



Douglas Partners

Geotechnics | Environment | Groundwater

Report on
Preliminary Geotechnical Investigation

Proposed Stables Precinct
Royal Randwick Racecourse, Randwick

Prepared for
The Australian Jockey Club

Project 71976
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Integrated Practical Solutions





Douglas Partners

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Report on Preliminary Geotechnical Investigation

Proposed Stables Precinct

Royal Randwick Racecourse, Randwick

1. Introduction

This report presents the results of a preliminary geotechnical assessment carried out by Douglas Partners Pty Ltd (DP) of the proposed Stables Precinct at the Royal Randwick Racecourse, Randwick. The assessment was requested by The Australian Jockey Club (AJC). It will be used as a base factual document for subsequent design and discussion with tenderers and also as part of a submission relating to the Director-General Environment Assessment Requirements (DGRs).

Geotechnical fieldwork, involving cone penetration testing (CPT), was undertaken to provide subsurface information for the eventual detailed design of foundations, excavation and retaining structures.

DP also undertook a soil and groundwater contamination investigation, the results of which will be reported separately. The contamination report will also address the issues of acid sulphate soils and salinity.

2. Site Description and Geology

The site investigated is indicated by the spread of CPT test locations (CPT 111 to CPT 119) shown on Drawing 1. It also continues about 100 m west of CPT 111 (refer Drawing 1) where a training ring is proposed. (There were no geotechnical test locations in this area, but there was one contamination test location.)

The area of interest covers a truncated triangular-shaped area of major dimensions of approximately 450 m x 180 m. The site is currently occupied by some stables, hardstand areas, training ring, fill stockpiles, and open ground. There are numerous trees over the eastern part of the site. The site is bounded by Wansey Road, Alison Road, the main race track and the '1400 m chute' section of race track. The Wansey Road side of the site falls relatively steeply from Wansey Road (say RL 45 m), down to more gently sloping ground (that falls towards the west from about RL 39 m to RL 31 m at an overall grade of about 2%) over the majority of the site.

Reference to the Sydney 1:100,000 Geological Series Sheet indicates that the racecourse is underlain by medium to fine-grained 'marine' sands with podsols, formed as transgressive dunes, and commonly referred to as the Botany Sands.

Reference to the New South Wales Department of Mines Bulletin No. 18 ('The Botany Basin'), Map 3, dated June 1962, indicates that the basement rock of the Botany Basin under the Stables Precinct is at approximately RL 24 m under Wansey Road, falling to approximately RL 9 m under the outside of

the main track. This implies that the depth to bedrock is greater than 20 m at the outside of the main track.

3. Field Work

3.1 Methods

The geotechnical fieldwork comprised nine CPTs (CPT 111 to 119) undertaken at the locations indicated on Drawing 1.

In the CPT, a 35 mm diameter cone with a following 130 mm long friction sleeve is attached to rods of the same diameter and pushed continuously into the soil by hydraulic thrust from a truck mounted test rig. Strain gauges in the cone and sleeve measure resistance to penetration. The results are displayed on a digital monitor and stored on computer for later plotting.

The target depth of testing for all CPTs was 8 m, but cone refusal (presumed to represent bedrock) was encountered in three of the CPTs.

The CPT locations were determined by GPS measurement in conjunction with existing features shown on the survey plan prepared by the client's surveyor. Their RLs to Australian Height Datum (AHD) were determined by interpolation of spot levels shown on the above survey plan.

Reference was also made to some test locations resulting from the DP contamination assessment. These locations included BH 5 (a groundwater monitoring well on the inside of the race tracks) and some shallow test pits across the site. One of these test pits was within the footprint of a proposed training ring immediately to the west of CPT 111 (refer Drawing 1).

3.2 Results

The result sheets for CPT 111 to CPT 119 are included in Appendix B, together with a brochure explaining the operation of the CPT and interpretation of results. Drawing 2 presents superimposed plots of cone resistance (q_c) versus depth.

The inferred subsurface conditions comprise shallow filling in places overlying sand. Where encountered by the CPTs, the filling is typically less than 1 m deep. This agrees in general with most of the test pits excavated during the contamination assessment field work. In those test pits, the filling ranged from about 0.4 m deep to 0.9 m deep, except towards the western end of the site where the filling was deeper. One test pit within the proposed training ring footprint (refer Drawing 1) encountered 2.2 m depth of variable, but mainly sandy, filling. The filling encountered elsewhere was also variable (including some ashes) but mainly sandy filling. Two test pit locations, however, encountered up to 0.7 m depth of ash filling.

The densities of the underlying natural sands are very variable across the site. The sands vary between loose and loose-to-very loose for the upper 3 to 4 m, but are medium dense in places. Every

CPT indicates medium dense sand below 5 m depth. All CPTs (except CPT 114) indicate dense sand below 6.5 m depth.

CPT refusal (presumed top of bedrock) was encountered in CPT 114, 115, 116 at depths of 7.8 m, 7.0 m, 5.4 m respectively. These depths correspond to RL 25.7 m, RL 29.8 m, RL 34.0 m respectively, indicating the rising level of the top of bedrock towards Wansey Road.

3.3 Groundwater

At the completion of each CPT, the cone rods were withdrawn and an attempt made to measure the depth to groundwater. This process is not always successful in sands because of collapse of the CPT hole. A water level measurement was also taken in BH 5. The results are summarised in Table 1.

Table 1: Groundwater Level Measurements

Location	Date Measured	Ground Surface (RL m.AHD)	Depth to Water (m)	Water Level (RL m.AHD)
BH 5	3/09/10	31.0	3.5	27.5
CPT 113	27/08/10	34.2	6.0	28.3

Note: Groundwater level measurements made in a BH are typically more accurate than those made in a CPT hole.

4. Proposed Development

The proposed Stables Precinct involves the following features of relevance to geotechnical investigation:

- Existing structures will be demolished. Bulk earthworks will result in a series of building platforms stepping down towards the west to follow the existing gentle fall in ground surface level.
- Six two storey stables buildings and associated structures will be constructed as indicated on Drawing 1.
- The western end of the site will be occupied by a training ring with a shallow stormwater detention basin located within the inside perimeter.
- Various pavements, roads, hardstand areas will be constructed.
- An equine tunnel under the outermost race tracks will be constructed with a base slab level varying from RL 28.8 m to RL 26.5 m, requiring at least 4.5 m depth of excavation.
- There will of course be other, relatively minor civil and structural works such as localised cut and fill, retaining walls etc that need not be addressed in this general report.

The comments that follow are of a general and broad nature and have the purpose of flagging the main geotechnical issues that will need to be addressed at the detailed planning and design stages.

5. Comments

5.1 Bulk Earthworks

After site clearance of structures and stockpiles of spoil, bulk earthworks will be required to form an adequate subgrade to both ground floor slabs for the stables and to pavements. The exposed subgrade after site clearance is expected to comprise mainly variable depths of sandy filling, overlying natural sands of variable density in the upper few metres. The existing filling under the footprint of the stables area appears to be typically less than 1 m deep, although deeper strata of filling were encountered towards the western end of the site.

Some of the filling encountered comprised ashes and hence would not be suitable for reuse as engineered fill, even if there is no contamination issue with such material. The remaining variable but mainly sandy filling is expected to be suitable for reuse (assuming hereafter that there is no contamination issue).

Consideration could be given to two approaches to bulk earthworks:

- Approach No. 1
 - Excavate a large number of shallow test pits seeking the locations of large pockets of unsuitable ash material. Chase out such pockets of unsuitable material and remove from the construction area.
 - Regrade the site such that the final planar surface represents the final average design subgrade.
 - Undertake very thorough impact rolling across the treated area so as to densify the filling and the underlying upper loose natural sands.
 - Undertake detailed earthworks using suitable material to form, by means of placement and compaction, the required individual building platform profiles.
 - Cap all treated areas with a 200 mm layer of compacted imported crushed sandstone to form a suitable working surface.
 - Ground floor slabs could be built as slab-on-grade. (Most structural loadings would still need to be carried by pile foundations – refer Section 5.2).
 - Pavements could be constructed on the prepared subgrade.
- Approach No. 2
 - The aim of this approach would be to avoid the need for piled foundations and instead support the two storey structures on raft slabs.
 - This approach would require the over-excavation of at least 1.5 m of material below the final average design subgrade. Unsuitable material could be removed and separately stockpiled during the over-excavation operation.
 - The exposed base of the excavation (which would probably be done in large panels) would then need to be very thoroughly rolled with a heavy vibrating roller. The panels would be too small to allow the use of the far more effective impact roller.

