SOIL SURVEYS

PROJECT NO. 112-14835

APRIL, 2013

SUNSHINE COAST COUNCIL

GEOTECHNICAL INVESTIGATION

NOOSA WATERS ESTATE
NOOSAVILLE

REVETMENT WALL STABILITY

Soil Surveys Engineering Pty Limited
Specialists in Applied Geotechnics
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15th April, 2013

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ATTENTION: SUNSHINE COAST COUNCIL SENIOR LEGAL ADVISOR

Dear Sir,

RE: GEOTECHNICAL INVESTIGATION
REVETMENT WALL STABILITY
NOOSA WATERS ESTATE - NOOSAVILLE

Enclosed is a draft copy of our report for the above project dated April, 2013. An electronic copy (PDF format) of the report has been issued.

The investigation was carried out in accordance with our Geotechnical Investigation Proposal 1-14835, 2012-12-18, PR VER 0 dated 18th December 2012 at the request of Denis Shaw on behalf of the Sunshine Coast Council.

Authorisation to proceed with the investigation was provided by Purchase Order No. PPB08920 dated 21/12/2012.

Should you have any queries regarding this report, please do not hesitate to contact Tim Phillips or Peter Elkington at our Gold Coast office.

Yours faithfully,

P. ELKINGTON (RPEQ 7226)

for and on behalf of

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1.0 INTRODUCTION

This report presents the results of the broadscale geotechnical investigation carried out by Soil Surveys Engineering Pty Limited at Noosa Waters Estate, Noosaville, to assess apparent slumping of the lake bed profile and instability of revetment walls.

The investigation was carried out on behalf of Sunshine Coast Council. Authorisation to proceed with the investigation was provided by Denis Shaw on behalf of Sunshine Coast Council, dated 21st December 2012.

The objectives of this investigation were to assess subsurface conditions across the estate lakes in accordance with the Scope of Geotechnical Services detailed in Section 2.0. The results of a preliminary geotechnical assessment carried out on behalf of the Noosa Waters Residents Association (our reference report No. 1-14835, 2012-12-10, LTR VER 0) were utilised in the compilation of this report.

2.0 SCOPE OF GEOTECHNICAL SERVICES

The scope of geotechnical services provided by Soil Surveys Engineering Pty Limited was directed towards evaluating the following items as detailed in our proposal 1-14835, 2012-12-18, PR VER 0 dated 18th December, 2012.

- Lake bed conditions at fifteen representative sections across the estate lake system
- Stability conditions at fifteen representative sections across the estate lake system
- Broadscale remedial options to stabilise lake beds and revetment walls in areas of potential instability.

3.0 GEOTECHNICAL ASSESSMENT

To provide the required evaluation, the following broadscale geotechnical investigation was carried out.

Stage 1

- Review of historic geotechnical data compiled by Soil Surveys Engineering Pty Limited during the estate development
- Assessment of hydrographic survey data provided by Port of Brisbane Pty Ltd

Stage 2

- Broadscale geotechnical investigation comprising:-
  - Dynamic Cone Penetrometer testing
  - Lake bed soil sampling
  - Lake bed measurements and collation of data by others

Stage 3

- Laboratory testing of recovered soil samples

Stage 4

- Collation and analysis of geotechnical data.

3.1 Stage 1 - Review of Historic Geotechnical Data

We advise that Soil Surveys Engineering Pty Limited were the geotechnical consultants during the estate development between January 1991 and October 1996, encompassing Stages 1 to 15.

Soil Surveys Engineering Pty Limited were engaged by Noosa Waters Pty Ltd and consulted to Cardno & Davies (QLD) Pty Ltd with geotechnical data reviewed by Coffey Partners International Pty Ltd.

The geotechnical brief included:-

- Substrata profiling, including marine clay mapping
- Compaction control of bulk and civil works for allotments, roadways, parkland, services and revetment wall foundations
- Settlement and consolidation analysis including preload monitoring
- Stability assessment of revetment and canal batter profiles
- Site classification of allotments in accordance with Australian Standard AS2870-1988
- Quality control of site won and imported materials, including revetment rock
- Foundation assessments for estate infrastructure, including bridges, underground services, etc.

3.1.1 Subsurface Profile

Noosa Waters Estate comprised a reclaimed canal subdivision with fill material placed and compacted over alluvial deposits.

The fill material generally comprised sand and residual clay material won from canal excavations.

The underlying alluvium comprised sand, silty sand, and clayey sand overlying firm to very soft marine clay deposits which were encountered in varying thicknesses across significant portions of the estate. A significant channel of marine clay, up to 13.0m thick, extended approximately east-west through the centre of the Noosa Waters Estate with further channels to the south of the main channel in Stages 5, 7A, 8A, 10, 11 and 15B. The marine clay deposits were predominantly soft, ie, shear strength <25kPa and slightly over-consolidated.

The underlying residual strata comprised stiff to very stiff silty and sandy clay grading into weathered siltstone, sandstone and ironstone of the Myrtle Creek Sandstone Group.

3.1.2 Compaction Control

On the basis of the control testing undertaken, a minimum compaction control specification of 95% Dry Density Ratio, Standard Compaction Effort (AS1289 5.1.1/5.4.1) for cohesive fill and 70% Density Index/Minimum and Maximum Dry Density (AS1289 5.5.1/5.6.1) were maintained for the bulk filling works across the estate. A bulk fill level of RL 2.4m was indicated on the construction drawings. A minimum Density Index/Minimum and Maximum Dry Density of 70% was maintained for the revetment wall foundations.

3.1.3 Preload Monitoring

Preloading was adopted across significant portions of the estate, based on marine clay thicknesses and properties derived from Borehole and Static Cone Penetrometer (CPT) investigations and laboratory analysis, to reduce the settlement potential under ‘equivalent house loads’.

Preload monitoring, using surveyed settlement plate data and settlement analysis was carried out by Soil Surveys Engineering Pty Limited with settlement analysis reviewed by Coffey Partners International Pty Ltd.

3.1.4 Stability Assessment

Stability analysis was carried out using the computer program G SLOPE on revetment and canal batter profiles provided by Cardno and Davies (QLD) Pty Ltd.

A long term factor of safety, against global instability, of $\geqslant$ 1.5 was confirmed based on a 15kPa surcharge on allotments, water in the canal and a canal batter profile as per Cardno and Davies (QLD) Pty Ltd design. Refer Appendix 'H' for Drawing No 1754/6-11 detailing Typical Section - Revetment Wall and Rock Protection and Typical Canal Profile.

3.1.5 Site Classification

Site classifications, in accordance with AS2870-1988 guidelines, were carried out across the estate. Classifications ranged from Class 'S' Slightly reactive, Class 'M' and 'H' Moderately and Highly reactive and encompassing a large portion of the estate, with a small portion of Class 'E' and 'P', Extremely reactive and Problem Sites, due to high settlement potentials afforded by significant marine clay deposits. A pile foundation system was recommended for Class 'P' sites.

3.2 Stage 2 - Broadscale Geotechnical Investigation

As part of our Broadscale Geotechnical Investigation Program, lake bed conditions immediately in front of the revetment walls were assessed at fifteen selected locations corresponding to known affected and non affected areas, using the following investigation procedures from a purpose modified boat platform.

- Sampling the upper level soil strata to depths of 1.0m below current lake bed levels at fifteen (15) representative locations across the estate lake system using a manual piston sampler.
- Probing the lake bed strata with a total of one hundred (100) continuous Dynamic Cone Penetrometer tests (DCP/test method AS1289 6.3.2).

The tests were offset from the revetment wall as follows:-

Sections 1 - 15

A - 0.3m - Generally not possible due to revetment rock obstruction
B - 1.8m
C - 5.0m
D - 10.0m

Opposite Lake Side

E - 0.3m - Generally not possible due to revetment rock obstruction
F - 1.8m
G - 5.0m
H - 10.0m

Figure 1 indicates the indicative testing locations.

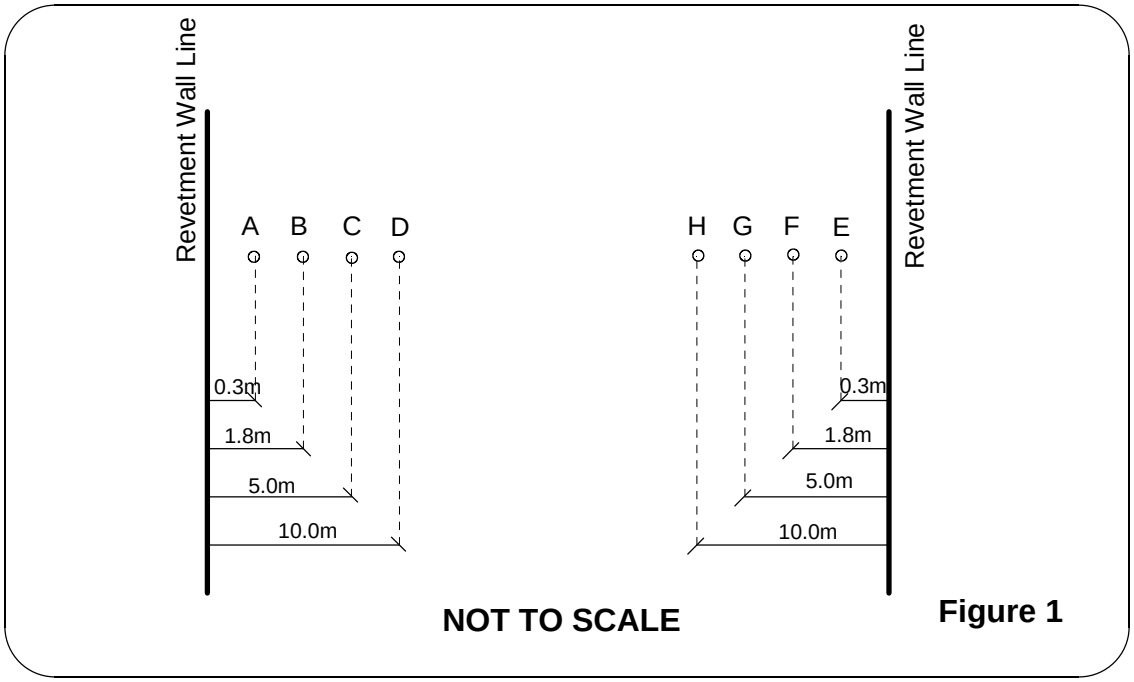


Figure 1

Tests were commenced at lake bed level with most tests recording no penetration resistance within the upper level very loose strata.

- Recording lake bed levels, using a surveyors staff, at DCP test locations.
- Laboratory analysis of recovered soil samples.

Testing included:-

- Particle Size Distribution tests - to assess soil grading
- Atterberg Limits tests - to assess soil plasticity properties

The field and laboratory testing and soil classifications were carried out in general accordance with the following Australian Standards:-

AS1289	Methods of testing soils for engineering purposes
AS 1726-1993	Geotechnical site investigations.

A description of the investigation method, Dynamic Cone Penetrometer Testing sheets, Sections detailing the test section locations and Laboratory Test Certificates are included in the Appendices.

Fieldwork was carried out between the 17th and 22nd January, 2013. Dynamic Cone Penetrometer test depths and lake bed level measurements were referenced to the lake water level at the time of the investigation, assumed to be RL 0.40m.

3.2.1 Dynamic Cone Penetrometer Assessment

A total of one hundred (100) Dynamic Cone Penetrometer tests (DCP's) were carried out at fifteen (15) representative sections across the lake bed within the estate. Additional tests were attempted and terminated at alternate locations due to revetment rock obstruction.

Very loose conditions were indicated at the majority of test sites with no penetration resistance (penetrometer sunk under self weight) recorded to depths of up to 1.2m (DCP-5C) below lake bed level and very loose to loose conditions extending to continuous depths of up to 3.8/4.7m (DCP 3G/2G respectively) below lake bed level.

Slightly improved conditions were indicated at Section 11 B to F, where penetration resistance was recorded from lake bed level.

Tests were terminated in apparent medium dense conditions or at near penetration refusal, ie. ⩾20 blows/100mm penetration.

3.2.2 Lake Bed Levels

The following lake bed levels were recorded at DCP test locations. All depths have been recorded from the current lake water level, assumed to be at RL 0.4m.

TABLE 1 LAKE BED LEVELS (17-22 FEBRUARY, 2013)

Section	Location	Revetment Wall Offset (m)	Water Depth (m)	Assumed Bed RL (m)
1	B	1.8	1.3	-0.9
1	C	5.0	1.4	-1.0
1	D	10.0	1.8	-1.4
1	F	1.8	1.2	-0.8
1	G	5.0	1.4	-1.0
1	H	10.0	1.8	-1.4
2	B	1.8	1.3	-0.9
2	C	5.0	1.6	-1.2
2	D	10.0	2.3	-1.9
2	F	1.8	1.3	-0.9
2	G	5.0	1.5	-1.1
2	H	10.0	1.9	-1.5
3	C	5.0	1.6	-1.2
3	D	10.0	2.3	-1.9
3	F	0.3	1.5	-1.1
3	G	5.0	1.7	-1.3
3	H	10.0	2.3	-1.9
4	B	1.8	1.4	-1.0
4	C	5.0	1.6	-1.2
4	D	10.0	2.3	-1.9
4	F	1.8	1.6	-1.2
4	G	5.0	1.7	-1.3
4	H	10.0	2.5	-2.1
5	B	1.8	1.5	-1.1
5	C	5.0	1.8	-1.4
5	D	10.0	2.5	-2.1
5	G	5.0	1.6	-1.2
5	H	10.0	2.3	-1.9

Section	Location	Revetment Wall Offset (m)	Water Depth (m)	Assumed Bed RL (m)
6	B	1.8	1.1	-0.7
6	C	5.0	1.2	-0.8
6	D	10.0	2.1	-1.7
6	F	1.8	1.0	-0.6
6	G	5.0	1.2	-0.8
6	H	10.0	1.6	-1.2
7	B	1.8	1.2	-0.8
7	C	5.0	1.4	-1.0
7	D	10.0	1.8	-1.4
7	G	5.0	1.5	-1.1
7	H	10.0	2.0	-1.6
8	B	1.8	1.2	-0.8
8	C	5.0	1.4	-1.0
8	D	10.0	1.8	-1.4
8	F	1.8	1.2	-0.8
8	G	5.0	1.4	-1.0
8	H	10.0	1.7	-1.3
9	B	1.8	1.4	-1.0
9	C	5.0	1.6	-1.2
9	D	10.0	2.0	-1.6
9	F	1.8	1.0	-0.6
9	G	5.0	1.3	-0.9
9	H	10.0	1.9	-1.5
10	B	1.8	1.4	-1.0
10	C	5.0	1.5	-1.1
10	D	10.0	1.9	-1.5
10	F	1.8	1.4	-1.0
10	G	5.0	1.7	-1.3
10	H	10.0	2.1	-1.7
11	B	1.8	1.3	-0.9
11	C	5.0	1.5	-1.1
11	D	10.0	1.9	-1.5
11	F	1.8	1.3	-0.9
11	G	5.0	1.5	-1.1
11	H	10.0	2.0	-1.6

Section	Location	Revetment Wall Offset (m)	Water Depth (m)	Assumed Bed RL (m)
12	B	1.8	1.2	-0.8
12	C	5.0	1.3	-0.9
12	D	10.0	2.1	-1.7
12	F	1.8	1.1	-0.7
12	G	5.0	1.2	-0.8
12	H	10.0	1.7	-1.3
13	B	1.8	1.1	-0.7
13	C	5.0	1.4	-1.0
13	D	10.0	1.6	-1.2
13	F	1.8	1.0	-0.6
13	G	5.0	1.3	-0.9
13	H	10.0	1.6	-1.2
14	B	1.8	1.4	-1.0
14	C	5.0	1.5	-1.1
14	D	10.0	2.0	-1.6
14	F	1.8	1.3	-0.9
14	G	5.0	1.3	-0.9
14	H	10.0	1.7	-1.3
15	B	1.8	1.3	-0.9
15	C	5.0	1.4	-1.0
15	D	10.0	1.8	-1.4
15	G	5.0	1.6	-1.2
15	H	10.0	1.9	-1.5

3.2.3 Laboratory Test Results

A total of twenty eight (28) Particle Size Distribution and three (3) Atterberg Limits analysis were carried out on samples recovered from the field investigation program to assess the grading and plasticity properties of the materials.

The Particle Size Distribution tests indicated the sands were predominantly fine to medium grained, clean sands, ie. ≤ 5% fines, with a median grain size of 0.2 to 0.3mm and would be classified as Sand (SP) in accordance with AS 1726-1993 guidelines.

Occasional dirty sands, ie. > 10% fines, were indicated with up to 16% silt/clay fines. These soils would be classified as Silty Sand (SM)/Clayey Sand (SC).

Clay based soils were also recovered from the field investigation program and recorded liquid limits of 31 to 43%, plasticity indices of 14 to 19 and linear shrinkages of 6 to 12%.

The clay based soils would be classified as Sandy Silty Clay (CI-CL) in accordance with AS 1726-1993 guidelines.

Laboratory Test Certificates are included in the appendices.

4.0 LAKE BED PROFILE ASSESSMENT

As part of our broadscale geotechnical assessment of twenty eight (28) sections of the lake bed profile within the Noosa Waters Estate was undertaken. The survey was carried out by Port of Brisbane Pty Ltd, Hydrographic Solutions, based on data recorded and collated from their January 2012 survey.

Additional lake bed profile data was recorded during our geotechnical investigation program. Refer previous Table 1.

4.1 Hydrographic Survey (17-31 January 2012)

Hydrographic drawings are included in the appendices and are referred to in the Cross Section Overview as follows:

- North - Drawing No. 127625 - 1
- West - Drawing No. 127625 - 2, 3, 4
- East - Drawing No. 127625 - 5, 6

Typical canal profiles, as detailed on the appended Drawing 1754/6-11 dated 23-08-1994 titled 'Noosa Waters Development - Stages 6B, 6C, 8C, 8D and 9 to 15' have been overlaid on the survey sections for reference.

The sections indicated a general flattening/relaxation of the lake batters, originally designed at 1V:10H to RL -0.5m and 1V:3H to RL -2.2m/RL -3.70m, with a general buildup of material at the base/toe of the batter profile and possibly some buildup across the lake base. Figure 2 refers.

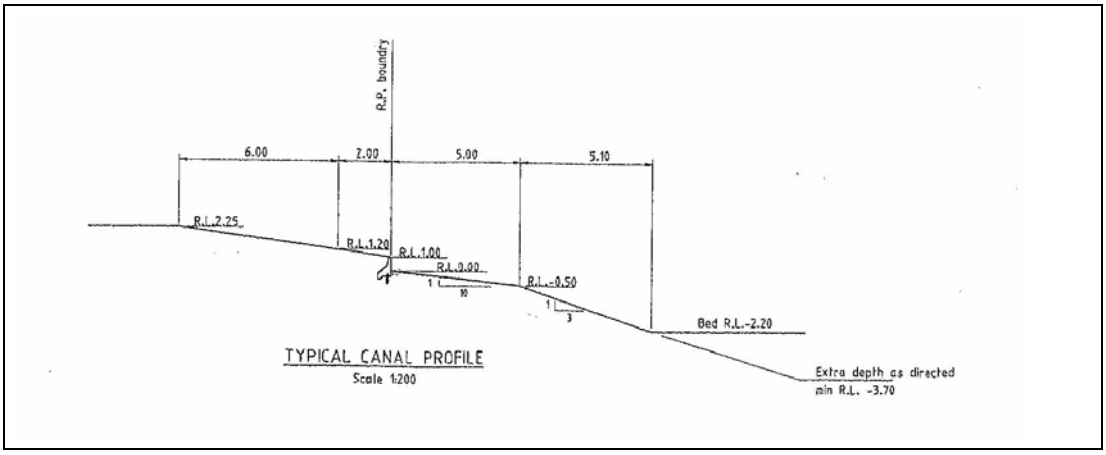


Figure 2

Significant overexcavation of the lake base was also indicated in Cross Sections 14 and 15 West. Historic geotechnical records indicated a revised canal bed level of RL -9.0m with canal batter profiles of 1V:3H from RL -0.5m to RL -9.0m were assessed for stability in this estate stage in order to win material suitable for filling.

