBR value of 12% to allow for some variability in subgrade support. This design value assumes that the subgrades for the pavements will be prepared in accordance with the recommendations given in this report and any soft areas detected during proof rolling will be removed and replaced.

10. Limitations

Douglas Partners (DP) has prepared this report for this project at 295-297 King Street, Mascot in accordance with DP's proposal dated 13 December 2018 and acceptance received from Mr Matt Lilley dated 19 December 2018. This report is provided for the exclusive use of Enstruct Group and Qantas Airways Ltd for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during this investigation. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations.

This report must be read in conjunction with all of the attached notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The scope for work for this investigation/report did not include the assessment of surface or sub-surface materials or groundwater for contaminants, within or adjacent to the site. Should evidence of filling of unknown origin be noted in the report, and in particular the presence of building demolition materials, it should be recognised that there may be some risk that such filling may contain contaminants and hazardous building materials.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the geotechnical components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

Douglas Partners Pty Ltd

Appendix A

About This Report

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



Sampling

Sampling is carried out during drilling or test pitting to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing it to obtain a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Test Pits

Test pits are usually excavated with a backhoe or an excavator, allowing close examination of the in-situ soil if it is safe to enter into the pit. The depth of excavation is limited to about 3 m for a backhoe and up to 6 m for a large excavator. A potential disadvantage of this investigation method is the larger area of disturbance to the site.

Large Diameter Augers

Boreholes can be drilled using a rotating plate or short spiral auger, generally 300 mm or larger in diameter commonly mounted on a standard piling rig. The cuttings are returned to the surface at intervals (generally not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube samples.

Continuous Spiral Flight Augers

The borehole is advanced using 90-115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are disturbed and may be mixed with soils from the sides of the hole. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively low

reliability, due to the remoulding, possible mixing or softening of samples by groundwater.

Non-core Rotary Drilling

The borehole is advanced using a rotary bit, with water or drilling mud being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from the rate of penetration. Where drilling mud is used this can mask the cuttings and reliable identification is only possible from separate sampling such as SPTs.

Continuous Core Drilling

A continuous core sample can be obtained using a diamond tipped core barrel, usually with a 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in weak rocks and granular soils), this technique provides a very reliable method of investigation.

Standard Penetration Tests

Standard penetration tests (SPT) are used as a means of estimating the density or strength of soils and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, Methods of Testing Soils for Engineering Purposes - Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the 'N' value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of, say, 4, 6 and 7 as:
4,6,7
N=13
- In the case where the test is discontinued before the full penetration depth, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm as:
15, 30/40 mm

Sampling Methods

The results of the SPT tests can be related empirically to the engineering properties of the soils.

Dynamic Cone Penetrometer Tests / Perth Sand Penetrometer Tests

Dynamic penetrometer tests (DCP or PSP) are carried out by driving a steel rod into the ground using a standard weight of hammer falling a specified distance. As the rod penetrates the soil the number of blows required to penetrate each successive 150 mm depth are recorded. Normally there is a depth limitation of 1.2 m, but this may be extended in certain conditions by the use of extension rods. Two types of penetrometer are commonly used.

- Perth sand penetrometer - a 16 mm diameter flat ended rod is driven using a 9 kg hammer dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands and is mainly used in granular soils and filling.
- Cone penetrometer - a 16 mm diameter rod with a 20 mm diameter cone end is driven using a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). This test was developed initially for pavement subgrade investigations, and correlations of the test results with California Bearing Ratio have been published by various road authorities.



Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard AS 1726-1993, Geotechnical Site Investigations Code. In general, the descriptions include strength or density, colour, structure, soil or rock type and inclusions.

Soil Types

Soil types are described according to the predominant particle size, qualified by the grading of other particles present:

Type	Particle size (mm)
Boulder	>200
Cobble	63 - 200
Gravel	2.36 - 63
Sand	0.075 - 2.36
Silt	0.002 - 0.075
Clay	<0.002

The sand and gravel sizes can be further subdivided as follows:

Type	Particle size (mm)
Coarse gravel	20 - 63
Medium gravel	6 - 20
Fine gravel	2.36 - 6
Coarse sand	0.6 - 2.36
Medium sand	0.2 - 0.6
Fine sand	0.075 - 0.2

The proportions of secondary constituents of soils are described as:

Term	Proportion	Example
And	Specify	Clay (60%) and Sand (40%)
Adjective	20 - 35%	Sandy Clay
Slightly	12 - 20%	Slightly Sandy Clay
With some	5 - 12%	Clay with some sand
With a trace of	0 - 5%	Clay with a trace of sand

Definitions of grading terms used are:

- Well graded - a good representation of all particle sizes
- Poorly graded - an excess or deficiency of particular sizes within the specified range
- Uniformly graded - an excess of a particular particle size
- Gap graded - a deficiency of a particular particle size with the range

Cohesive Soils

Cohesive soils, such as clays, are classified on the basis of undrained shear strength. The strength may be measured by laboratory testing, or estimated by field tests or engineering examination. The strength terms are defined as follows:

Description	Abbreviation	Undrained shear strength (kPa)
Very soft	vs	<12
Soft	s	12 - 25
Firm	f	25 - 50
Stiff	st	50 - 100
Very stiff	vst	100 - 200
Hard	h	>200

Cohesionless Soils

Cohesionless soils, such as clean sands, are classified on the basis of relative density, generally from the results of standard penetration tests (SPT), cone penetration tests (CPT) or dynamic penetrometers (PSP). The relative density terms are given below:

Relative Density	Abbreviation	SPT N value	CPT qc value (MPa)
Very loose	vl	<4	<2
Loose	l	4 - 10	2 - 5
Medium dense	md	10 - 30	5 - 15
Dense	d	30 - 50	15 - 25
Very dense	vd	>50	>25

Soil Descriptions

Soil Origin

It is often difficult to accurately determine the origin of a soil. Soils can generally be classified as:

- Residual soil - derived from in-situ weathering of the underlying rock;
- Transported soils - formed somewhere else and transported by nature to the site; or
- Filling - moved by man.

Transported soils may be further subdivided into:

- Alluvium - river deposits
- Lacustrine - lake deposits
- Aeolian - wind deposits
- Littoral - beach deposits
- Estuarine - tidal river deposits
- Talus - scree or coarse colluvium
- Slopewash or Colluvium - transported downslope by gravity assisted by water. Often includes angular rock fragments and boulders.



Rock Strength

Rock strength is defined by the Point Load Strength Index ($Is_{(50)}$) and refers to the strength of the rock substance and not the strength of the overall rock mass, which may be considerably weaker due to defects. The test procedure is described by Australian Standard 4133.4.1 - 2007. The terms used to describe rock strength are as follows:

Term	Abbreviation	Point Load Index $Is_{(50)}$ MPa	Approximate Unconfined Compressive Strength MPa*
Extremely low	EL	<0.03	<0.6
Very low	VL	0.03 - 0.1	0.6 - 2
Low	L	0.1 - 0.3	2 - 6
Medium	M	0.3 - 1.0	6 - 20
High	H	1 - 3	20 - 60
Very high	VH	3 - 10	60 - 200
Extremely high	EH	>10	>200

* Assumes a ratio of 20:1 for UCS to $Is_{(50)}$. It should be noted that the UCS to $Is_{(50)}$ ratio varies significantly for different rock types and specific ratios should be determined for each site.

Degree of Weathering

The degree of weathering of rock is classified as follows:

Term	Abbreviation	Description
Extremely weathered	EW	Rock substance has soil properties, i.e. it can be remoulded and classified as a soil but the texture of the original rock is still evident.
Highly weathered	HW	Limonite staining or bleaching affects whole of rock substance and other signs of decomposition are evident. Porosity and strength may be altered as a result of iron leaching or deposition. Colour and strength of original fresh rock is not recognisable
Moderately weathered	MW	Staining and discolouration of rock substance has taken place
Slightly weathered	SW	Rock substance is slightly discoloured but shows little or no change of strength from fresh rock
Fresh stained	Fs	Rock substance unaffected by weathering but staining visible along defects
Fresh	Fr	No signs of decomposition or staining

Degree of Fracturing

The following classification applies to the spacing of natural fractures in diamond drill cores. It includes bedding plane partings, joints and other defects, but excludes drilling breaks.

Term	Description
Fragmented	Fragments of <20 mm
Highly Fractured	Core lengths of 20-40 mm with some fragments
Fractured	Core lengths of 40-200 mm with some shorter and longer sections
Slightly Fractured	Core lengths of 200-1000 mm with some shorter and longer sections
Unbroken	Core lengths mostly > 1000 mm

Rock Descriptions

Rock Quality Designation

The quality of the cored rock can be measured using the Rock Quality Designation (RQD) index, defined as:

$$\text{RQD \%} = \frac{\text{cumulative length of 'sound' core sections} \geq 100 \text{ mm long}}{\text{total drilled length of section being assessed}}$$

where 'sound' rock is assessed to be rock of low strength or better. The RQD applies only to natural fractures. If the core is broken by drilling or handling (i.e. drilling breaks) then the broken pieces are fitted back together and are not included in the calculation of RQD.

Stratification Spacing

For sedimentary rocks the following terms may be used to describe the spacing of bedding partings:

Term	Separation of Stratification Planes
Thinly laminated	< 6 mm
Laminated	6 mm to 20 mm
Very thinly bedded	20 mm to 60 mm
Thinly bedded	60 mm to 0.2 m
Medium bedded	0.2 m to 0.6 m
Thickly bedded	0.6 m to 2 m
Very thickly bedded	> 2 m

Symbols & Abbreviations

Douglas Partners



Introduction

These notes summarise abbreviations commonly used on borehole logs and test pit reports.

Drilling or Excavation Methods

C	Core drilling
R	Rotary drilling
SFA	Spiral flight augers
NMLC	Diamond core - 52 mm dia
NQ	Diamond core - 47 mm dia
HQ	Diamond core - 63 mm dia
PQ	Diamond core - 81 mm dia

Water

▷	Water seep
▽	Water level

Sampling and Testing

A	Auger sample
B	Bulk sample
D	Disturbed sample
E	Environmental sample
U ₅₀	Undisturbed tube sample (50mm)
W	Water sample
pp	Pocket penetrometer (kPa)
PID	Photo ionisation detector
PL	Point load strength Is(50) MPa
S	Standard Penetration Test
V	Shear vane (kPa)

Description of Defects in Rock

The abbreviated descriptions of the defects should be in the following order: Depth, Type, Orientation, Coating, Shape, Roughness and Other. Drilling and handling breaks are not usually included on the logs.

Defect Type

B	Bedding plane
Cs	Clay seam
Cv	Cleavage
Cz	Crushed zone
Ds	Decomposed seam
F	Fault
J	Joint
Lam	Lamination
Pt	Parting
Sz	Sheared Zone
V	Vein

Orientation

The inclination of defects is always measured from the perpendicular to the core axis.

h	horizontal
v	vertical
sh	sub-horizontal
sv	sub-vertical

Coating or Infilling Term

cln	clean
co	coating
he	healed
inf	infilled
stn	stained
ti	tight
vn	veneer

Coating Descriptor

ca	calcite
cbs	carbonaceous
cly	clay
fe	iron oxide
mn	manganese
slt	silty

Shape

cu	curved
ir	irregular
pl	planar
st	stepped
un	undulating

Roughness

po	polished
ro	rough
sl	slickensided
sm	smooth
vr	very rough

Other

fg	fragmented
bnd	band
qtz	quartz

Symbols & Abbreviations

Graphic Symbols for Soil and Rock

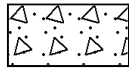
General



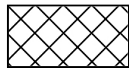
Asphalt



Road base



Concrete



Filling

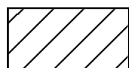
Soils



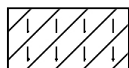
Topsoil



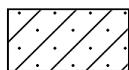
Peat



Clay



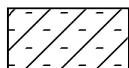
Silty clay



Sandy clay



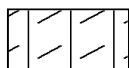
Gravelly clay



Shaly clay



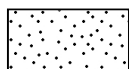
Silt



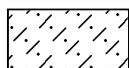
Clayey silt



Sandy silt



Sand



Clayey sand



Silty sand



Gravel



Sandy gravel



Cobbles, boulders



Talus

Sedimentary Rocks



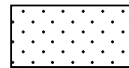
Boulder conglomerate



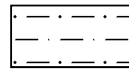
Conglomerate



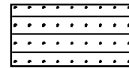
Conglomeratic sandstone



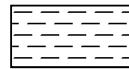
Sandstone



Siltstone



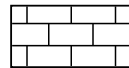
Laminite



Mudstone, claystone, shale

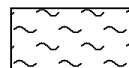


Coal

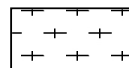


Limestone

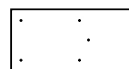
Metamorphic Rocks



Slate, phyllite, schist

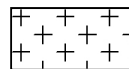


Gneiss

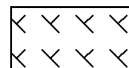


Quartzite

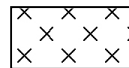
Igneous Rocks



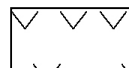
Granite



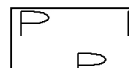
Dolerite, basalt, andesite



Dacite, epidote



Tuff, breccia



Porphyry

Cone Penetration Tests Douglas Partners



Introduction

The Cone Penetration Test (CPT) is a sophisticated soil profiling test carried out in-situ. A special cone shaped probe is used which is connected to a digital data acquisition system. The cone and adjoining sleeve section contain a series of strain gauges and other transducers which continuously monitor and record various soil parameters as the cone penetrates the soils.

The soil parameters measured depend on the type of cone being used, however they always include the following basic measurements

- Cone tip resistance q_c
- Sleeve friction f_s
- Inclination (from vertical) i
- Depth below ground z

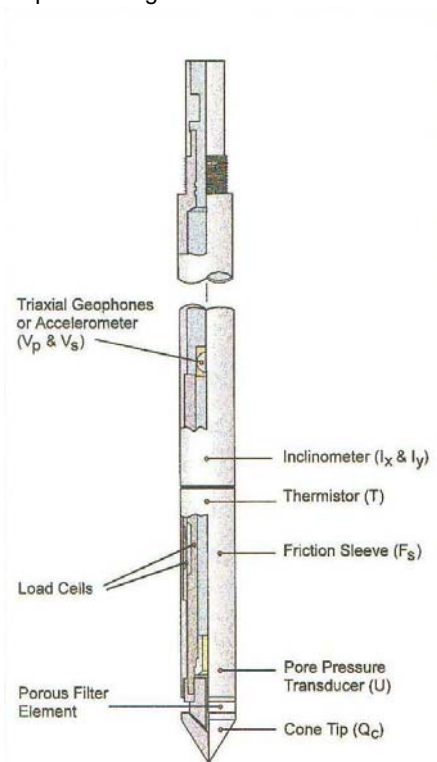


Figure 1: Cone Diagram

The inclinometer in the cone enables the verticality of the test to be confirmed and, if required, the vertical depth can be corrected.

The cone is thrust into the ground at a steady rate of about 20 mm/sec, usually using the hydraulic rams of a purpose built CPT rig, or a drilling rig. The testing is carried out in accordance with the Australian Standard AS1289 Test 6.5.1.



Figure 2: Purpose built CPT rig

The CPT can penetrate most soil types and is particularly suited to alluvial soils, being able to detect fine layering and strength variations. With sufficient thrust the cone can often penetrate a short distance into weathered rock. The cone will usually reach refusal in coarse filling, medium to coarse gravel and on very low strength or better rock. Tests have been successfully completed to more than 60 m.

Types of CPTs

Douglas Partners (and its subsidiary GroundTest) owns and operates the following types of CPT cones:

Type	Measures
Standard	Basic parameters (q_c , f_s , i & z)
Piezococone	Dynamic pore pressure (u) plus basic parameters. Dissipation tests estimate consolidation parameters
Conductivity	Bulk soil electrical conductivity (σ) plus basic parameters
Seismic	Shear wave velocity (V_s), compression wave velocity (V_p), plus basic parameters

Strata Interpretation

The CPT parameters can be used to infer the Soil Behaviour Type (SBT), based on normalised values of cone resistance (Q_t) and friction ratio (Fr). These are used in conjunction with soil classification charts, such as the one below (after Robertson 1990)

Cone Penetration Tests

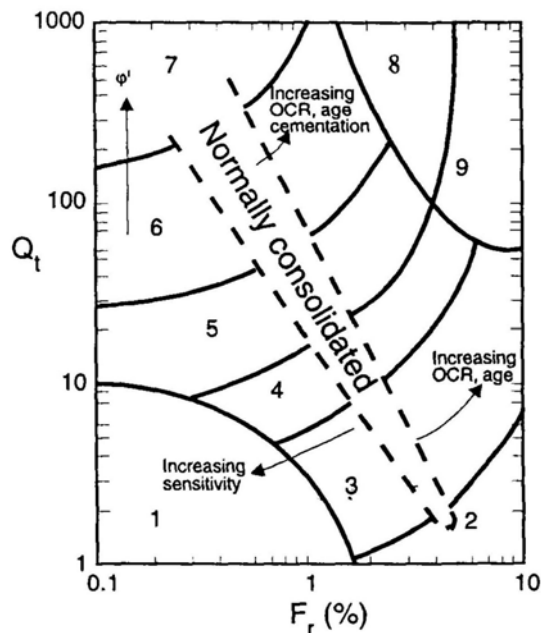


Figure 3: Soil Classification Chart

DP's in-house CPT software provides computer aided interpretation of soil strata, generating soil descriptions and strengths for each layer. The software can also produce plots of estimated soil parameters, including modulus, friction angle, relative density, shear strength and over consolidation ratio.

DP's CPT software helps our engineers quickly evaluate the critical soil layers and then focus on developing practical solutions for the client's project.

Engineering Applications

There are many uses for CPT data. The main applications are briefly introduced below:

Settlement

CPT provides a continuous profile of soil type and strength, providing an excellent basis for settlement analysis. Soil compressibility can be estimated from cone derived moduli, or known consolidation parameters for the critical layers (eg. from laboratory testing). Further, if pore pressure dissipation tests are undertaken using a piezocone, in-situ consolidation coefficients can be estimated to aid analysis.

Pile Capacity

The cone is, in effect, a small scale pile and, therefore, ideal for direct estimation of pile capacity. DP's in-house program ConePile can analyse most pile types and produces pile capacity versus depth plots. The analysis methods are based on proven static theory and empirical studies, taking account of scale effects, pile materials and method of installation. The results are expressed in limit state format, consistent with the Piling Code AS2159.

Dynamic or Earthquake Analysis

CPT and, in particular, Seismic CPT are suitable for dynamic foundation studies and earthquake response analyses, by profiling the low strain shear modulus G_0 . Techniques have also been developed relating CPT results to the risk of soil liquefaction.

Other Applications

Other applications of CPT include ground improvement monitoring (testing before and after works), salinity and contaminant plume mapping (conductivity cone), preloading studies and verification of strength gain.

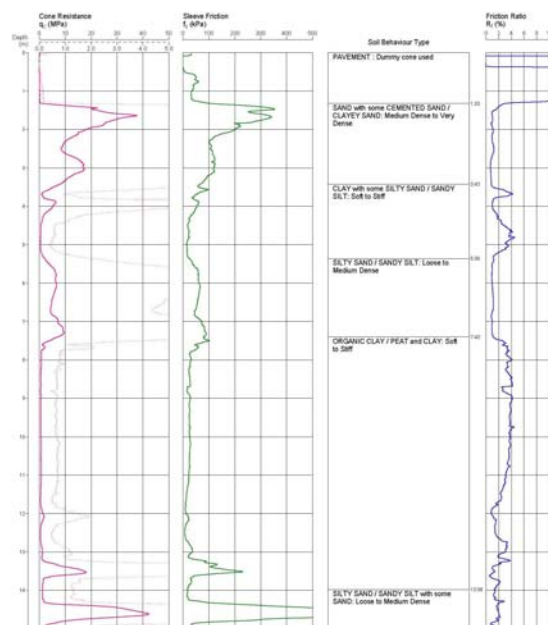
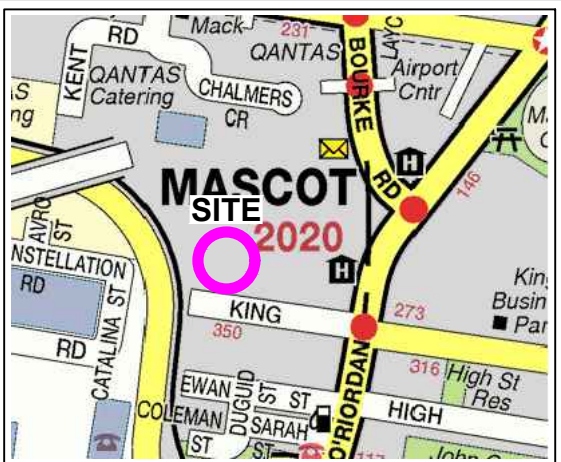
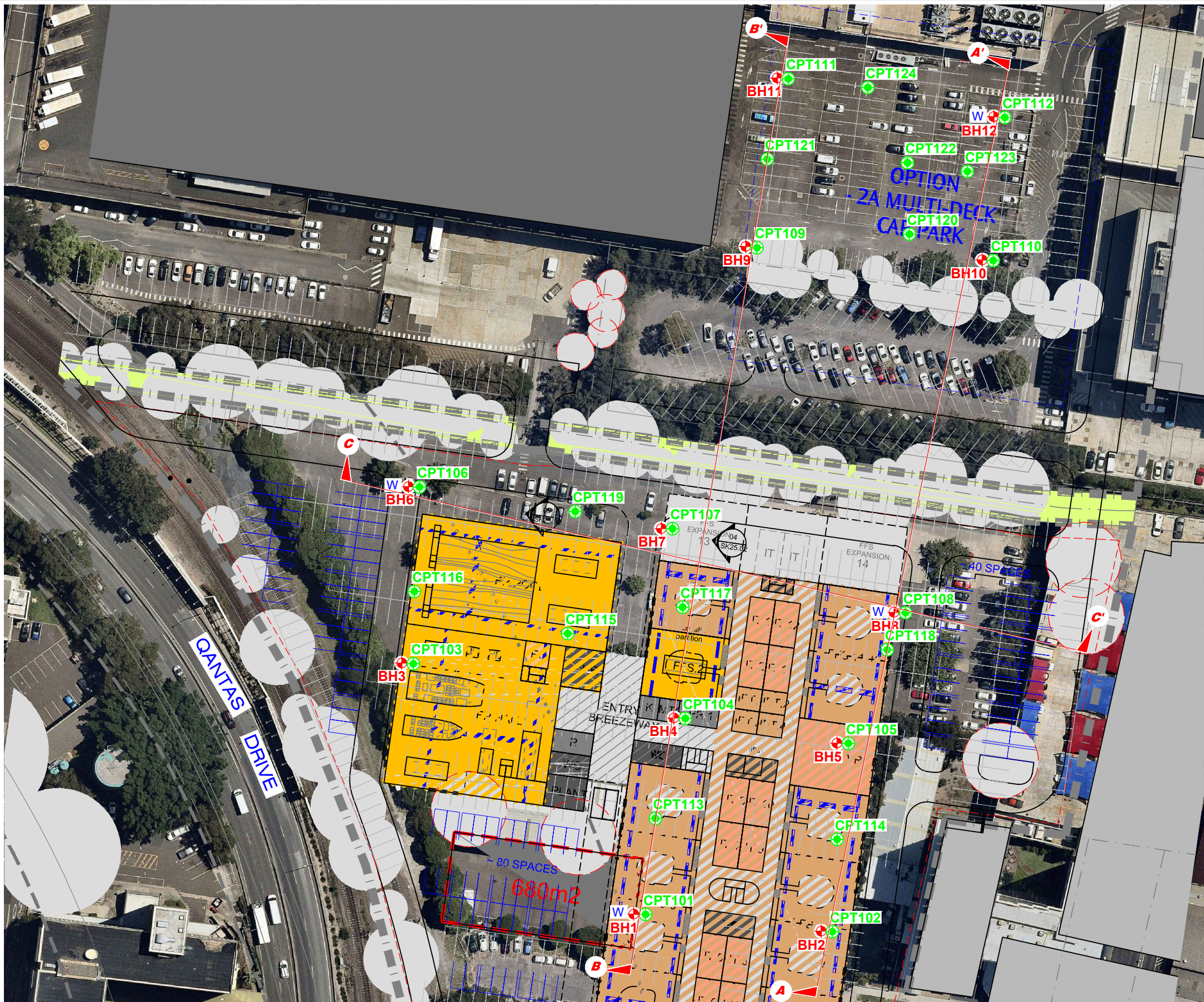