- Backfilling by placement of suitable fill in layers followed by compaction would be undertaken to attain the required subgrade profile for the stepped building platforms. A capping layer should also be placed as with Approach No. 1.

Approach No. 2 represents a substantial amount of bulk earthworks and is also very dependent upon the excavation and shifting of existing filling being permissible from a contamination perspective.

5.2 Foundations

The two storey buildings could be supported on raft slabs provided the bulk earthworks Approach No. 2 (refer Section 5.1) is first carried out. The bulk earthworks approach would be expected to provide a relatively uniform 'soil raft' of at least 2 m thickness below the base of the slab. The natural sands underlying the 'soil raft' would still exhibit variable loose densities for another 1 m to 2 m depth. Hence there would still be a risk of differential settlement across the footprint of the raft slab. Such settlement however, would be expected to occur soon after first application of the dead load.

If it is decided to follow bulk earthworks Approach No. 1, then consideration could be given to the following pile types. Structural loads are expected to be relatively modest.

- Steel screw piles
- Driven timber piles
- CFA piles
- Atlas displacement piles.

All piles should bear in the dense sand stratum that was encountered typically below about 6.5 m depth. As mentioned in Section 3.2, presumed bedrock was encountered at depths of 5 m to 8 m at CPTs 114, 115, 116 but the stables buildings are located some distance from this part of the site.

Due to the presence of upper very loose and loose sands, the use of shallow footings is not recommended due to settlement considerations.

5.3 Equine Tunnel

The Equine Tunnel floor slab will be approximately 4.5 m below ground level and hence is expected to fall from about RL 28.8 m at the stables end of the tunnel to about RL 26.5 m at the other end. The groundwater levels measured during the field work fell from about RL 28.2 m near the stables end of the tunnel (CPT 113) to about RL 27.5 m near the other end (BH 5).

Hence provision will need to be made for a ground water level continuously above the slab level of some parts of the tunnel and possibly above the slab level for its full length during or after periods of prolonged rainfall.

Design consideration will need to be given to the following issues:

- The need for localised dewatering during construction.

- The need to 'tank' the structure so as to make it water-tight.
- The need for a method to overcome any resultant buoyancy forces. Tension piles in sand tend not to be very efficient and hence the use of deadweight might be more suitable. The latter might not be so readily achievable within the tunnel.
- The method of construction of the tunnel walls. Several options are available:
 - Seacant pile walls, cantilevered if possible during construction or else temporarily braced/anchored. Permanent bracing of the walls in the tunnel would be achieved by the roof slab.
 - Driven steel sheet piling with temporary anchors, and with the walls and base slab subsequently built in open space.
 - If space permits, construction within an open excavation that has temporarily battered side slopes. The side slopes would have to be no steeper than 1.5:1 (h:v) and hence the footprint of the excavation would be substantially larger than the final footprint of the tunnel.

5.4 Detention Basin

It is understood that a 0.5 m to 1 m deep detention basin is proposed within the training ring at the western end of the site (west of CPT 111). One test pit excavated within this area during the contamination assessment encountered 2.2 m of filling (silty sand; some rubble fragments) overlying natural sand to 3.5 m depth (at which depth testing was terminated).

Ponded water would undoubtedly seep out of the basin into the sandy filling and the underlying sand stratum. An estimate of likely infiltration rates would require a relatively large-scale infiltration test rather than the conventional test using small diameter PVC tubing. A meaningful qualitative assessment could probably be made by means of repeated filling of a test pit and recording the times taken for the pit to empty.

5.5 Concluding Remarks

The broad geotechnical issues concerning the design and construction of the Stables Precinct have been addressed in this report. None of these issues are considered to be outside the normal range of issues routinely encountered on any comparable project.

6. Limitations

Douglas Partners (DP) has prepared this report for a project at Royal Randwick Racecourse, NSW in accordance with DP's proposal dated 13 August 2010 and 19 August 2010, and acceptance received from Mr Daniel Lacey of The AJC. The report is provided for the exclusive use of The AJC for this project only and for the purposes described in the report. It should not be used for other projects or by a third party. 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 only at the specific sampling 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 anthropogenic 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 limited by undetected variations in ground conditions between sampling locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

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 given in this report.

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.

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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.

Appendix B

Results of Field Work



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

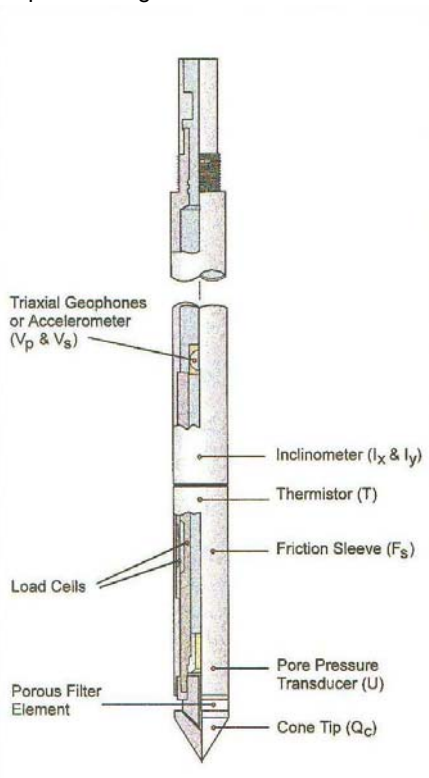


Figure 1: Cone Diagram

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)
Piezocone	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 (F_r). These are used in conjunction with soil classification charts, such as the one below (after Robertson 1990)

Cone Penetration Tests

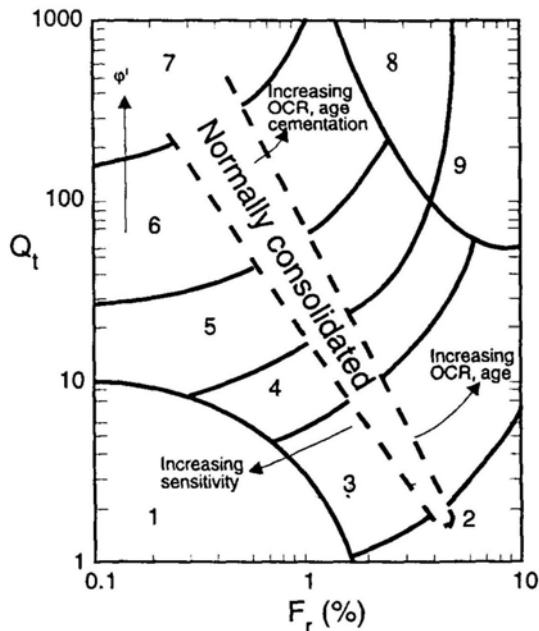


Figure 3: Soil Classification Chart

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.