The lake bed levels recorded during our broadscale geotechnical investigation program generally concur with the Hydrographic Survey Sections.

We do advise, however, that the hydrographic survey data and recorded lake bed depths have been reviewed in comparison to the Construction Drawings. 'As Constructed' surveys have not been provided for this assessment.

An extensive lake bed measurement program has also been carried out by the Noosa Waters Residents Association.

Lake bed measurements, recorded from the top of the revetment wall (assumed to be RL 1.00m) have been recorded graphically of Drawing No. 112-14835-02 presented in Appendix 'G'.

The levels indicated significant portions of the 1V:10H lake bed profile extending along the toe of the revetment walls had slumped to the base or below the revetment wall. Probing at select locations concurred with the measurements.

5.0 ENGINEERING ASSESSMENT

5.1 Global Stability

The findings of the broadscale geotechnical assessment indicated no evidence of global instability along the lake revetment. A long term factor of safety of $\geq$ 1.5 was assessed with the existing lake bed profiles, revetment batter load conditions and lake water level to RL 0.40m.

However, alteration of the above conditions could impact the global stability accordingly, particularly if the lake batter profile continued to slump or lake water levels were reduced.

5.2 Revetment Wall Failure Mechanism

Based on the findings of the broadscale geotechnical assessment, it is Soil Surveys Engineering Pty Limited assessment that the failure mechanism responsible for the movement and distress of the revetment walls, ie. settlement and rotation, is loss of toe foundation support afforded by slumping of the lake batter profile. It would appear the slumping has originated within the 1V:3H batter profile and regressed to impact the 1V:10H batter profile. At many sites, the regression has continued to such an extent that the support of the revetment wall foundation has been lost.

Comparison of lake bed measurements, refer Drawing No. 112-14835-02, with areas of overexcavation, ie. lake bed level > RL -2.20m, indicated a correlation with apparent lake batter slumping, most likely as a result of slumping of an increased/extended 1V:3H lake batter profile.

Comparison of lake bed measurements with known marine clay thickness maps did not indicate a any correlation.

In view of the results of the geotechnical investigation and wide spread nature of the slumping, further regression of the batter profile would therefore be expected without appropriate intervention.

5.3 Remediation

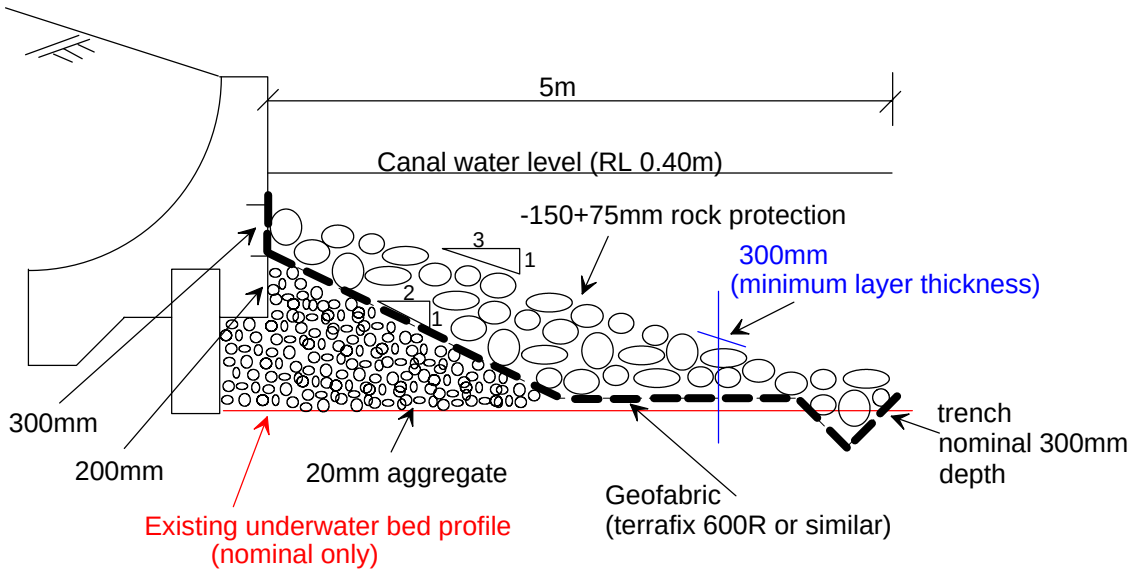
It is recommended remediation of the lake batter be carried out, without unnecessary delay, to re-establish the revetment wall foundation support and inhibit further slumping of the immediate lake batter.

The installation of protective revetment rock is recommended to prevent the continued regression of the underwater batter slopes. The revetment rock will provide an overburden pressure.

A broadscale remediation program of rock scour protection is therefore recommended around the entire estate.

Figure 3 indicates a diagrammatic recommended Typical Section of rock scour protection. The use of 20mm aggregate, without geofabric underlay, is suggested to fill voids and re-establish ground support at the toe of the revetment wall where slumping has exposed or undermined the revetment wall base.

Where the lake batter has not slumped below RL 0.0m immediately adjacent to the wall a -150 + 75mm rock protection layer, with geofabric underlay, is recommended.



Typical Section

Figure 3 **Not to Scale**

It is recommended the extent of the remediation program be assessed by independent survey. It is considered that all walls where the lake batter immediately adjacent the revetment wall has slumped would require prompt remediation. Revetment rock protection should also be considered on remaining unaffected lake batters, however, a monitoring program comprising periodic inspections of the revetment walls and lake bed measurements at the toe of the walls could also be considered with remedial works carried out on an 'as needed' basis.

Drawing No. 112-14835-02, graphically representing the lake bed level measurements recorded by the Noosa Waters Residents Association, should be assessed as a broadscale overview of apparent lake bed profiles at the revetment wall toe and an aid to the geotechnical assessment of the lake batters and is not intended for use in the remediation program.

It is recommended the hydraulic consultants for the estate, GHD, review the geotechnical investigation findings and remedial recommendations. It is expected that modification/s of the remediation program may be required on a site specific basis, subject to the findings of further assessments.

It is essential the remedial works proceed with adequate engineering supervision/inspection to ensure that the intent of the remediation program conforms with Best Industry Practice, revetment wall construction standards and expectations.

6.0 LIMITATIONS

We have prepared this report for the use of **SUNSHINE COAST COUNCIL** for design purposes in accordance with generally accepted geotechnical engineering practices. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has not been prepared for use by parties other than **SUNSHINE COAST COUNCIL**. It may not contain sufficient information for purposes of other parties or for other uses.

Soil Surveys Engineering consider that a documentation review service (during the design phase and prior to remediation) to verify that the intent of geotechnical recommendations is properly reflected in the remedial works, along with construction inspections, forms a very important component of the geotechnical engineering design service/process.

This statement is not intended to reduce the level of responsibility accepted by Soil Surveys Engineering in accordance with our commission, but rather to ensure that all parties who may rely on this report are aware of the responsibilities each assumes in doing so and the risks they accept should they decline to have Soil Surveys Engineering carry out a geotechnical documentation review and geotechnical construction inspections.

The geotechnical review ensures geotechnical risks to our Client and their project are minimised at the design and tender stage of the project. Further, with Soil Surveys Engineering being commissioned to carry out geotechnical inspections, an opportunity at the time of remediation to confirm any assumptions made in the preparation of the report and allow the effect of any normally occurring variation in site conditions to be assessed with respect to remediation becomes available.

It is highly recommended that the Client avail themselves of these review and inspection services; our standard rates will apply.

T. PHILLIPS

P. ELKINGTON (RPEQ 7226)

for and on behalf of
SOIL SURVEYS ENGINEERING PTY LIMITED

APPENDICES

APPENDIX A

NOTES RELATING TO THIS REPORT

INTRODUCTION

These notes are provided by Soil Surveys Engineering Pty Limited (the Company) to complement the geotechnical report in regard to classification methods and field procedures. Not all notes are necessarily relevant to all reports.

The ground is a product of continuing natural and man-made processes and therefore exhibits a variety of characteristics and properties which vary from place to place and can change with time. Geotechnical engineering involves gathering and assimilating limited information about these characteristics and properties in order to understand or predict the behaviour of the ground on a particular site under certain conditions. This report may contain such information obtained by inspection, excavation, probing, sampling, testing or other means of investigation. If so, they are directly relevant only to the ground at the place where and at the time when the investigation was carried out.

DESCRIPTION AND CLASSIFICATION METHODS

Soils - The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726-1993 (Geotechnical Site Investigations), where appropriate. In general, descriptions cover the following properties - soil or rock type, colour, structure, strength or density, and inclusions. Identification and classification of soil and rock involves judgement and the Company infers accuracy only to the extent that is common in current geotechnical practice.

Soil types are described according to the dominant particle size and behaviour as set out in AS 1726-1993.

Cohesive soils are classified on the basis of strength (consistency) either by use of hand penetrometer, shear vane, laboratory testing or engineering examination. The strength terms are defined in AS1726-1993 Table A4.

Non-cohesive soils are classified on the basis of relative density usually based on insitu testing or engineering examination (see AS1726-1993 Table A5).

Rocks - Rock types are classified by their geological names (AS1726-1993 Table A6), together with descriptive terms regarding weathering (AS1726-1993 Table A9), strength (refer Table 1 below), defects (AS1726-1993 Table A10), etc. Where strength testing (ie Point Loads) is carried out, AS1726-1993 Table A8 is used. Where relevant, further information regarding rock classification is attached.

Table 1 Estimated strength descriptions given to rock based on engineering examination

Strength Term	Approximate Qu (MPa)
Extremely Weak	< 1.0
Very Weak	1.0 - 5.0
Weak	5.0 - 25
Medium Strong	25 - 50
Strong	50 - 100
Very Strong	100 - 250
Extremely Strong	> 250

Ref ISRM "Suggested Methods for the Quantitative Description of Discontinuities in Rock Masses"

SAMPLING

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

Disturbed samples taken during drilling provide information on plasticity, grain size, colour, moisture content, minor constituents and, depending upon sample disturbance, (information on strength and structure).

Undisturbed samples are taken by pushing a thin walled sample tube, usually 50mm diameter (U50), into the soil and withdrawing it with a sample of the soil contained in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength, volume change potential and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling used are given on the attached logs.

TEST LOCATIONS

Test locations (e.g. boreholes, CPT's, test pits etc.) were based on available access at the time of testing (access may need to be provided "by others"). Test locations may have been shifted if access was not suitable.

Unless noted otherwise, accuracy of test locations are to the accuracy of hand held GPS equipment.

INVESTIGATION METHODS

The following is a brief summary of investigation methods currently adopted by the Company and some comments on their use and application.

Test Pits - These are normally excavated with a backhoe or a tracked excavator, allowing close examination of the insitu soils if it is safe to descend into the pit. The depth of penetration is limited to about 3m for a backhoe and up to 6m for an excavator. Limitations of test pits are the problems associated with disturbance and difficulty of reinstatement and the consequent effects on close-by structures. Care must be taken if construction is to be carried out near test pit locations to either properly recompact the backfill during construction or to design and construct the structure so as not to be adversely affected by poorly compacted backfill at the test pit location.

Hand Auger Drilling - A borehole of 50 to 100mm diameter is advanced by manually operated equipment. Refusal of the augers can occur on a variety of materials such as hard clay, gravel or rock fragments and does not necessarily indicate rock level.

Continuous Spiral Flight Augers - The borehole is advanced using 75 to 300 mm diameter continuous spiral flight augers, which are withdrawn at intervals to allow sampling or insitu testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface by the flights or may be collected after withdrawal of the augers. Information from the drilling (as distinct from specific sampling) is of relatively lower reliability due to remoulding, inclusion of cuttings from above or softening of samples by groundwater, or uncertainties as to the original depth of the samples. Augering below the groundwater table has a lower reliability than augering above the water table. Various drill bits are attached to the base of the augers during the drilling. The depth of refusal of the different bit types can provide information as to the strength of the material encountered. Generally two different bit types are used. The 'V' bit is a V shaped steel bit and the 'TC' bit is a tungsten carbide tipped screw type bit.

Wash Boring - The borehole is usually advanced by a rotary bit with water or fluid pumped down the hollow drill rods and returned up in the space between the rods and the soil or casing, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from "feel" and rate of penetration. More accurate information on soil strata is gained by regular testing and sampling using the Standard Penetration Test (SPT) and undisturbed thin walled tube samples (U50).

Mud Stabilized Drilling - Either Wash Boring or Continuous Core Drilling can use drilling mud as a circulating fluid to stabilize the borehole. The term "mud" encompasses a range of products ranging from bentonite to polymers such as Revert or Biogel. The mud tends to mask the cuttings and reliable identification is only possible from regular intact sampling (eg. from SPT and U50 samples) or from rock coring, etc.

Continuous Core Drilling - A continuous core sample is obtained using a diamond or tungsten carbide tipped core barrel. Provided full core recovery is achieved (which is not always possible in very weak rocks and granular soils), this technique provides a very reliable method of investigation. In rocks, NMLC coring (nominal 52 mm diameter) is usually used with water flush. The length of core recovered is compared to the length drilled and any length not recovered is shown as CORE LOSS. The location of losses is determined on site by the supervisor. If the location of the loss is uncertain, it is placed at the top end of the run, when the core is placed in a storage tray and recorded on the log.

Standard Penetration Tests - Standard Penetration Tests (SPT) are used mainly in non-cohesive soils, but can also be used in cohesive soils, as a means of indicating density or strength. 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 50mm diameter split sample tube with a tapered shoe, 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, the upper 150 mm being neglected due to possible disturbance from the drilling method. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued at a reduced penetration.

In the case where full penetration is obtained with successive blow counts for each 150 mm of, say 4, 6 and 7 blows, the record shows,

4, 6, 7 N = 13

In a case where the test is discontinued short of full penetration, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm, the record shows:

15, 30/40mm

The results of the test can be related empirically to the engineering properties of the soil.

Occasionally, the drop hammer is used to drive 50mm diameter thin walled sample tubes (U50) in clays. In such circumstances, it is noted on the borehole logs.

A modification to the SPT test is where the same driving system is used with a solid 60^0 tipped steel cone of the same diameter as the SPT hollow sampler. The solid cone can be continuously driven for some distance in soft clays or loose sands, or may be used where damage would otherwise occur to the SPT. The results of this Solid SPT are shown as "N_c" on the borehole logs, together with the number of blows per 150 mm penetration.

Cone Penetration Tests - Test Method - Cone Penetration Tests (CPT) are carried out in accordance with AS 1289 Test 6.5.1-1977, using an electrical friction-cone penetrometer.

The test essentially comprises the measurement of resistance to penetration of a cone of 35.7 mm diameter pushed into the soil at a rate of 10-20 mm per second by hydraulic force. The resistance to penetration is recorded in terms of pressure on the end area of the cone (cone resistance, q_c, in MPa) and friction on the side of the 135 mm long sleeve immediately above the top of the cone (friction resistance, f_s, in kPa). These forces are measured by electrical transducers (strain gauges) within the cone device. The ratio between friction resistance and cone resistance is also calculated as a percentage, ie.-

$$Friction\ Ratio\ (FR) = \frac{Friction\ Resistance, f_s\ (kPa) \times 100}{cone\ resistance,\ q_c\ (kPa)}$$

The friction ratio, FR, is generally low in sands (less than 1% or 2%) and generally higher in clays (say 3% or more). The interpretation of sandy clays, clayey sands and material with a high silt content is more difficult, but intermediate values (between 1% and 3%) would be expected. Highly organic clays and peats generally have a friction ratio in excess of 5%.

Static cone data is recorded in the field on disc for later presentation using computer aided drafting.

The equipment can be operated from any conventional drill rig. A total applied load in the range of 4 to 10 tonnes is required for practical purposes, although lighter loads may be used. The cone penetrometers are available with various capacities of cone resistance ranging up to 100 MPa for general purpose investigations, while a range of 0 to 10 MPa can be used where more sensitive investigations of soft clay are required.

The cone resistance value provides a continuous measure of soil strength or density, and together with the friction ratio, provide very useful indications of the presence of narrow bands of geotechnically significant layers such as thin, soft clay layers or lenses of sand which might otherwise be missed using conventional drilling methods.

The lithology of the encountered soils is interpreted from static cone data and is generally presented on the static cone log sheets.

It is important to note that the lithology is interpreted information and is based on research by Schmertmann (1970), Sanglerat (1972), Robinson and Campinalli (1986), modified to suit local conditions as indicated by borehole information and laboratory testing.

As soils generally change gradually it is sometimes difficult to accurately describe depths of strata changes, although greater accuracy is obtained with the static cone compared with conventional drilling. In addition, friction ratios decrease in accuracy with low cone resistance values, and in desiccated soils. As a result, some overlap and minor discrepancies may

exist between static cone and nearby borehole information.

Portable Dynamic Cone Penetrometers - Portable Dynamic Cone Penetrometer (DCP) tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 100mm increments of penetration.

The DCP comprises a Cone of 20 mm diameter with 30 degree taper attached to steel rods of smaller section.

The cone end is driven with a 9 kg hammer falling 510 mm (AS. 1289 Test 6.3.2). The test was developed initially for pavement subgrade investigations, and empirical correlations of the test results with California Bearing Ratio have been published by various Road Authorities. The Company has developed their own correlations with Standard Penetration tests and Density Index tests in sands.

LOGS

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

The attached explanatory notes define the terms and symbols used in preparation of the logs.

Interpretation of the information shown on the logs, and its application to design and construction, should therefore take into account the spacing of boreholes or test pits, the method of drilling or excavation, the frequency of sampling and testing and the possibility of other than "straight line" variations between the boreholes or test pits. Subsurface conditions between boreholes or test pits may vary significantly from conditions encountered at the borehole or test pit locations.

GROUNDWATER

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

- Although groundwater may be present in lower permeability soils, it may enter the hole slowly or perhaps not at all during the time the hole is open.
- A localized 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 and may not be the same at the time of construction.
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be bailed out of the bore and mud must be washed out of the hole or "reverted" if water observations are to be made.

More reliable measurements can be made by use of standpipes which are read after stabilizing at periods ranging from several days to 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 perched water tables or surface water.

FILL

The presence of fill materials can often be determined only by the inclusion of foreign objects (eg. bricks, steel, etc.) or by distinctly unusual colour, texture or fabric. Identification of the extent of fill materials will also depend on investigation methods and frequency. Where natural soils similar to those at the site are used for fill, it may be difficult with limited testing and sampling to reliably determine the extent of the fill.

The presence of fill materials is usually regarded with caution as the possible variation in density, strength and material type is much greater than with natural soil deposits. Consequently, there is an increased risk of adverse engineering characteristics or behaviour. If the volume and quality of fill is important to a project, then frequent test pit excavations are preferable to boreholes.

LABORATORY TESTING

Laboratory testing is normally carried out in accordance with Australian Standard 1289 "Methods of Testing Soil for Engineering Purposes". Details of the test procedure used are given on the individual report forms and the attached explanatory notes summarize important aspects of the Laboratory Test Procedures adopted.