Figure 4: Sample Cone Plot

Appendix B

Drawings



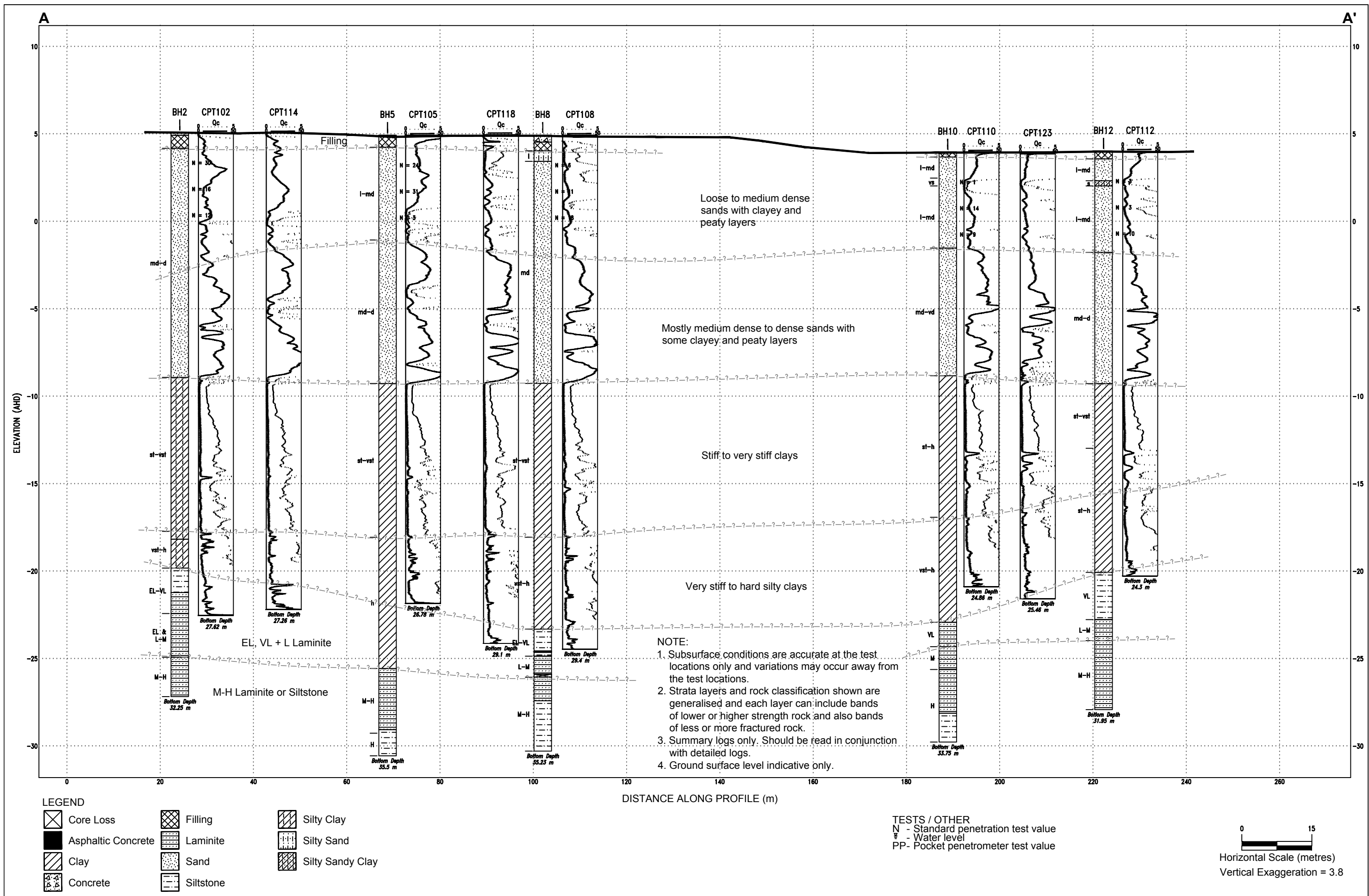
Locality Plan

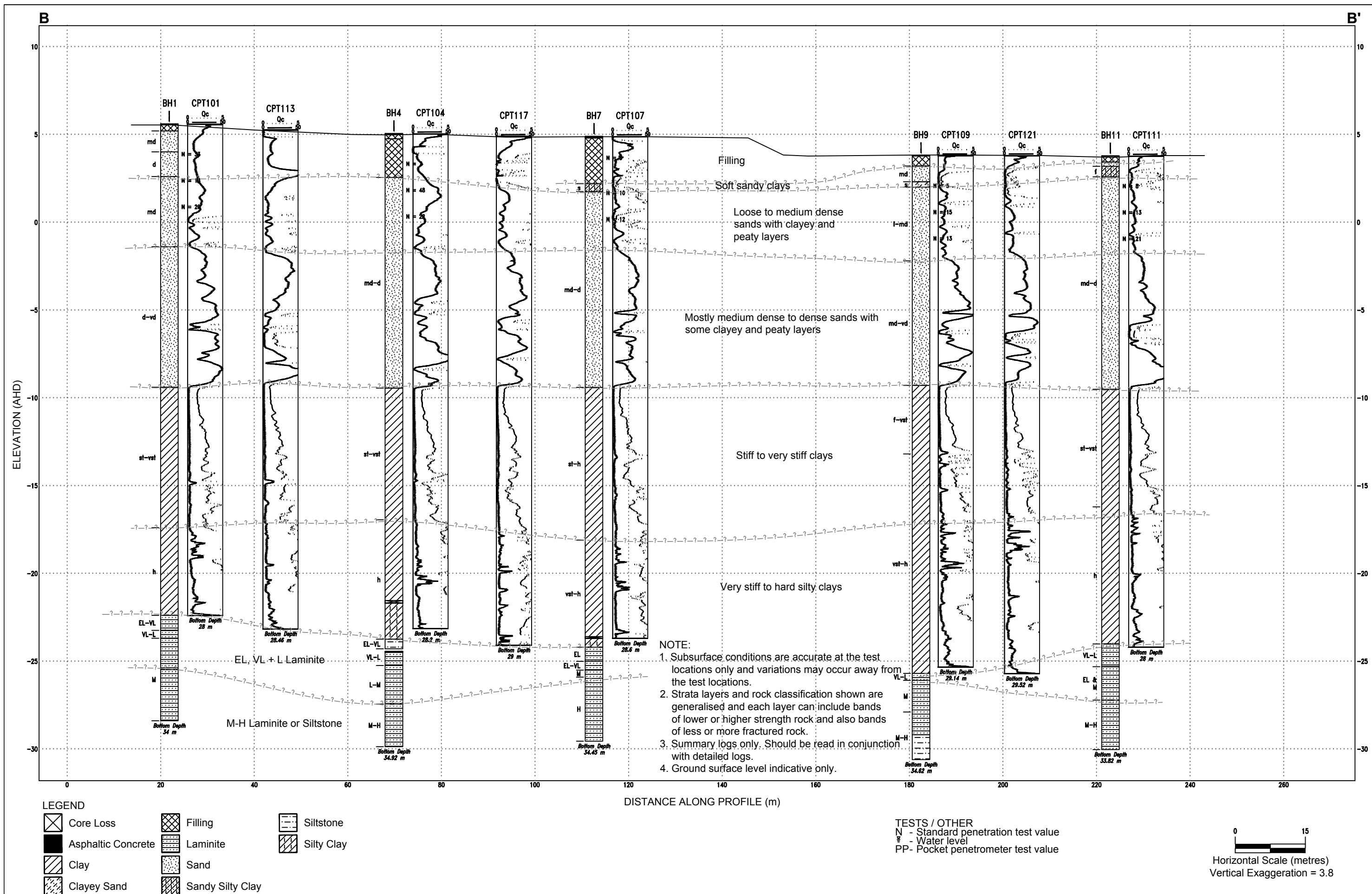
NOTE:
1: Base image from Nearmap.com
(Dated 27.12.2018)
2: Test locations are approximate only and
are shown with reference to existing features.

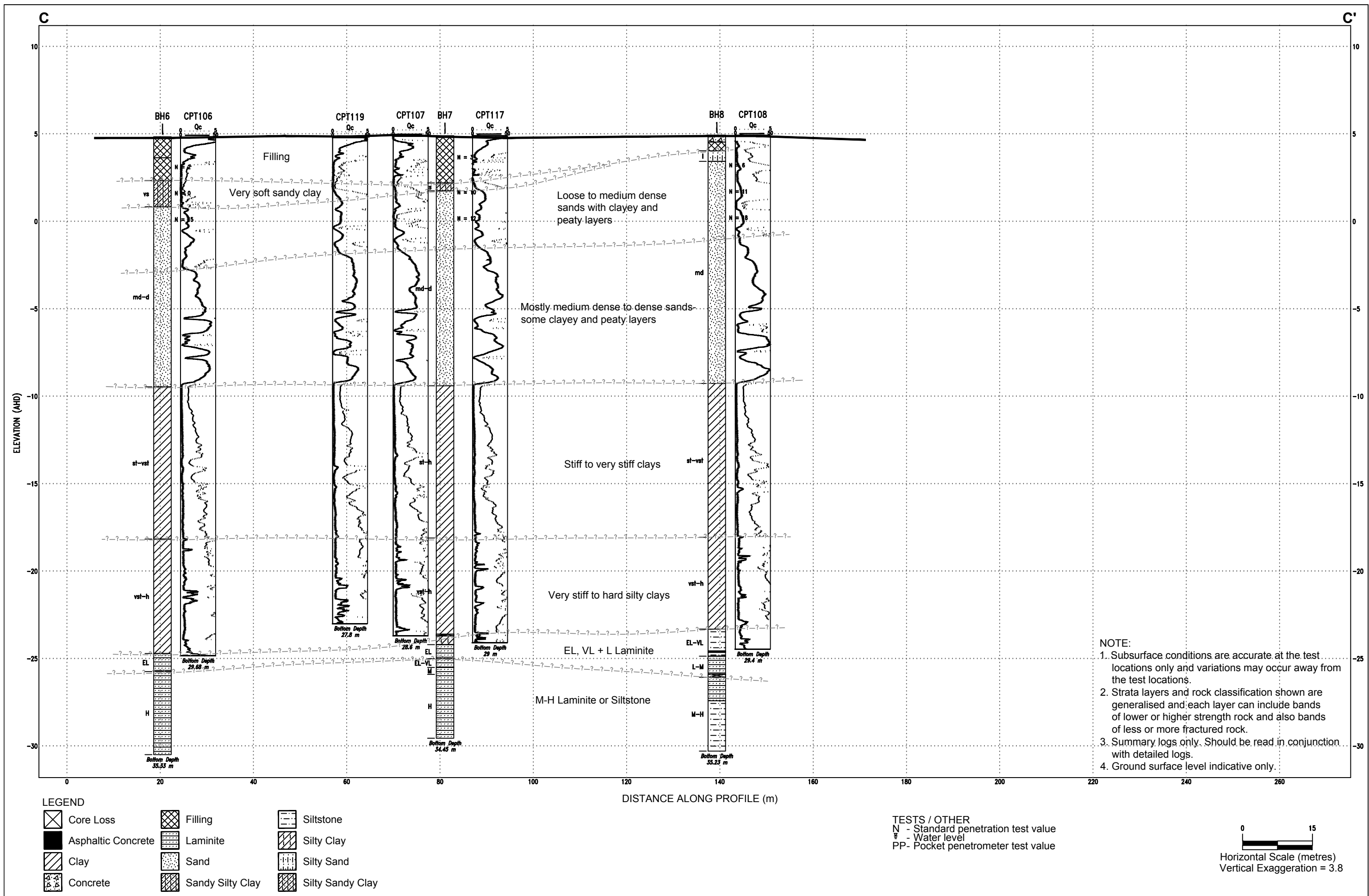
LEGEND

- Test Bore Location
- Cone Penetration Test Location
- Monitoring well location
- Geotechnical Cross Section A-A'









Appendix C

Borehole Logs

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.61 AHD
EASTING: 332213
NORTHING: 6244341
DIP/AZIMUTH: 90°/--

BORE No: BH1
PROJECT No: 85777.15
DATE: 15/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 9.0m, HQ to 28.0m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.0m, NMLC-coring to 31.08m

WATER OBSERVATIONS: Free ground water observed at 3.3m on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT101

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PLD	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.61 AHD
EASTING: 332213
NORTHING: 6244341
DIP/AZIMUTH: 90°/--

BORE No: BH1
PROJECT No: 85777.15
DATE: 15/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 9.0m, HQ to 28.0m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.0m, NMLC-coring to 31.08m

WATER OBSERVATIONS: Free ground water observed at 3.3m on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT101

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U _s	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.61 AHD
EASTING: 332213
NORTHING: 6244341
DIP/AZIMUTH: 90°/--

BORE No: BH1
PROJECT No: 85777.15
DATE: 15/1/2019
SHEET 3 **OF** 4

[illegible]

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 9.0m, HQ to 28.0m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.0m, NMLC-coring to 31.08m

WATER OBSERVATIONS: Free ground water observed at 3.3m on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT101

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50) (MPa)
BLK	Block sample	U _x	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W _s	Water seep	S	Standard penetration test
E	Environmental sample	W _l	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.61 AHD
EASTING: 332213
NORTHING: 6244341
DIP/AZIMUTH: 90°/-

BORE No: BH1
PROJECT No: 85777.15
DATE: 15/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		Ex Low	Very Low	Low	Medium	High	Very High		B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
31.08	31.08	LAMINITE: medium strength with several extremely low strength bands, slightly weathered, slightly fractured, pale grey to grey laminite with approximately 25% fine sandstone laminations and some clay bands (continued)														cln 29.81m: J 60°, ir, ro, cln 30.02-30.04m: Cs 30.14-30.15m: Cs 30.52-30.53m: Cs 30.67m: J 45°, pl, ro, cln 30.84-30.85m: Cs 31.06-31.08m: Cs 31.14m: B 5°, pl, cly 8mm 31.23-31.35m: J 30°-70°, st, cly 5mm 31.35m: B 0°, pl, cly 5mm 31.52m: B 0°, pl, cly 7mm 31.55-31.56m: Cs 31.91m: J 45°, pl, cly 3mm 32.3m: B 0°, pl, cly 4mm 32.47m: B 10°, pl, cly 2mm 32.62m: J 40°, pl, cln 33.27-33.28m: fg, 5mm		C	100	88	PL(A) = 0.9 PL(A) = 2 PL(A) = 0.85
34.0	34.0	Bore discontinued at 34.0m														33.66m: J 70°-90°, cu, cln, ro 33.77m: J 0°-45°, cu, cln, ro 33.89m: J (x2) 45°, pl, partially he		C	100	91	PL(A) = 0.9

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 9.0m, HQ to 28.0m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.0m, NMLC-coring to 31.08m

WATER OBSERVATIONS: Free ground water observed at 3.3m on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT101

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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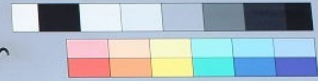
BORE: 1

PROJECT: MASCOT

JANUARY 2019



Project No: 85777.15
BH ID: BH 1
Depth: 28.00 - 32.00 m
Core Box No.: 1



85777.15 MASCOT START 28.0m BH1 15-1-19



28.00 - 32.00m

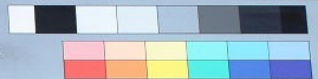
BORE: 1

PROJECT: MASCOT

JANUARY 2019



Project No: 85777.15
BH ID: BH 1
Depth: 32.00 - 34.00 m
Core Box No.: 2



32.00 - 34.00m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.08 AHD
EASTING: 332258
NORTHING: 6244337
DIP/AZIMUTH: 90°/--

BORE No: BH2
PROJECT No: 85777.15
DATE: 14/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High		Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
5	0.15	CONCRETE PAVEMENT: 25mm aggregate, 8mm dia steel reinforcement																									
		FILLING: dark brown sand filling with some gravel, damp																									
1	0.9	SAND: medium dense to dense, pale brown and dark brown, fine to medium sand with trace silt, damp																									
4																											
1																											
4																											
2																											
3																											
2																											
3																											
4																											
1																											
5		4.7m: dark brown clay band with rootlets																									
0																											
6																											
-1																											
7																											
-2																											
8																											
-3																											
9		Some peaty layers between 8.5m and 11.5m																									
-4																											

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m, HQ to 23.2m

TYPE OF BORING: Diacore to 0.15m, solid flight auger to 5.5m, Rotary wash-bore to 23.25m, NMLC-coring to 32.25m

WATER OBSERVATIONS: Free ground water observed at 2.1m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT102

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.08 AHD
EASTING: 332258
NORTHING: 6244337
DIP/AZIMUTH: 90°/--

BORE No: BH2
PROJECT No: 85777.15
DATE: 14/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
-5		SAND: medium dense to dense, pale brown and dark brown, fine to medium sand with trace silt, damp <i>(continued)</i>																									
-6	11																										
-7	12																										
-8	13																										
-9	14.0	SILTY CLAY: stiff to very stiff, dark brown silty clay, low to medium plasticity																									
-10	15	grey below 15.7m																									
-11	16																										
-12	17																										
-13	18																										
-14	19																										
-15																											

RIG: Explora 140 **DRILLER:** John S **LOGGED:** RB/SI **CASING:** HW to 5.6m, HQ to 23.2m
TYPE OF BORING: Diacore to 0.15m, solid flight auger to 5.5m, Rotary wash-bore to 23.25m, NMLC-coring to 32.25m
WATER OBSERVATIONS: Free ground water observed at 2.1m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT102

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		gp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.08 AHD
EASTING: 332258
NORTHING: 6244337
DIP/AZIMUTH: 90°/--

BORE No: BH2
PROJECT No: 85777.15
DATE: 14/1/2019
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
-15		SILTY CLAY: stiff to very stiff, dark brown silty clay, low to medium plasticity <i>(continued)</i>																								
-21																										
-22																										
-23		hard below 22.8m																								
-23.25		SILTY CLAY: very stiff to hard silty clay, with medium to high strength ironstone bands and ironstone gravel																								pp = 200
-24																						C	100	0		pp = 270
-24.9		SILTSTONE: extremely low and very low strength, extremely and highly weathered, pale grey-brown siltstone																								pp = 600
-26																										pp = 700
-26.3		LAMINITE: very low strength, highly weathered, slightly fractured, grey-brown laminite with approximately 20% fine sandstone laminations																								PL(A) = 0.11
-27																										
-27.5		LAMINITE: low to medium strength with numerous extremely low strength bands, slightly weathered, fractured, pale grey and grey laminite with approximately 25% fine sandstone laminations																								PL(A) = 0.75
-28																										PL(A) = 0.91
-29																										PL(A) = 0.81
-30.0																										

RIG: Explora 140 **DRILLER:** John S **LOGGED:** RB/SI **CASING:** HW to 5.6m, HQ to 23.2m
TYPE OF BORING: Diacore to 0.15m, solid flight auger to 5.5m, Rotary wash-bore to 23.25m, NMLC-coring to 32.25m
WATER OBSERVATIONS: Free ground water observed at 2.1m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT102

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	> Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.08 AHD
EASTING: 332258
NORTHING: 6244337
DIP/AZIMUTH: 90°/-

BORE No: BH2
PROJECT No: 85777.15
DATE: 14/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
-25		LAMINITE: medium to high strength, fresh, slightly fractured, pale grey and grey laminite with approximately 20% fine sandstone laminations																C	100	96	28.91-28.98m: J 70°, pl, cly vn 28.95-29.04m: Ds 28.97-28.48m: Cs 29.00-29.08m: fg 10mm 29.12m: J 60°, pl, cln 29.14-29.20m: fg, 10-20mm 29.23-29.33m: Ds 29.52-29.54m: Cs 29.59-31.02m: J (x5) 45°-85°, cly vn, ir 31.62-31.70m: J (x2), pl, ro, partially he	PL(A) = 1.1 <

RIG: Explora 140 **DRILLER:** John S **LOGGED:** RB/SI **CASING:** HW to 5.6m, HQ to 23.2m
TYPE OF BORING: Diacore to 0.15m, solid flight auger to 5.5m, Rotary wash-bore to 23.25m, NMLC-coring to 32.25m
WATER OBSERVATIONS: Free ground water observed at 2.1m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT102

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	Δ	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BORE: 2

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH 2
Depth: 23.25 - 28.00 m
Core Box No.: 1



23.25 - 28.00m

BORE: 2

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH 2
Depth: 28.00 - 32.25 m
Core Box No.: 2



28.00 - 32.25m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.19 AHD
EASTING: 332158
NORTHING: 6244401
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 85777.15
DATE: 15/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering	Graphic Log	Rock Strength	Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
								B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
5.03	0.03	ASPHALTIC CONCRETE: 30mm								A			
		FILLING: dark brown gravelly sand and gravelly clayey sand filling, with some clay and silt, damp								A			
										B			
										S			5,7,4 N = 11
	2.3	SANDY CLAY: soft dark brown sandy clay with some silt, saturated											
										S			0,0,2 N = 2
	3.4	SAND: medium dense to dense, pale brown fine to medium sand, with some peaty layers											
										S			5,12,12 N = 24

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.65m, HQ to 28.0m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.95m, NMLC-coring to 35.43m

WATER OBSERVATIONS: Free ground water observed at 3.2m

REMARKS: Soil descriptions and strengths at depth based on CPT103

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.19 AHD
EASTING: 332158
NORTHING: 6244401
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 85777.15
DATE: 15/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
	-5	SAND: medium dense to dense, pale brown fine to medium sand, with some peaty layers <i>(continued)</i>																									
	-6																										
	-7																										
	-8																										
	-9																										
	-10																										
	-11																										
	-12																										
	-13																										
	-14																										
	14.4	SILTY CLAY: stiff to very stiff, light grey, silty clay																									
	15																										
	16																										
	17																										
	18																										
	19																										

RIG: Explora 140 **DRILLER:** John S **LOGGED:** RB/SI **CASING:** HW to 5.65m, HQ to 28.0m
TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.95m, NMLC-coring to 35.43m
WATER OBSERVATIONS: Free ground water observed at 3.2m
REMARKS: Soil descriptions and strengths at depth based on CPT103

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U _s	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		gp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.19 AHD
EASTING: 332158
NORTHING: 6244401
DIP/AZIMUTH: 90°/--

BORE No: BH3
PROJECT No: 85777.15
DATE: 15/1/2019
SHEET 3 OF 4

[illegible]

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.65m, HQ to 28.0m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.95m, NMLC-coring to 35.43m

WATER OBSERVATIONS: Free ground water observed at 3.2m

REMARKS: Soil descriptions and strengths at depth based on CPT103

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Blank sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.19 AHD
EASTING: 332158
NORTHING: 6244401
DIP/AZIMUTH: 90°/-

BORE No: BH3
PROJECT No: 85777.15
DATE: 15/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
-25		SILTSTONE: extremely then very low strength, extremely then highly weathered, pale grey-brown to grey-brown siltstone <i>(continued)</i>																C	100	0	PL(A) = 0.74
-31																					
-26																					
-31.75		LAMINITE: medium strength, slightly weathered then fresh, slightly fractured, pale grey and grey laminite with approximately 20% fine sandstone laminations																C	100	50	PL(A) = 0.94
-32																					
-27																					
-33		LAMINITE: high strength, fresh, slightly fractured pale grey and grey laminite with approximately 20% fine sandstone laminations																			
-28																					
-34																					
-29																					
-35		34.40-34.85m: increase in bedding angle to 40° 34.70-34.85m: shear zone																C	100	87	PL(A) = 2.4
-30																					
-35.43		Bore discontinued at 35.43m																			
-36																					
-31																					
-37																					
-32																					
-38																					
-33																					
-39																					
-34																					

RIG: Explora 140 **DRILLER:** John S **LOGGED:** RB/SI **CASING:** HW to 5.65m, HQ to 28.0m
TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.95m, NMLC-coring to 35.43m
WATER OBSERVATIONS: Free ground water observed at 3.2m
REMARKS: Soil descriptions and strengths at depth based on CPT103

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U ₁ Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	Δ Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

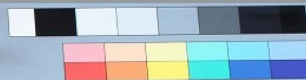
BORE: 3

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH3
Depth: 28.45 - 33.00m
Core Box No.: 1



85777-15 MASCOT BH 3 16-01-19 START 28.45m

29m

30m

31m

32m

28.45 - 33.00m

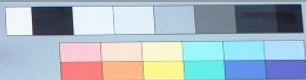
BORE: 3

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH3
Depth: 33.00 - 35.43m
Core Box No.: 2



33.00 - 35.43m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.06 AHD
EASTING: 332223
NORTHING: 6244388
DIP/AZIMUTH: 90°/--

BORE No: BH4
PROJECT No: 85777.15
DATE: 14/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
5	0.04	ASPHALTIC CONCRETE																								
	0.3	FILLING: dark brown, fine to medium gravelly sand filling, damp																				A				
		FILLING: pale brown, fine to medium sand filling, moist																				A				
	1	0.9m: dark brown gravel, plastic fragments																				A				
	2																					S				2,3,4 N = 7
	2.5	SAND: medium dense to dense, brown, fine to medium sand, moist																								
	3																					S				13,24,24 N = 48
	4																									
	5																					S				5,10,12 N = 22
	6																									
	7																									
	8																									
	9	several peaty layers between 8.5m and 11.5m																								

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 5.5m, HQ to 34.92m

TYPE OF BORING: Solid flight auger to 5.5m, Rotary wash-bore to 26.6m, NMLC-coring to 34.92m

WATER OBSERVATIONS: Free ground water observed at 2.7m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT104

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.06 AHD
EASTING: 332223
NORTHING: 6244388
DIP/AZIMUTH: 90°/--

BORE No: BH4
PROJECT No: 85777.15
DATE: 14/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High		Ex High	B - Bedding	J - Joint	S - Shear	F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
-5		SAND: medium dense to dense, brown, fine to medium sand, moist <i>(continued)</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									</

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 5.5m, HQ to 34.92m

TYPE OF BORING: Solid flight auger to 5.5m, Rotary wash-bore to 26.6m, NMLC-coring to 34.92m

WATER OBSERVATIONS: Free ground water observed at 2.7m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT104

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.06 AHD
EASTING: 332223
NORTHING: 6244388
DIP/AZIMUTH: 90°/--

BORE No: BH4
PROJECT No: 85777.15
DATE: 14/1/2019
SHEET 3 **OF** 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	NW	SW	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
-15		CLAY: stiff to very stiff clay <i>(continued)</i>																								
-16	21																									
-17	22	hard below 22m																								
-18	23																									
-19	24																									
-20	25																									
-21	26																									
26.6	26.6	SILTY CLAY: hard, grey and brown silty clay with medium to high strength ironstone bands and gravel, high plasticity																							pp = 470	
26.75	27																									pp = 600
-22	28																				C	95	4		pp = 570	
-23																										
28.8	29	SILTSTONE: extremely low strength, extremely weathered, grey-brown siltstone																								
-24	29																									
29.35	29.35																									
29.55	29.55																				C	98	49		PL(A) = 0.29	

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 5.5m. HQ to 34.92m

TYPE OF BORING: Solid flight auger to 5.5m, Rotary wash-bore to 26.6m, NMLC-coring to 34.92m

WATER OBSERVATIONS: Free ground water observed at 2.7m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT104

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 5.06 AHD
EASTING: 332223
NORTHING: 6244388
DIP/AZIMUTH: 90°/-