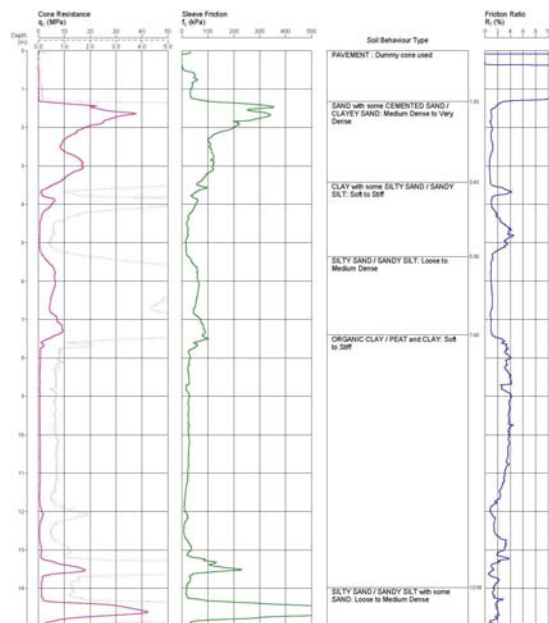


Figure 4: Sample Cone Plot

CONE PENETRATION TEST

CLIENT: AUSTRALIAN JOCKEY CLUB

PROJECT: SPECTATOR AND STABLES PRECINCTS

LOCATION: ROYAL RANDWICK RACECOURSE

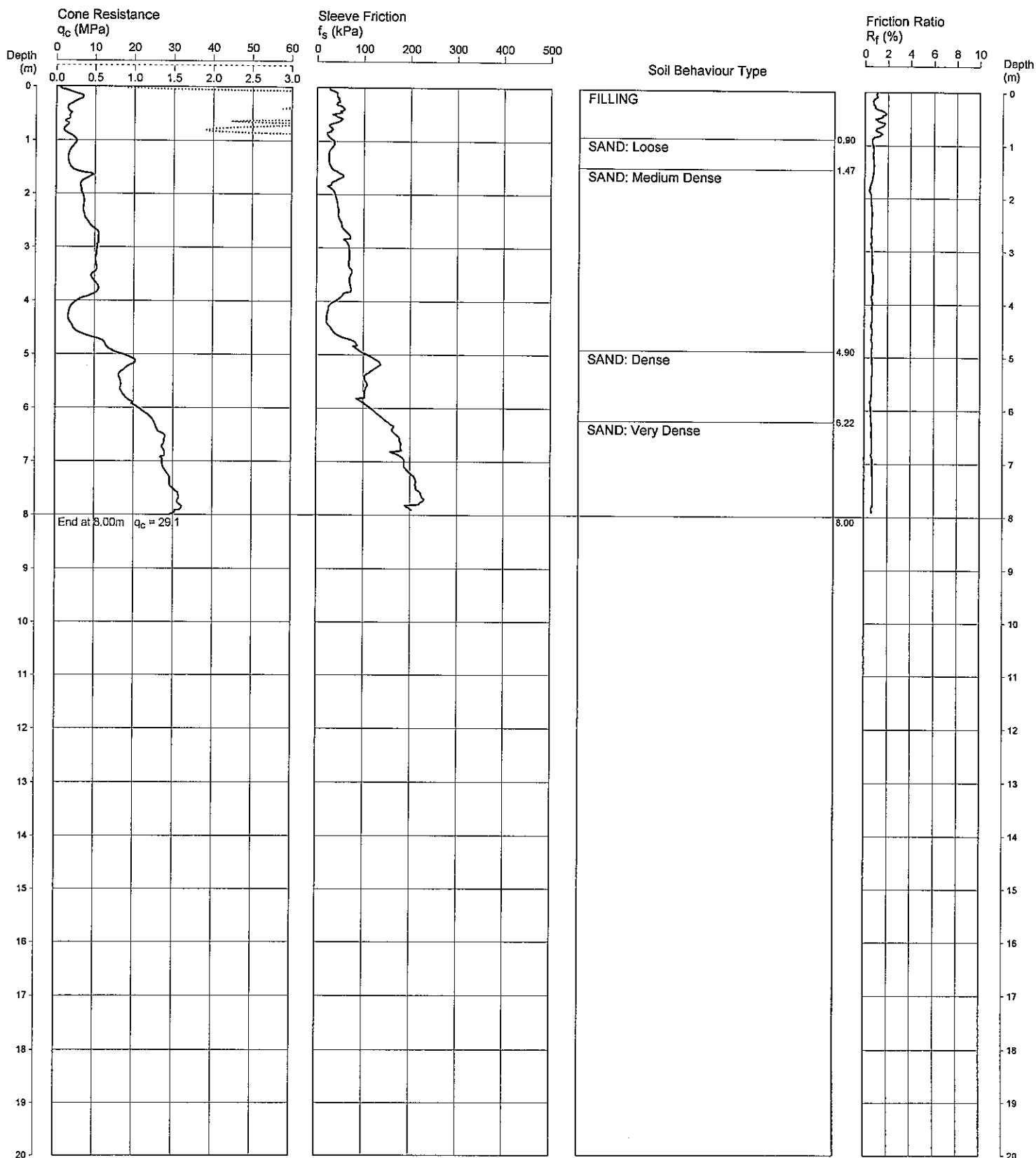
PROJECT No: 71976

CPT 111

Page 1 of 1

DATE 27/8/2010

SURFACE RL: 32.4 AHD



REMARKS: HOLE COLLAPSE AT 4.1M DEPTH

Date 9/10
 Plotted
 Checked RNL

File: P:\71976.00 RANDWICK, Royal Randwick - Spectator Precinct & Stables RWL\Fid... 76... dwick Racecourse\71976111.CP5
 Cone ID: H2 Type: 2 Standard

ConePlot Version 5.8.1
 © 2003 Douglas Partners Pty Ltd

Displacement Test



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CONE PENETRATION TEST

CLIENT: AUSTRALIAN JOCKEY CLUB

PROJECT: SPECTATOR AND STABLES PRECINCTS

LOCATION: ROYAL RANDWICK RACECOURSE

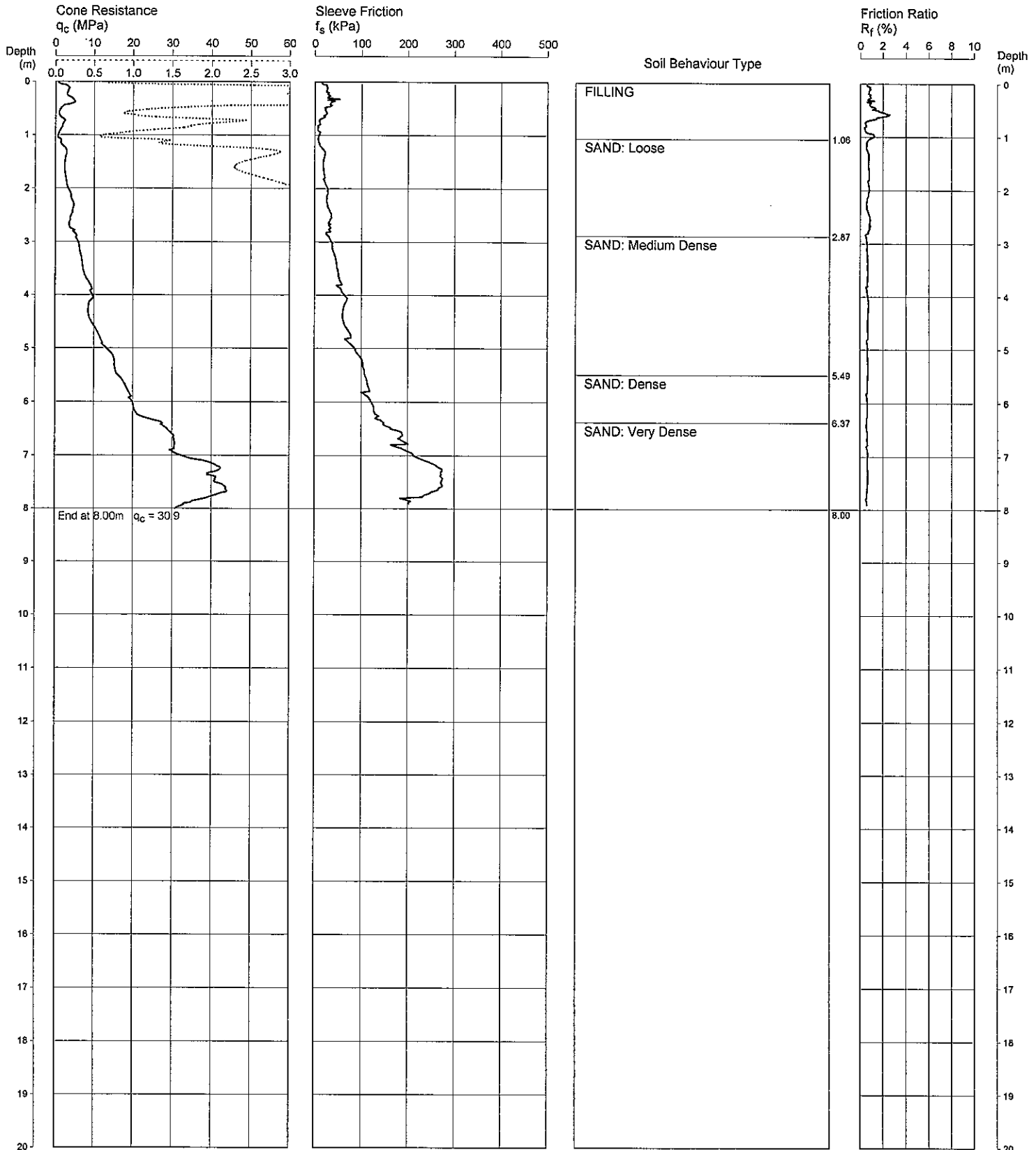
PROJECT No: 71976

CPT 112

Page 1 of 1

DATE 27/8/2010

SURFACE RL: 34.4 AHD



REMARKS: HOLE COLLAPSE AT 5.1M DEPTH

Date *9/10*
 Plotted *RWL*
 Checked *RWL*

File: P:\71976.00 RANDWICK, Royal Randwick - Spectator Precinct & Stables RWL\Fil... 76... dwick Racecourse\71976112.CP5
 Cone ID: H2 Type: 2 Standard