ENGINEERING REPORTS

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. The information provided in Soil Surveys Engineering reports is opinion and interpretation and not factual. The client/contractor increases their risk by not retaining the person who authored the geotechnical report, to carry out site inspection and review (overseeing role) during construction, to confirm opinion and interpretation expressed in the report is accurate. 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, the Company 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 aspects and recommendations or suggestions for design and construction. Since the test sites in any exploration represent a very small proportion of the total site and since the exploration only identifies actual ground conditions at the test sites, even under the best circumstances actual conditions may vary from those inferred to exist. No responsibility is taken for:-

- Unexpected variations in ground and/or groundwater conditions.
- Changes in policy or interpretation of policy by statutory authorities.
- The actions of other persons.
- Any work where the company is not given the opportunity to supervise the construction using the Companies designs/recommendations.

If differences occur, the Company will be pleased to assist with investigation or advice to resolve any problems occurring.

SITE ANOMALIES

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

Extreme events including but not limited to the results of climate change, eg. flood levels above previously identified levels, beach scour or erosion beyond normal expectations (as identified by local authorities) extreme rainfall events, war, espionage, sabotage may result in different conditions between time of investigation and time of construction.

REPRODUCTION OF INFORMATION FOR CONTRACTUAL PURPOSES

Attention is drawn to the document “Guidelines for the Provision of Geotechnical Information in Construction Contracts (1987)”, published by the Institution of Engineers, Australia. Where information obtained from this investigation 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. The Company would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

REVIEW OF DESIGN

Where major civil or structural developments are proposed or where only a limited investigation has been completed or where the geotechnical conditions/ constraints are quite complex, it is prudent to have a joint design review which involves a senior geotechnical engineer. We would be happy to assist in this regard as an extension of our investigation commission. Construction drawings should be reviewed by Soil Surveys Engineering, with sufficient time to allow changes if required, prior to inspections.

Otherwise Soil Surveys Engineering reserves the right to refuse to carry out inspections.

SITE INSPECTION

The Company will always be pleased to provide engineering inspection services for geotechnical aspects of work to which this report is related.

i) Site visits during construction to confirm reported ground conditions

ii) Site visits to assist the contractor or other site personnel in identifying various soil/rock types such as appropriate footing or pier founding depths, the stability of a filled or excavated slope; or

iii) Full-time engineering presence on site.

In the vast majority of cases it is advantageous to the principal for the geotechnical engineer who wrote the investigation report to be involved in the construction stage of the project.

The geotechnical engineer cannot take responsibility for variations in encountered conditions, where he is not given the opportunity to review plans for the proposed development with sufficient time to allow review and make changes to the proposed development if required, and where he is not given the opportunity to inspect the site and oversee construction methods with regard to site conditions with sufficient time to observe all relevant site conditions and operations.

RESPONSIBLE USE OF GEOTECHNICAL INFORMATION

Recommendations in our report are for design purposes only and provided on the basis that inspections are carried out to allow finalisation of opinions and recommendations contained in our report.

The geotechnical investigation consisting of field and laboratory testing has been carried out to indicate typical conditions by indicating conditions and parameters at the specific locations of boreholes/test pits. Subsurface conditions are indicated at these locations only and the inference of conditions between or away from these locations (interpolation and extrapolation) involves a certain degree of risk. Persons inferring such conditions or carrying out such inferences should do so with a degree of caution and conservatism which is commensurate with the consequences of the risk of error.

Estimates of volumes based on our findings require interpolation and extrapolation between test locations and as such may be significantly different from actual volumes.

APPENDIX B

NOOSA WATERS ESTATE PLAN

WATERFRONT LAND
NOOSA - AUSTRALIA

NOOSA WATERS

AUSTRALIA
NOOSA
BRISBANE

THIS PLAN WAS COMPILED ON 5/11/93. FROM THE LATEST INFORMATION AVAILABLE. HOWEVER, THE INFORMATION IS SUBJECT TO CHANGE UNTIL THE SURVEY PLAN FOR THIS LAND IS REGISTERED

APPENDIX C
DYNAMIC CONE PENETROMETER TESTING

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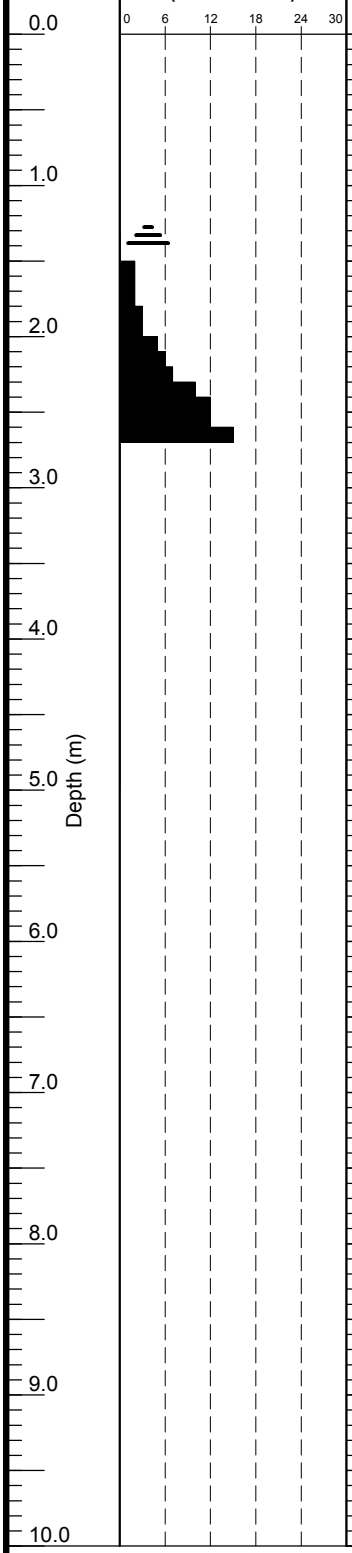
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

01/B

Easting: Northing: RL



Notes
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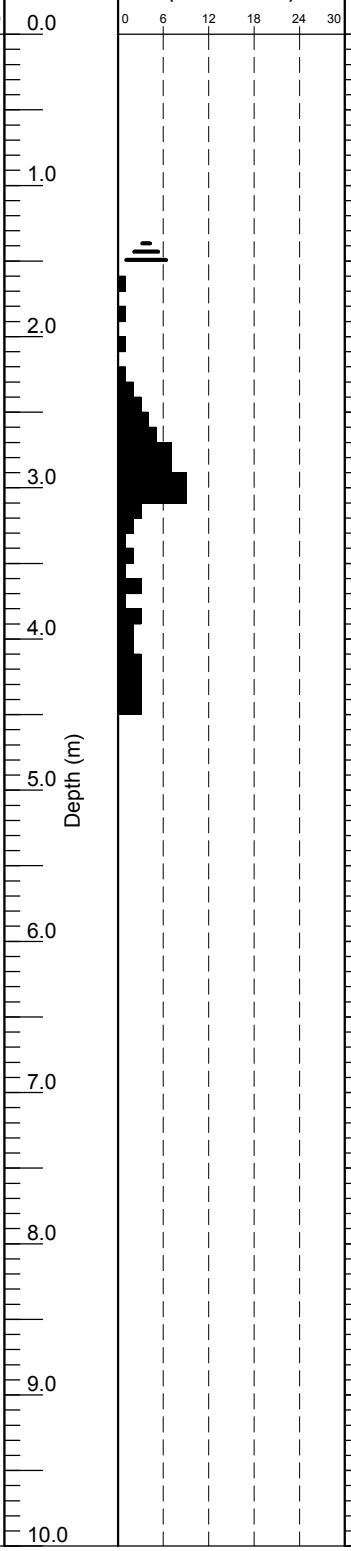
2. Date: 17/01/2013
3. Test commenced at 1.3m.

01/C

Easting: Northing: RL



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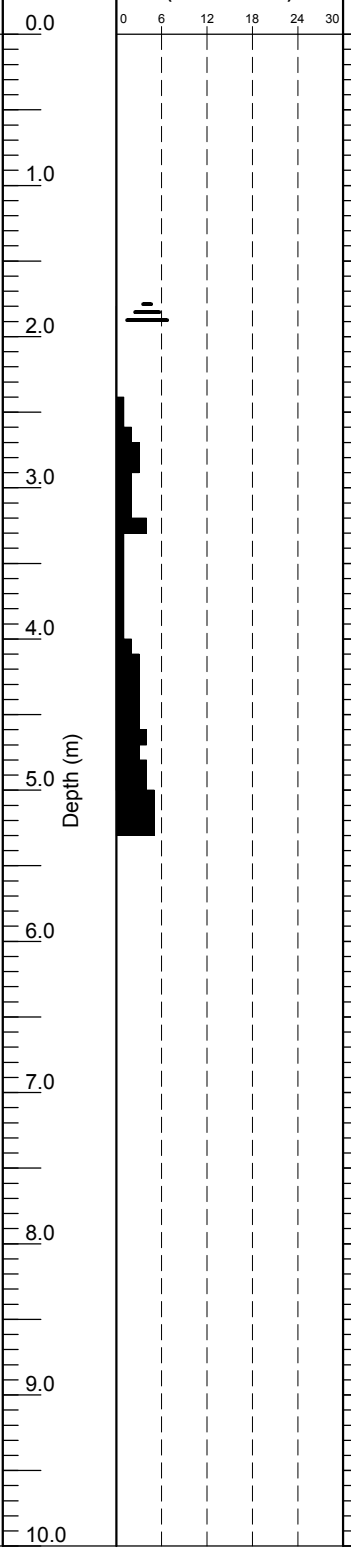
01/D

Easting: Northing: RL



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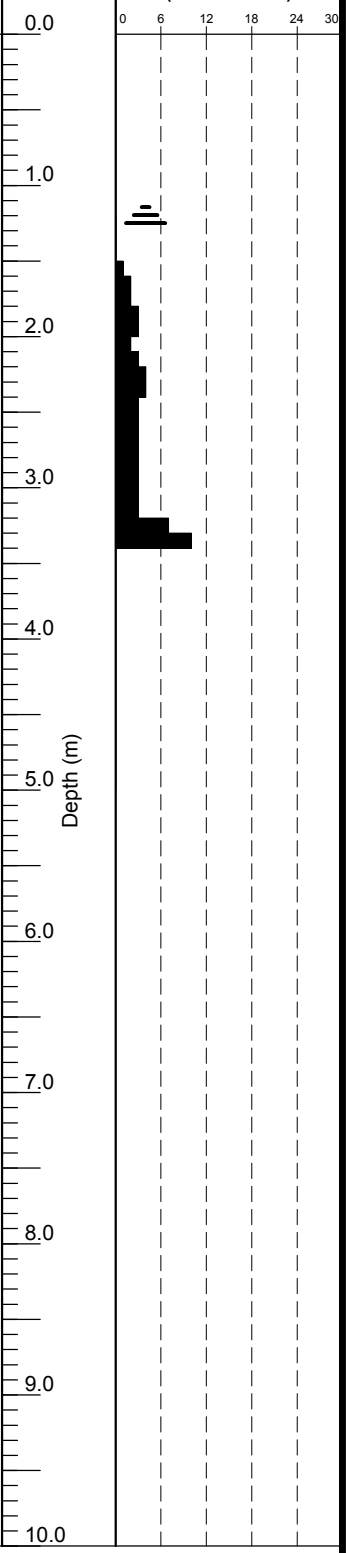
01/F

Easting: Northing: RL



Notes
1. Operator : TP
2. Date: 17/01/2013
3. Test commenced at 1.2m.

Note: Depth in metres below water level.
- Bed level.

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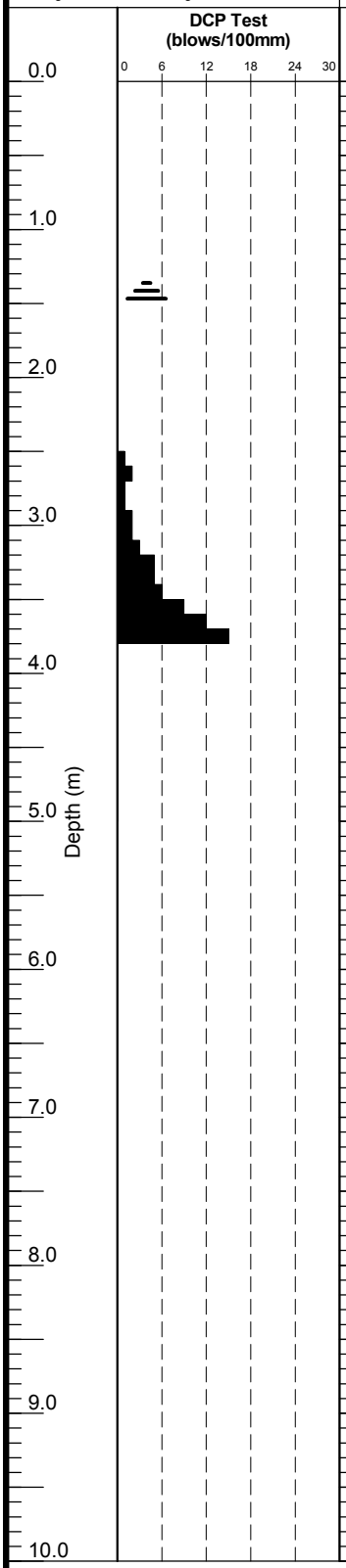
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

01/G

Easting: Northing: RL



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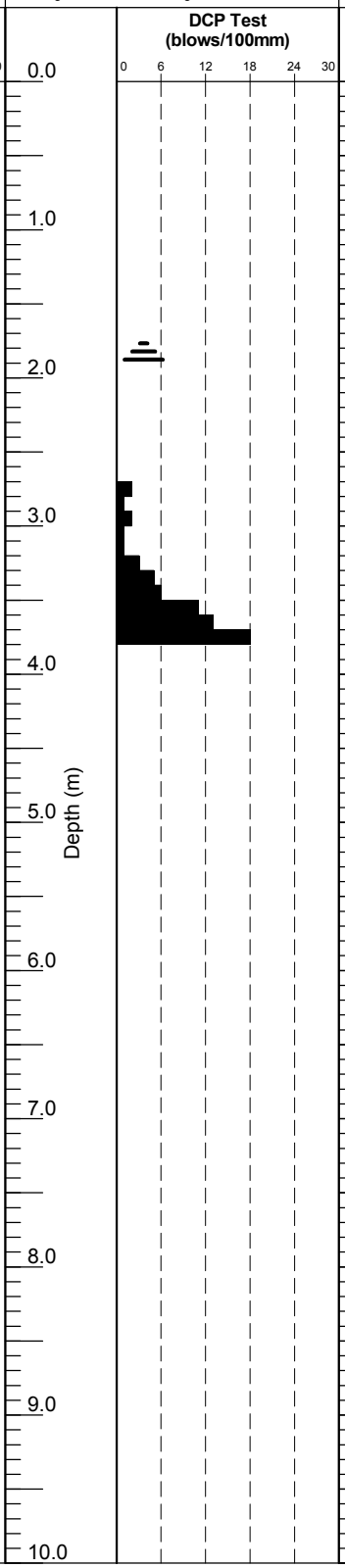
2. Date: 17/01/2013
3. Test commenced at 1.4m.

01/H

Easting: Northing: RL



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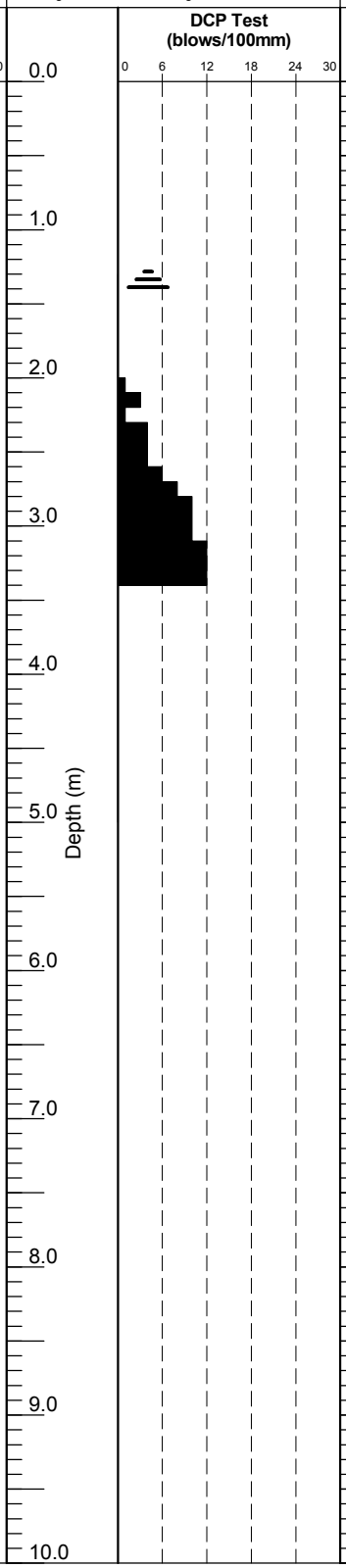
02/B

Easting: Northing: RL



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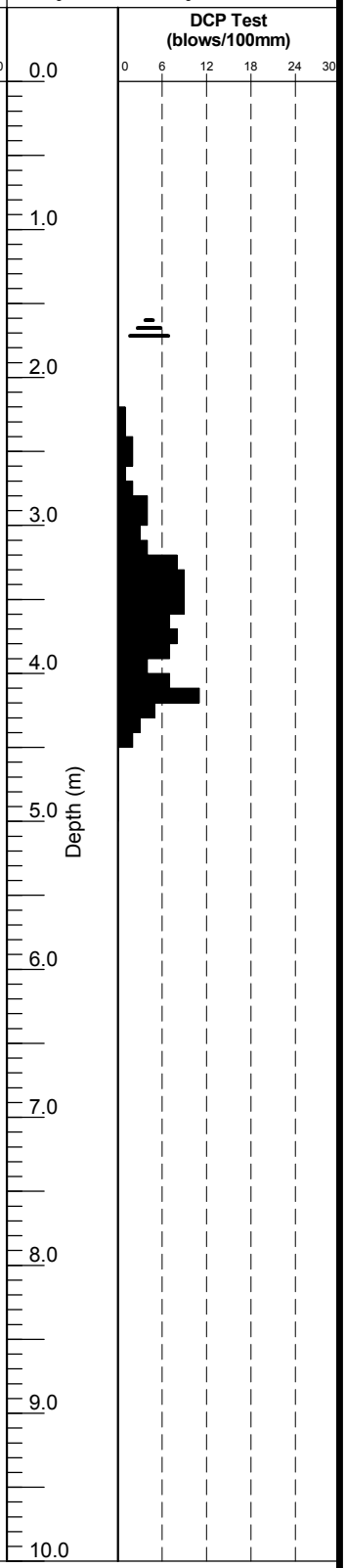
02/C

Easting: Northing: RL



Notes
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2. Date: 17/01/2013
3. Test commenced at 1.6m.

Note: Depth in metres below water level.
- Bed level.