BORE No: BH4
PROJECT No: 85777.15
DATE: 14/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High			Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
-25	30.3	LAMINITE: very low to low strength, highly then slightly weathered, slightly fractured, pale grey and grey laminite with approximately 20% fine sandstone laminations <i>(continued)</i>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

RIG: Scout 4 **DRILLER:** Rhett K-E **LOGGED:** RB/SI **CASING:** HW to 5.5m, HQ to 34.92m
TYPE OF BORING: Solid flight auger to 5.5m, Rotary wash-bore to 26.6m, NMLC-coring to 34.92m
WATER OBSERVATIONS: Free ground water observed at 2.7m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT104

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W Water seep	S Standard penetration test	
E Environmental sample	W Water level	V Shear vane (kPa)	

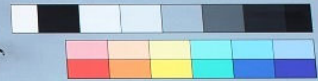
BORE: 4

PROJECT: MASCOT

JANUARY 2019



Project No: 85777.15
BH ID: BH4
Depth: 26.60 - 31.00 m
Core Box No.: 1



26.60 - 31.00m

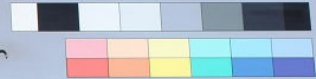
BORE: 4

PROJECT: MASCOT

JANUARY 2019



Project No: 85777.15
BH ID: BH4
Depth: 31.00 - 34.92 m
Core Box No.: 2



31.00 - 32.92m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.94 AHD
EASTING: 332262
NORTHING: 6244382
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 85777.15
DATE: 17/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
	0.04	ASPHALTIC CONCRETE																								
		FILLING: dark brown gravelly sand filling with some clay, damp																								
	0.7	SAND: loose to medium dense, pale brown, fine to medium sand with some peaty and clayey bands																								
	1																									
	2																									6,10,14 N = 24
	3																									
	4																									
	5																									7,10,21 N = 31
	6	Mostly medium dense to dense below 6m																								
	7																									
	8																									
	9																									1,0,3 N = 3

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 6m, HQ to 30.45m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 30.5m, NMLC-coring to 35.5m

WATER OBSERVATIONS: Free ground water observed at 1.9m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT105

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



Douglas Partners
 Geotechnics | Environment | Groundwater

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.94 AHD
EASTING: 332262
NORTHING: 6244382
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 85777.15
DATE: 17/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		SAND: loose to medium dense, pale brown, fine to medium sand with some peaty and clayey bands <i>(continued)</i>																								
	11																									
	12																									
	13																									
	14																									
	14.2	CLAY: stiff to very stiff clay and sandy clay																								
	15																									
	16																									
	17																									
	18																									
	19																									

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 6m, HQ to 30.45m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 30.5m, NMLC-coring to 35.5m

WATER OBSERVATIONS: Free ground water observed at 1.9m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT105

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.94 AHD
EASTING: 332262
NORTHING: 6244382
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 85777.15
DATE: 17/1/2019
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		CLAY: stiff to very stiff clay and sandy clay (continued)																								

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 6m, HQ to 30.45m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 30.5m, NMLC-coring to 35.5m

WATER OBSERVATIONS: Free ground water observed at 1.9m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT105

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.94 AHD
EASTING: 332262
NORTHING: 6244382
DIP/AZIMUTH: 90°/--

BORE No: BH5
PROJECT No: 85777.15
DATE: 17/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
	30.5	CLAY: stiff to very stiff clay and sandy clay <i>(continued)</i>																			
	31	LAMINITE: medium to high strength, fresh, slightly fractured and unbroken, pale grey and grey laminite with approximately 20% fine sandstone laminations																C	100	85	PL(A) = 1.3
	32																				PL(A) = 1.1
	33																				PL(A) = 1.3
	34																				PL(A) = 1.1
	34.0	SILTSTONE: high strength, fresh, slightly fractured and unbroken, grey siltstone, with a trace of fine sandstone laminations																C	100	96	PL(A) = 1.2
	35	Bore discontinued at 35.5m																			PL(A) = 1.5
	36																				
	37																				
	38																				
	39																				

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 6m, HQ to 30.45m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 30.5m, NMLC-coring to 35.5m

WATER OBSERVATIONS: Free ground water observed at 1.9m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT105

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BORE: 5

PROJECT: MASCOT

JANUARY 2019



Project No: 85777.15
BH ID: BH 5
Depth: 30.55 - 34.00 m
Core Box No.: 1



30.50 - 34.00m

BORE: 5

PROJECT: MASCOT

JANUARY 2019



Project No: 85777.15
BH ID: BH 5
Depth: 34.00 - 35.45 m
Core Box No.: 2



34.00 - 35.45m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.84 AHD
EASTING: 332160
NORTHING: 6244443
DIP/AZIMUTH: 90°/--

BORE No: BH6
PROJECT No: 85777.15
DATE: 23/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m, HQ to 27.25m

TYPE OF BORING: Solid flight auger to 5.60m, Rotary wash-bore to 29.35m, NMLC-coring to 35.33m

WATER OBSERVATIONS: Free groundwater observed at 3.2m on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT106

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.84 AHD
EASTING: 332160
NORTHING: 6244443
DIP/AZIMUTH: 90°/--

BORE No: BH6
PROJECT No: 85777.15
DATE: 23/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High			Ex High	B - Bedding	J - Joint	S - Shear	F - Fault	Type	Core Rec. %
		SAND: medium dense to dense, pale brown, fine to medium sand, saturated with some peaty and clayey bands (continued)																						
	11																							
	12																							
	13																							
	14																							
	14.3	CLAY: stiff to very stiff, light grey clay																						
	15																							
	16																							
	17																							
	18																							
	19																							

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m, HQ to 27.25m

TYPE OF BORING: Solid flight auger to 5.60m, Rotary wash-bore to 29.35m, NMLC-coring to 35.33m

WATER OBSERVATIONS: Free groundwater observed at 3.2m on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT106

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U _s	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.84 AHD
EASTING: 332160
NORTHING: 6244443
DIP/AZIMUTH: 90°/--

BORE No: BH6
PROJECT No: 85777.15
DATE: 23/1/2019
SHEET 3 **OF** 4

[illegible]

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m. HQ to 27.25m

TYPE OF BORING: Solid flight auger to 5.60m, Rotary wash-bore to 29.35m, NMLC-coring to 35.33m

WATER OBSERVATIONS: Free groundwater observed at 3.2m on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT106

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50) (MPa)
BLK	Blank sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.84 AHD
EASTING: 332160
NORTHING: 6244443
DIP/AZIMUTH: 90°/-

BORE No: BH6
PROJECT No: 85777.15
DATE: 23/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
	30.58	LAMINITE: extremely low then very low to low strength, extremely to highly weathered, pale grey-brown laminite (continued)															29.79-29.82m: B(x4), 0°, pl, cly vn, fe	C	100	0	PL(A) = 1.3
	31	LAMINITE: high strength, fresh, slightly fractured and unbroken, pale grey to grey laminite with approximately 20% fine grained sandstone laminations 31.00-31.20m: fractured															29.89m: J(x2), 60°, pl, cly vn, fe 29.93m: B0°, pl, cly 3mm, fe 30.15m: B10°, pl, cly 5mm, fe 30.23m: B10°, pl, cly vn, fe 30.3m: B0°, pl, cly 8mm, fe 30.44-30.48m: Cs, 40mm 30.52-30.53m: Cs, 10mm, fe 30.56m: J60-90°, cu, cly vn, fe 30.57-30.58m: Cs, 10mm, fe 30.66m: B5°, pl, cly 5mm, fe 30.72m: J30° & 70°, st, ro, cln 30.87m: J60°, ir, cly vn 30.93m: J60°, ir, cly vn 31.04-31.15m: J60°, ir, cly vn 31.15m: J60°, ir, cly vn 31.25m: J80°, ir, ti 31.34m: J65°, pl, sm, cln 33.25-33.40m: J65°, pl, ro, cln	C	100	29	
	32																				PL(A) = 1.3
	33																	C	100	100	PL(A) = 2.1
	34																				PL(A) = 1.8
	35																	C	100	100	PL(A) = 1.6
	35.33	Bore discontinued at 35.33m																			PL(A) = 1.4
	36																				
	37																				
	38																				
	39																				

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m, HQ to 27.25m

TYPE OF BORING: Solid flight auger to 5.60m, Rotary wash-bore to 29.35m, NMLC-coring to 35.33m

WATER OBSERVATIONS: Free groundwater observed at 3.2m on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT106

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	Δ	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BORE: 6

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH6
Depth: 29.55 - 34.00 m
Core Box No.: 1



85777-15 MASCOT BH6 START 29.55 m
24-1-2019



29.55 - 34.00 m

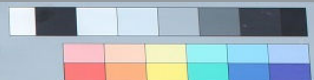
BORE: 6

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH6
Depth: 34.00 - 35.33 m
Core Box No.: 2



34.00 - 35.33 m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.90 AHD
EASTING: 332220
NORTHING: 6244433
DIP/AZIMUTH: 90°/--

BORE No: BH7
PROJECT No: 85777.15
DATE: 18/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low			Medium	High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type
	0.05 0.1	APSHALTIC CONCRETE: 50mm thick																A			1,1,2 N = 3
		FILLING: dark brown gravelly sand filling (roadbase)																A			
	4	FILLING: dark brown clayey sand filling with some gravel, damp																A			
	1																	S			
	2	1.6m: becoming soft, sandy clay with trace gravel																			
	2.7	SANDY SILTY CLAY: soft, dark brown sandy silty clay, wet																			
	3.15	SAND: mostly medium dense to dense, pale brown, fine to medium sand with some clayey and peaty layers																S			4,4,6 N = 10
	4																				
	5																	S			3,5,7 N = 12
	6																				
	7																				
	8																				
	9																				
	10																				
	11																				
	12																				
	13																				
	14																				
	15																				

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 6.5m, HQ to 28.05m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.5m, NMLC-coring to 34.45m

WATER OBSERVATIONS: Free ground water observed at 2.8m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT107

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.90 AHD
EASTING: 332220
NORTHING: 6244433
DIP/AZIMUTH: 90°/--

BORE No: BH7
PROJECT No: 85777.15
DATE: 18/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
		SAND: mostly medium dense to dense, pale brown, fine to medium sand with some clayey and peaty layers <i>(continued)</i>																									
	11																										
	12																										
	13																										
	14																										
	14.3	CLAY: stiff to hard clay																									
	15																										
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	19																										
	20																										
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RIG: Scout 4 **DRILLER:** Rhett K-E **LOGGED:** RB/SI **CASING:** HW to 6.5m, HQ to 28.05m
TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.5m, NMLC-coring to 34.45m
WATER OBSERVATIONS: Free ground water observed at 2.8m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT107

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U _s	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		gp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.90 AHD
EASTING: 332220
NORTHING: 6244433
DIP/AZIMUTH: 90°/--

BORE No: BH7
PROJECT No: 85777.15
DATE: 18/1/2019
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS	FR	Ex Low	Very Low	Low	Medium	High	Very High	Ex High	Type	Core Rec. %	RQD %	Test Results & Comments		
		CLAY: stiff to hard clay (continued)																			
	21																				
	22																				
	23	hard below 23m																			
	24																				
	25																				
	26																				
	27																				
	28																				
	28.5	SILTY CLAY: very stiff to hard, grey and brown silty clay with medium to high strength ironstone bands and gravel																			
	28.6																				
	29.1	LAMINITE: extremely low strength, extremely weathered, pale grey-brown laminite																			
	29.9																				
	28.5m																				
	28.6																				
	29.1																				
	29.9																				

RIG: Scout 4 **DRILLER:** Rhett K-E **LOGGED:** RB/SI **CASING:** HW to 6.5m, HQ to 28.05m
TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.5m, NMLC-coring to 34.45m
WATER OBSERVATIONS: Free ground water observed at 2.8m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT107

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U _s	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.90 AHD
EASTING: 332220
NORTHING: 6244433
DIP/AZIMUTH: 90°/-

BORE No: BH7
PROJECT No: 85777.15
DATE: 18/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High			Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	30.4	LAMINITE: extremely low to very low strength, highly weathered, slightly fractured, grey laminite (continued)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 6.5m, HQ to 28.05m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 28.5m, NMLC-coring to 34.45m

WATER OBSERVATIONS: Free ground water observed at 2.8m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT107

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	Δ	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



Douglas Partners
 Geotechnics | Environment | Groundwater

BORE: 7

PROJECT: MASCOT

JANUARY 2019



Project No: 8577715
BH ID: BH 7
Depth: 28.50 - 33.00 m
Core Box No.: 1



28.50 - 33.00m

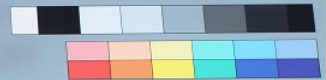
BORE: 7

PROJECT: MASCOT

JANUARY 2019



Project No: 8577715
BH ID: BH 7
Depth: 33.00 - 34.45 m
Core Box No.: 2



33.00 - 34.45m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.94 AHD
EASTING: 332275
NORTHING: 6244413
DIP/AZIMUTH: 90°/--

BORE No: BH8
PROJECT No: 85777.15
DATE: 22/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
	0.05	ASPHALTIC CONCRETE																								
	0.4	CONCRETE SLAB: 20mm aggregate, metal plates up to 10mm thick																					A			
	0.9	FILLING: brown and dark brown, fine to medium sand and sandy clay filling with a trace of gravel																					B			
	1.5	SILTY SAND: loose, dark grey silty fine to medium sand with some clay, damp																					A			
	1.5	SAND: mostly medium dense, brown, fine to medium sand with some clayey lenses and peaty sands																					B			
	2																						S			1,3,3 N = 6
	3																									
	3																						S			3,5,6 N = 11
	4																									
	5																						S			2,7,11 N = 18
	6																									
	7																									
	8																									
	9																									

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 9.0m, HQ to 28.25m

TYPE OF BORING: Diacore to 0.4m, solid flight auger to 5.0m, Rotary wash-bore to 28.25m, NMLC-coring to 32.23m

WATER OBSERVATIONS: Free ground water observed at 2.48 on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT108

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.94 AHD
EASTING: 332275
NORTHING: 6244413
DIP/AZIMUTH: 90°/--

BORE No: BH8
PROJECT No: 85777.15
DATE: 22/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
		SAND: mostly medium dense, brown, fine to medium sand with some clayey lenses and peaty sands <i>(continued)</i>																									
	11																										
	12																										
	13																										
	14																										
	14.2	CLAY: stiff to very stiff, light grey clay																									
	15																										
	16																										
	17																										
	18																										
	19	19m: ironstone band																									

RIG: Explora 140 **DRILLER:** John S **LOGGED:** RB/SI **CASING:** HW to 9.0m, HQ to 28.25m
TYPE OF BORING: Diacore to 0.4m, solid flight auger to 5.0m, Rotary wash-bore to 28.25m, NMLC-coring to 32.23m
WATER OBSERVATIONS: Free ground water observed at 2.48 on 24 Jan 2019
REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT108

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U _s	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.94 AHD
EASTING: 332275
NORTHING: 6244413
DIP/AZIMUTH: 90°/--

BORE No: BH8
PROJECT No: 85777.15
DATE: 22/1/2019
SHEET 3 **OF** 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type
		CLAY: stiff to very stiff, light grey clay <i>(continued)</i>																							
		20.5m: ironstone band																							
-16	21																								
-17	22																								
		very stiff to hard below 23m																							
-18	23																								
-19	24																								
		24.5m: ironstone band																							
-20	25																								
-21	26																								
-22	27																								
-23	28																								
28.25		SILTSTONE: extremely to very low strength, extremely to highly weathered, slightly fractured, pale grey-brown and red-brown siltstone with medium strength iron-cemented bands																							
-24	29																								
29.58																									
29.8																									

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 9.0m. HQ to 28.25m

TYPE OF BORING: Diacore to 0.4m, solid flight auger to 5.0m, Rotary wash-bore to 28.25m, NMLC-coring to 32.23m

WATER OBSERVATIONS: Free ground water observed at 2.48 on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT108

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test (s(50) (MPa)
BLK	Blank sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test (s(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.94 AHD
EASTING: 332275
NORTHING: 6244413
DIP/AZIMUTH: 90°/-

BORE No: BH8
PROJECT No: 85777.15
DATE: 22/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS		Ex Low	Very Low	Low	Medium	High	Very High		B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
	31.0	LAMINITE: low then medum strength, slightly weathered, fractured and slightly fractured pale grey and grey laminite with approximately 20 % fine sandstone laminations (continued)														29.62-29.65m: Cs, fe 29.68m: J 80°-90°, ir, cly vn, fe 29.70-29.73m: Cs, fe 29.78-29.85m: B (x3) 0°-10°, pl, cly 5-9mm, fe 30.1m: B 0°, pl, cly 9mm		C	94	10	PL(A) = 0.73
	32.35	LAMINITE: medium and high strength, fresh, fractured and slightly fractured, pale grey and grey laminite with approximately 20% fine sandstone laminations														30.14m: J 45°, pl, cly vn 30.18m: B 0°, pl, cly 8mm 30.27m: J 35°, cu, ro, cln 30.32-30.55m: J (x4) 45°, pl, cly vn 30.57-30.70m: J (45°-70°, ir, cly vn 30.83m: CORE LOSS: 170mm		C	88	29	PL(A) = 1.4
	33	SILTSTONE: medium and high strength, fresh, slightly fractured grey siltstone with approximately 5% fine sandstone laminations														31.12-31.25m: J (x4) 45°, pl, cly vn, partially he 31.82-31.83m: J (x13) 40°-60°, pl, ro, cly vn 31.88m: B 15°, pl, cly 5mm 32.64m: J 45°, pl, he 33.22m: J 40°, ir, cly vn 33.47m: J 80°-90°, cu, partially he 33.56m: J 60°, pl, ro, cln 33.57-33.73m: J 60°, pl, cly vn 33.85m: J 40°, pl, ro, cln 33.88m: J 60°, pl, ro, cln		C	100	78	PL(A) = 0.39 PL(A) = 1.1 PL(A) = 0.72
	35.23	Bore discontinued at 35.23m														34.04m: J 60°-90°, ir, ro, cln 34.07m: J 30°-45°, st, ro, cln 34.5m: J (x2) 60°, pl, cly vn 35.12m: J 60°, pl, cly vn					PL(A) = 0.86

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 9.0m, HQ to 28.25m

TYPE OF BORING: Diacore to 0.4m, solid flight auger to 5.0m, Rotary wash-bore to 28.25m, NMLC-coring to 32.23m

WATER OBSERVATIONS: Free ground water observed at 2.48 on 24 Jan 2019

REMARKS: Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT108

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BORE: 8

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH 8
Depth: 28.25 - 33.00 m
Core Box No.: 1



28.25 - 33.00 m

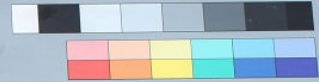
BORE: 8

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH 8
Depth: 33.00 - 35.23 m
Core Box No.: 2



33.00 - 35.23 m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.81 AHD
EASTING: 332240
NORTHING: 6244500
DIP/AZIMUTH: 90°/--

BORE No: BH9
PROJECT No: 85777.15
DATE: 16/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
	0.03	ASPHALTIC CONCRETE: 30mm thick																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 10.5m, HQ to 29.5m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 29.5m, NMLC-coring to 34.62m

WATER OBSERVATIONS: Free ground water observed at 1.4m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT109

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.81 AHD
EASTING: 332240
NORTHING: 6244500
DIP/AZIMUTH: 90°/--

BORE No: BH9
PROJECT No: 85777.15
DATE: 16/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		SAND: loose to medium dense, pale brown fine sand with some clayey or peaty layers (continued)																				
	11																					
	12																					
	13	13.1 CLAY: firm to very stiff clay																				
	14																					
	15																					
	16																					
	17	very stiff to hard below 17m																				
	18																					
	19																					
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RIG: Scout 4 **DRILLER:** Rhett K-E **LOGGED:** RB/SI **CASING:** HW to 10.5m, HQ to 29.5m
TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 29.5m, NMLC-coring to 34.62m
WATER OBSERVATIONS: Free ground water observed at 1.4m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT109

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U _s	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		gp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.81 AHD
EASTING: 332240
NORTHING: 6244500
DIP/AZIMUTH: 90°/--

BORE No: BH9
PROJECT No: 85777.15
DATE: 16/1/2019
SHEET 3 **OF** 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
-17	21	CLAY: firm to very stiff clay (continued)																								
-18	22																									
-19	23																									
-20	24																									
-21	25																									
-22	26																									
-23	27																									
-24	28																									
-25	29																									
-26	29.5																									
-26	29.9	LAMINITE: very low and low strength,slightly weathered, fractured and slightly fractured,																			C	100	93	PL(A) = 0.14		

RIG: Scout 4

DRILLER: Rhett K-E

LOGGED: RB/SI

CASING: HW to 10.5m, HQ to 29.5m

TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 29.5m, NMLC-coring to 34.62m

WATER OBSERVATIONS: Free ground water observed at 1.4m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT109

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W	Water seep
E	Environmental sample	W	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.81 AHD
EASTING: 332240
NORTHING: 6244500
DIP/AZIMUTH: 90°/-

BORE No: BH9
PROJECT No: 85777.15
DATE: 16/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength						Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing			
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High	Very High			Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
	-27	grey laminite with approximately 20% fine sandstone laminations															5mm						
	-31	LAMINITE: medium then medium to high strength, fresh, slightly fractured and unbroken, pale grey and grey laminite with approximately 25% fine sandstone laminations (continued)															29.74m: B 0°, pl, cly 8mm 29.95m: J 45°, ti 30.04-30.16m: J (x2) 45°&70°, pl, ro, cln				PL(A) = 0.93		
	-28																						
	-32																31.58-31.68m: J 60°, pl, ro, cln 31.70-31.83m: J 60°, pl, ro, cln, partially he 31.80-31.95m: J 60°, pl, he 32.22m: B 0°, pl, cly, 9mm				PL(A) = 0.86		
	-29	32.45-32.92m: fractured															32.35-32.45m: J 45°-70°, pl, ir, ro, cln				PL(A) = 1.1		
	-33	33.0																					
	-30	SILTSTONE: medium to high strength, slightly fractured, grey siltstone with approximately 10% fine sandstone laminations															33.12m: B 0°, pl, cly 5mm 33.121m: J 60°, pl, ro, cln 33.29m: B 0°, pl, cly 2mm 33.32m: J 30°, pl, ro, cln 33.35m: J 90°, st, ro, cln				PL(A) = 0.66		
	-34																						
	-34.62	Bore discontinued at 34.62m																			PL(A) = 1		
	-31																						
	-35																						
	-32																						
	-36																						
	-33																						
	-37																						
	-34																						
	-38																						
	-35																						
	-39																						
	-36																						

RIG: Scout 4 **DRILLER:** Rhett K-E **LOGGED:** RB/SI **CASING:** HW to 10.5m, HQ to 29.5m
TYPE OF BORING: Solid flight auger to 5.0m, Rotary wash-bore to 29.5m, NMLC-coring to 34.62m
WATER OBSERVATIONS: Free ground water observed at 1.4m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT109

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U ₁ Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	Δ Water seep	S Standard penetration test	
E Environmental sample	≡ Water level	V Shear vane (kPa)	

BORE: 9

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH 9
Depth: 29.50 - 33.00 m
Core Box No.: 1



MASCOT 16-119 BH:9 85777-15 START 29.5

29.5



29.5 - 33.00 m

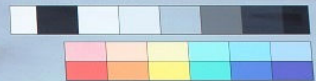
BORE: 9

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH 9
Depth: 33.00 - 34.62 m
Core Box No.: 2



33.00 - 34.62 m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.98 AHD
EASTING: 332297
NORTHING: 6244497
DIP/AZIMUTH: 90°/--

BORE No: BH10
PROJECT No: 85777.15
DATE: 16/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.55m, HQ to 26.9m

TYPE OF BORING: Solid flight auger to 5.55m, Rotary wash-bore to 26.9m, NMLC-coring to 33.75m

WATER OBSERVATIONS: Free ground water observed at 0.85m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT110

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U ₁	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.98 AHD
EASTING: 332297
NORTHING: 6244497
DIP/AZIMUTH: 90°/--

BORE No: BH10
PROJECT No: 85777.15
DATE: 16/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering						Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing							
			EW	HW	MW	SW	FS	FR		Ex Low	Very Low	Low	Medium	High		Very High	Ex High		0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments
		SAND: medium dense to very dense, fine to medium sand with some clayey or peaty bands <i>(continued)</i>																											
	11																												
	12																												
	12.8																												
	13	CLAY: stiff to hard, red and brown clay and silty clay with some ironstone bands																											
	14																												
	15																												
	16																												
	17																												
	18																												
	19																												

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.55m, HQ to 26.9m

TYPE OF BORING: Solid flight auger to 5.55m, Rotary wash-bore to 26.9m, NMLC-coring to 33.75m

WATER OBSERVATIONS: Free ground water observed at 0.85m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT110

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U ₁	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.98 AHD
EASTING: 332297
NORTHING: 6244497
DIP/AZIMUTH: 90°/--

BORE No: BH10
PROJECT No: 85777.15
DATE: 16/1/2019
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		CLAY: stiff to hard, red and brown clay and silty clay with some ironstone bands <i>(continued)</i>																								
	-17 21	very stiff to hard below 20.9m																								
	-18 22																									
	-19 23																									
	-20 24																									
	-21 25																									
	-22 26																									
	-23 26.9	LAMINITE: very low strength, highly weathered, pale grey to grey laminite with approximately 30% fine sandstone laminations																								PL(A) = 0.09
	-24 28																									
	-25 28.3	LAMINITE: medium strength with some extremely low strength bands, slightly weathered, fractured and slightly fractured, pale grey and grey laminite with approximately 20% fine sandstone laminations																								PL(A) = 0.31 PL(A) = 0.62
	-26 29																									
	-29 29.6																									PL(A) = 1.2

RIG: Explora 140 **DRILLER:** John S **LOGGED:** RB/SI **CASING:** HW to 5.55m, HQ to 26.9m
TYPE OF BORING: Solid flight auger to 5.55m, Rotary wash-bore to 26.9m, NMLC-coring to 33.75m
WATER OBSERVATIONS: Free ground water observed at 0.85m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT110