ConePlot Version 5.8.1
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-||- Dissipation Test



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CONE PENETRATION TEST

CLIENT: AUSTRALIAN JOCKEY CLUB

PROJECT: SPECTATOR AND STABLES PRECINCTS

LOCATION: ROYAL RANDWICK RACECOURSE

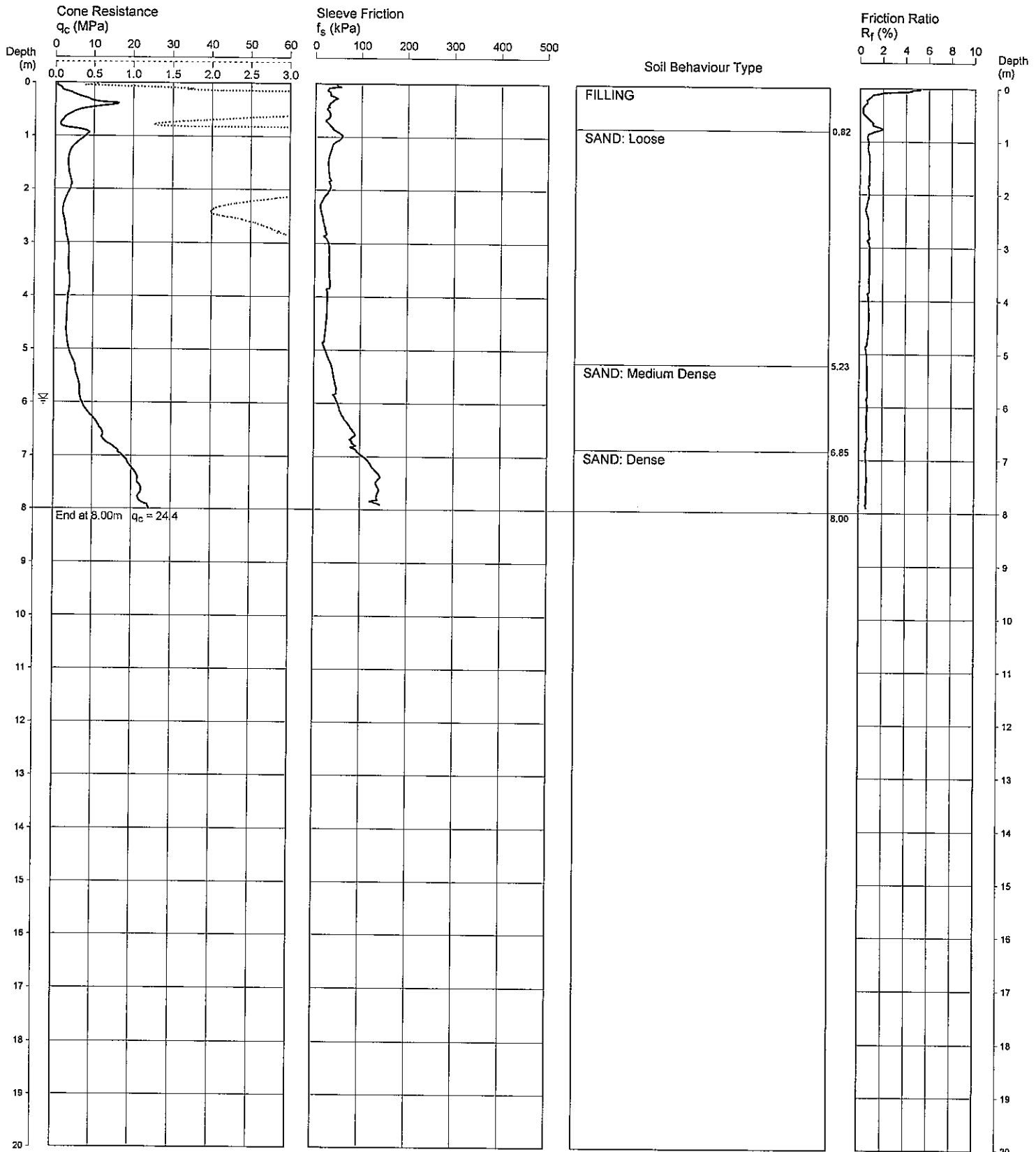
PROJECT No: 71976

CPT 113

Page 1 of 1

DATE 27/8/2010

SURFACE RL: 34.2 AHD



REMARKS: WATER AT 6.0M DEPTH

Date 9/10
Plotted RML
Checked RML

File: P:\71976.00 RANDWICK, Royal Randwick - Spectator Precinct & Stables RWL\Fil... 76... dwick Racecourse\71976113.CP5
Cone ID: H2 Type: 2 Standard

ConePlot Version 5.8.1
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Dissipation Test