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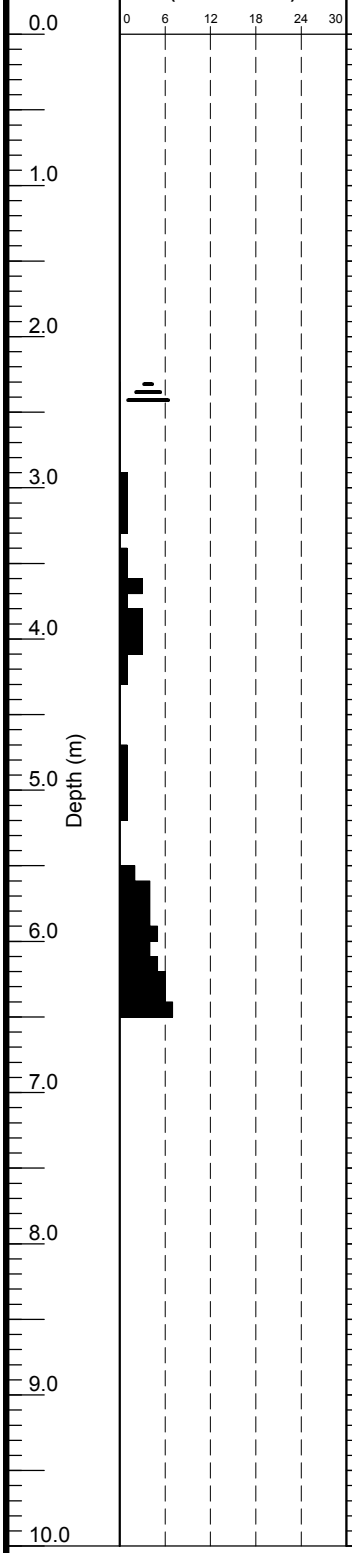
Mackay: ph +61 7 4942 2907 mackay@soilsurveys.com.au

DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

02/D

Easting: Northing: RL



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02/F

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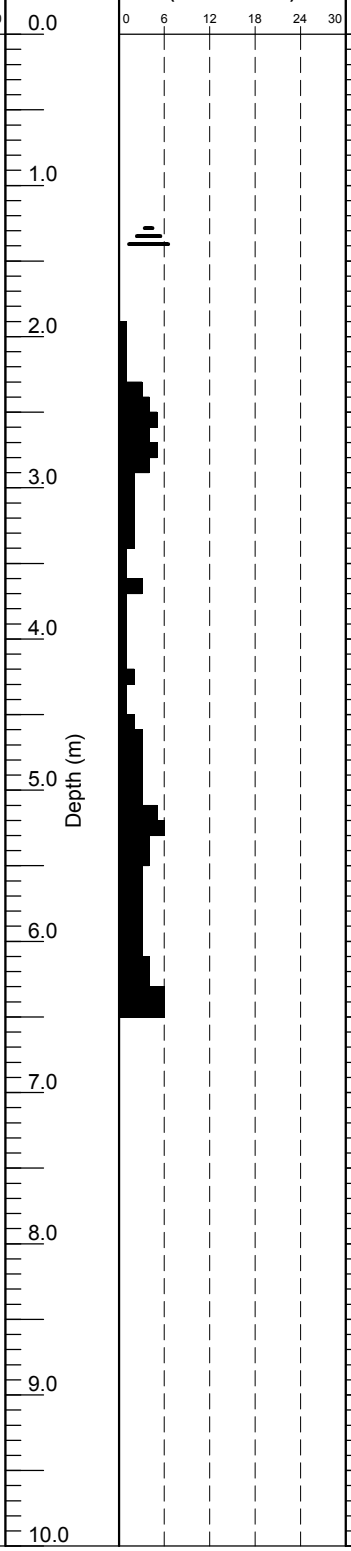

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02/G

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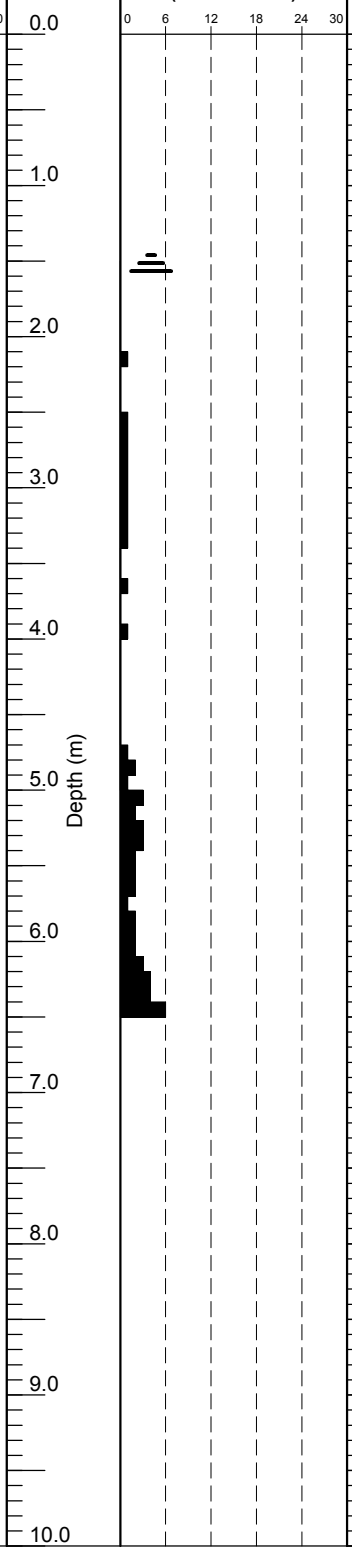

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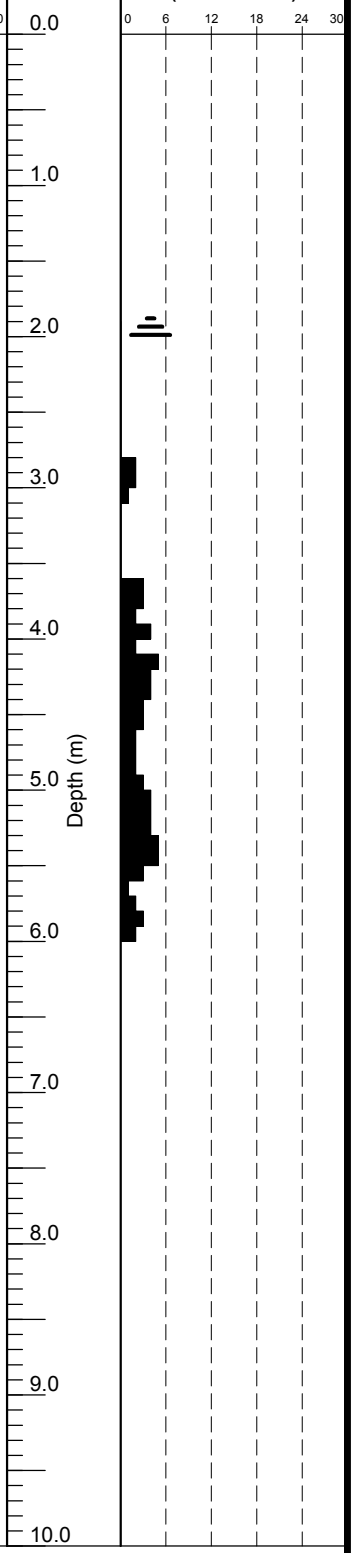
02/H

Easting: Northing: RL



Notes
1. Operator : TP
2. Date: 17/01/2013
3. Test commenced at 1.9m.

Note: Depth in metres below water level.
- Bed level.

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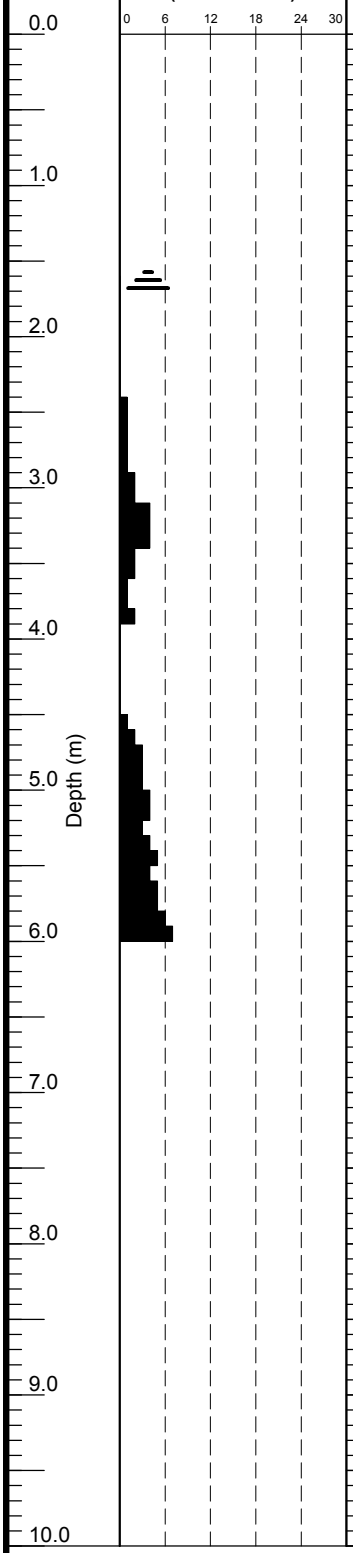
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

03/C

Easting: Northing: RL



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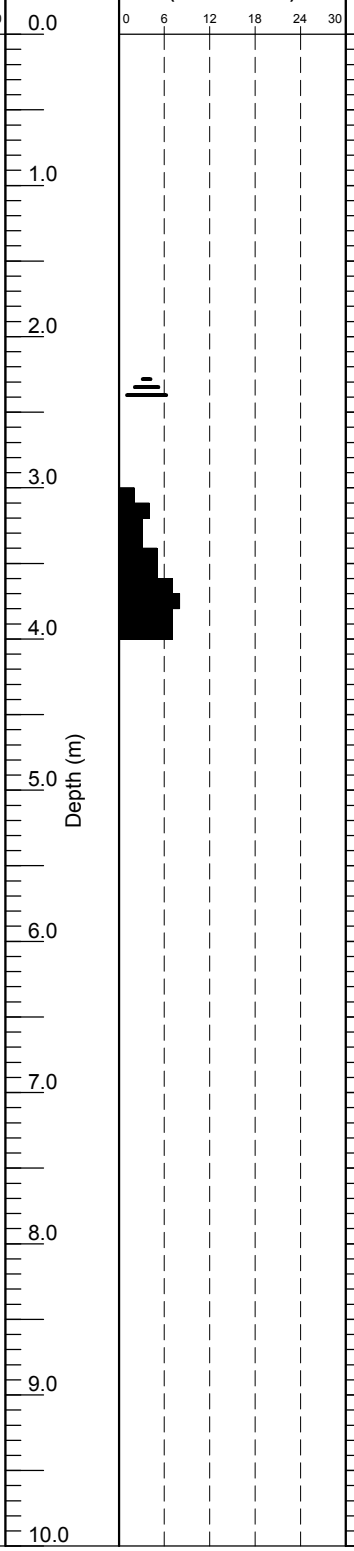
03/D

Easting: Northing: RL



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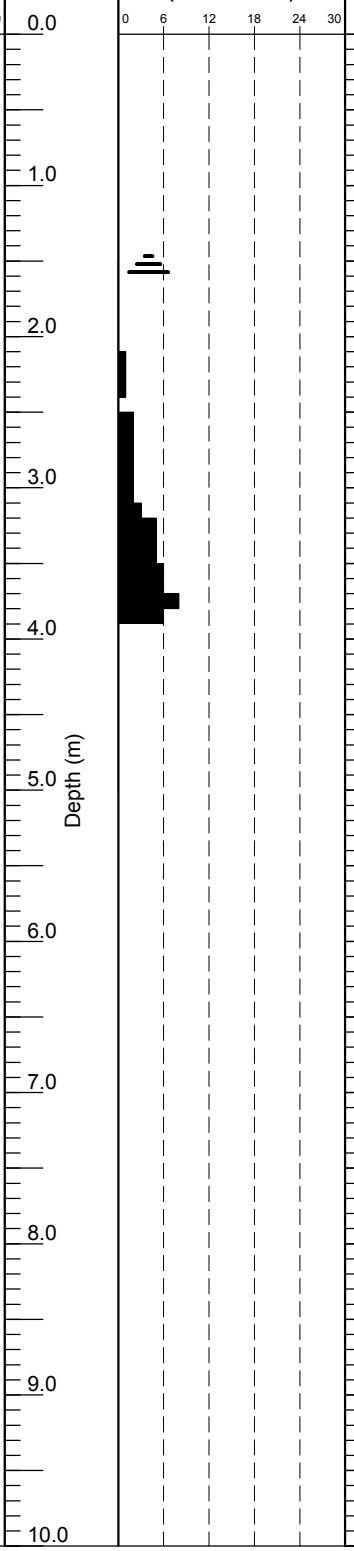
03/F

Easting: Northing: RL



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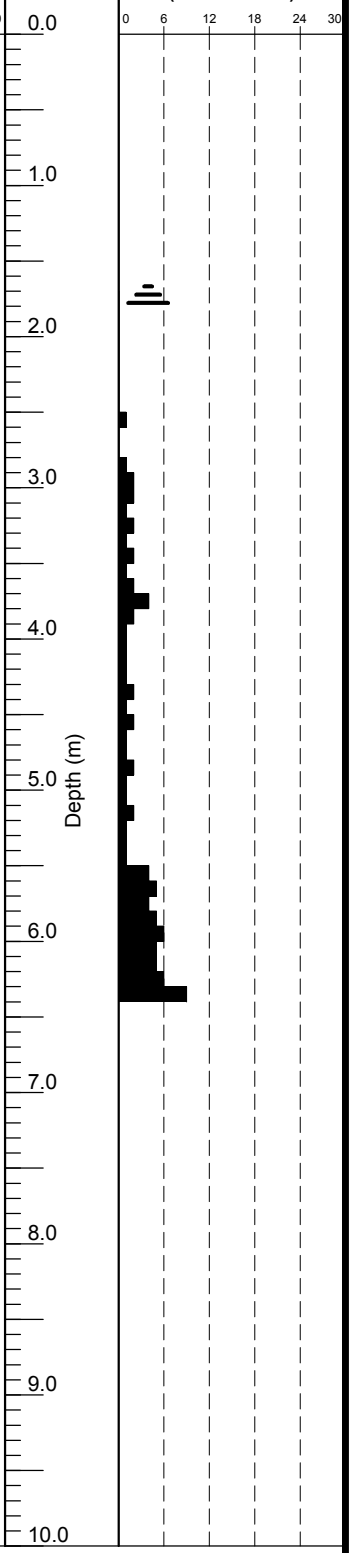
03/G

Easting: Northing: RL



Notes
1. Operator : TP
2. Date: 17/01/2013
3. Test commenced at 1.7m.

Note: Depth in metres below water level.
- Bed level.

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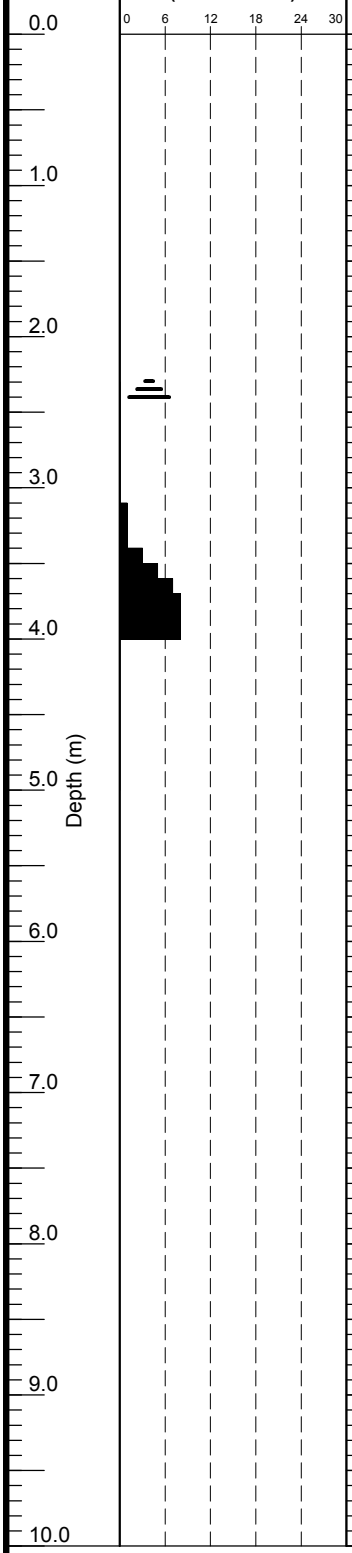
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

03/H

Easting: Northing: RL



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04/B

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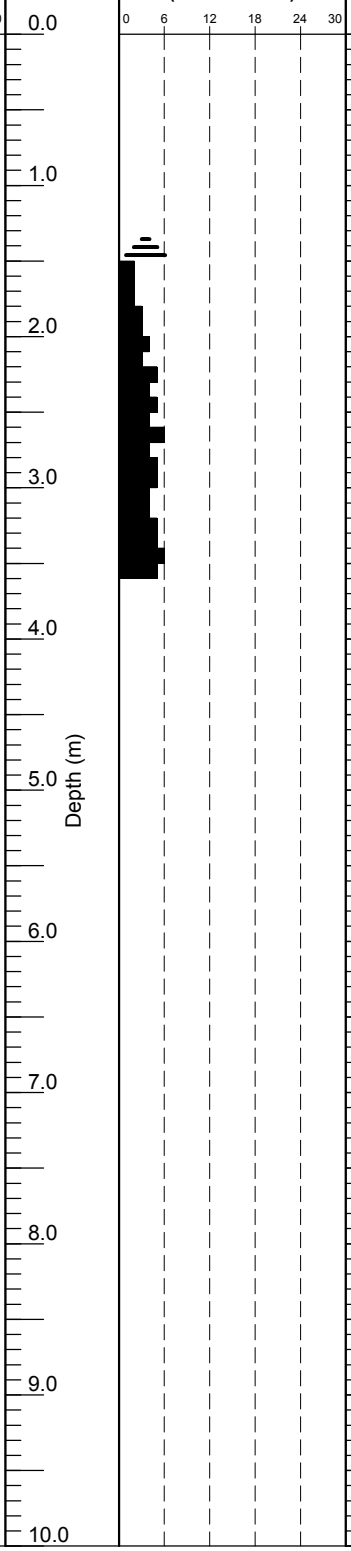

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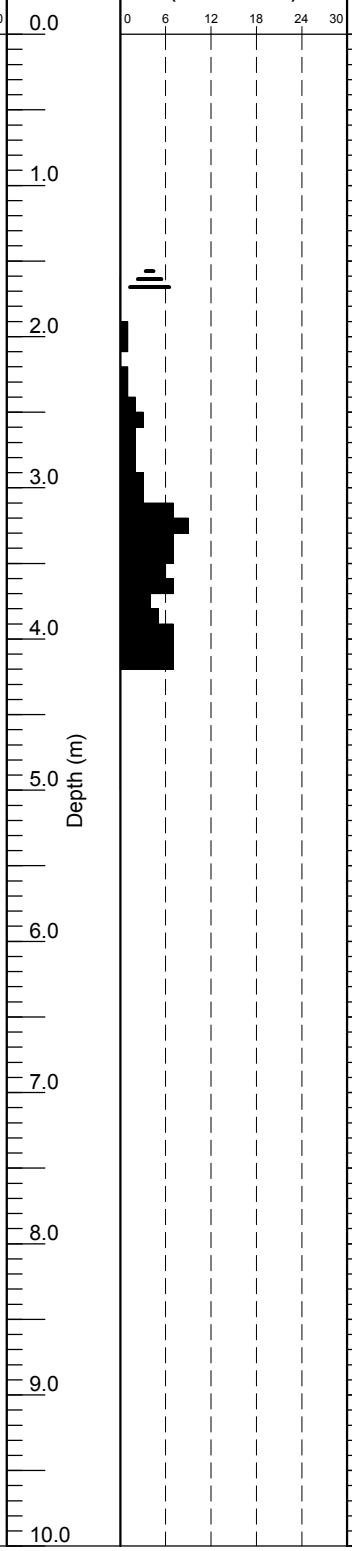
04/C

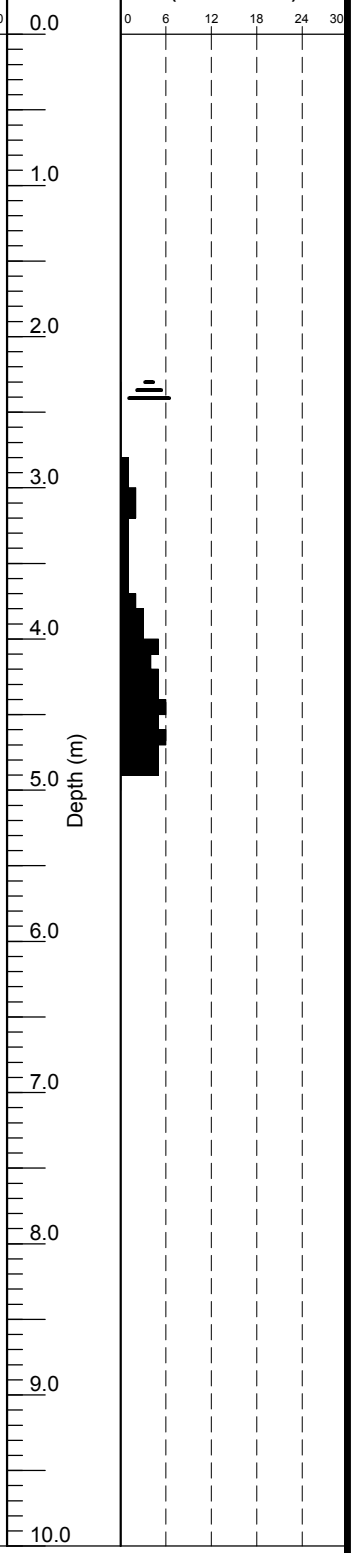
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.6m.