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U _s	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	▷	Water seep
E	Environmental sample	≡	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		gp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.98 AHD
EASTING: 332297
NORTHING: 6244497
DIP/AZIMUTH: 90°/--

BORE No: BH10
PROJECT No: 85777.15
DATE: 16/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing				
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
		LAMINITE: high strength, fresh, slightly fractured, pale grey to grey laminite with approximately 20% fine grained sandstone <i>(continued)</i>																				
	-27 31																					
	-28 32																					
	32.1	SILTSTONE: high strength, fresh, slightly fractured, grey siltstone with a trace of fine sandstone laminations																				
	-29 33																					
	33.75	Bore discontinued at 33.75m																				
	-30 34																					
	-31 35																					
	-32 36																					
	-33 37																					
	-34 38																					
	-35 39																					

RIG: Explora 140 **DRILLER:** John S **LOGGED:** RB/SI **CASING:** HW to 5.55m, HQ to 26.9m
TYPE OF BORING: Solid flight auger to 5.55m, Rotary wash-bore to 26.9m, NMLC-coring to 33.75m
WATER OBSERVATIONS: Free ground water observed at 0.85m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT110

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U ₁	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W ₁	Water seep
E	Environmental sample	W ₂	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test Is(50) (MPa)
		PL(D)	Point load diametral test Is(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)

BORE: 10

PROJECT: MASCOT

JANUARY 2019



Project No: 8577715
BH ID: BH10
Depth: 26.90 - 31.00m
Core Box No.: 1



8577715 MASCOT BH10 17-01-19 START 26.9mtr.

27

28

29

30

26.9 - 31.0m

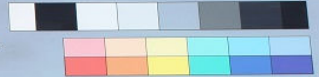
BORE: 10

PROJECT: MASCOT

JANUARY 2019



Project No: 8577715
BH ID: BH10
Depth: 31.00 - 33.75m
Core Box No.: 2



31

32

33

EOB 33.75m

31.00 - 33.75m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.79 AHD
EASTING: 332247
NORTHING: 6244540
DIP/AZIMUTH: 90°/--

BORE No: BH11
PROJECT No: 85777.15
DATE: 18/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering				Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
			EW	HW	MW	SW		FS	FR	Ex Low	Very Low	Low		Medium	High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %	Test Results & Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m, HQ to 27.8m

TYPE OF BORING: Solid flight auger to 5.50m, Rotary wash-bore to 27.80m, NMLC-coring to 33.82m

WATER OBSERVATIONS: Free groundwater observed at 1.2m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT111

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.79 AHD
EASTING: 332247
NORTHING: 6244540
DIP/AZIMUTH: 90°/--

BORE No: BH11
PROJECT No: 85777.15
DATE: 18/1/2019
SHEET 2 OF 4

[illegible]

RIG: Explora 140 **DRILLER:** John S **LOGGED:** RB/SI **CASING:** HW to 5.6m, HQ to 27.8m
TYPE OF BORING: Solid flight auger to 5.50m, Rotary wash-bore to 27.80m, NMLC-coring to 33.82m
WATER OBSERVATIONS: Free groundwater observed at 1.2m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT111

SAMPLING & IN SITU TESTING LEGEND					
A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test ls(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test ls(50) (MPa)
C	Core drilling	W	Water sample	pp	Pocket penetrometer (kPa)
D	Disturbed sample	W	Water seep	S	Standard penetration test
E	Environmental sample	W	Water level	V	Shear vane (kPa)



BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.79 AHD
EASTING: 332247
NORTHING: 6244540
DIP/AZIMUTH: 90°/--

BORE No: BH11
PROJECT No: 85777.15
DATE: 18/1/2019
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
	-17	CLAY: stiff to very stiff clay (continued) hard below 20m																									
	-21																										
	-18																										
	-22																										
	-19																										
	-23																										
	-20																										
	-24																										
	-21																										
	-25																										
	-22																										
	-26																										
	-23																										
	-27																										
	-24	27.8	LAMINITE: very low and very low to low strength, highly weathered, fractured and slightly fractured, pale grey and grey laminite with approximately 25% fine sandstone laminations																			C	100	0	PL(A) = 0.1		
	-28	28																								PL(A) = 0.18	
	-25	29.1	LAMINITE: medium strength with several very low strength bands, extremely and slightly weathered, pale grey and grey laminite with approximately 25% fine sandstone laminations																			C	100	49	PL(A) = 0.42		
	-26	26																									

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m, HQ to 27.8m

TYPE OF BORING: Solid flight auger to 5.50m, Rotary wash-bore to 27.80m, NMLC-coring to 33.82m

WATER OBSERVATIONS: Free groundwater observed at 1.2m (measured off SPT rod)

REMARKS: Soil descriptions and strengths at depth based on CPT111

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U _s	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 3.79 AHD
EASTING: 332247
NORTHING: 6244540
DIP/AZIMUTH: 90°/-

BORE No: BH11
PROJECT No: 85777.15
DATE: 18/1/2019
SHEET 4 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)	Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium			High	Very High	Ex High	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
	-27	LAMINITE: medium strength with several very low strength bands, extremely and slightly weathered, pale grey and grey laminite with approximately 25% fine sandstone laminations <i>(continued)</i>																C	100	49	PL(A) = 0.42		
31	31.0	LAMINITE: medium to high and high strength, fresh, slightly fractured, pale grey and grey laminite with approximately 20% fine sandstone laminations																C	100	74	PL(A) = 1.8		
-28	32																					PL(A) = 0.98	
-29	33																						
-30	33.82	Bore discontinued at 33.82m																					PL(A) = 1.3
34																							
-31	35																						
-32	36																						
-33	37																						
-34	38																						
-35	39																						
-36																							

RIG: Explora 140 **DRILLER:** John S **LOGGED:** RB/SI **CASING:** HW to 5.6m, HQ to 27.8m
TYPE OF BORING: Solid flight auger to 5.50m, Rotary wash-bore to 27.80m, NMLC-coring to 33.82m
WATER OBSERVATIONS: Free groundwater observed at 1.2m (measured off SPT rod)
REMARKS: Soil descriptions and strengths at depth based on CPT111

SAMPLING & IN SITU TESTING LEGEND			
A Auger sample	G Gas sample	PID Photo ionisation detector (ppm)	
B Bulk sample	P Piston sample	PL(A) Point load axial test Is(50) (MPa)	
BLK Block sample	U ₁ Tube sample (x mm dia.)	PL(D) Point load diametral test Is(50) (MPa)	
C Core drilling	W Water sample	pp Pocket penetrometer (kPa)	
D Disturbed sample	W ₁ Water seep	S Standard penetration test	
E Environmental sample	W ₂ Water level	V Shear vane (kPa)	

BORE: 11

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH 11
Depth: 27.80 - 32.00 m
Core Box No.: 1



27.80 - 32.00m

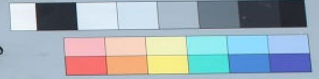
BORE: 11

PROJECT: MASCOT

JANUARY 2019



Project No: 85777-15
BH ID: BH 11
Depth: 32.00 - 33.82 m
Core Box No.: 2










32.00 - 33.82m

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.03 AHD
EASTING: 332299
NORTHING: 6244531
DIP/AZIMUTH: 90°/-

BORE No: BH12
PROJECT No: 85777.15
DATE: 21/1/2019
SHEET 1 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
4	0.04	ASPHALTIC CONCRETE																					A			
	0.45	FILLING: brown and dark brown, gravelly sand and clayey sand filling																				A				
3	1	SAND: loose to medium dense, pale brown fine to medium grained sand, moist																				A				
	1.7	SILTY SANDY CLAY: soft, dark brown silty sandy clay																				S			2,1,2 N = 3	
2	2.0	SAND: loose to medium dense, pale brown, fine to medium sand, saturated																								
																										
3																					S					
																									4,2,1 N = 3	
																										
4																										
																									0,4,6 N = 10	
																						S				
5																										
	5.8	SAND: medium dense to dense, pale brown, fine to medium sand with some clayey and peaty layers																								
6																										
7																										
8																										
9																										

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m, HQ to 24.1m

TYPE OF BORING: Solid flight auger to 5.5m, Rotary wash-bore to 24.1m, NMLC-coring to 31.95m

WATER OBSERVATIONS: Free ground water observed at 1.2m on 24 Jan 2019

REMARKS: Excess core (0.38m) was recovered during 27.04 - 29.35m run. Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT112

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	>	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)

BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.03 AHD
EASTING: 332299
NORTHING: 6244531
DIP/AZIMUTH: 90°/--

BORE No: BH12
PROJECT No: 85777.15
DATE: 21/1/2019
SHEET 2 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing						
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %	RQD %
-6		SAND: medium dense to dense, pale brown, fine to medium sand with some clayey and peaty layers <i>(continued)</i>																									
-7	11																										
-8	12																										
-9	13																										
-10	13.3	CLAY: stiff to very stiff, light grey and brown clay																									
-11	14																										
-12	15																										
-13	16																										
-14	17	stiff to hard below 17m																									
-15	18																										
-16	19																										

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m, HQ to 24.1m

TYPE OF BORING: Solid flight auger to 5.5m, Rotary wash-bore to 24.1m, NMLC-coring to 31.95m

WATER OBSERVATIONS: Free ground water observed at 1.2m on 24 Jan 2019

REMARKS: Excess core (0.38m) was recovered during 27.04 - 29.35m run. Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT112

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.03 AHD
EASTING: 332299
NORTHING: 6244531
DIP/AZIMUTH: 90°/--

BORE No: BH12
PROJECT No: 85777.15
DATE: 21/1/2019
SHEET 3 OF 4

RL	Depth (m)	Description of Strata	Degree of Weathering					Graphic Log	Rock Strength					Water	Fracture Spacing (m)				Discontinuities		Sampling & In Situ Testing					
			EW	HW	MW	SW	FS		FR	Ex Low	Very Low	Low	Medium		High	Very High	Ex High	0.01	0.05	0.10	0.50	1.00	B - Bedding S - Shear	J - Joint F - Fault	Type	Core Rec. %
-16		CLAY: stiff to very stiff, light grey and brown clay <i>(continued)</i>																								
-17	21																									
-18	22																									
-19	23																									
-20	24																									
-20	24.1	SILTSTONE: very low strength, highly weathered, slightly fractured, grey siltstone																								PL(A) = 0.08
-21	25																			24.74m: B 0°, pl, cly 9mm, fe 24.85m: B 15°, ir, fe, cly 9mm 25.1m: J 45°, pl, cly vn, fe 25.46m: B 10°, pl, cly 2mm, fe		C	100	0	PL(A) = 0.1	
-22	26																			26.30-26.31m: Ds		C	100	15	PL(A) = 0.14	
-23	26.8	LAMINITE: low then medium strength with several extremely low strength bands, slightly weathered, slightly fractured grey laminite																		27.07-27.08m: Cs 27.16-27.18m: Cs 27.22-27.23m: Cs 27.31-27.32m: Cs 27.40-27.65m: J 75°-90°, ir, ro, cln, partially he 27.55-27.58m: Cs 27.73-27.85m: B (x3) 0°-5°, pl, cly 7-9mm 27.95m: J 45°, pl, ro, cln 28.19-28.69m: B (x8) 0°-10°, pl, cly 5-9mm 28.74m: J 30°&45°, st, ro, cln 29.03-29.36m: B (x4) 0°-5°, pl, cly 3-6mm					PL(A) = 0.27	
-24	28.0	LAMINITE: medium to high strength, slightly weathered, slightly fractured grey laminite with approximately 30% fine sandstone laminations																		29.7m: J 50°, pl, ro, cln 29.85m: J 40°, pl. clv vn		C	100	33	PL(A) = 0.95	
-25	29																					C	100	90	PL(A) = 1.4	

RIG: Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m, HQ to 24.1m

TYPE OF BORING: Solid flight auger to 5.6m, Rotary wash-bore to 24.1m, NMLC-coring to 31.95m

WATER OBSERVATIONS: Free ground water observed at 1.2m on 24 Jan 2019

REMARKS: Excess core (0.38m) was recovered during 27.04 - 29.35m run. Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT112

SAMPLING & IN SITU TESTING LEGEND

A	Auger sample	G	Gas sample	PID	Photo ionisation detector (ppm)
B	Bulk sample	P	Piston sample	PL(A)	Point load axial test Is(50) (MPa)
BLK	Block sample	U _s	Tube sample (x mm dia.)	PL(D)	Point load diametral test Is(50) (MPa)
C	Core drilling	W	Water sample	gp	Pocket penetrometer (kPa)
D	Disturbed sample	▷	Water seep	S	Standard penetration test
E	Environmental sample	≡	Water level	V	Shear vane (kPa)



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BOREHOLE LOG

CLIENT: Enstruct Group Pty Ltd
PROJECT: QANTAS Sydney Flight Training Centre
LOCATION: 295-297 King Street Mascot

SURFACE LEVEL: 4.03 AHD
EASTING: 332299
NORTHING: 6244531
DIP/AZIMUTH: 90°/--

BORE No: BH12
PROJECT No: 85777.15
DATE: 21/1/2019
SHEET 4 OF 4

[illegible]**RIG:** Explora 140

DRILLER: John S

LOGGED: RB/SI

CASING: HW to 5.6m. HQ to 24.1m

TYPE OF BORING: Solid flight auger to 5.5m, Rotary wash-bore to 24.1m, NMLC-coring to 31.95m

WATER OBSERVATIONS: Free ground water observed at 1.2m on 24 Jan 2019

REMARKS: Excess core (0.38m) was recovered during 27.04 - 29.35m run. Standpipe installed to 9.0m (screen 6.0-9.0m, gravel 5.0-9.0m, bentonite 4.0-5.0m backfill to GL with gatic cover). Soil descriptions and strengths at depth based on CPT112

SAMPLING & IN SITU TESTING LEGEND			
A	Auger sample	G	Gas sample
B	Bulk sample	P	Piston sample
BLK	Block sample	U	Tube sample (x mm dia.)
C	Core drilling	W	Water sample
D	Disturbed sample	W _s	Water seep
E	Environmental sample	W _l	Water level
		PID	Photo ionisation detector (ppm)
		PL(A)	Point load axial test (s(50) (MPa)
		PL(D)	Point load diametral test (s(50) (MPa)
		pp	Pocket penetrometer (kPa)
		S	Standard penetration test
		V	Shear vane (kPa)



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BORE: 12

PROJECT: MASCOT

JANUARY 2019



Project No: 85777.15
BH ID: BH 12
Depth: 24.10 - 28.00 m
Core Box No.: 1



85777.15 MASCOT BH12 21-1-2019 START 24.1m

24.1 m

25
m

26
m

27
m

24.10 - 28.00m

BORE: 12

PROJECT: MASCOT

JANUARY 2019



Project No: 85777.15
BH ID: BH 12
Depth: 28.00 - 31.95 m
Core Box No.: 2



28
m

29
m

30
m

31
m

29.35m

29.35
m

EOB
31.95

28.00 - 31.95m

Appendix D

Cone Penetration Tests

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 5.61

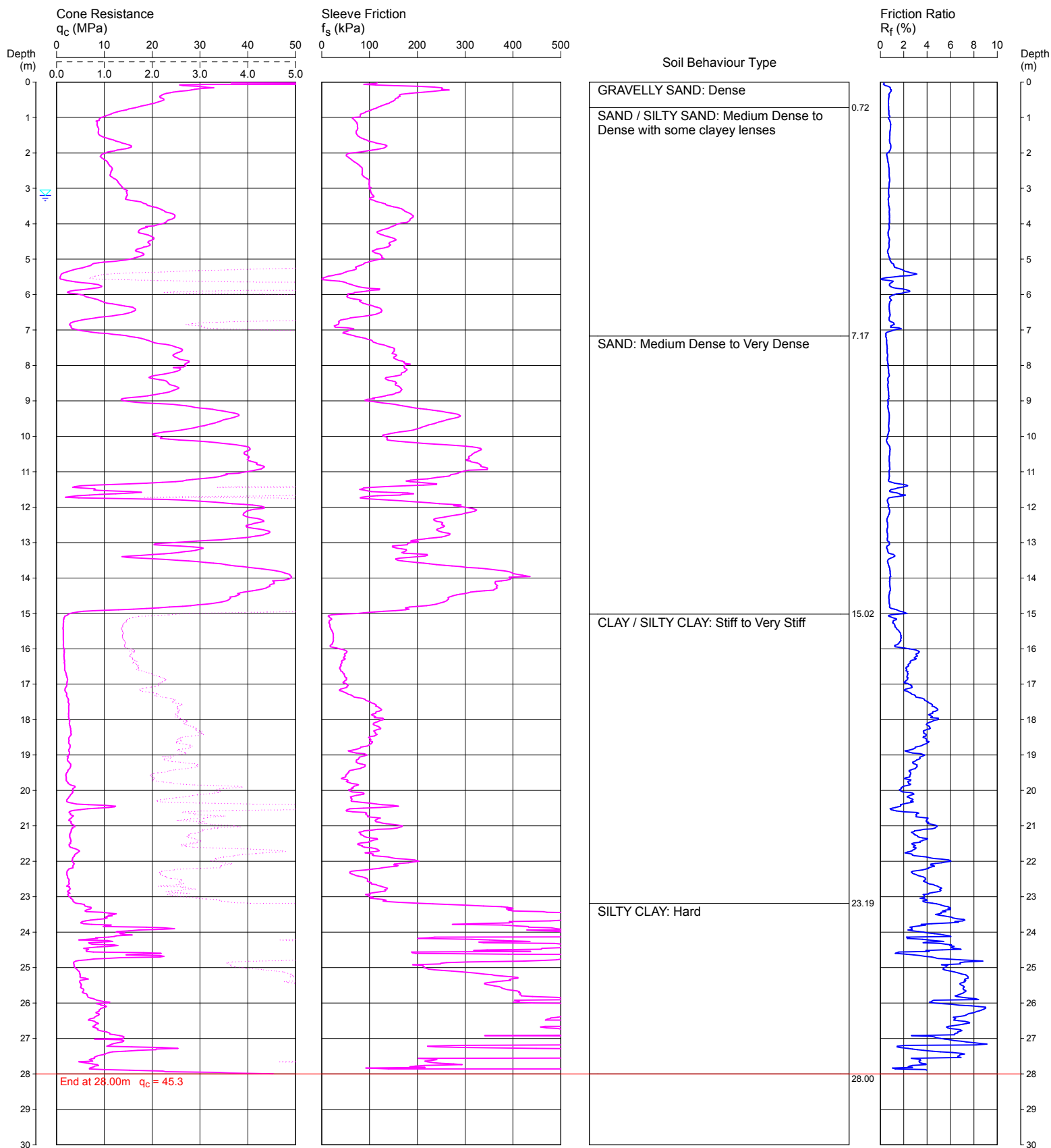
COORDINATES: 332213E 6244341N

CPT101

Page 1 of 1

DATE 7/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE ROD BOWING.
GROUNDWATER OBSERVED AT 3.2 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 3.20m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT101.CP5

Cone ID: 181002

Type: I-CFXY-10

ConePlot Version 5.9.2

© 2003 Douglas Partners Pty Ltd

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 5.08

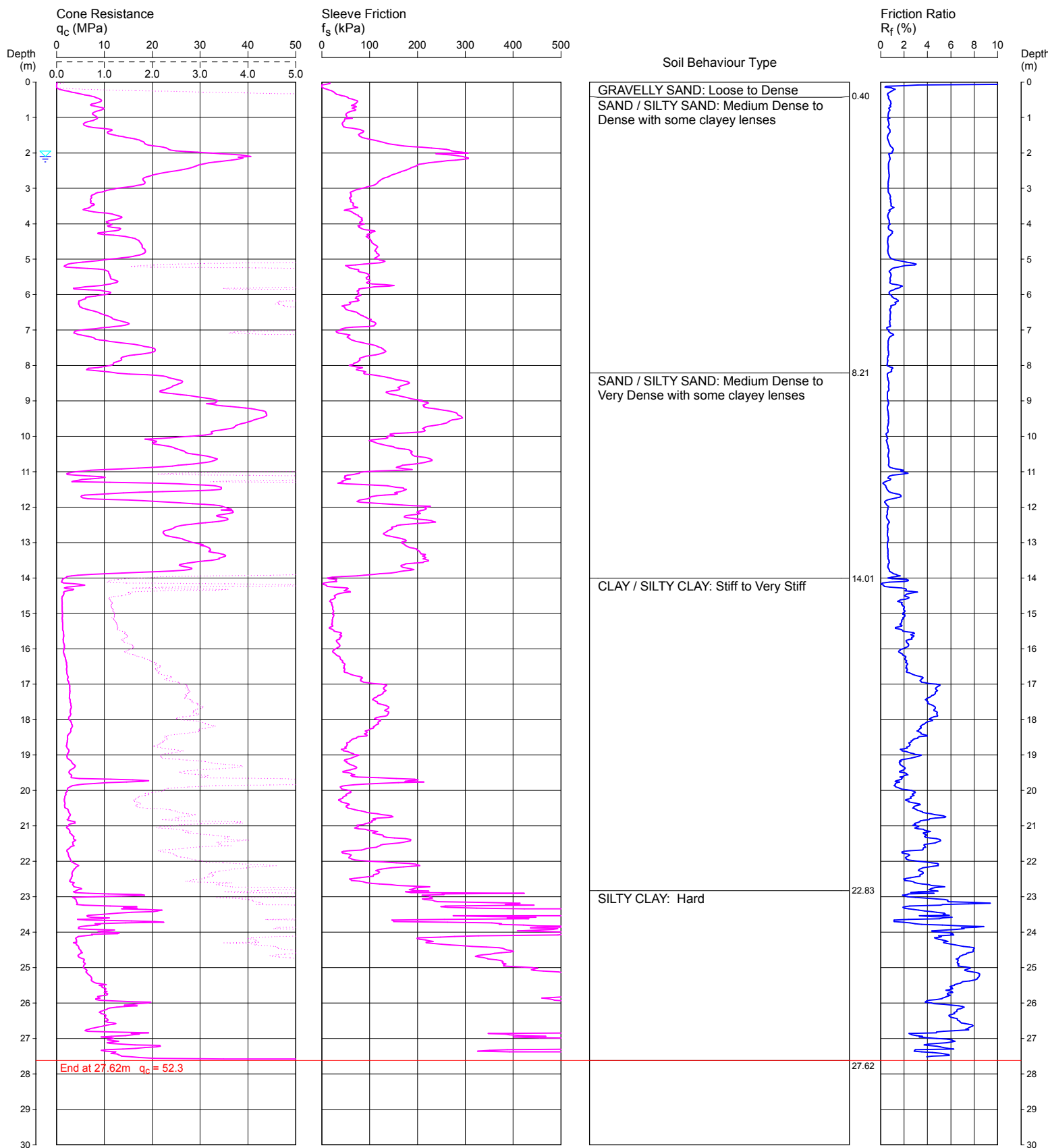
COORDINATES: 332258E 6244337N

CPT102

Page 1 of 1

DATE 10/01/2019

PROJECT No: 85777.15



REMARKS: CONCRETE CORE TO 0.2 m DEPTH. TEST DISCONTINUED DUE TO CONE TIP REFUSAL.
HOLE COLLAPSE AT 0.8 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 2.10m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT102.CP5

Cone ID: 181002

Type: I-CFYX-10

ConePlot Version 5.9.2

© 2003 Douglas Partners Pty Ltd

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 5.19

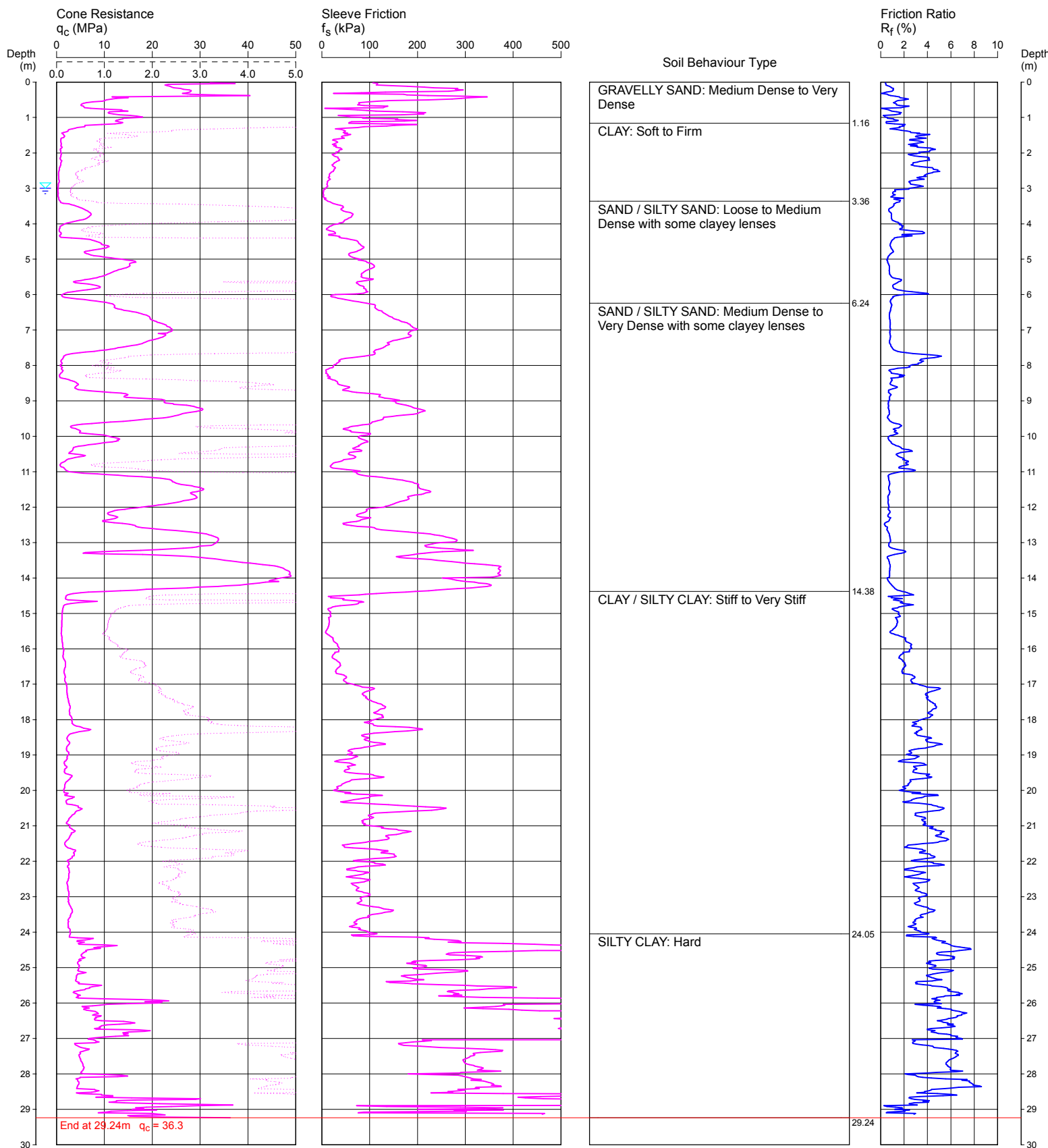
COORDINATES: 332158E 6244401N

CPT103

Page 1 of 1

DATE 7/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING. GROUNDWATER OBSERVED AT 3.0 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 3.00m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT103.CP5