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CONE PENETRATION TEST

CLIENT: AUSTRALIAN JOCKEY CLUB

PROJECT: SPECTATOR AND STABLES PRECINCTS

LOCATION: ROYAL RANDWICK RACECOURSE

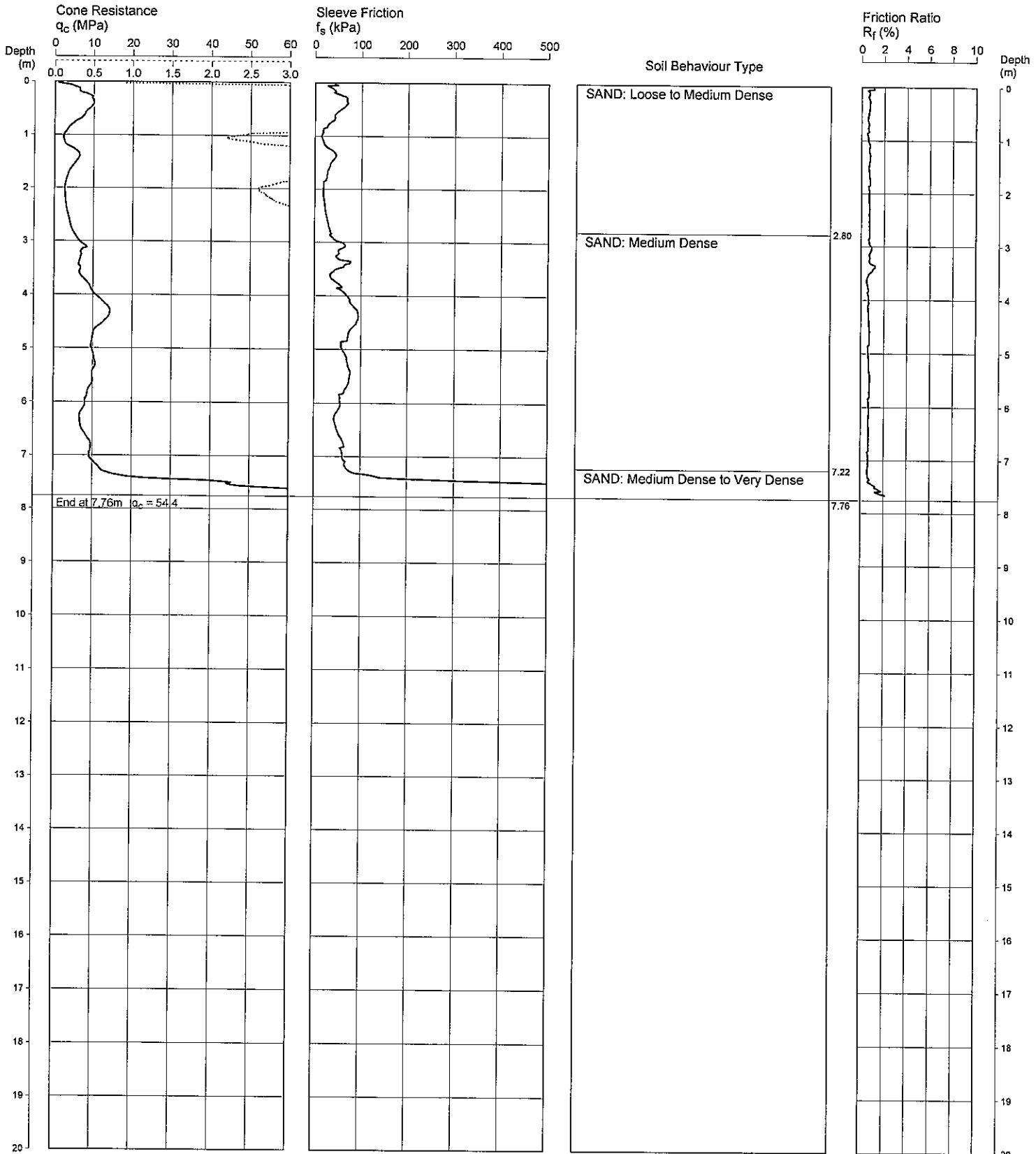
PROJECT No: 71976

CPT 114

Page 1 of 1

DATE 27/8/2010

SURFACE RL: 33.5 AHD



REMARKS: HOLE COLLAPSE AT 5.5M DEPTH

Date *9/10*
 Plotted *RWL*
 Checked

File: P:\71976.00 RANDWICK, Royal Randwick - Spectator Precinct & Stables RWL\Fig 71976.00 Randwick Racecourse\71976114.CP5
 Cone ID: H2 Type: 2 Standard

ConePlot Version 5.8.1
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CONE PENETRATION TEST

CLIENT: AUSTRALIAN JOCKEY CLUB

PROJECT: SPECTATOR AND STABLES PRECINCTS

LOCATION: ROYAL RANDWICK RACECOURSE

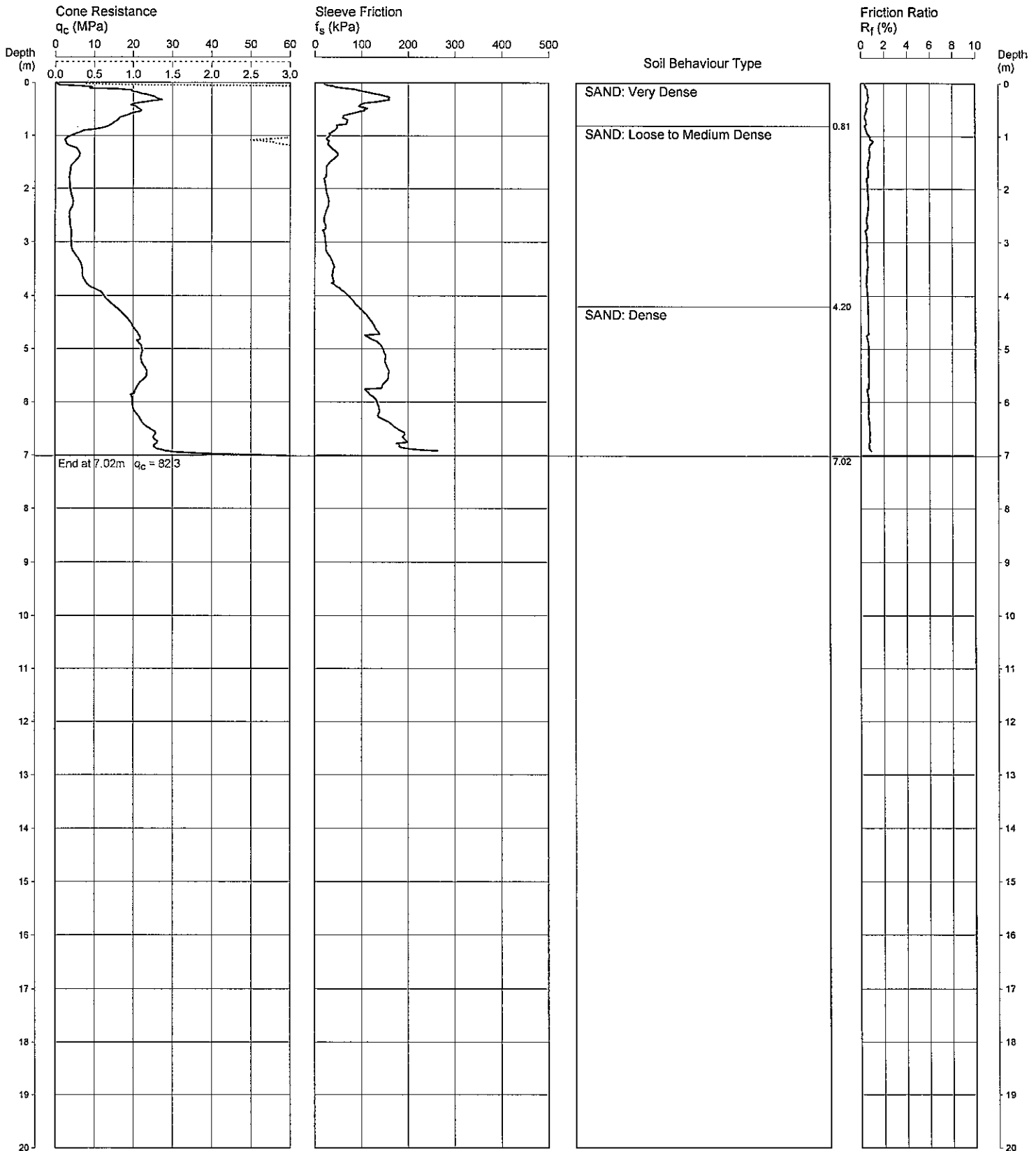
PROJECT No: 71976

CPT 115

Page 1 of 1

DATE 27/8/2010

SURFACE RL: 36.8 AHD



REMARKS: Located on unsealed vehicular track

Date *2/10*
 Plotted *RM*
 Checked

File: P:\71976.00 RANDWICK, Royal Randwick - Spectator Precinct & Stables RWL\Fil... 76... dwick Racecourse\71976115.CP5
 Cone ID: H2 Type: 2 Standard

ConePlot Version 5.8.1
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|| Dissipation Test