04/D

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.3m.

Note: Depth in metres below water level.
⏥ - Bed level.

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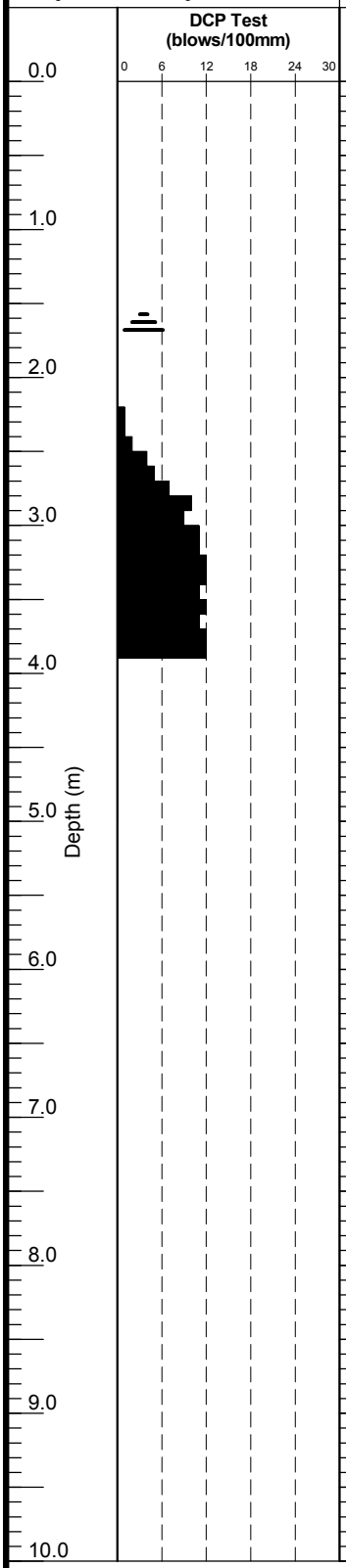
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

04/F

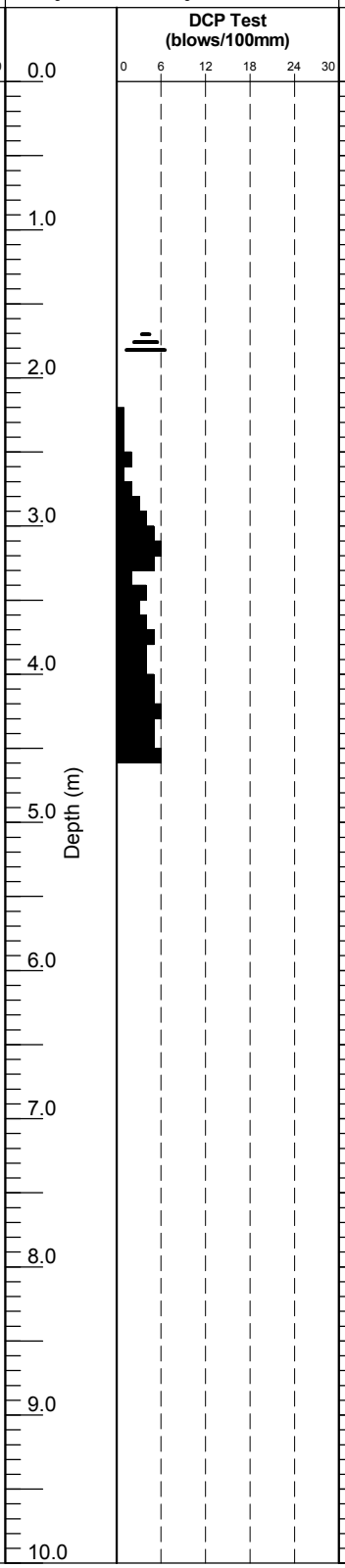
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.6m.

04/G

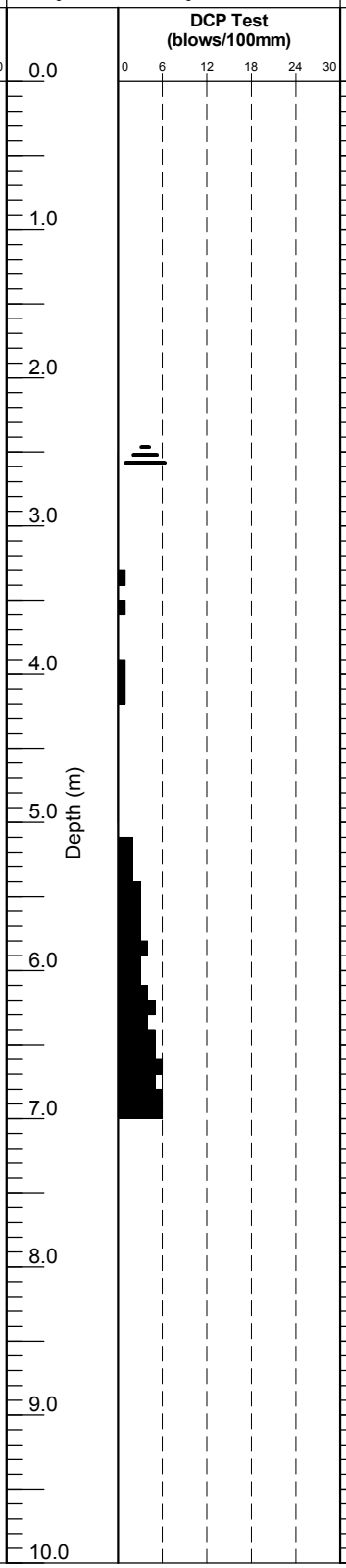
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.7m.

04/H

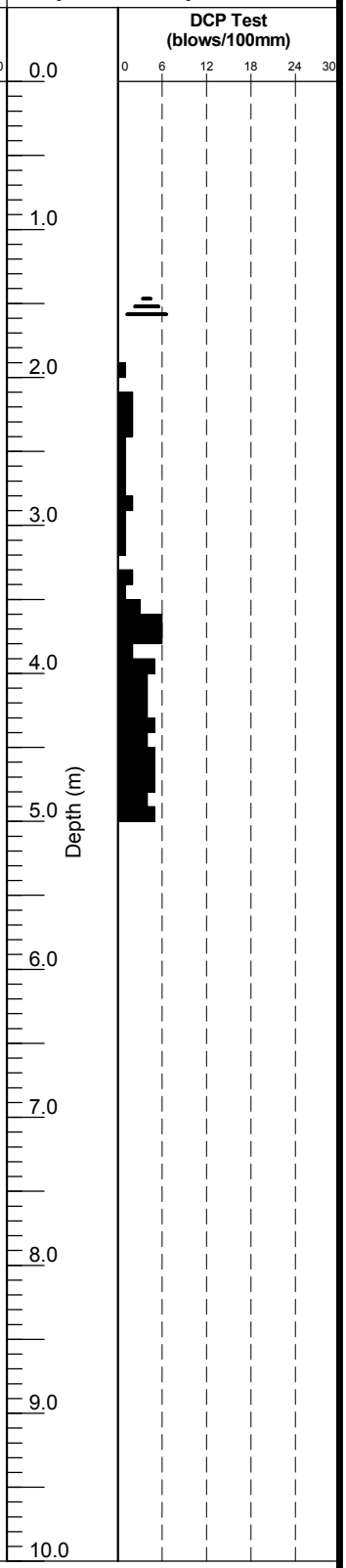
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.5m.

05/B

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.5m.

Note: Depth in metres below water level.
- Bed level.

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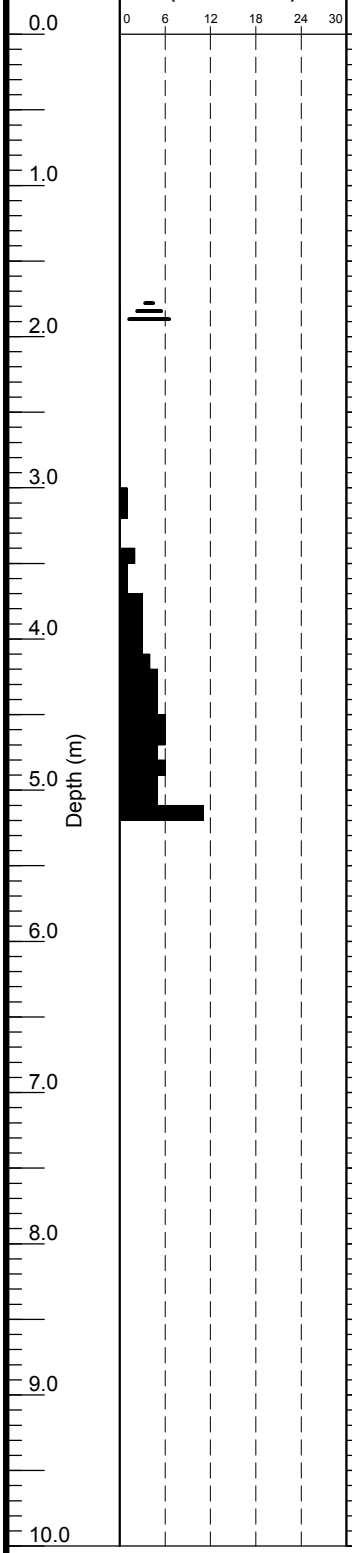
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

05/C

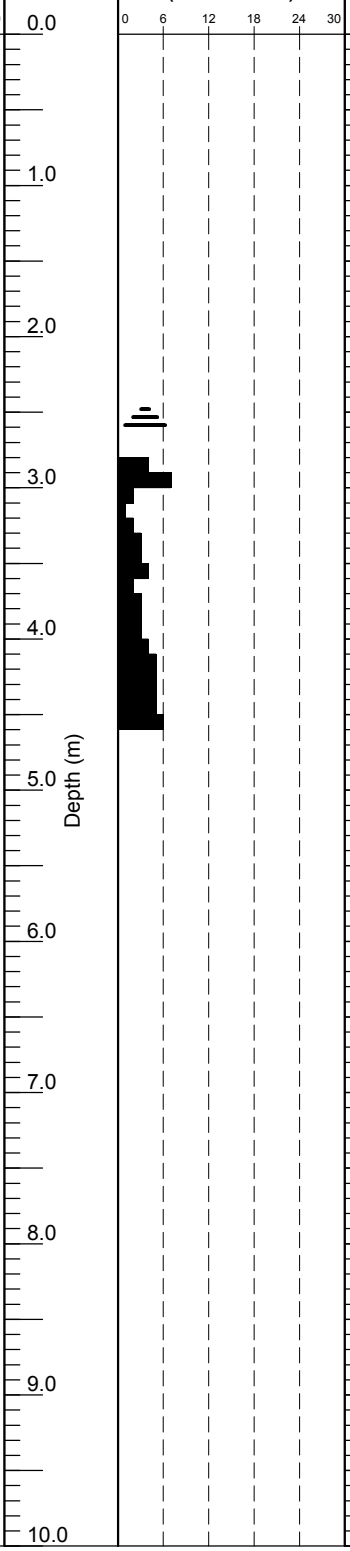
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.8m.

05/D

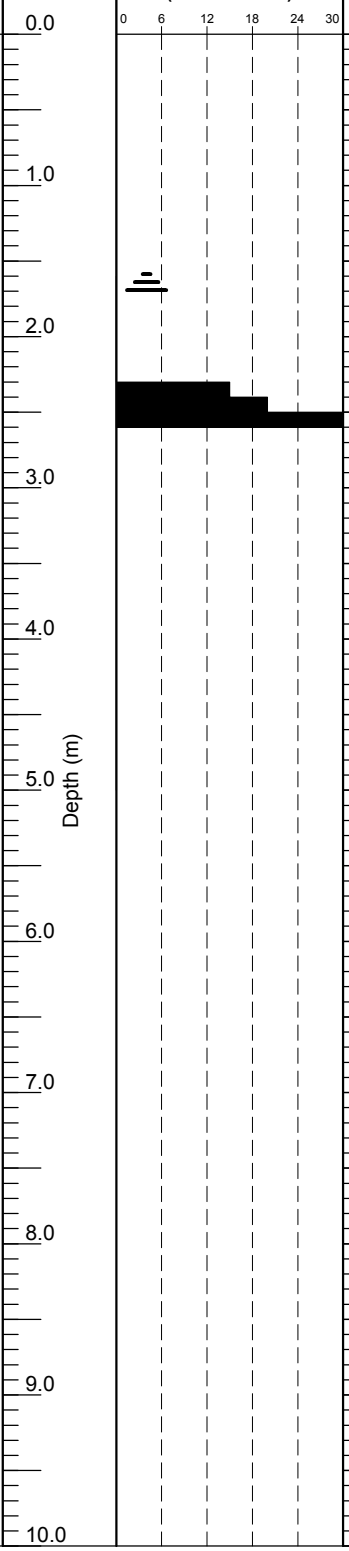
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.5m.

05/G

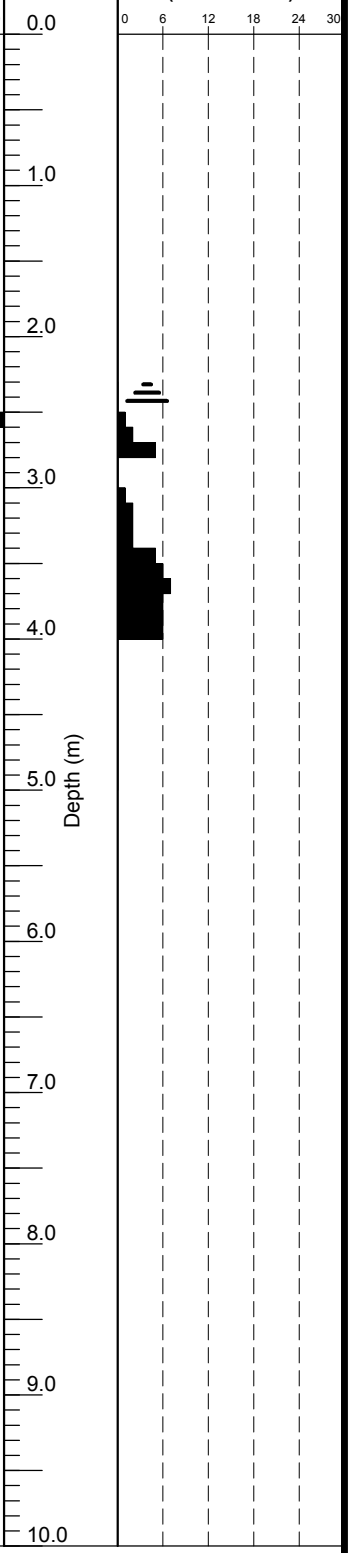
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.6m.

05/H

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.3m.

Note: Depth in metres below water level.
- Bed level.

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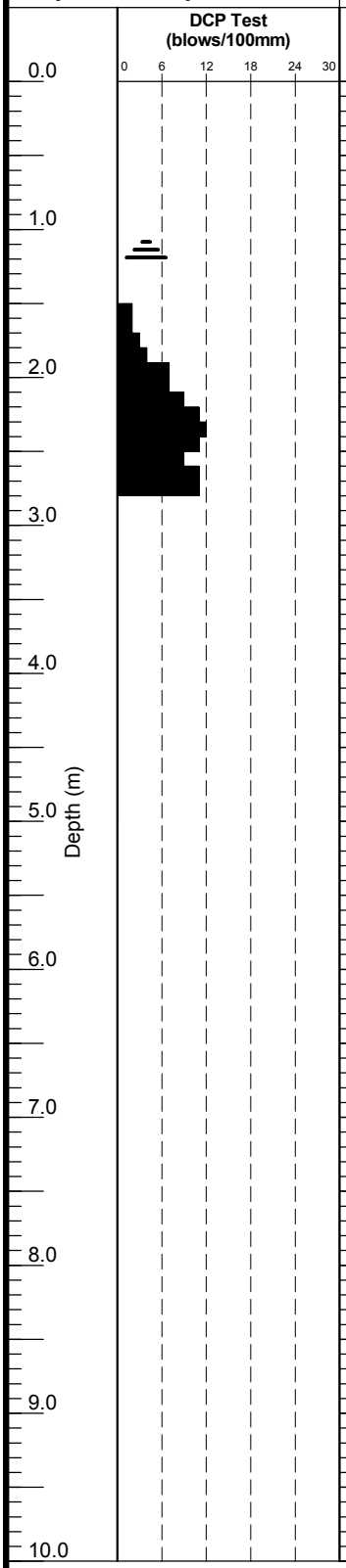
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

06/B

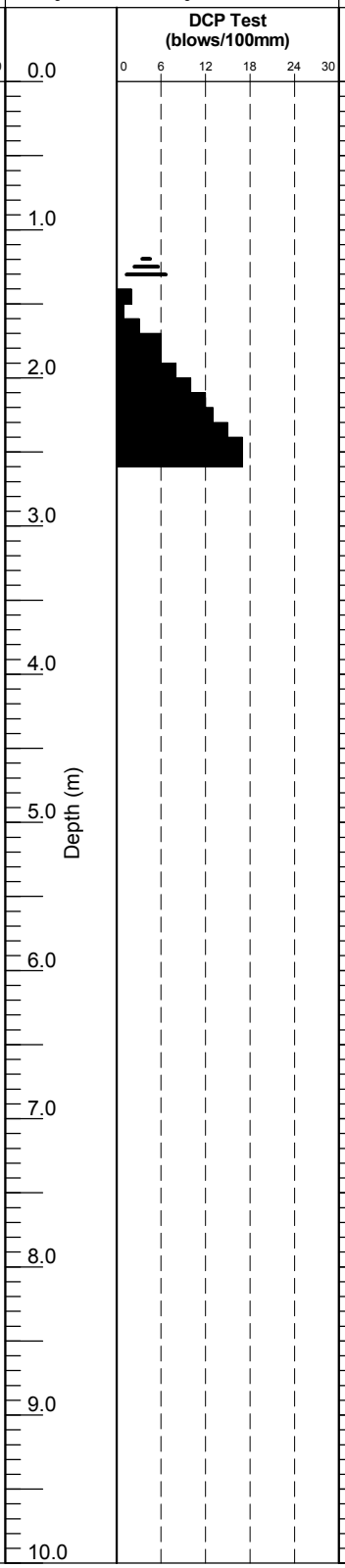
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.1m.