Cone ID: 181002

Type: I-CFXY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 5.06

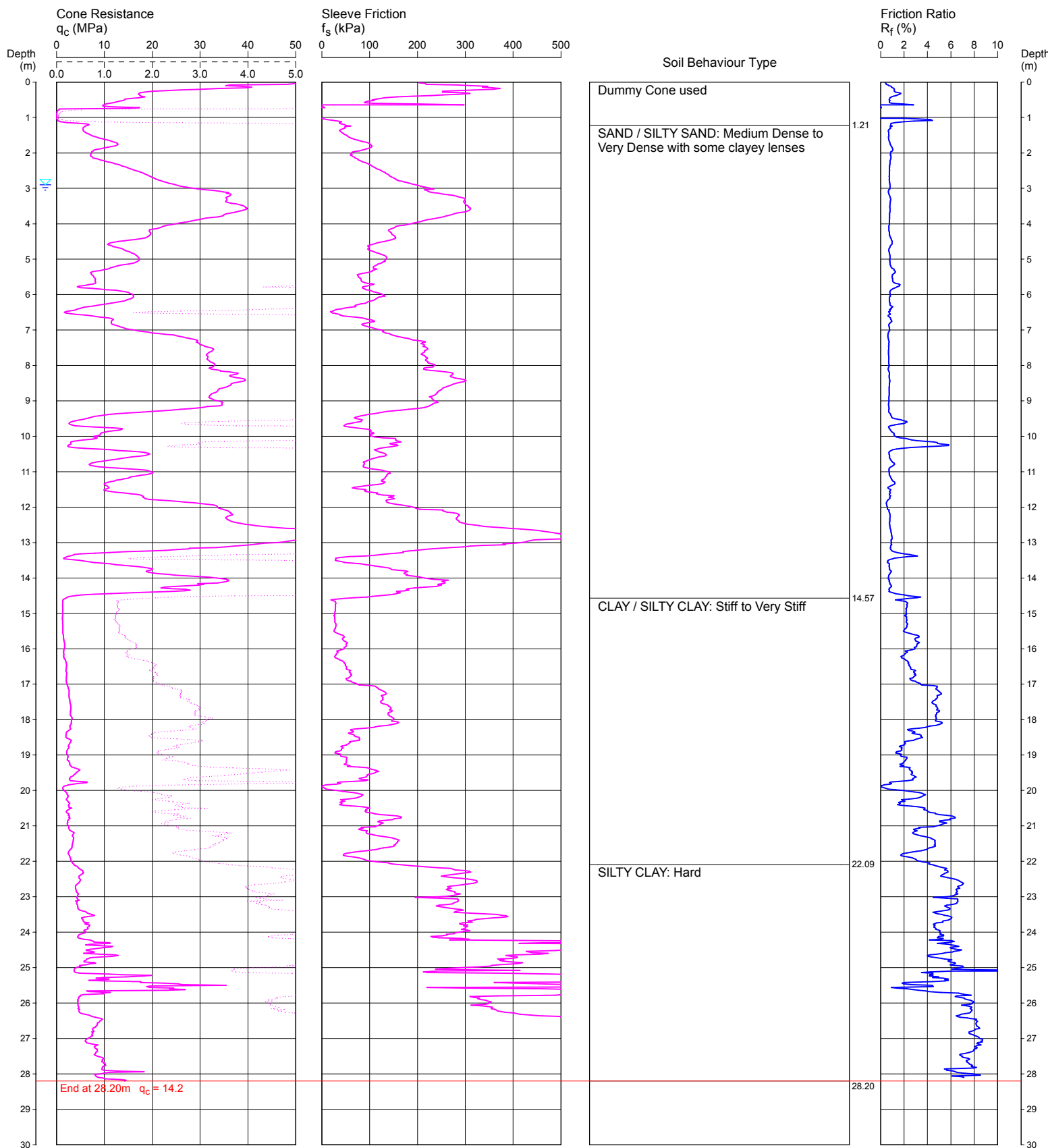
COORDINATES: 332223E 6244388N

CPT104

Page 1 of 1

DATE 7/01/2019

PROJECT No: 85777.15



REMARKS: DUMMY CONE FROM 0.74 TO 1.2 m TO PENETRATE FILLING. TEST DISCONTINUED DUE TO EXCESSIVE ROD BOWING.
GROUNDWATER OBSERVED AT 2.9 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 2.90m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT104.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 4.94

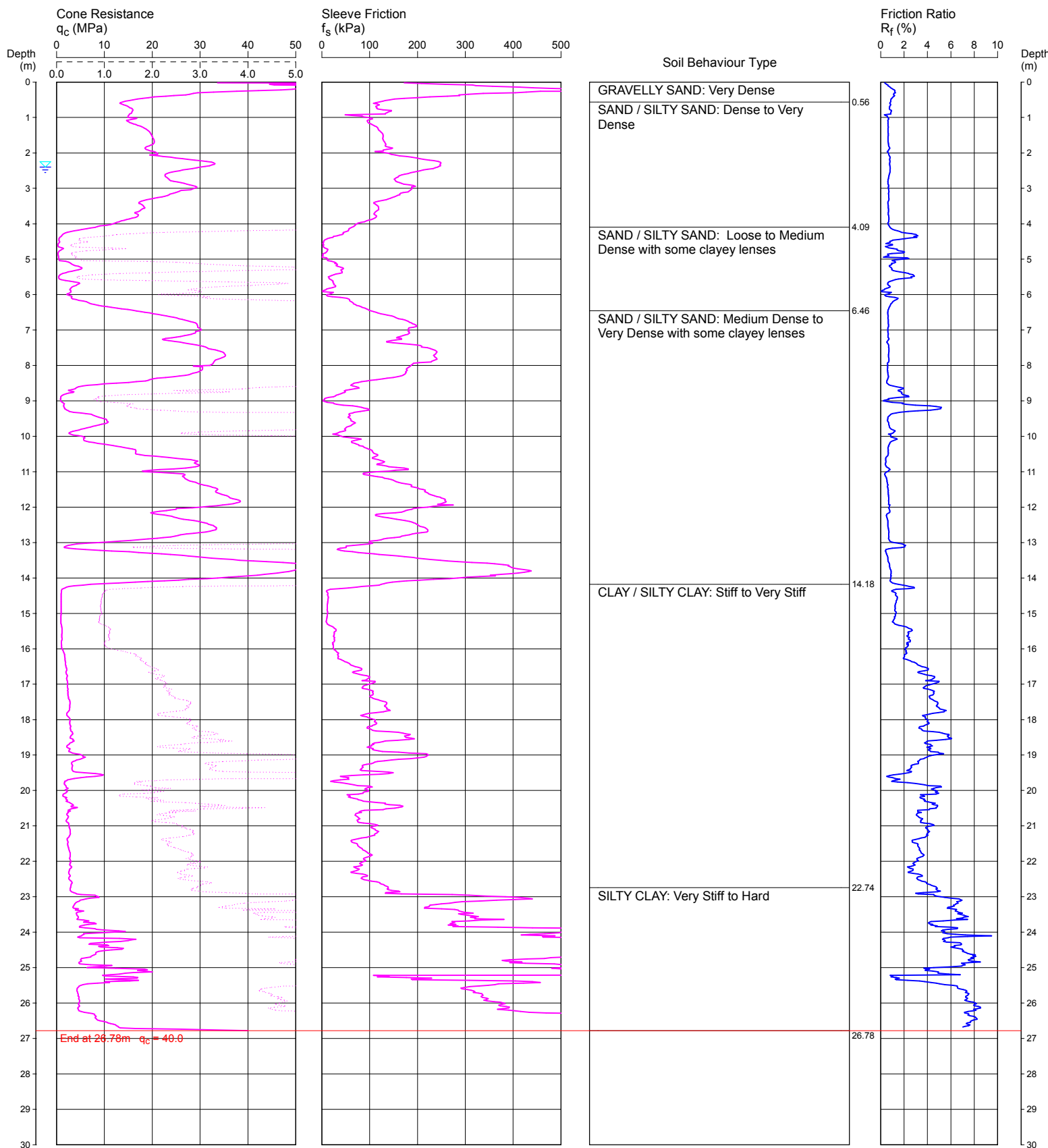
COORDINATES: 332262E 6244382N

CPT105

Page 1 of 1

DATE 8/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING.
GROUNDWATER OBSERVED AT 2.4 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 2.40m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT105.CP5
Cone ID: 181002 Type: I-CFY-10

ConePlot Version 5.9.2
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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 4.84

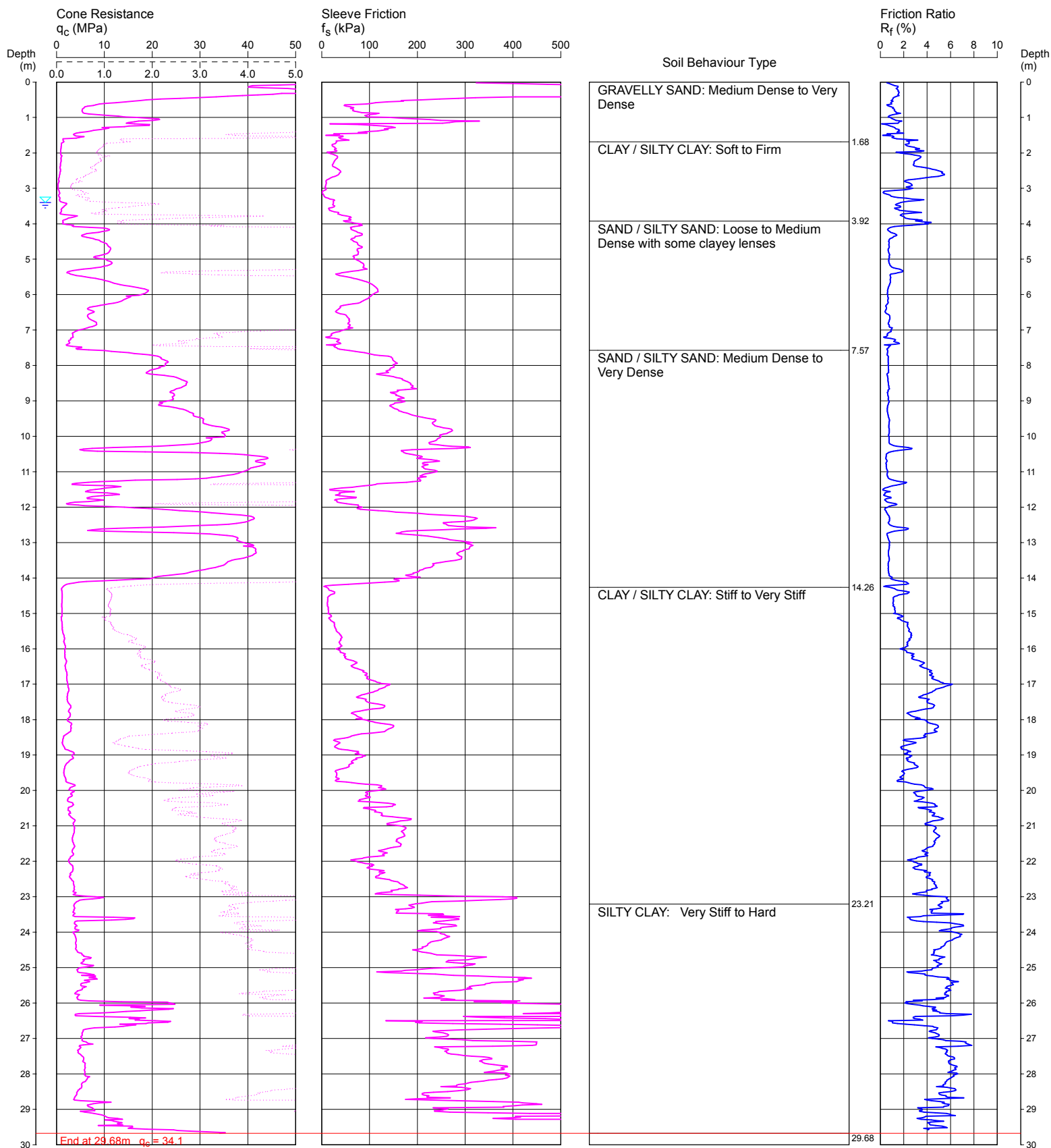
COORDINATES: 332160E 6244443N

CPT106

Page 1 of 1

DATE 9/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING.
GROUNDWATER OBSERVED AT 3.4 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 3.40m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT106.CP5

Cone ID: 181002

Type: I-CFYX-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 4.90

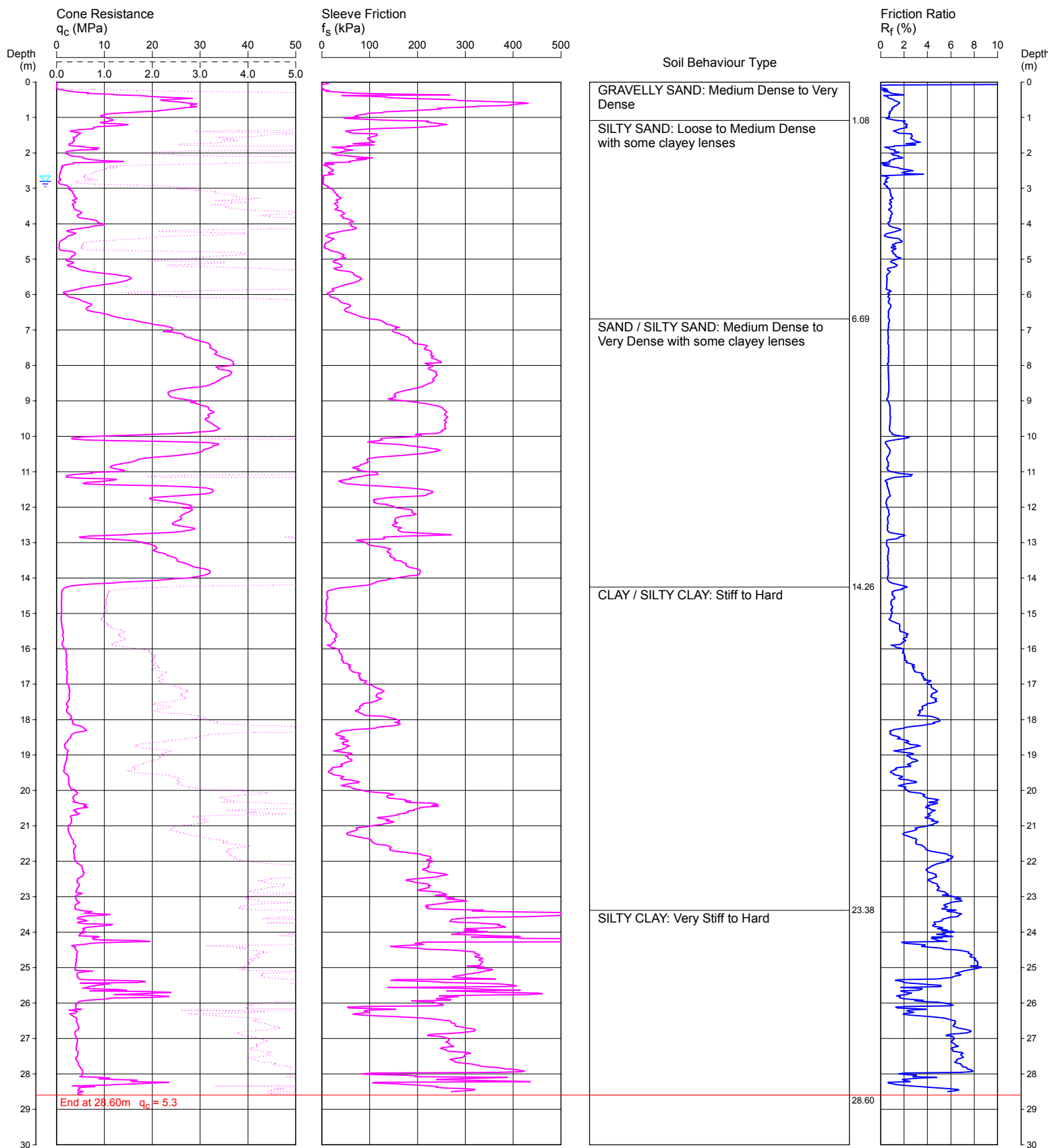
COORDINATES: 332220E 6244433N

CPT107

Page 1 of 1

DATE 11/01/2019

PROJECT No: 85777.15



REMARKS: CONCRETE CORE TO 0.2 m DEPTH. TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING.
HOLE COLLAPSE AT 0.5 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 2.80m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT107.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 4.94

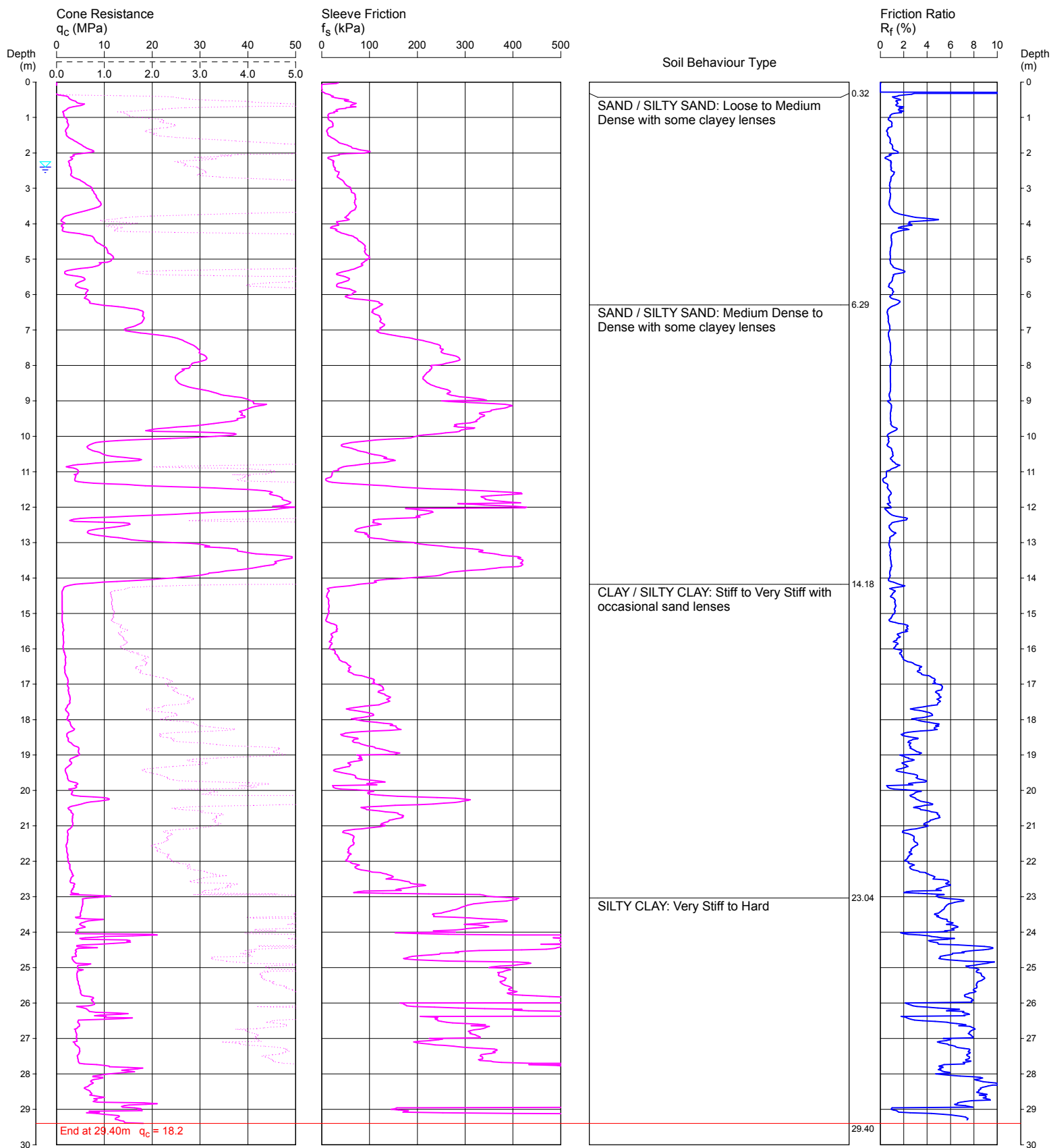
COORDINATES: 332275E 6244413N

CPT108

Page 1 of 1

DATE 24/01/2019

PROJECT No: 85777.15



REMARKS: CONCRETE CORE TO 0.35 m DEPTH. TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING.
GROUNDWATER OBSERVED AT 2.4 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 2.40m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT108.CP5

Cone ID: 161225

Type: I-CFY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 3.81

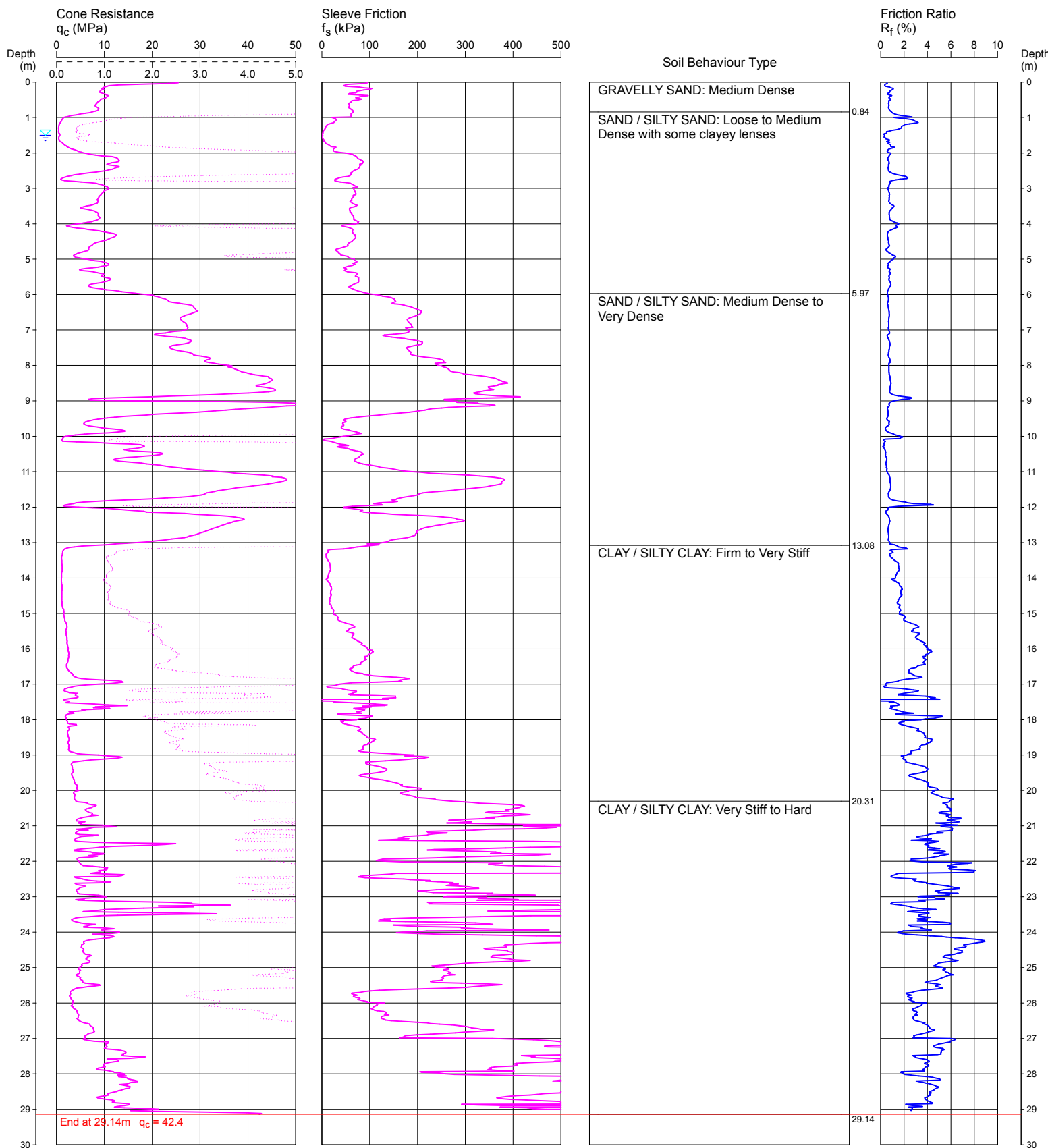
COORDINATES: 332240E 6244500N

CPT109

Page 1 of 1

DATE 9/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING.
HOLE COLLAPSE AT 1.5 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 1.50m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT109.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 3.98