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CONE PENETRATION TEST

CLIENT: AUSTRALIAN JOCKEY CLUB

PROJECT: SPECTATOR AND STABLES PRECINCTS

LOCATION: ROYAL RANDWICK RACECOURSE

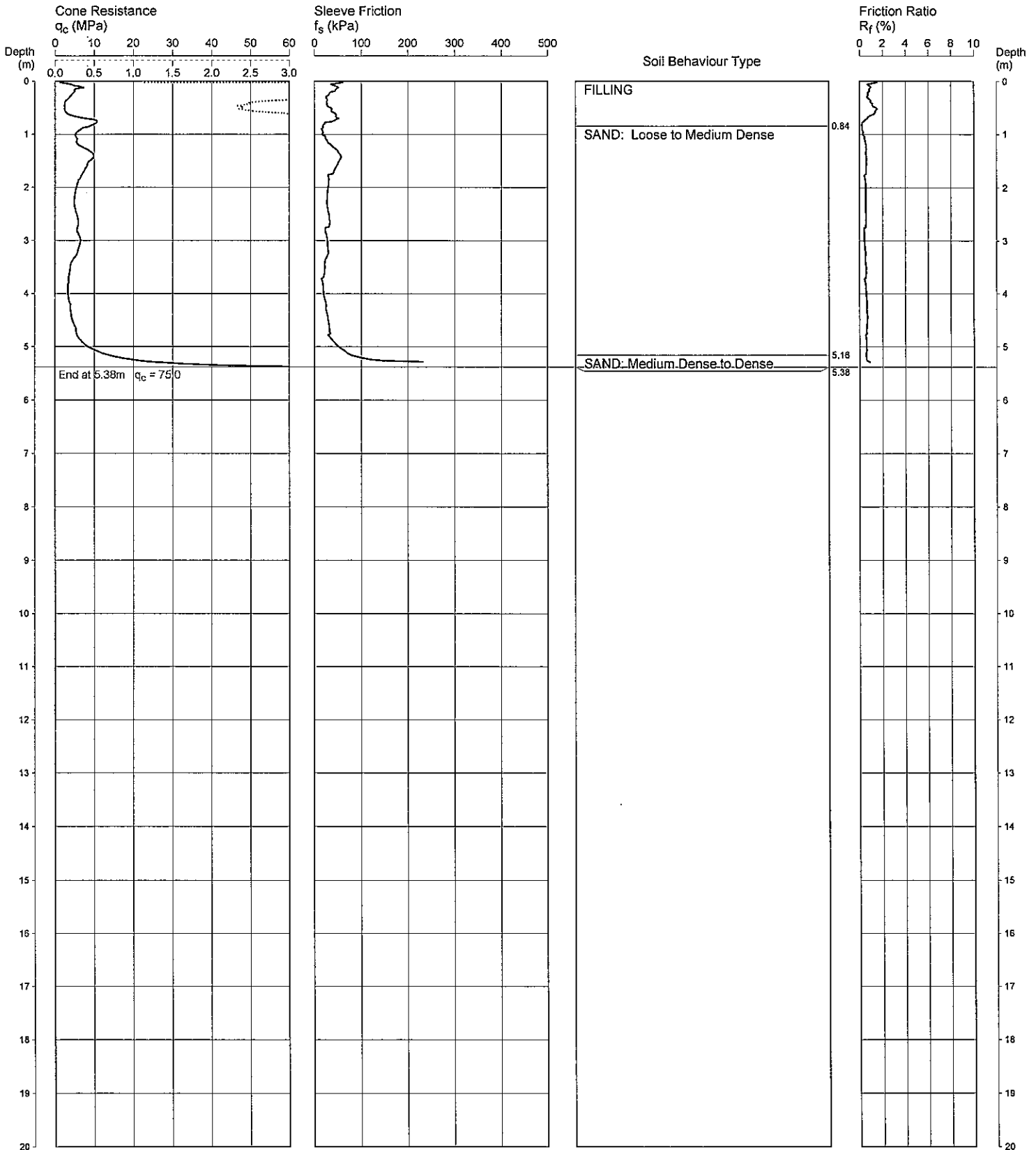
PROJECT No: 71976

CPT 116

Page 1 of 1

DATE 30/08/2010

SURFACE RL: 39.4 AHD



REMARKS: HOLE COLLAPSE AT 5.0M DEPTH

Date *31/8*
 Plotted *RM*
 Checked *RM*

File: P:\71976.00 RANDWICK, Royal Randwick - Spectator Precinct & Stables RWL\Fil...
 Cone ID: H2 Type: 2 Standard

ConePlot Version 5.8.1
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·-·-· Dissipation Test



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CONE PENETRATION TEST

CLIENT: AUSTRALIAN JOCKEY CLUB

PROJECT: SPECTATOR AND STABLES PRECINCTS

LOCATION: ROYAL RANDWICK RACECOURSE

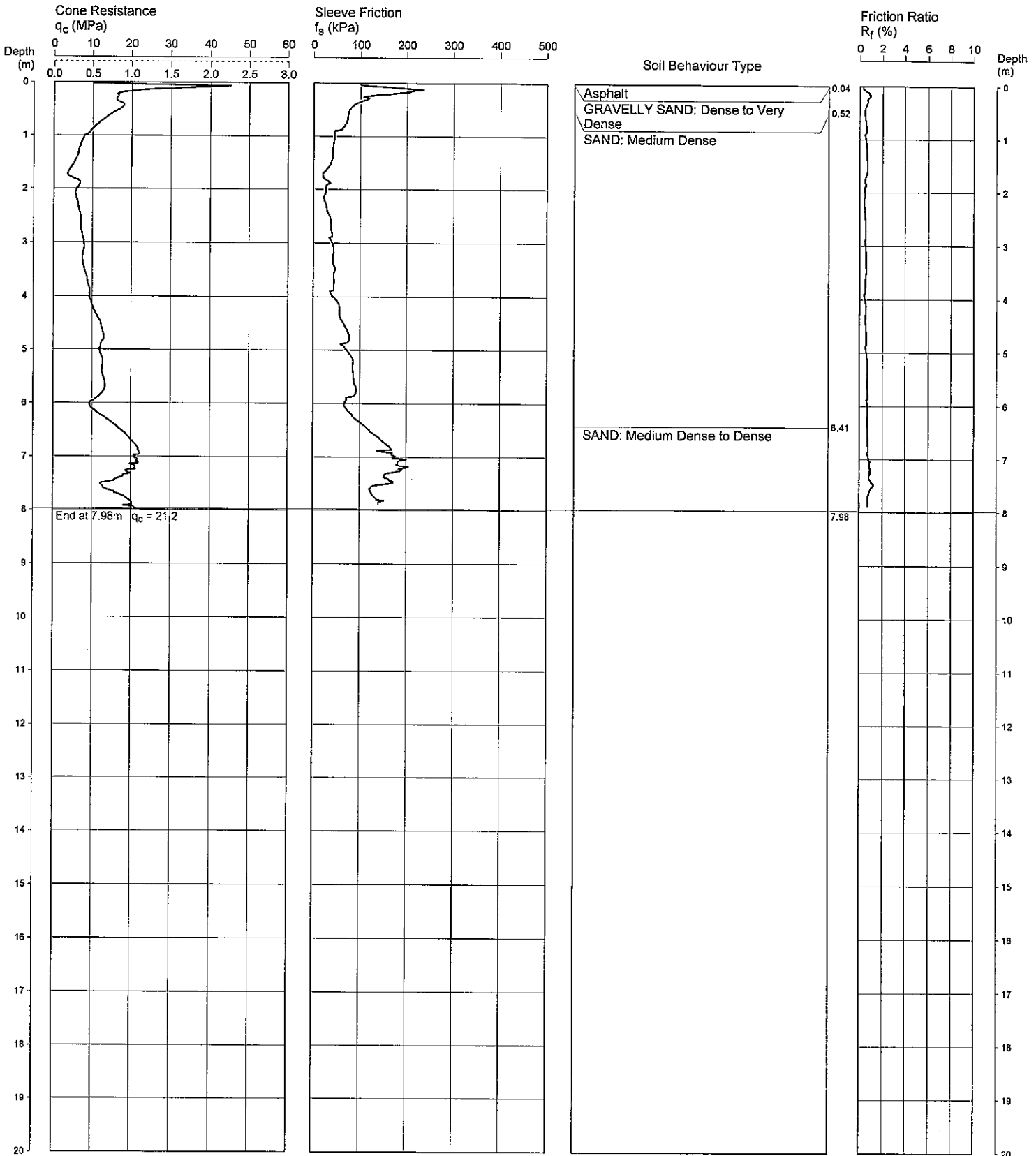
PROJECT No: 71976

CPT 117

Page 1 of 1

DATE 27/9/2010

SURFACE RL: 36.6 AHD



REMARKS: HOLE COLLAPSE AT 7.5M DEPTH

Date *9/10*
 Plotted *RM*
 Checked

File: P:\71976.00 RANDWICK, Royal Randwick - Spectator Precinct & Stables RWLF\71976 - Randwick Racecourse\71976117.CP5
 Cone ID: H2 Type: 2 Standard