06/C

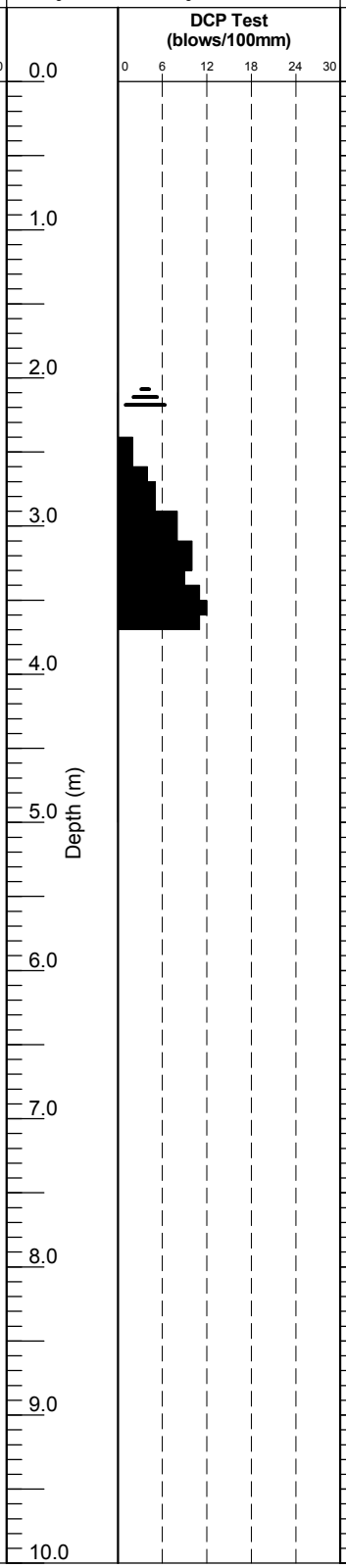
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.2m.

06/D

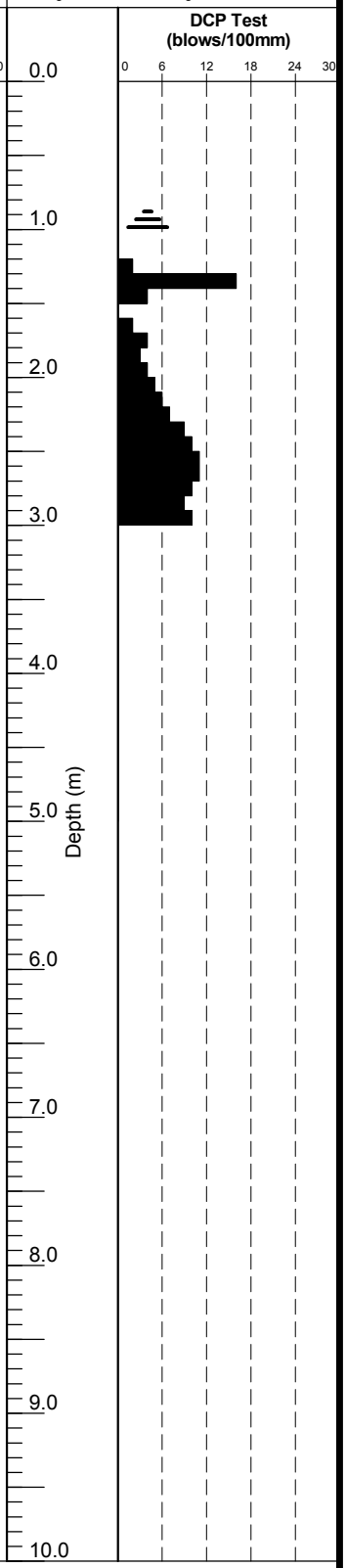
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.1m.

06/F

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 0.9m.

Note: Depth in metres below water level.
- Bed level.

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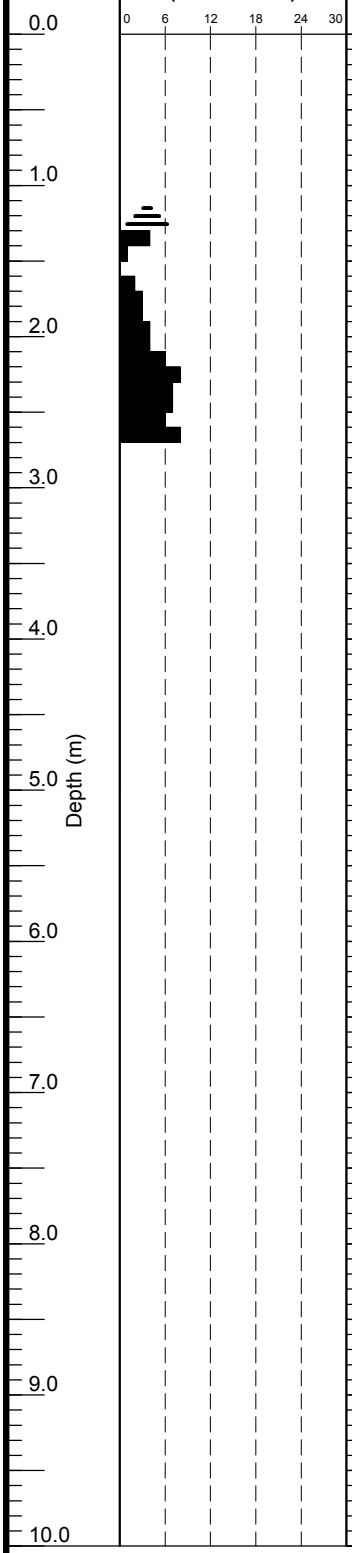
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

06/G

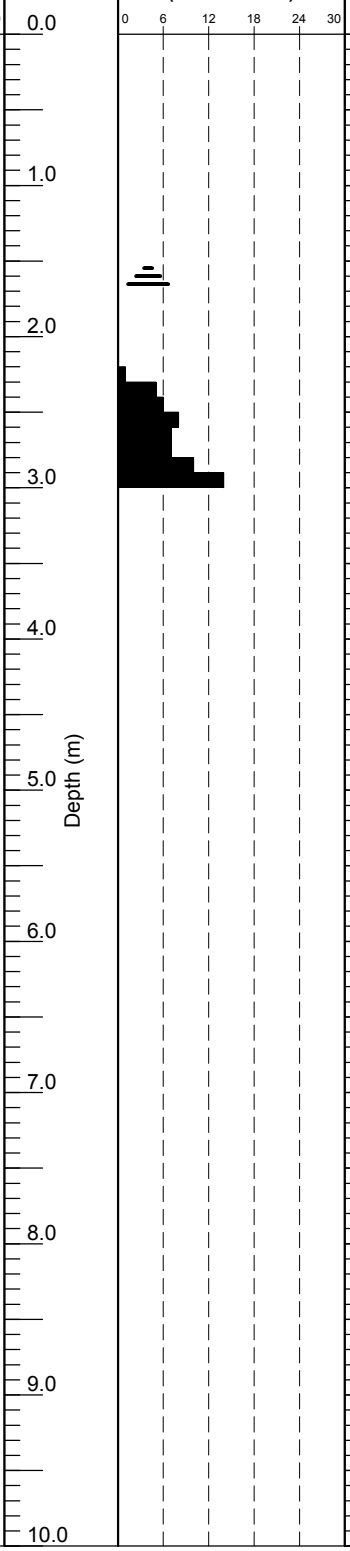
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.2m.

06/H

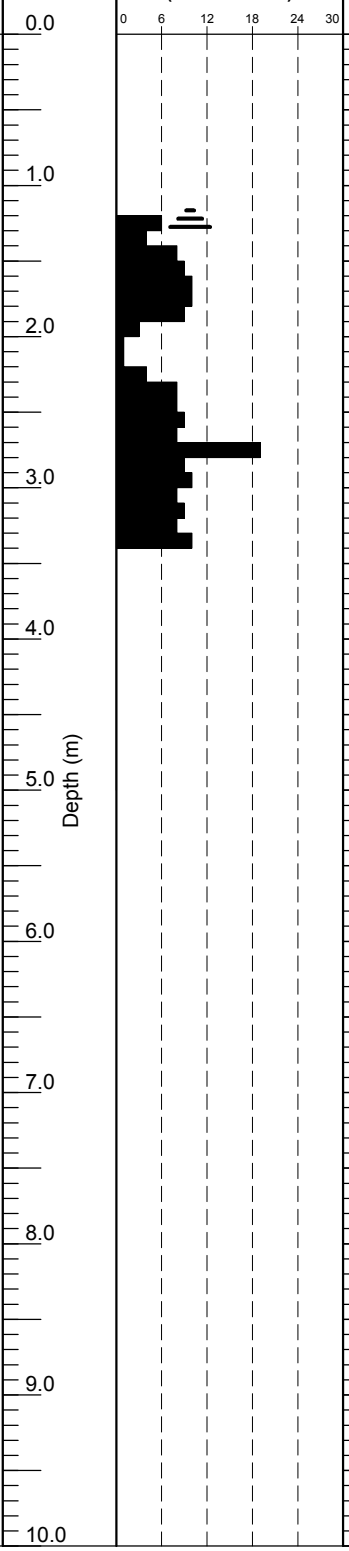
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.6m.

07/B

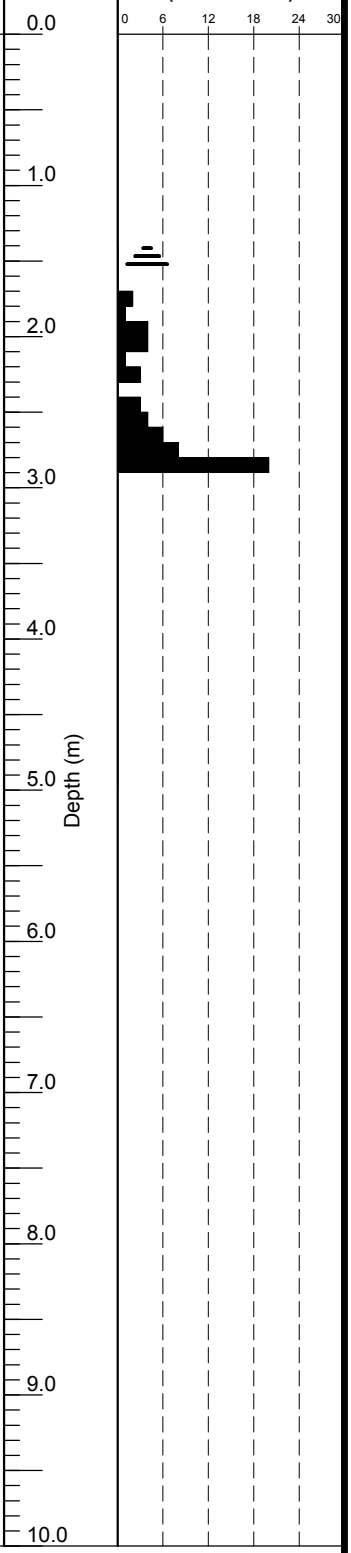
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.2m.

07/C

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.4m.

Note: Depth in metres below water level.
- Bed level.

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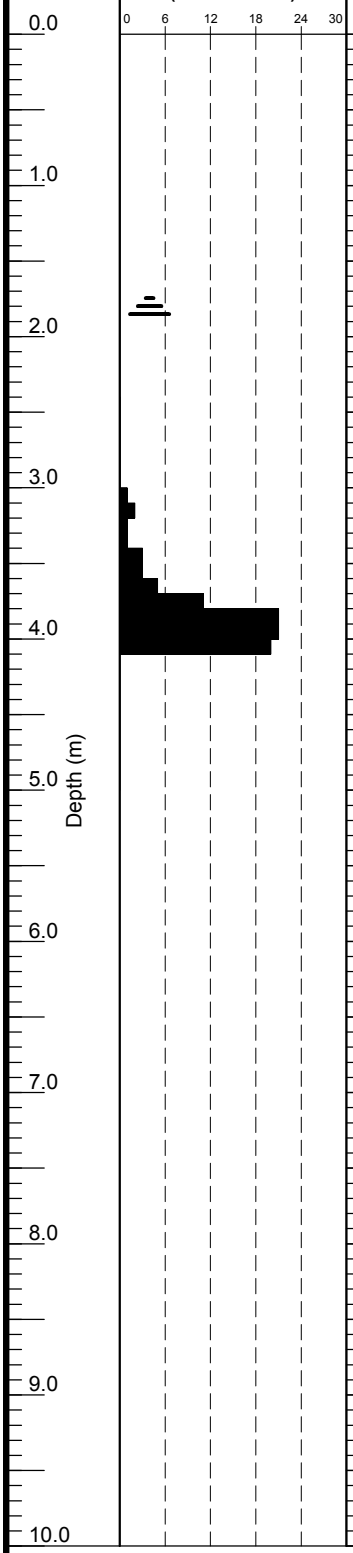
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

07/D

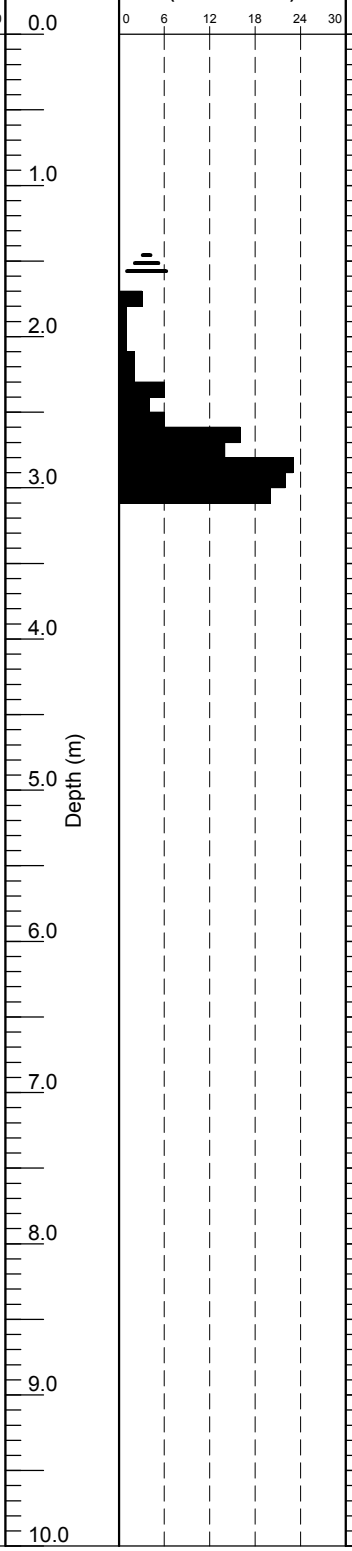
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.8m.

07/G

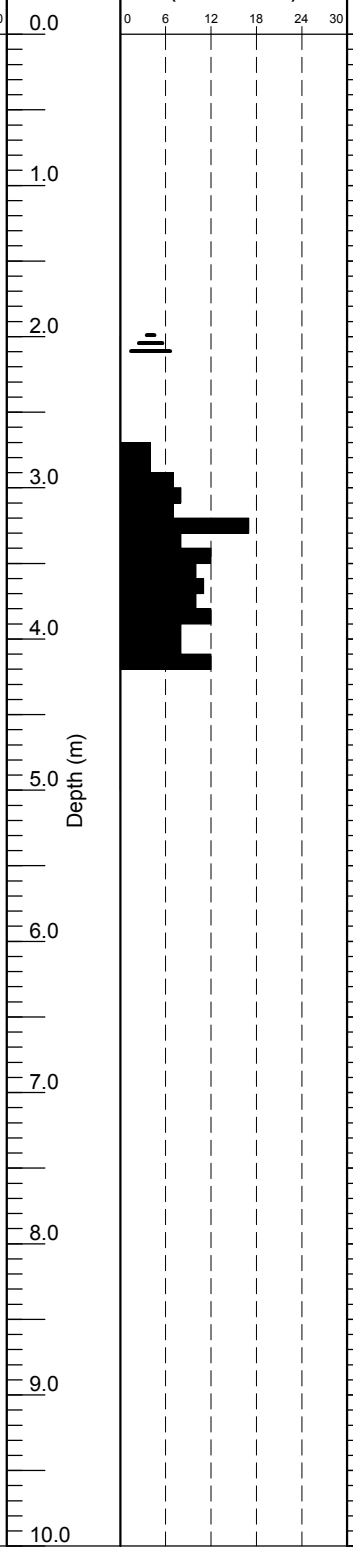
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.5m.

07/H

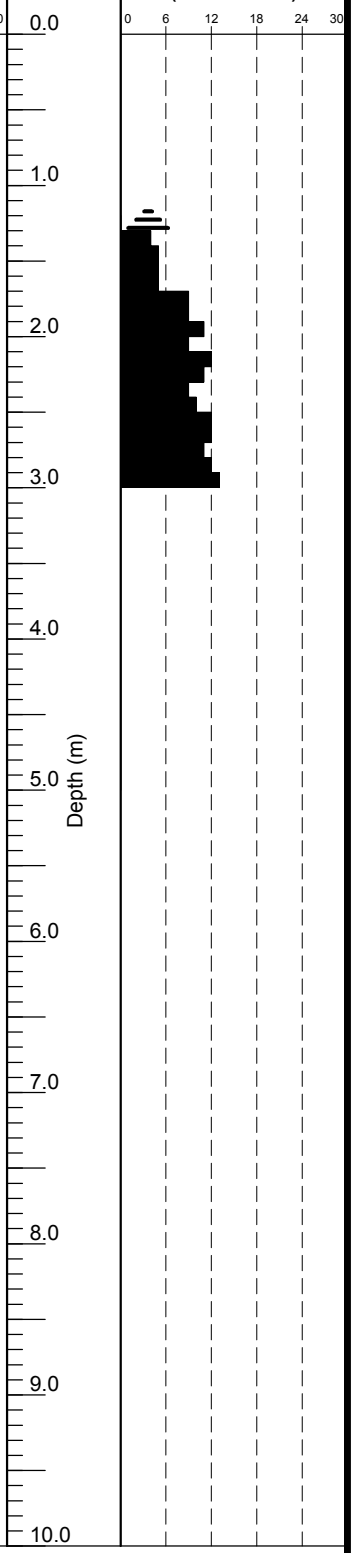
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.0m.

08/B

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.2m.

Note: Depth in metres below water level.
- Bed level.