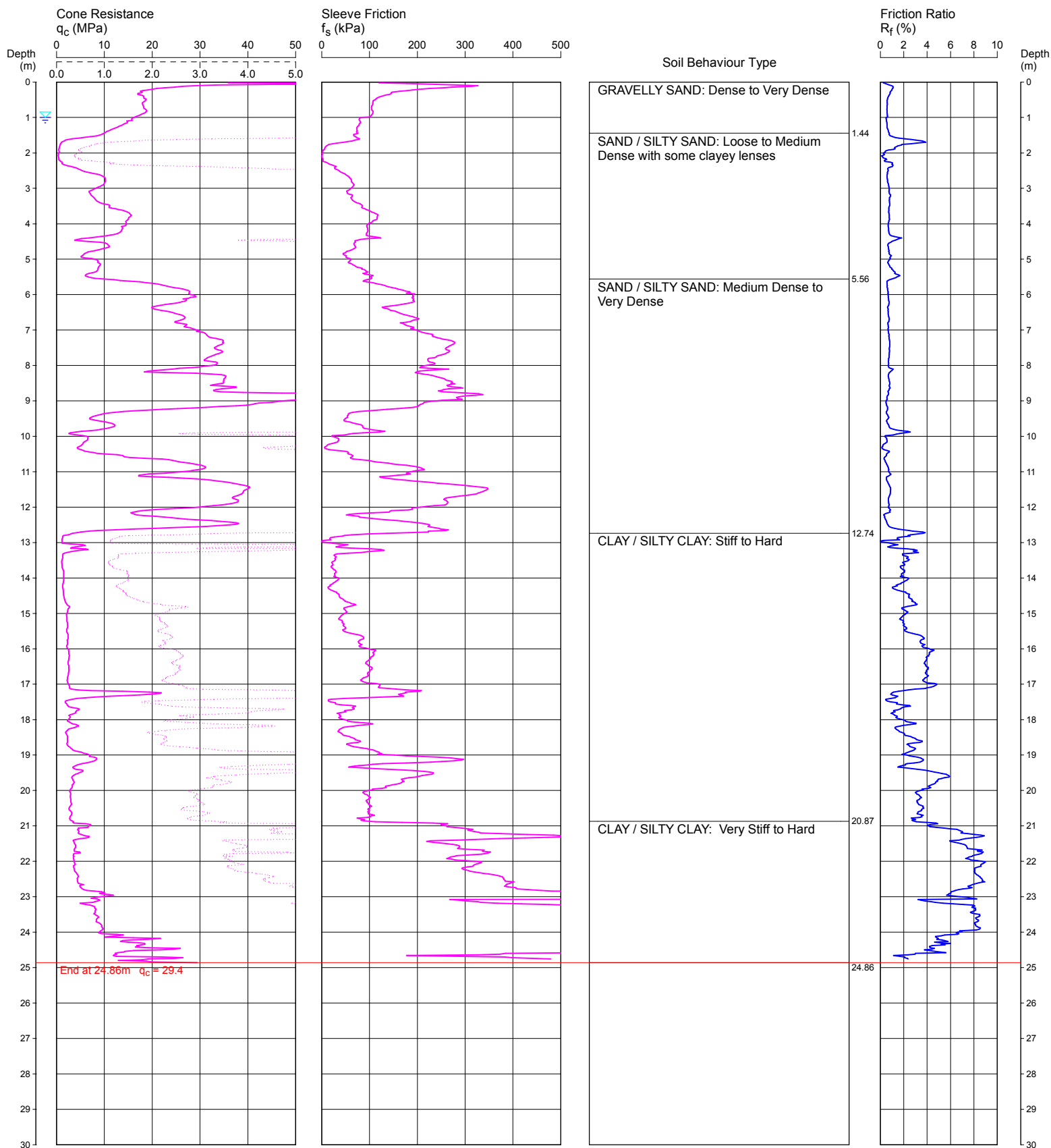
COORDINATES: 332297E 6244497N

CPT110

Page 1 of 1

DATE 9/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING.
GROUNDWATER OBSERVED AT 1.0 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 1.00m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT110.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

© 2003 Douglas Partners Pty Ltd

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 3.79

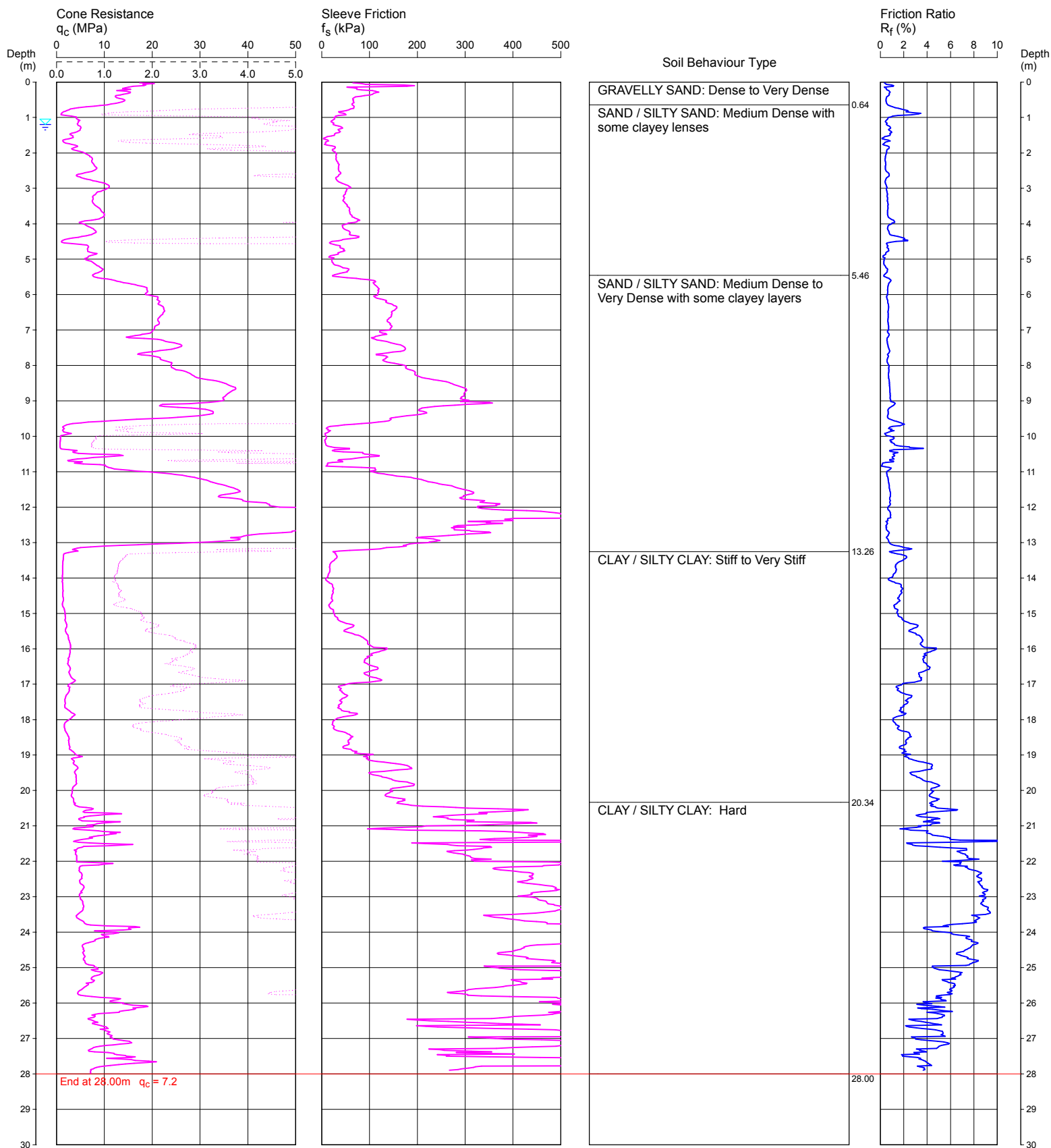
COORDINATES: 332247E 6244540N

CPT111

Page 1 of 1

DATE 10/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE ROD BOWING.
HOLE COLLAPSE AT 1.4 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 1.20m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT111.CP5
Cone ID: 181002 Type: I-CFY-10

ConePlot Version 5.9.2
© 2003 Douglas Partners Pty Ltd

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 4.03

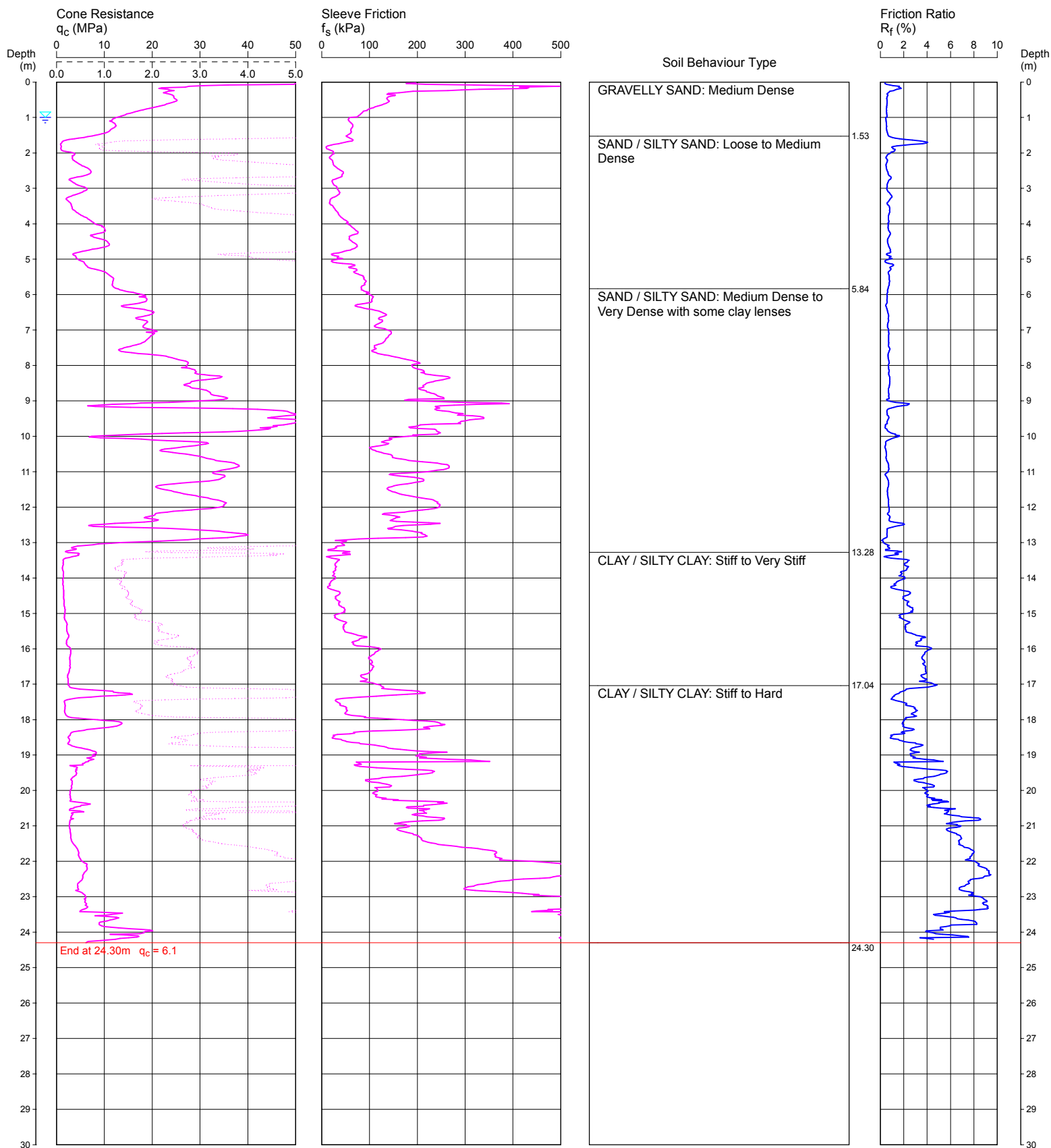
COORDINATES: 332299E 6244531N

CPT112

Page 1 of 1

DATE 11/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING.
GROUNDWATER OBSERVED AT 1.0 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 1.00m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT112.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 5.30

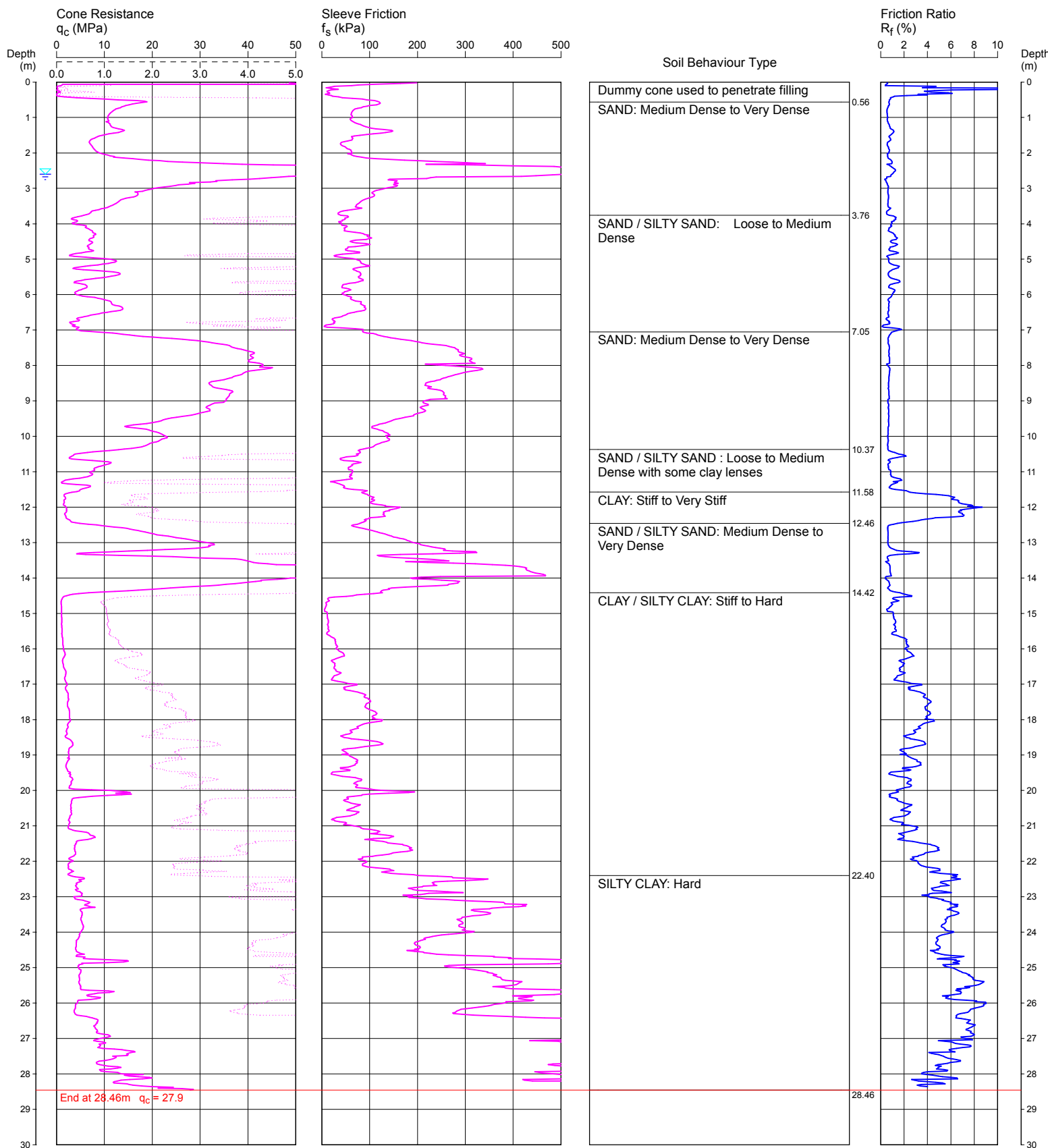
COORDINATES: 332219E 6244364N

CPT113

Page 1 of 1

DATE 8/01/2019

PROJECT No: 85777.15



REMARKS: DUMMY CONE FROM 0.04 TO 0.5 m DEPTH TO PENETRATE FILLING. TEST DISCONTINUED DUE TO EXCESSIVE ROD BOWING.
HOLE COLLAPSE AT 2.6 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 2.60m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT113.CP5
Cone ID: 181002 Type: I-CFXY-10

ConePlot Version 5.9.2
© 2003 Douglas Partners Pty Ltd

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 5.07

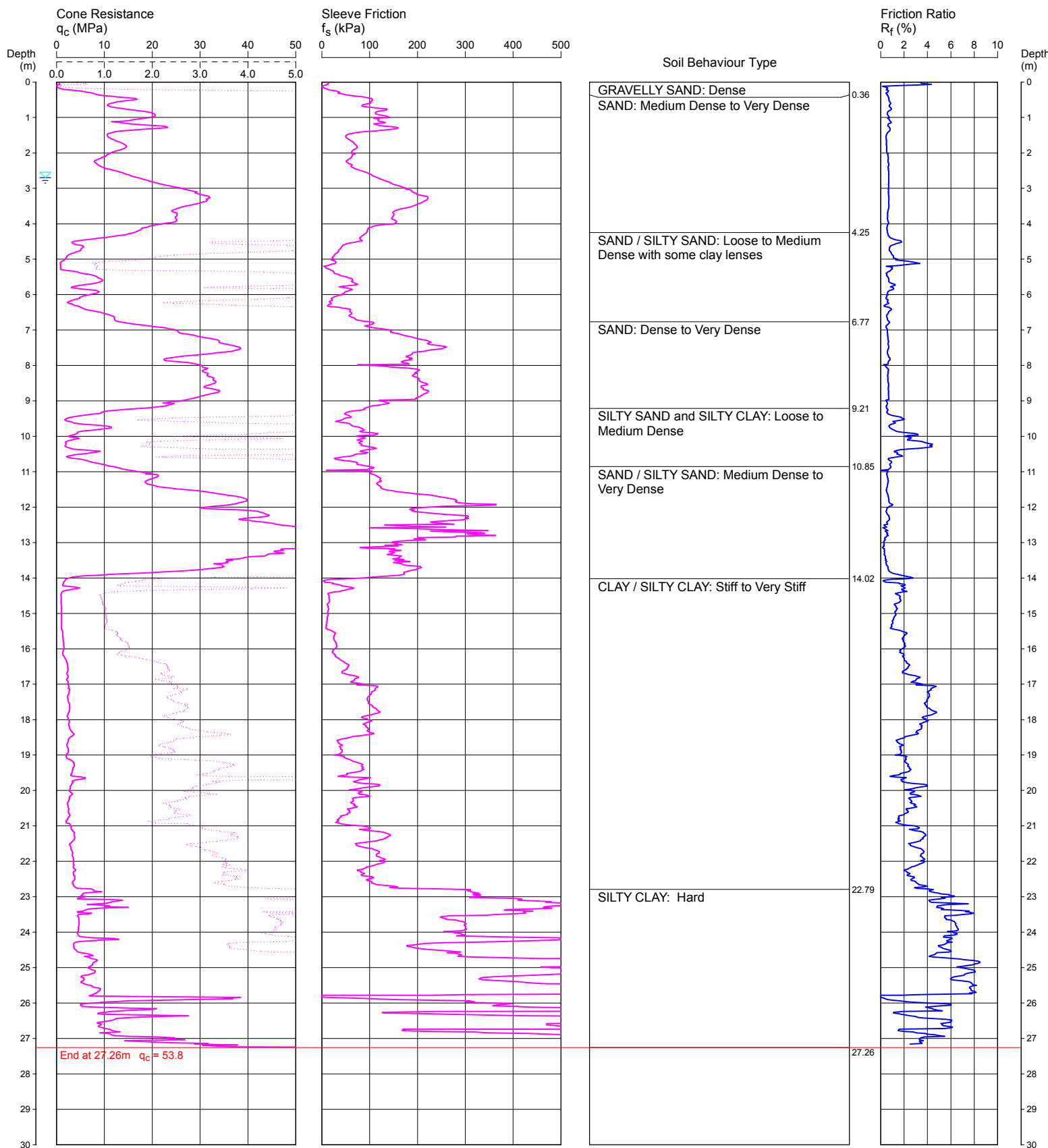
COORDINATES: 332262E 6244359N

CPT114

Page 1 of 1

DATE 11/01/2019

PROJECT No: 85777.15



REMARKS: CONCRETE CORE TO 0.13 m DEPTH. TEST DISCONTINUED DUE TO CONE TIP REFUSAL.
GROUNDWATER OBSERVED AT 2.7 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 2.70m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT114.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 5.09

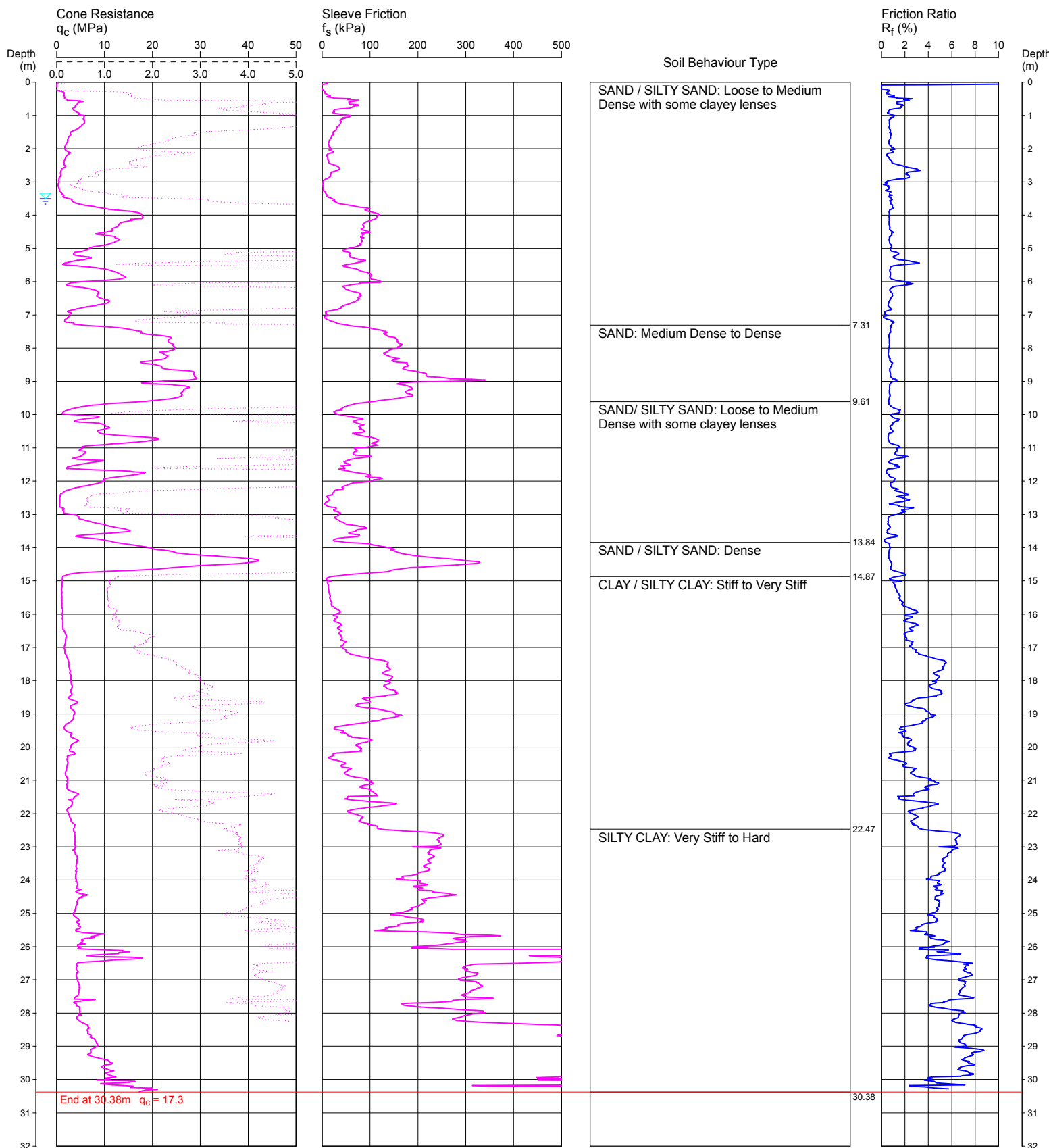
COORDINATES: 332198E 6244408N

CPT115

Page 1 of 1

DATE 10/01/2019

PROJECT No: 85777.15



REMARKS: CONCRETE CORE TO 0.2 m DEPTH. TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING.
GROUNDWATER OBSERVED AT 3.5 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 3.50m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT115.CP5