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CONE PENETRATION TEST

CLIENT: AUSTRALIAN JOCKEY CLUB

PROJECT: SPECTATOR AND STABLES PRECINCTS

LOCATION: ROYAL RANDWICK RACECOURSE

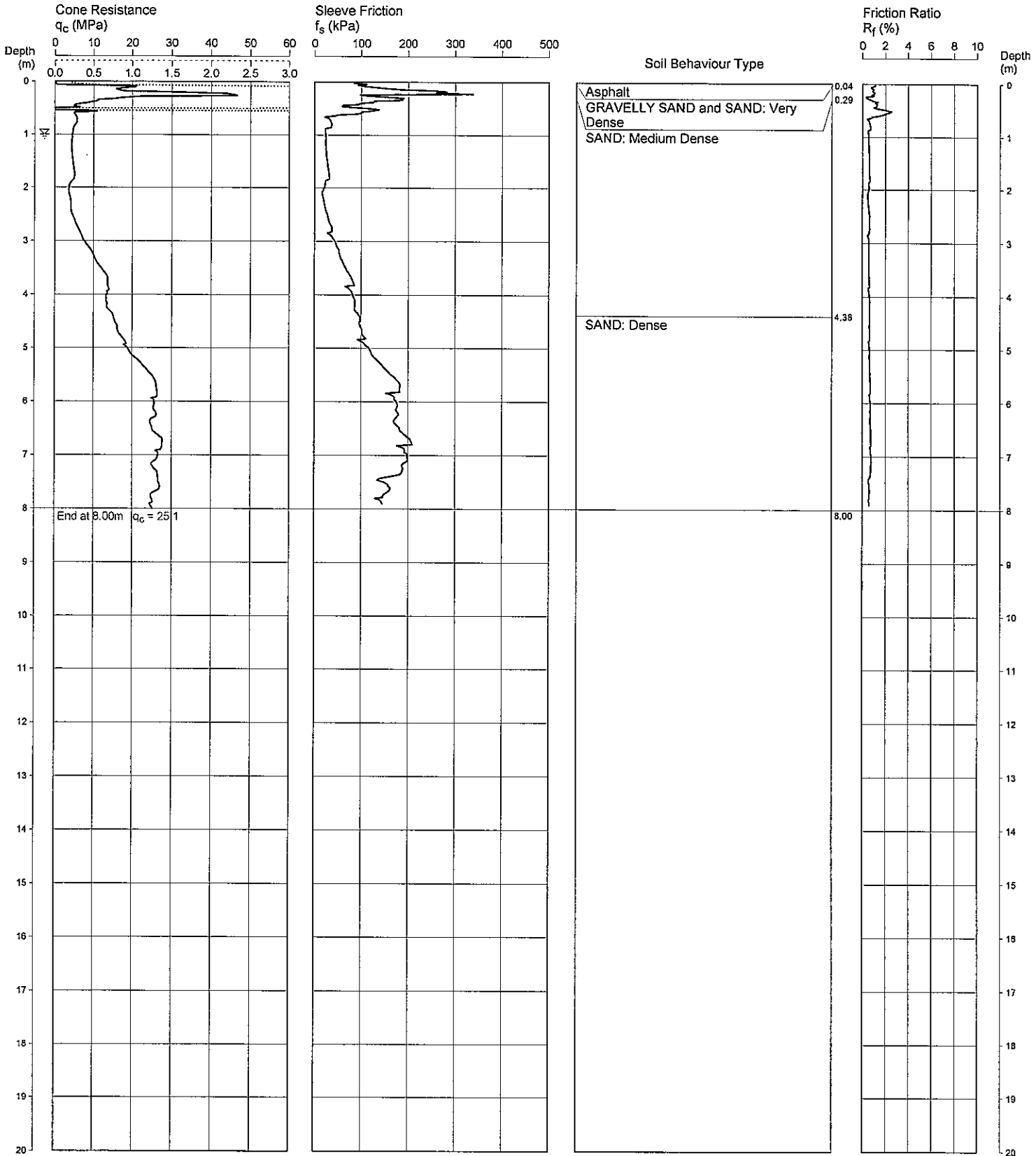
PROJECT No: 71976

CPT 118

Page 1 of 1

DATE 30/08/2010

SURFACE RL: 37.8 AHD



REMARKS: UNEXPECTEDLY SHALLOW DEPTH TO WATER AT 1.0M

Date *9/10*
 Plotted *Rm*
 Checked *Rm*

File: P:71976.00 RANDWICK, Royal Randwick - Spectator Precinct & Stables RWLFid 76 Randwick Racecourse\71976118.CP5
 Cone ID: H2 Type: 2 Standard

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CONE PENETRATION TEST

CLIENT: AUSTRALIAN JOCKEY CLUB

PROJECT: SPECTATOR AND STABLES PRECINCTS

LOCATION: ROYAL RANDWICK RACECOURSE

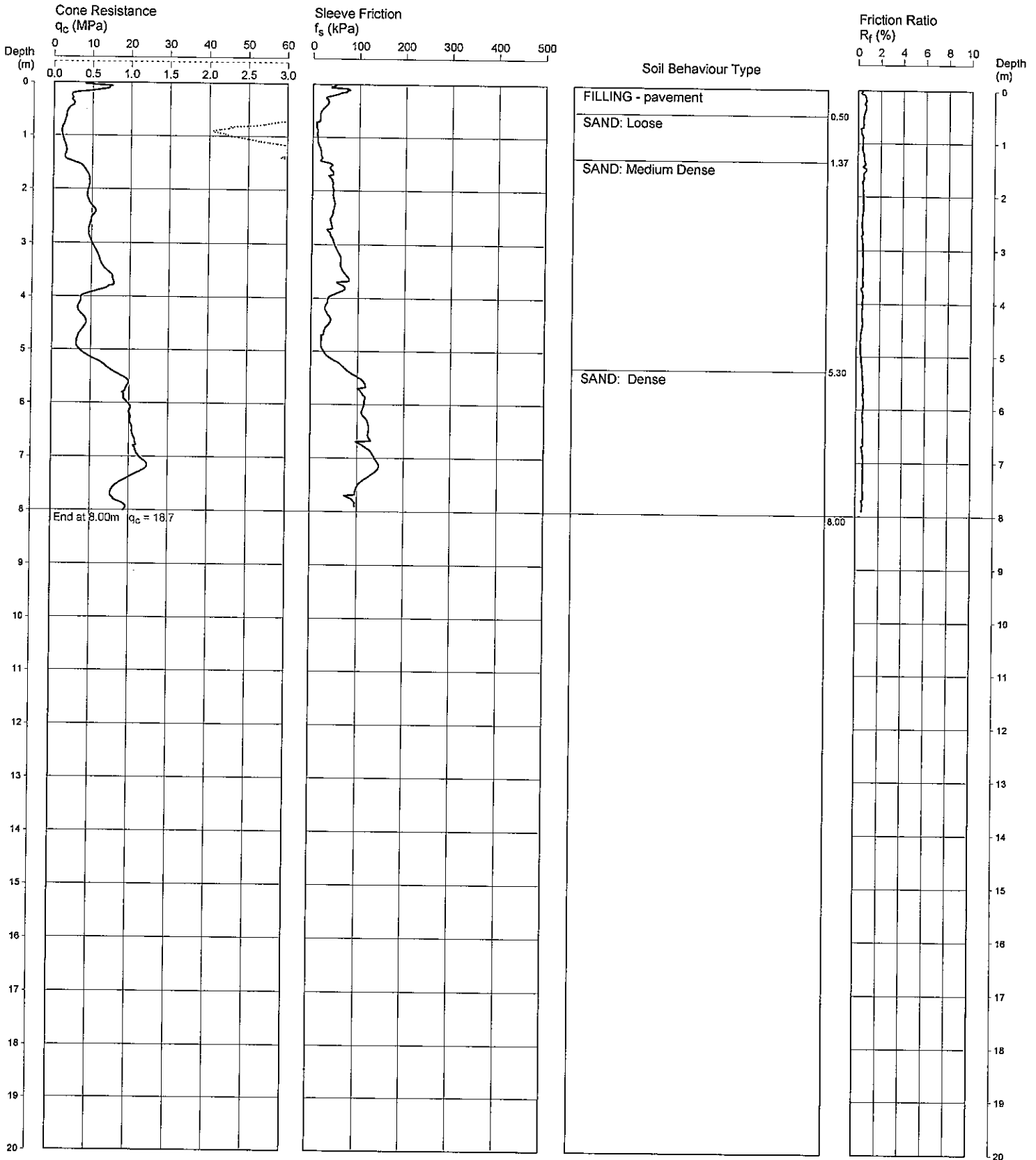
PROJECT No: 71976

CPT 119

Page 1 of 1

DATE 30/08/2010

SURFACE RL: 38.9 AHD



REMARKS: HOLE DRY FOR FULL DEPTH

Date *9/10*
 Plotted *Rm*
 Checked

File: P:\71976.00 RANDWICK, Royal Randwick - Spectator Precinct & Stables RWL\Fi...
 Cone ID: H2 Type: 2 Standard