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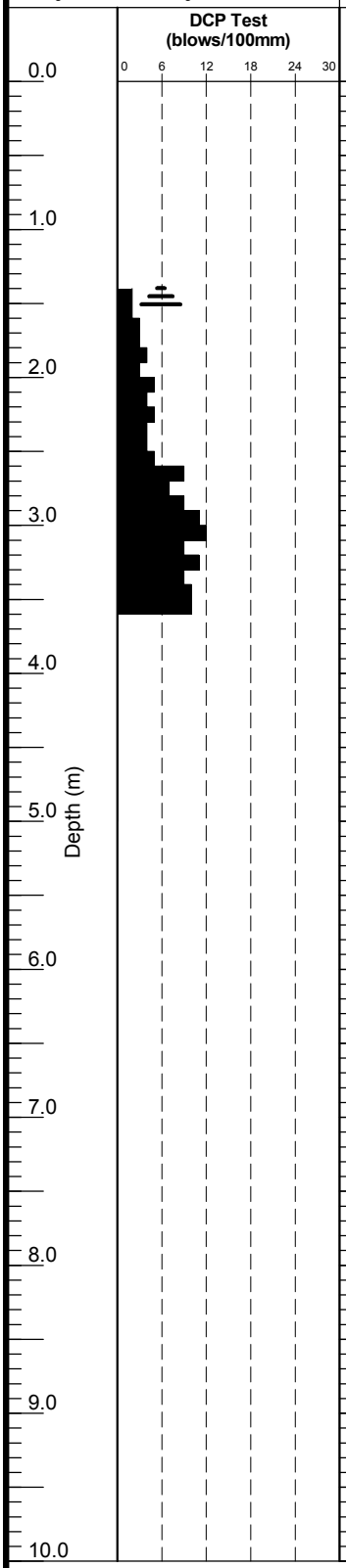
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

08/C

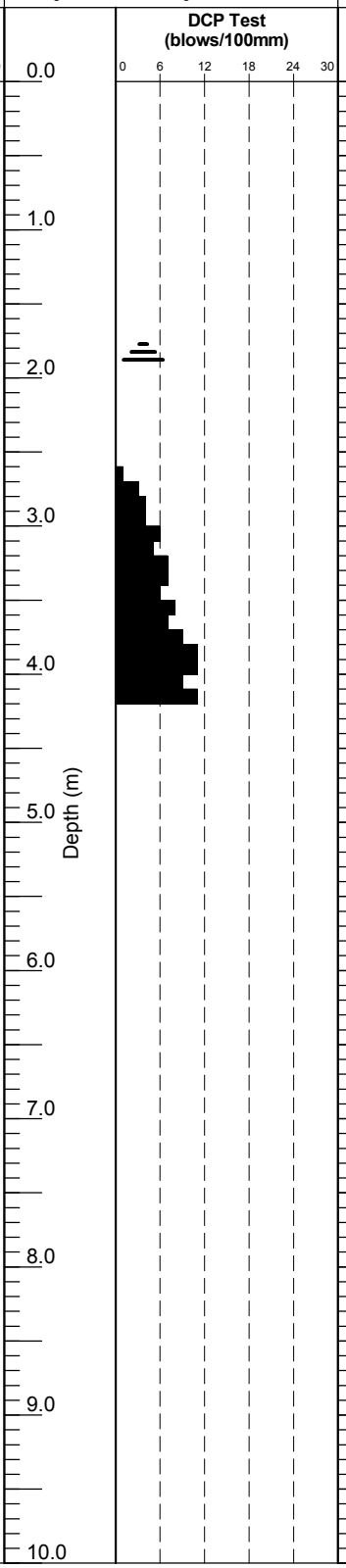
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.4m.

08/D

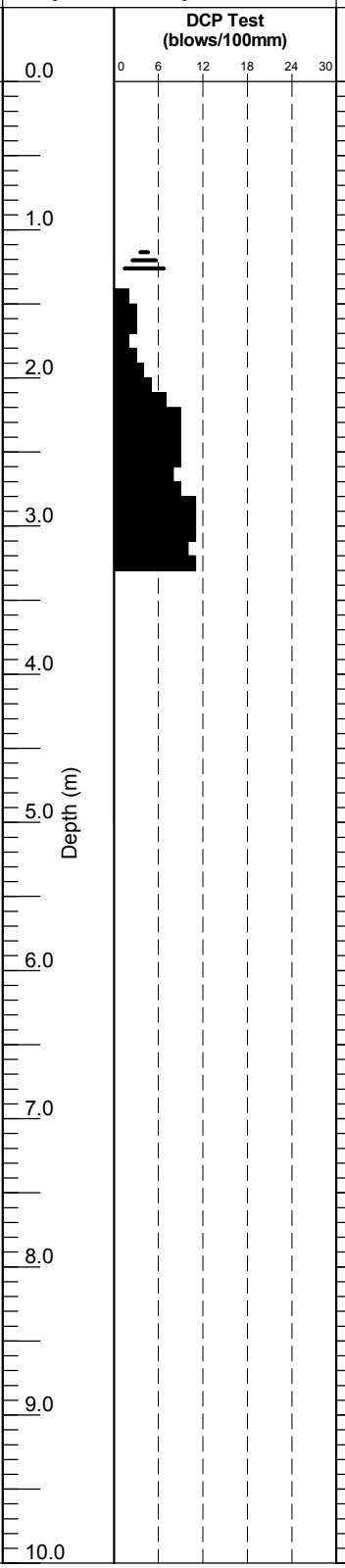
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.8m.

08/F

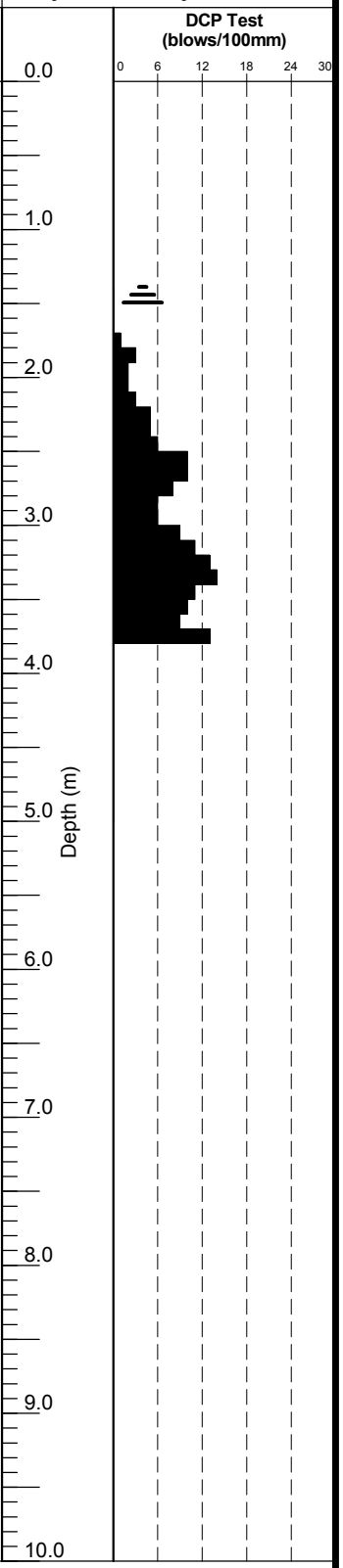
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.2m.

08/G

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.4m.

Note: Depth in metres below water level.
- Bed level.

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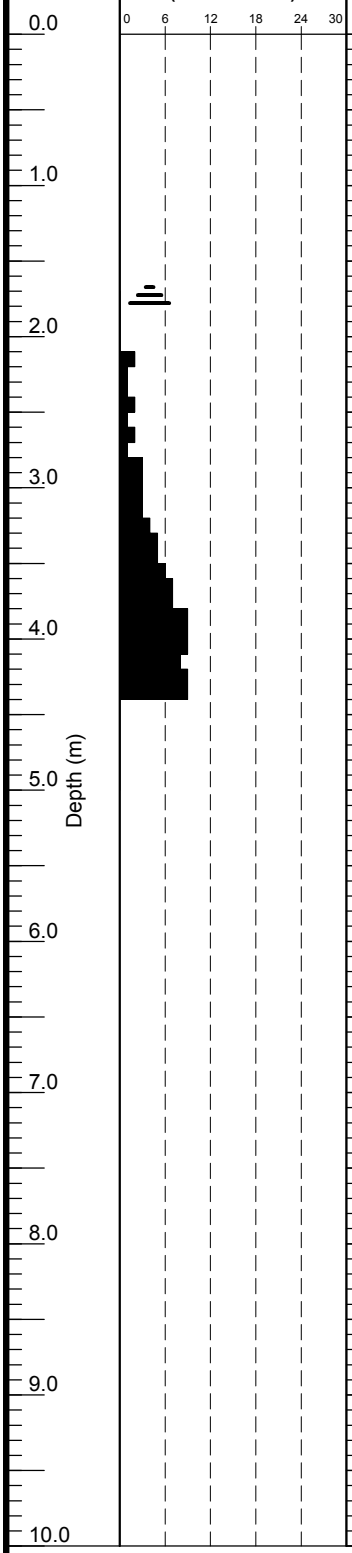
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

08/H

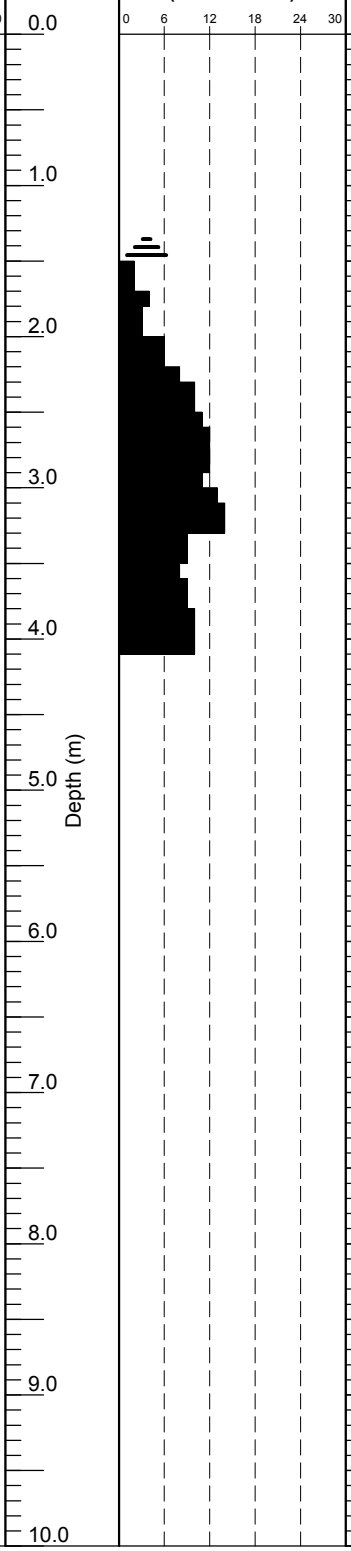
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.7m.

09/B

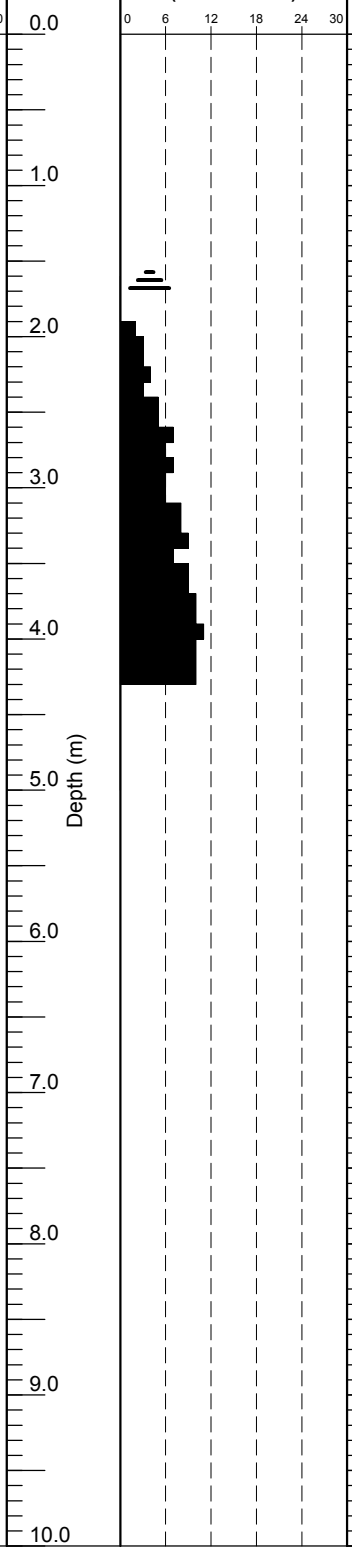
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.4m.

09/C

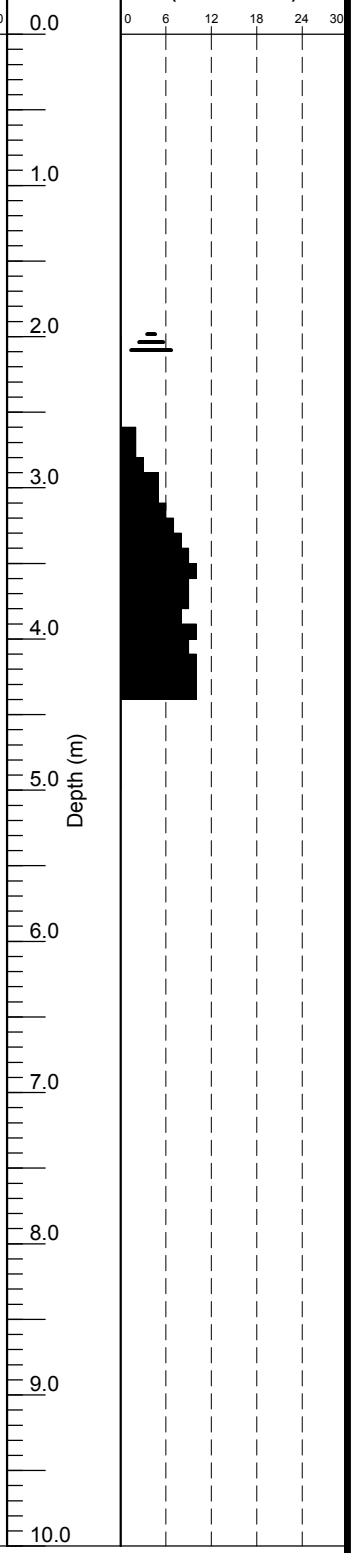
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.6m.

09/D

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.0m.

Note: Depth in metres below water level.
- Bed level.

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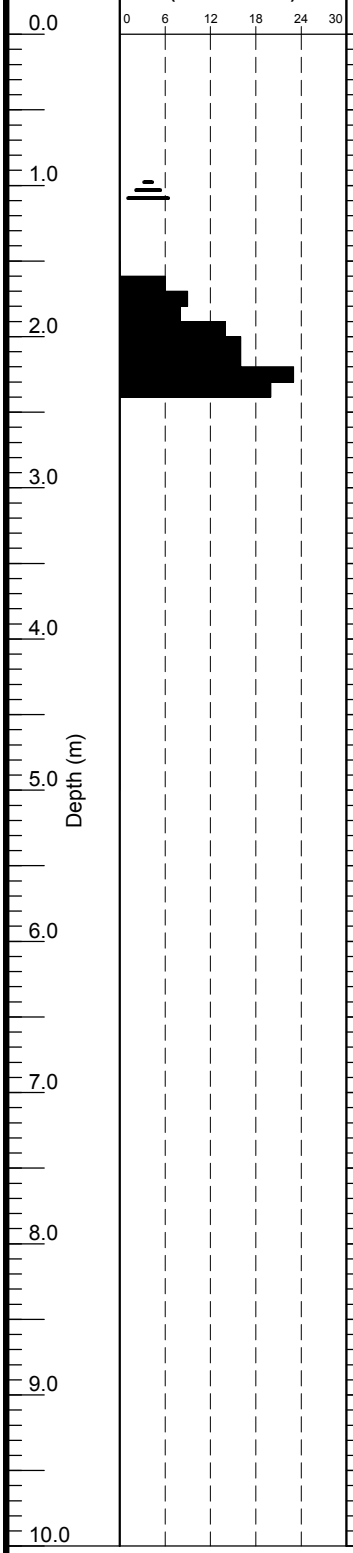
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

09/F

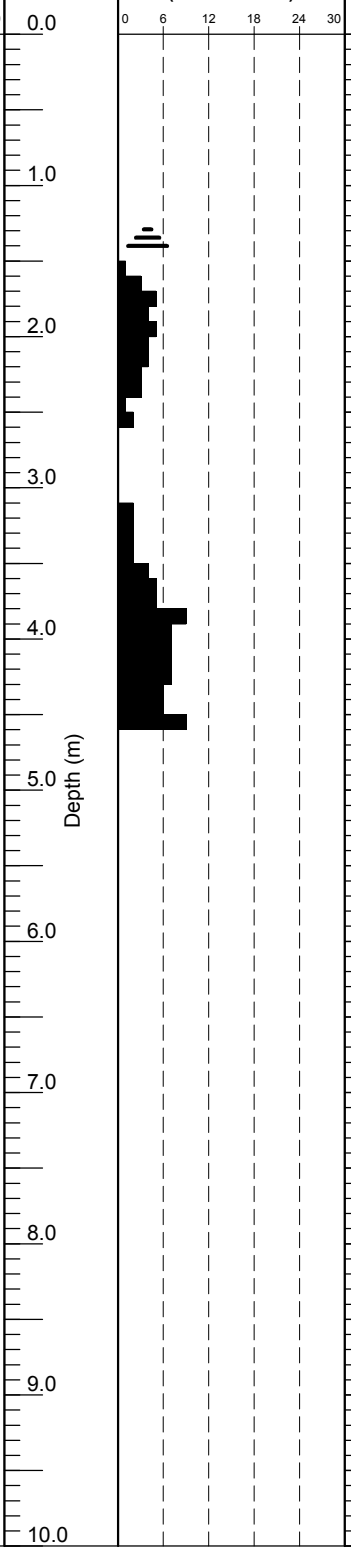
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.0m.

09/G

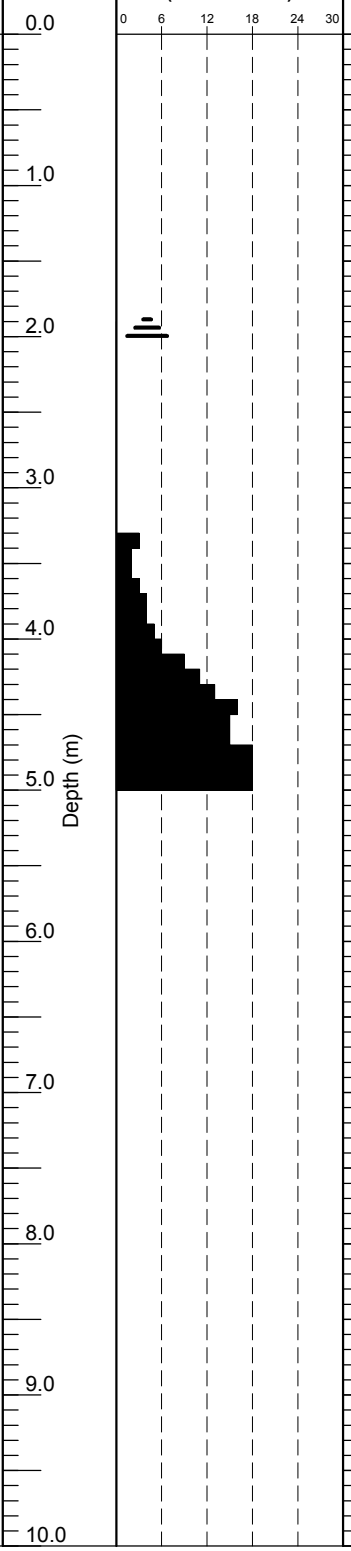
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.3m.