Cone ID: 181002

Type: I-CFYX-10

ConePlot Version 5.9.2

© 2003 Douglas Partners Pty Ltd

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 5.02

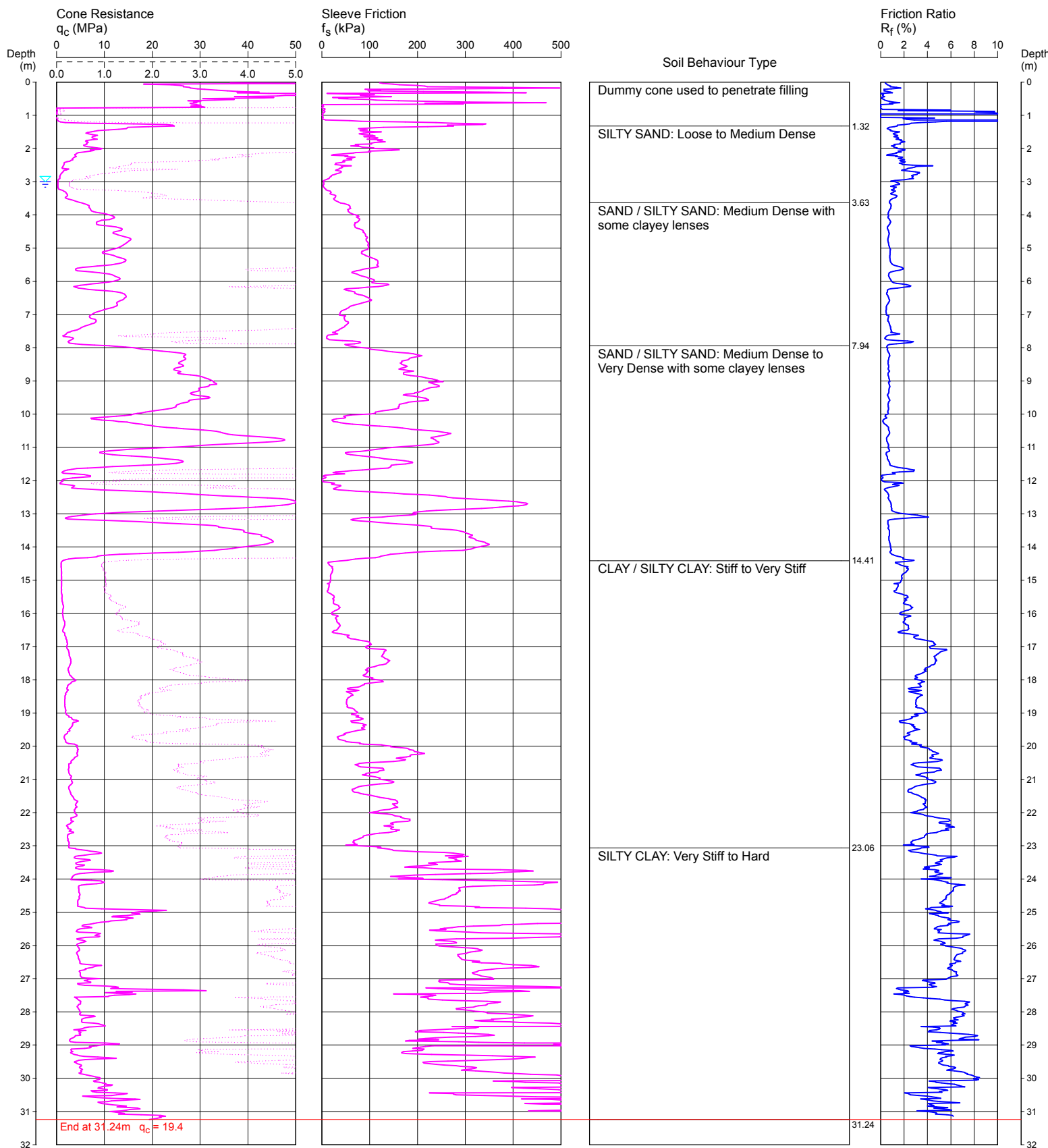
COORDINATES: 332161E 6244418N

CPT116

Page 1 of 1

DATE 7/01/2019

PROJECT No: 85777.15



REMARKS: DUMMY CONE FROM 0.76 TO 1.3 m TO PENETRATE FILLING. TEST DISCONTINUED DUE TO SLEEVE REFUSAL.
HOLE COLLAPSE AT 3.0 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 3.00m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT116.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

© 2003 Douglas Partners Pty Ltd

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 4.91

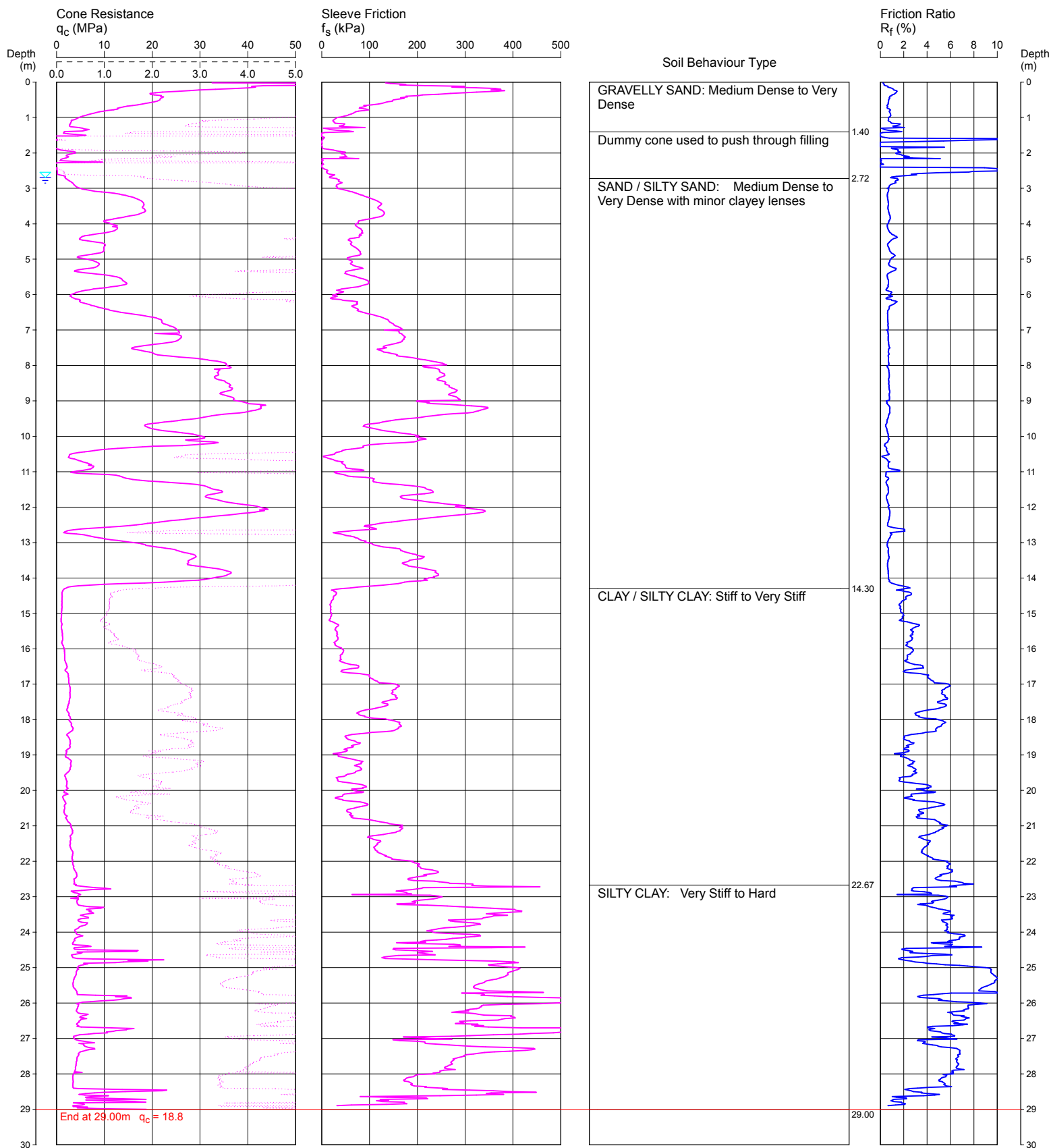
COORDINATES: 332225E 6244414N

CPT117

Page 1 of 1

DATE 8/01/2019

PROJECT No: 85777.15



REMARKS: DUMMY CONE FROM 1.52 TO 2.0 m AND 2.26 TO 2.7 m TO PENETRATE FILLING. TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING. GROUNDWATER OBSERVED AT 2.7 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 2.70m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT117.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 4.97

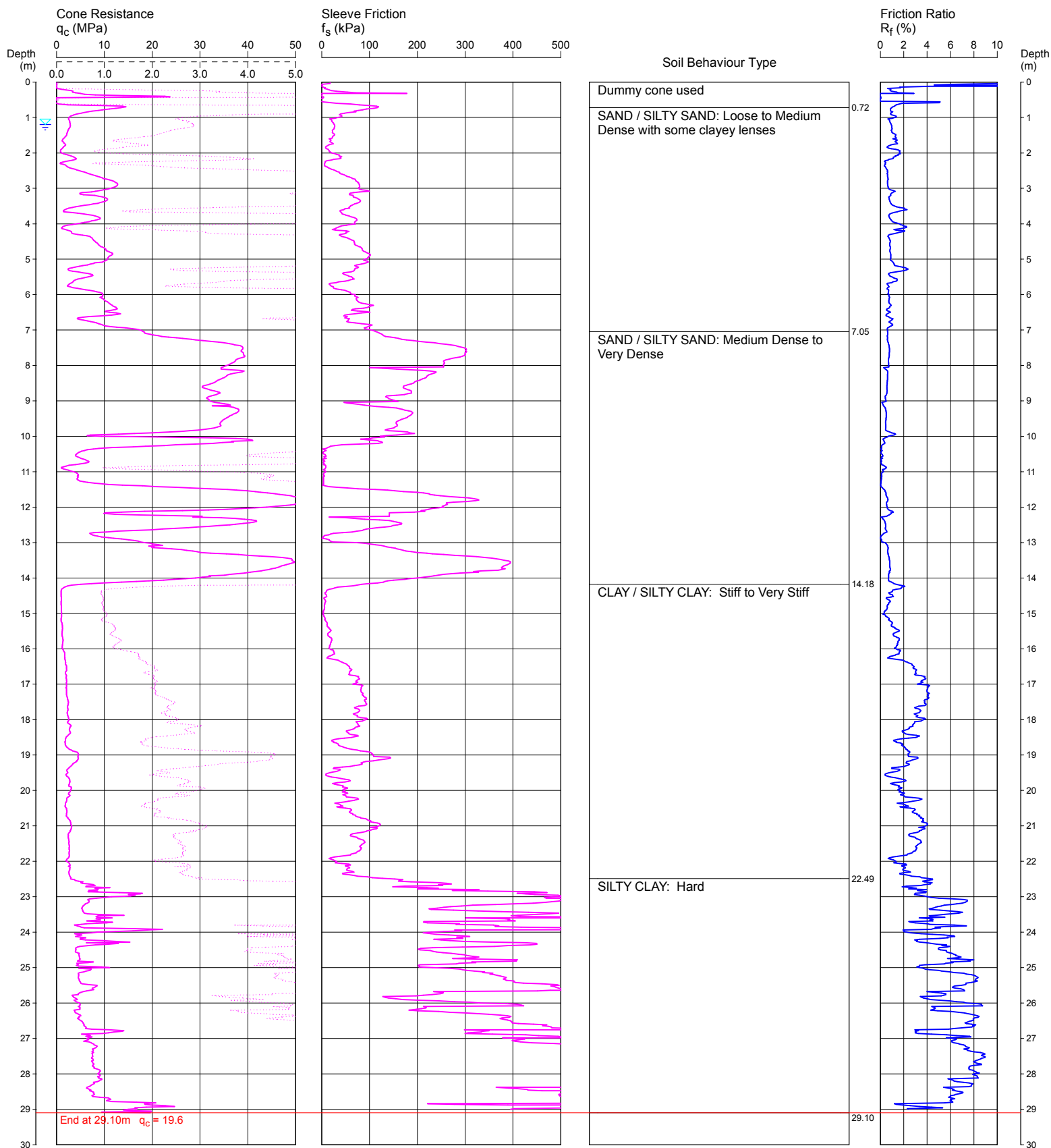
COORDINATES: 332274E 6244404N

CPT118

Page 1 of 1

DATE 14/01/2019

PROJECT No: 85777.15



REMARKS: CONCRETE CORE TO 0.2 m DEPTH. DUMMY CONE FROM 0.42 TO 0.7 m DEPTH.
TEST DISCONTINUED DUE TO EXCESSIVE ROD BOWING. GROUNDWATER OBSERVED AT 1.2 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 1.20m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT118.CP5

Cone ID: 181002

Type: I-CFYX-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 4.80

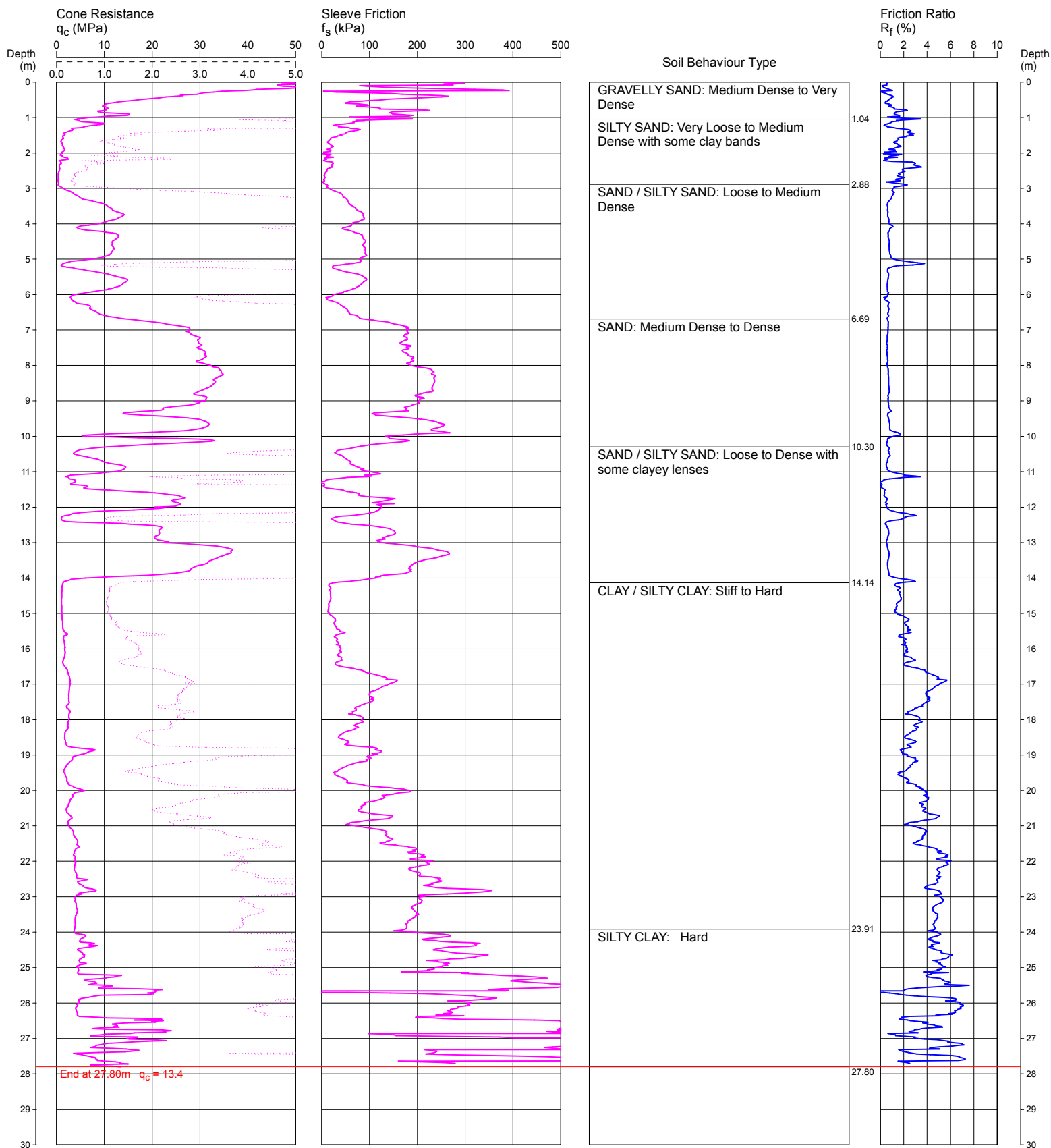
COORDINATES: 332200E 6244437N

CPT119

Page 1 of 1

DATE 8/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING.
HOLE COLLAPSE AT 1.0 m AFTER WITHDRAWAL OF RODS.

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 3.57

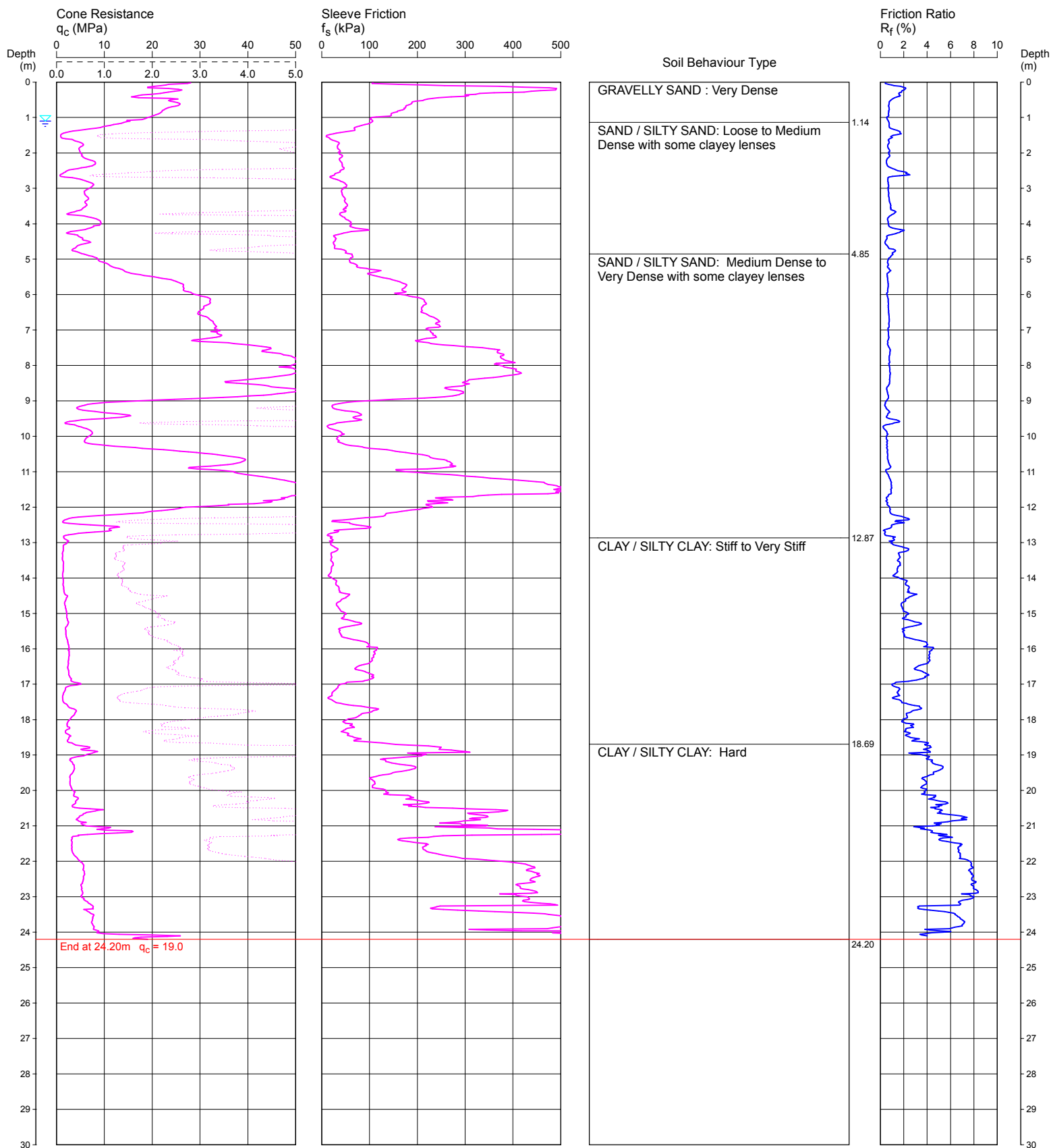
COORDINATES: 332279E 6244503N

CPT120

Page 1 of 1

DATE 9/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE CONE BENDING.
GROUNDWATER OBSERVED AT 1.1 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 1.10m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT120.CP5
Cone ID: 181002 Type: I-CFY-10

ConePlot Version 5.9.2
© 2003 Douglas Partners Pty Ltd

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 3.81

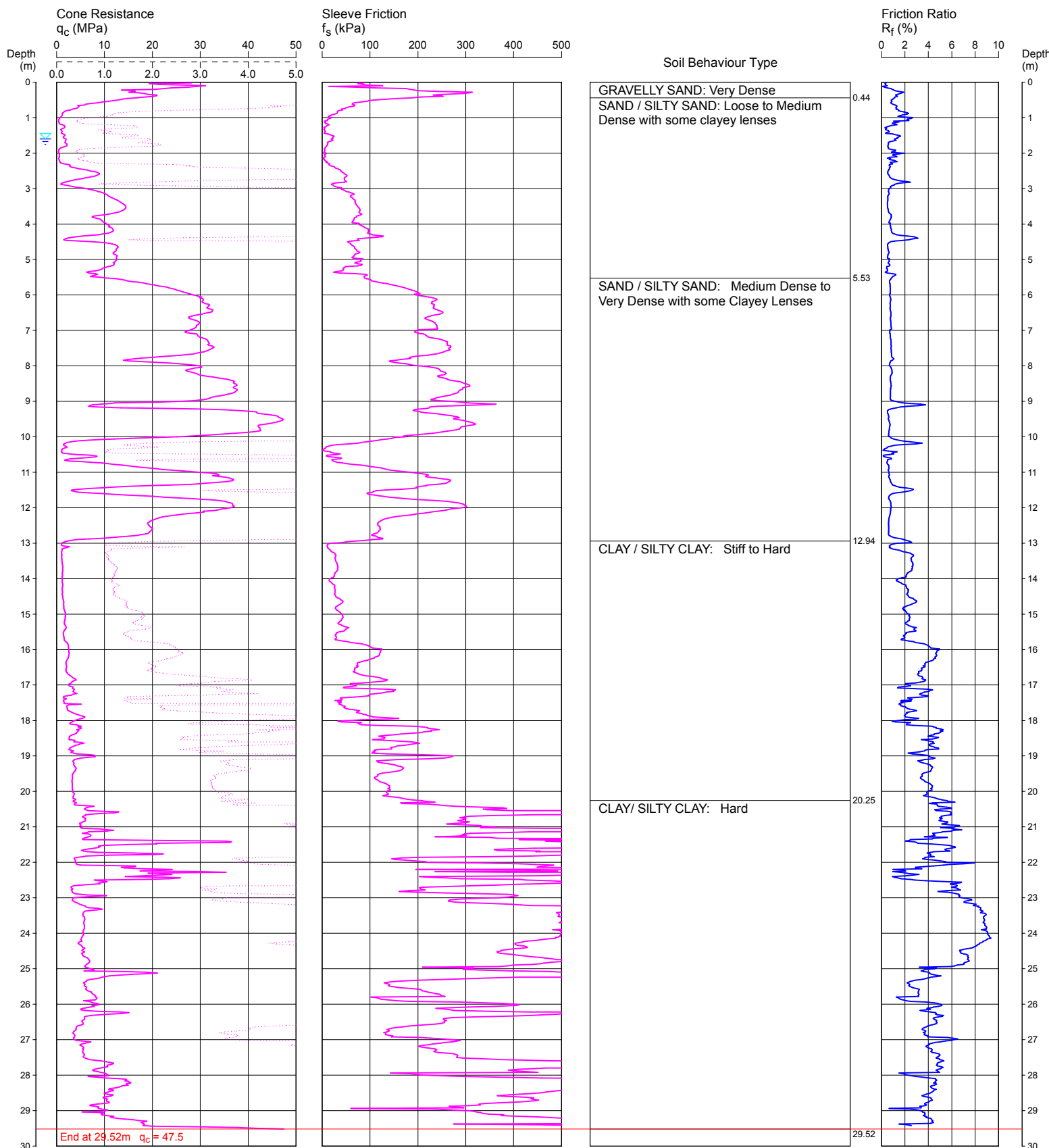
COORDINATES: 332245E 6244521N

CPT121

Page 1 of 1

DATE 9/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE ROD BOWING.
GROUNDWATER OBSERVED AT 1.6 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 1.60m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT121.CP5
Cone ID: 181002 Type: I-CFY-10