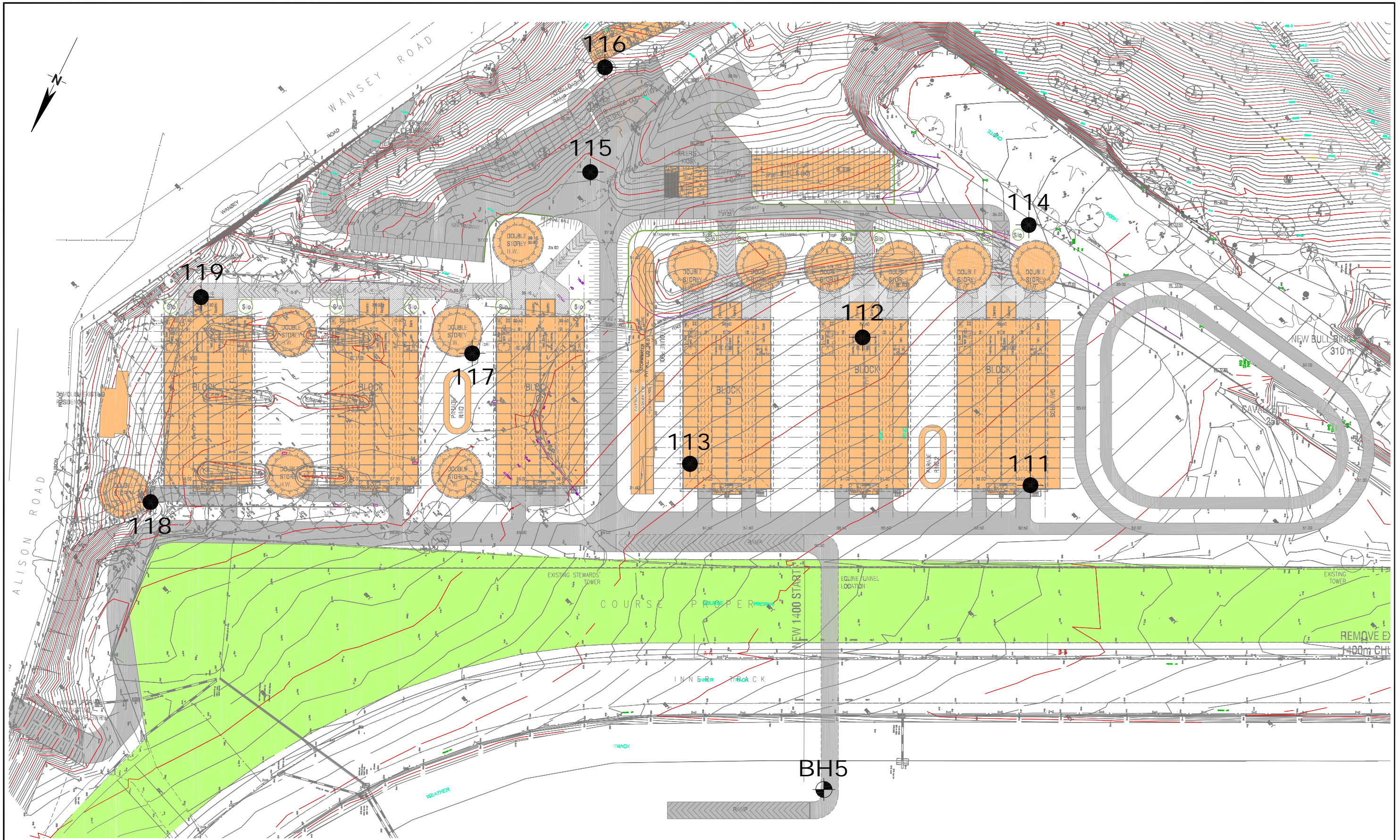
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Drawings

Drawings 1 and 2



LEGEND
 ● CONE PENETRATION TEST
 ⊕ BORE HOLE

SCALE 50
 1:1250
 0 100m



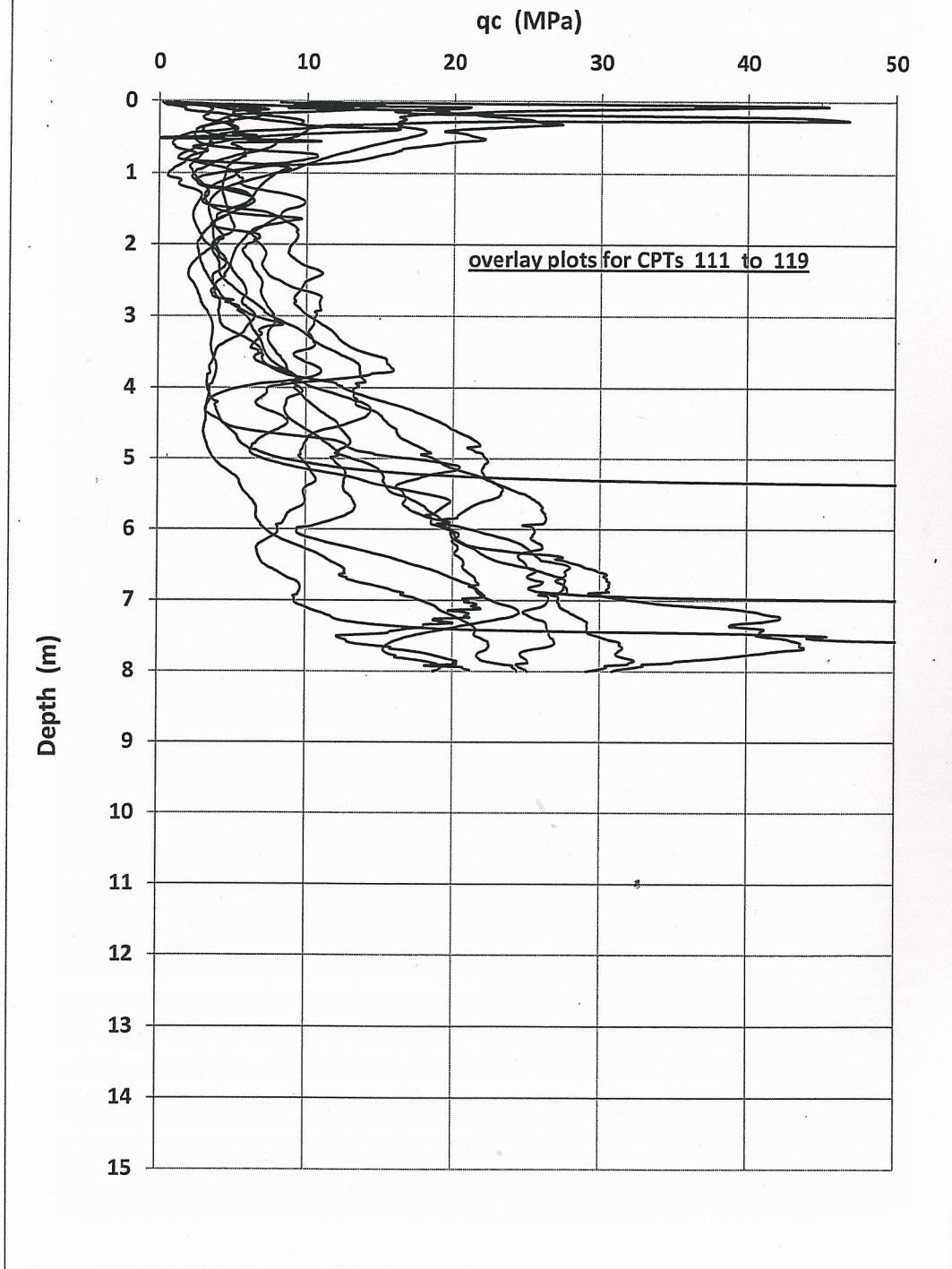
CLIENT: Australian Jockey Club		
DRAWN BY: PSCH	SCALE: As shown	OFFICE: Sydney
APPROVED BY:	DATE: 31.8.2010	

TITLE: Location of CPTs and Bore Hole Stables Precinct Royal Randwick Racecourse, RANDWICK

PROJECT No:	71976
DRAWING No:	1
REVISION:	B

P:\1976.00 RANDWICK, Royal Randwick - Spectator Precinct & Stables RVL Drawings\1976-2 Rev.B.dwg, 9/7/2010 11:49:26 AM

Randwick STABLES



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*Sydney, Newcastle,
Brisbane, Melbourne,
Perth, Wyong, Canberra*

*Campbelltown, Townsville,
Wollongong, Darwin, Cairns
Gold Coast, Sunshine Coast*

**TITLE: Summary of CPTs, Proposed Stables Precinct
Royal Randwick Racecourse, RANDWICK**

CLIENT: Australian Jockey Club

OFFICE: SYDNEY

DRAWN BY: PSCH

SCALE: As shown

PROJECT No: 71976

DRAWING No. 2

APPROVED BY: *RMV*

DATE: 31.8.2010