ConePlot Version 5.9.2
© 2003 Douglas Partners Pty Ltd

CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 3.61

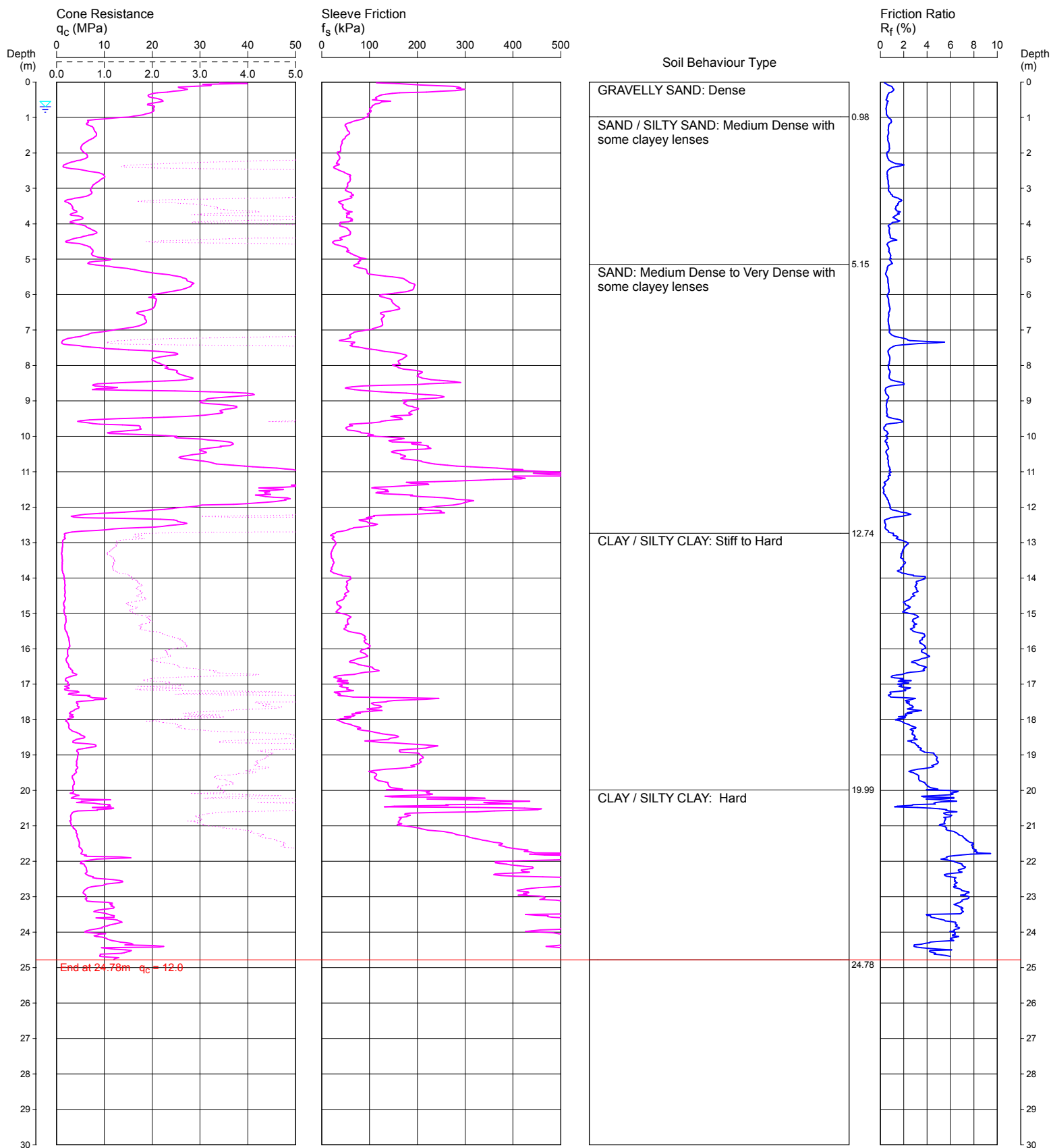
COORDINATES: 332279E 6244520N

CPT122

Page 1 of 1

DATE 10/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE ROD BOWING.
GROUNDWATER OBSERVED AT 0.7 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 0.70m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT122.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 3.89

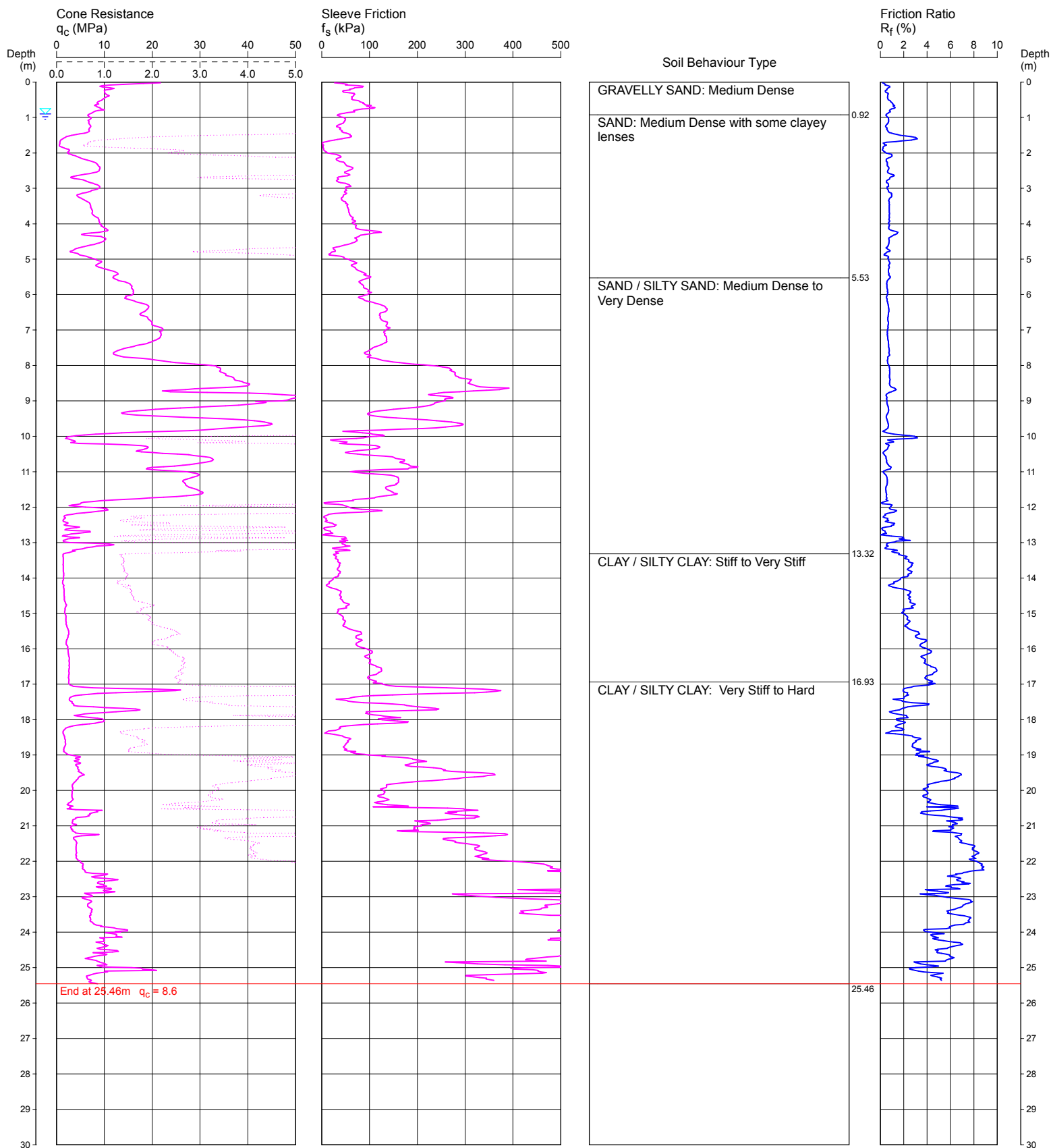
COORDINATES: 332293E 6244518N

CPT123

Page 1 of 1

DATE 10/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO EXCESSIVE ROD BOWING.
GROUNDWATER OBSERVED AT 0.9 m AFTER WITHDRAWAL OF RODS.

Water depth after test: 0.90m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT123.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

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CONE PENETRATION TEST

CLIENT: ENSTRUCT GROUP PTY LTD

PROJECT: AIRPORT - QANTAS FLIGHT TRAINING CENTRE

LOCATION: 295 - 297 KING STREET, MASCOT

REDUCED LEVEL: 3.71

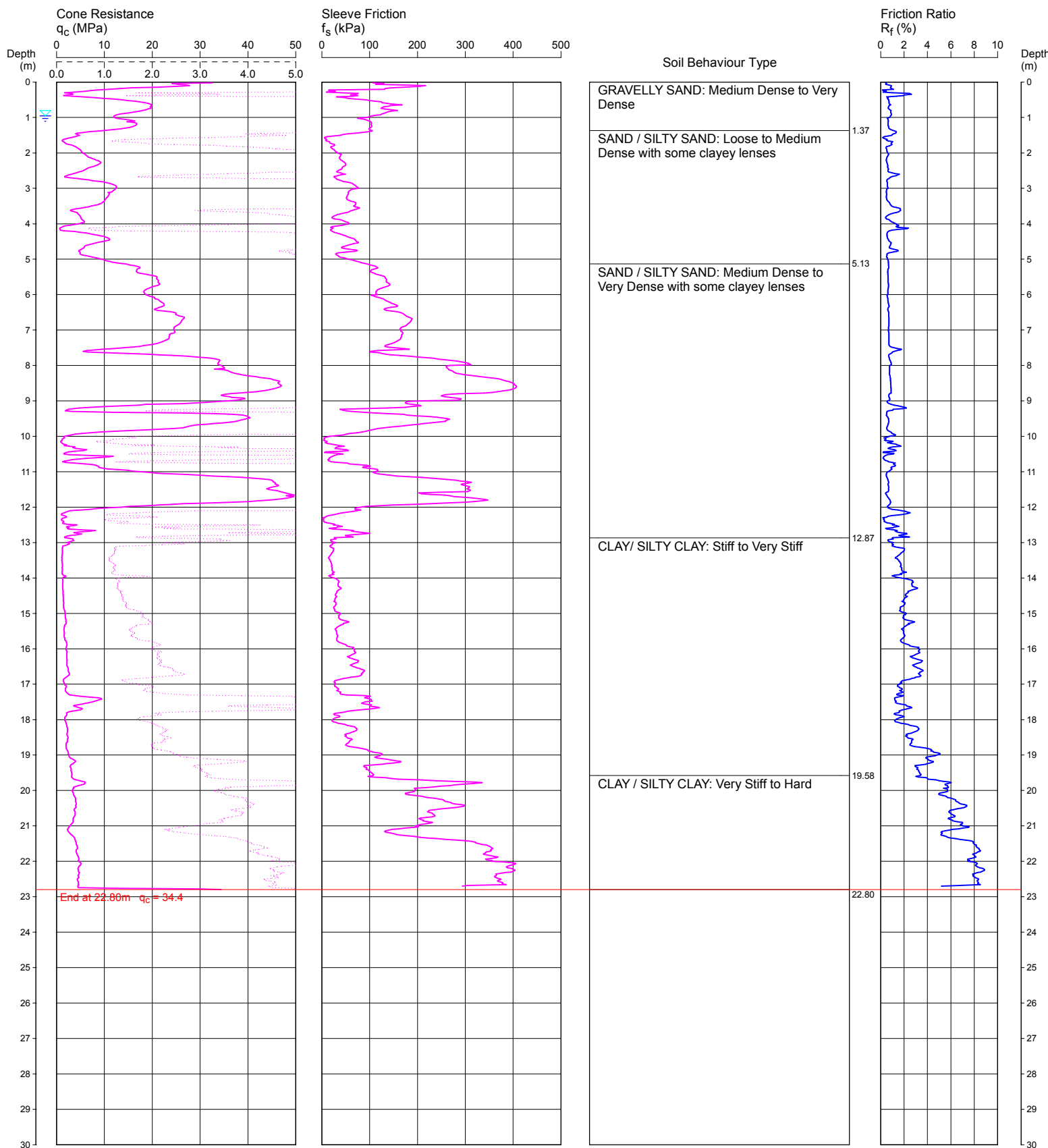
COORDINATES: 332269E 6244538N

CPT124

Page 1 of 1

DATE 21/01/2019

PROJECT No: 85777.15



REMARKS: TEST DISCONTINUED DUE TO BENDING NEAR REFUSAL
GROUNDWATER MEASURED AT 0.95 m DEPTH AFTER WITHDRAWAL OF RODS

Water depth after test: 0.95m depth (assumed)

File: P:\85777.15 - AIRPORT - QANTAS Flight Training Centre\4.0 Field Work\4.2 Testing\CPTs\CPT124.CP5

Cone ID: 181002

Type: I-CFY-10

ConePlot Version 5.9.2

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Appendix E

Laboratory Test Results

Material Test Report

Report Number: 85777.15-1
Issue Number: 1
Date Issued: 07/02/2019
Client: Enstruct Group Pty Ltd
 Level 4, 2 Glen Street, Milsons Point NSW 2061
Contact: Matt Lilley
Project Number: 85777.15
Project Name: QANTAS Sydney Flight Training Centre
Project Location: 295-297 King Street, Mascot
Work Request: 4029
Sample Number: 19-4029A
Date Sampled: 30/01/2019
Dates Tested: 30/01/2019 - 04/02/2019
Sampling Method: Sampled by Engineering Department
Sample Location: 2 (0.2 - 1.5m)
Material: Sand



Mick Gref

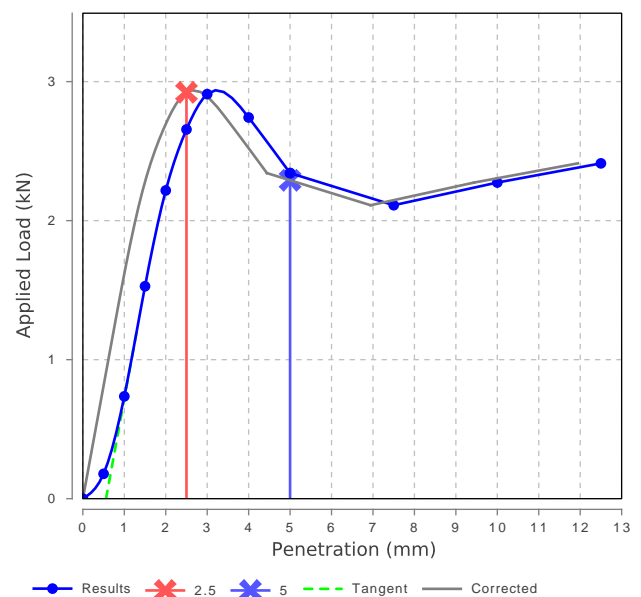
Approved Signatory: Mick Gref

Senior Technician

NATA Accredited Laboratory Number: 828

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	2.5 mm		
CBR %	20		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.76		
Optimum Moisture Content (%)	9.5		
Laboratory Density Ratio (%)	100.0		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.77		
Field Moisture Content (%)	8.2		
Moisture Content at Placement (%)	9.3		
Moisture Content Top 30mm (%)	16.7		
Moisture Content Rest of Sample (%)	17.2		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	26		
Swell (%)	-0.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	0		

California Bearing Ratio



Material Test Report

Report Number: 85777.15-1
Issue Number: 1
Date Issued: 07/02/2019
Client: Enstruct Group Pty Ltd
 Level 4, 2 Glen Street, Milsons Point NSW 2061
Contact: Matt Lilley
Project Number: 85777.15
Project Name: QANTAS Sydney Flight Training Centre
Project Location: 295-297 King Street, Mascot
Work Request: 4029
Sample Number: 19-4029B
Date Sampled: 30/01/2019
Dates Tested: 30/01/2019 - 04/02/2019
Sampling Method: Sampled by Engineering Department
Sample Location: 3 (0.2 - 1.5m)
Material: Slightly silty, gravelly sand



Approved Signatory: Mick Gref
 Senior Technician
 NATA Accredited Laboratory Number: 828

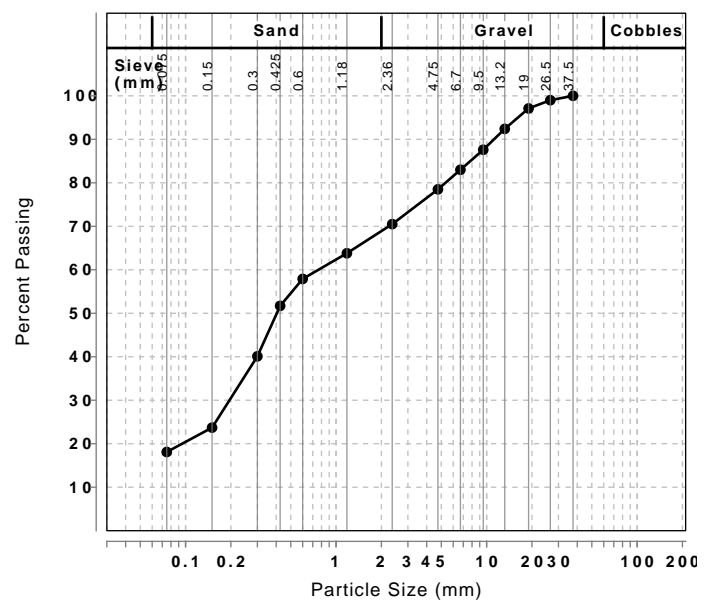
Particle Distribution (AS1289 3.6.1)

Sieve	Passed %	Passing Limits
37.5 mm	100	
26.5 mm	99	
19 mm	97	
13.2 mm	92	
9.5 mm	88	
6.7 mm	83	
4.75 mm	78	
2.36 mm	70	
1.18 mm	64	
0.6 mm	58	
0.425 mm	52	
0.3 mm	40	
0.15 mm	24	
0.075 mm	18	

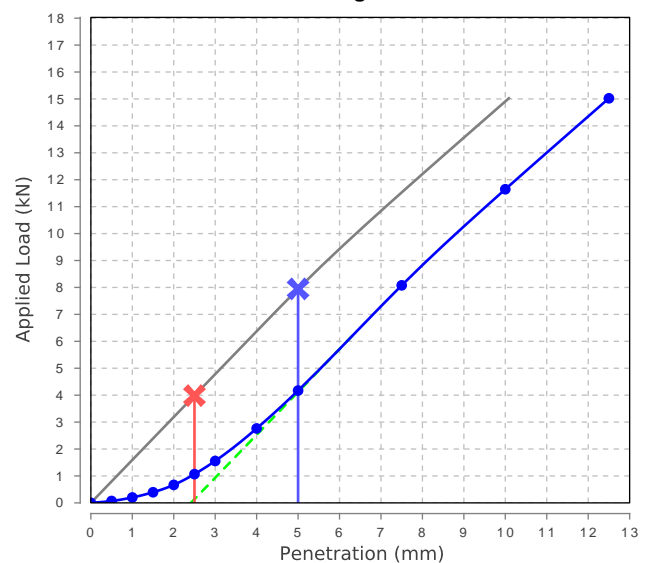
California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)

	Min	Max
CBR taken at	5 mm	
CBR %	40	
Method of Compactive Effort	Standard	
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1	
Method used to Determine Plasticity	Visual Assessment	
Maximum Dry Density (t/m ³)	1.91	
Optimum Moisture Content (%)	13.0	
Laboratory Density Ratio (%)	100.0	
Laboratory Moisture Ratio (%)	100.0	
Dry Density after Soaking (t/m ³)	1.90	
Field Moisture Content (%)	10.8	
Moisture Content at Placement (%)	12.8	
Moisture Content Top 30mm (%)	13.0	
Moisture Content Rest of Sample (%)	12.1	
Mass Surcharge (kg)	4.5	
Soaking Period (days)	4	
Curing Hours	2.5	
Swell (%)	0.5	
Oversize Material (mm)	19	
Oversize Material Included	Excluded	
Oversize Material (%)	3	

Particle Size Distribution



California Bearing Ratio



● Results ✕ 2.5 ✕ 5 - - - Tangent — Corrected

Material Test Report

Report Number: 85777.15-1
Issue Number: 1
Date Issued: 07/02/2019
Client: Enstruct Group Pty Ltd
 Level 4, 2 Glen Street, Milsons Point NSW 2061
Contact: Matt Lilley
Project Number: 85777.15
Project Name: QANTAS Sydney Flight Training Centre
Project Location: 295-297 King Street, Mascot
Work Request: 4029
Sample Number: 19-4029C
Date Sampled: 30/01/2019
Dates Tested: 30/01/2019 - 04/02/2019
Sampling Method: Sampled by Engineering Department
Sample Location: 6 (0.1 - 1.2m)
Material: Gravelly sand



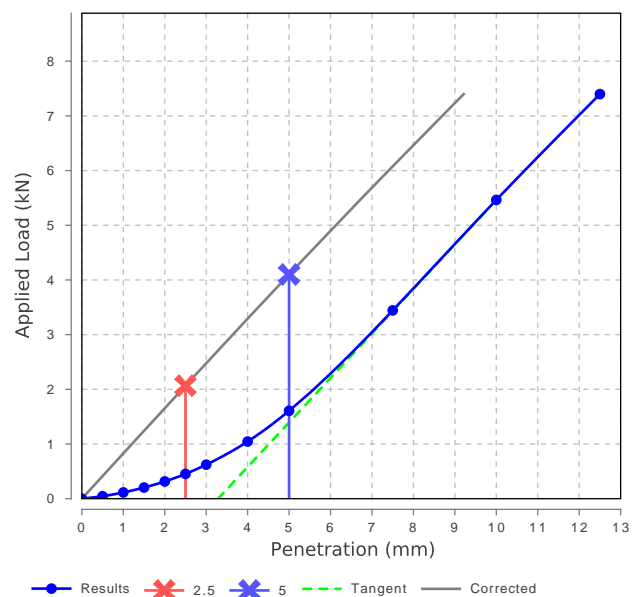

Approved Signatory: Mick Gref

Senior Technician

NATA Accredited Laboratory Number: 828

California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)		Min	Max
CBR taken at	5 mm		
CBR %	20		
Method of Compactive Effort	Standard		
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1		
Method used to Determine Plasticity	Visual Assessment		
Maximum Dry Density (t/m^3)	1.97		
Optimum Moisture Content (%)	11.0		
Laboratory Density Ratio (%)	100.0		
Laboratory Moisture Ratio (%)	100.0		
Dry Density after Soaking (t/m^3)	1.97		
Field Moisture Content (%)	7.1		
Moisture Content at Placement (%)	11.2		
Moisture Content Top 30mm (%)	11.3		
Moisture Content Rest of Sample (%)	11.9		
Mass Surcharge (kg)	4.5		
Soaking Period (days)	4		
Curing Hours	26		
Swell (%)	-0.5		
Oversize Material (mm)	19		
Oversize Material Included	Excluded		
Oversize Material (%)	2		

California Bearing Ratio



Material Test Report

Report Number: 85777.15-1
Issue Number: 1
Date Issued: 07/02/2019
Client: Enstruct Group Pty Ltd
 Level 4, 2 Glen Street, Milsons Point NSW 2061
Contact: Matt Lilley
Project Number: 85777.15
Project Name: QANTAS Sydney Flight Training Centre
Project Location: 295-297 King Street, Mascot
Work Request: 4029
Sample Number: 19-4029D
Date Sampled: 30/01/2019
Dates Tested: 30/01/2019 - 04/02/2019
Sampling Method: Sampled by Engineering Department
Sample Location: 8 (0.4 - 3.0m)
Material: Sand with some silt and trace gravel



Approved Signatory: Mick Gref
 Senior Technician
 NATA Accredited Laboratory Number: 828

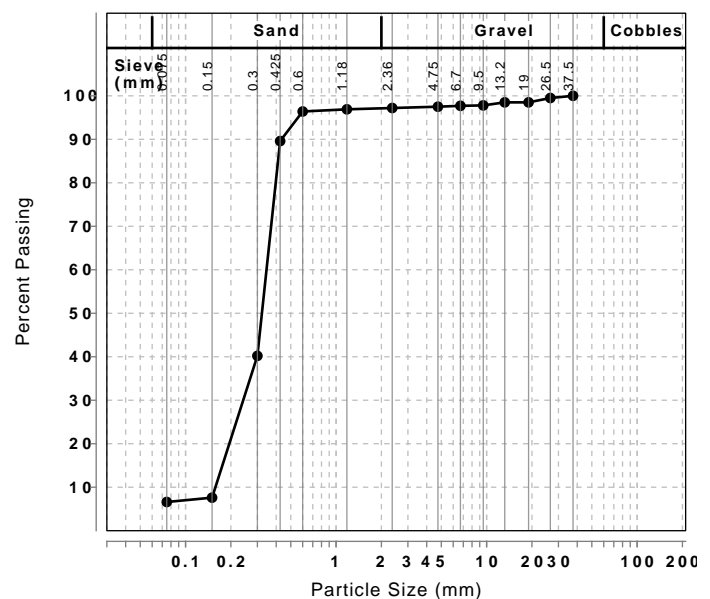
Particle Distribution (AS1289 3.6.1)

Sieve	Passed %	Passing Limits
37.5 mm	100	
26.5 mm	100	
19 mm	98	
13.2 mm	98	
9.5 mm	98	
6.7 mm	98	
4.75 mm	98	
2.36 mm	97	
1.18 mm	97	
0.6 mm	96	
0.425 mm	90	
0.3 mm	40	
0.15 mm	8	
0.075 mm	7	

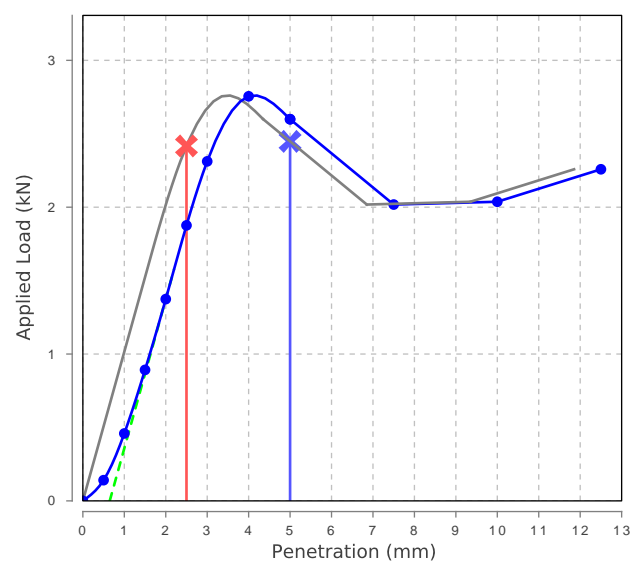
California Bearing Ratio (AS 1289 6.1.1 & 2.1.1)

	Min	Max
CBR taken at	2.5 mm	
CBR %	18	
Method of Compactive Effort	Standard	
Method used to Determine MDD	AS 1289 5.1.1 & 2.1.1	
Method used to Determine Plasticity	Visual Assessment	
Maximum Dry Density (t/m^3)	1.82	
Optimum Moisture Content (%)	12.5	
Laboratory Density Ratio (%)	100.0	
Laboratory Moisture Ratio (%)	100.0	
Dry Density after Soaking (t/m^3)	1.82	
Field Moisture Content (%)	14.9	
Moisture Content at Placement (%)	12.5	
Moisture Content Top 30mm (%)	15.2	
Moisture Content Rest of Sample (%)	14.9	
Mass Surcharge (kg)	4.5	
Soaking Period (days)	4	
Curing Hours	2.5	
Swell (%)	0.0	
Oversize Material (mm)	19	
Oversize Material Included	Excluded	
Oversize Material (%)	1	

Particle Size Distribution



California Bearing Ratio



Results 2.5 5 Tangent Corrected