09/H

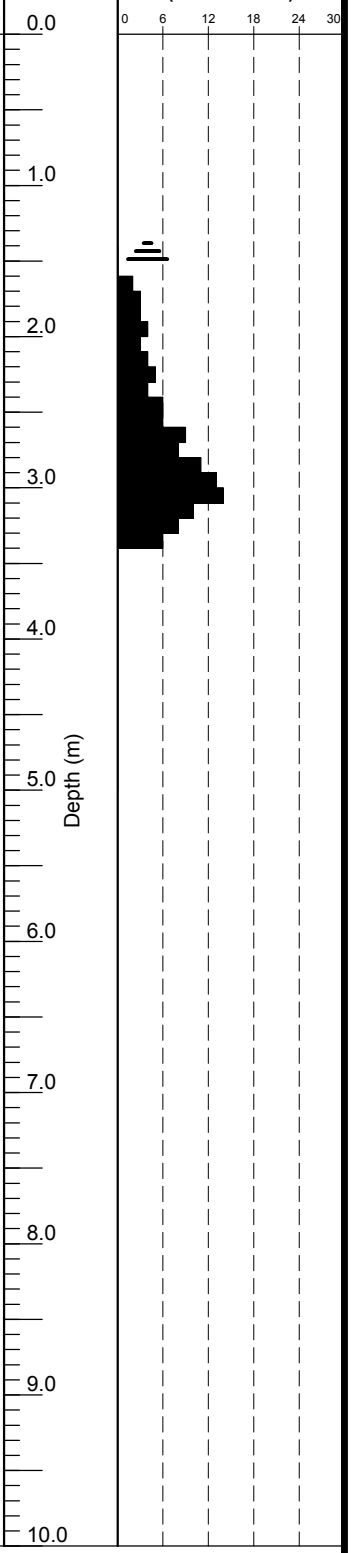
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.9m.

10/B

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.4m.

Note: Depth in metres below water level.
⎯ - Bed level.

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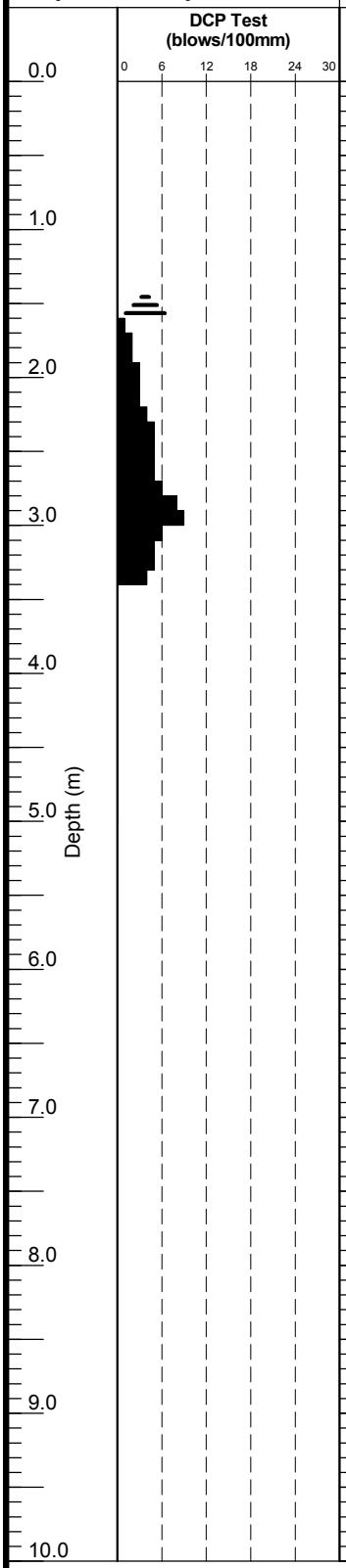
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

10/C

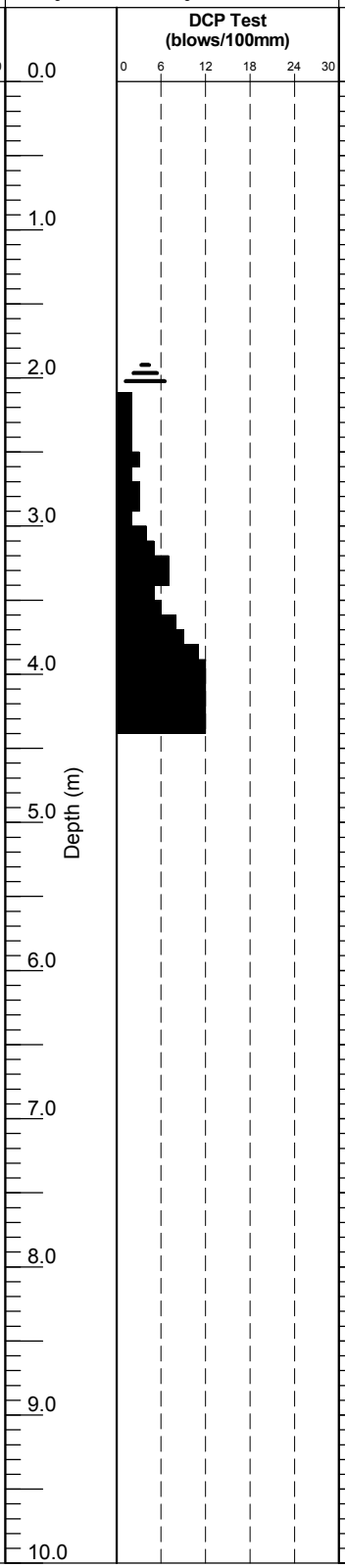
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.5m.

10/D

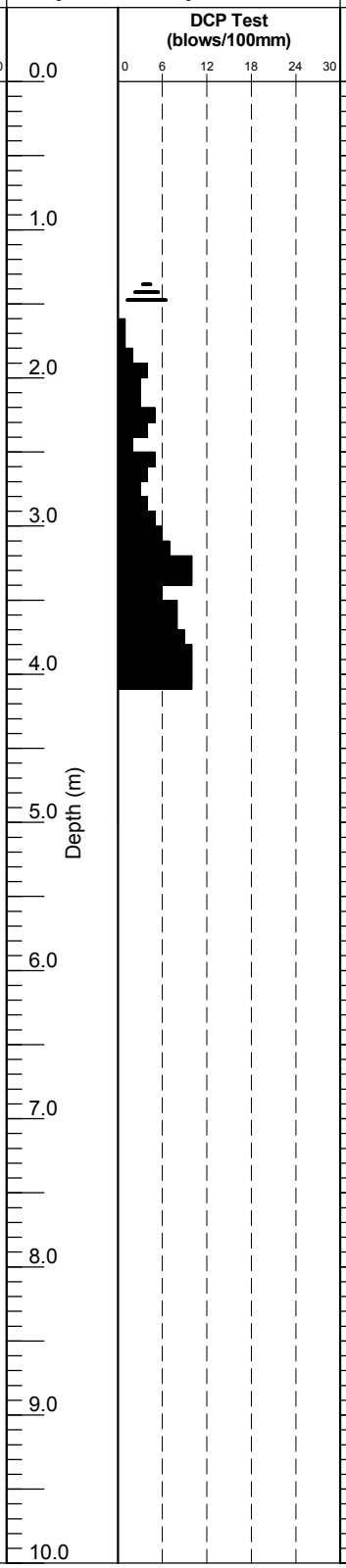
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.9m.

10/F

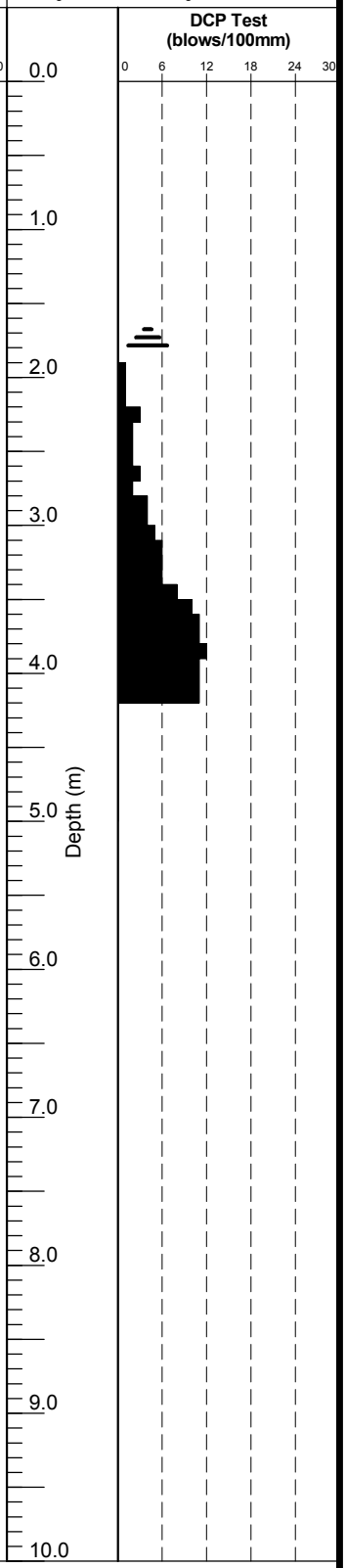
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.4m.

10/G

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.7m.

Note: Depth in metres below water level.
- Bed level.

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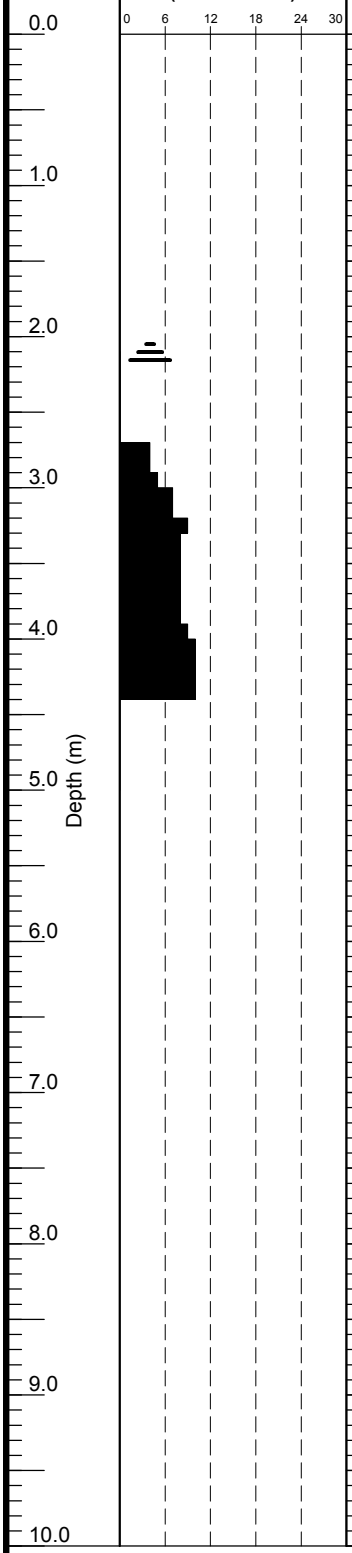
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

10/H

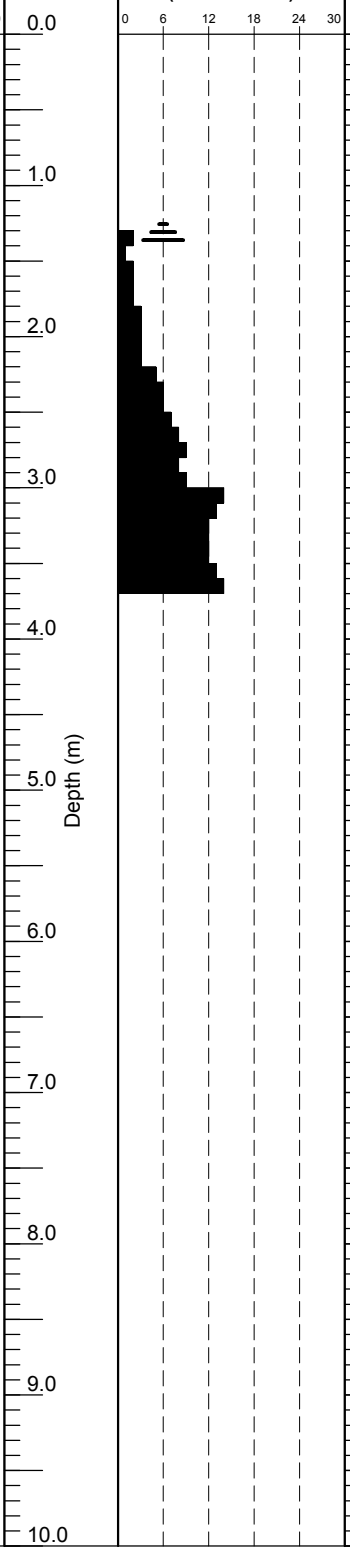
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.1m.

11/B

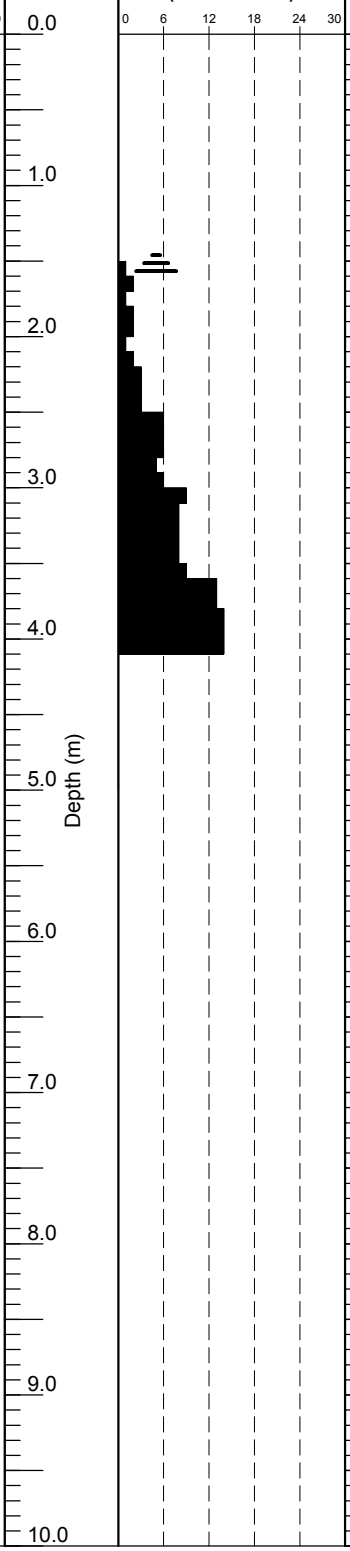
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.3m.

11/C

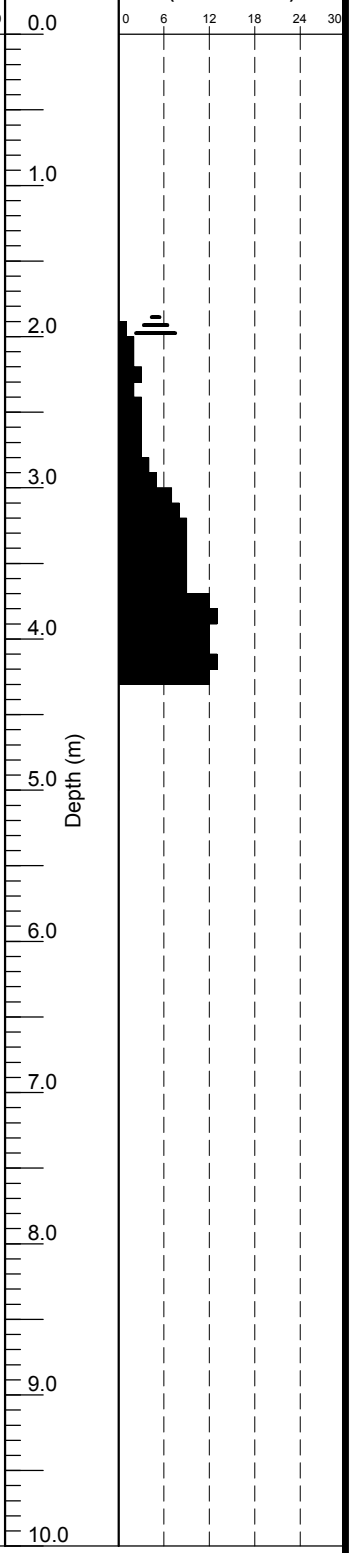
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.5m.

11/D

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.9m.

Note: Depth in metres below water level.
- Bed level.

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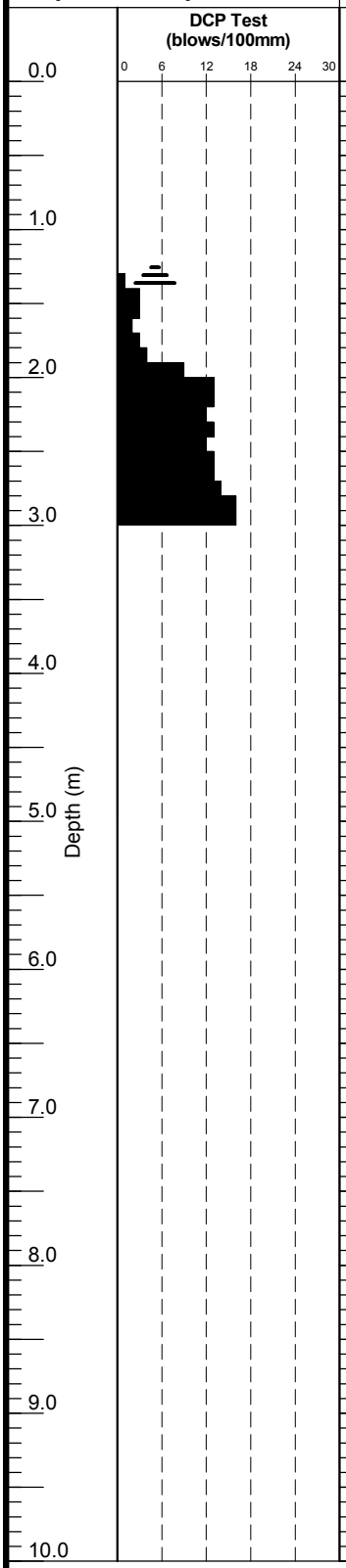
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

11/F

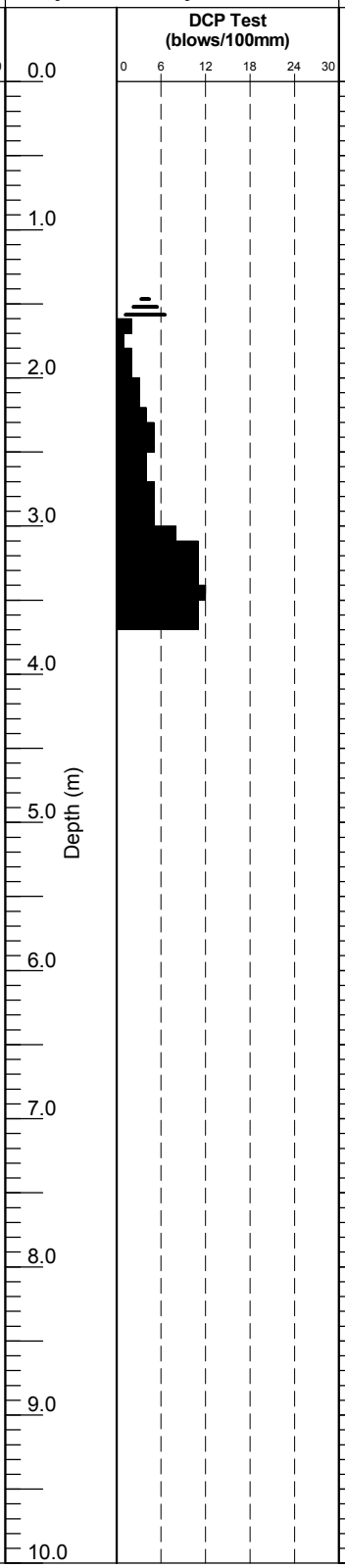
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.3m.

11/G

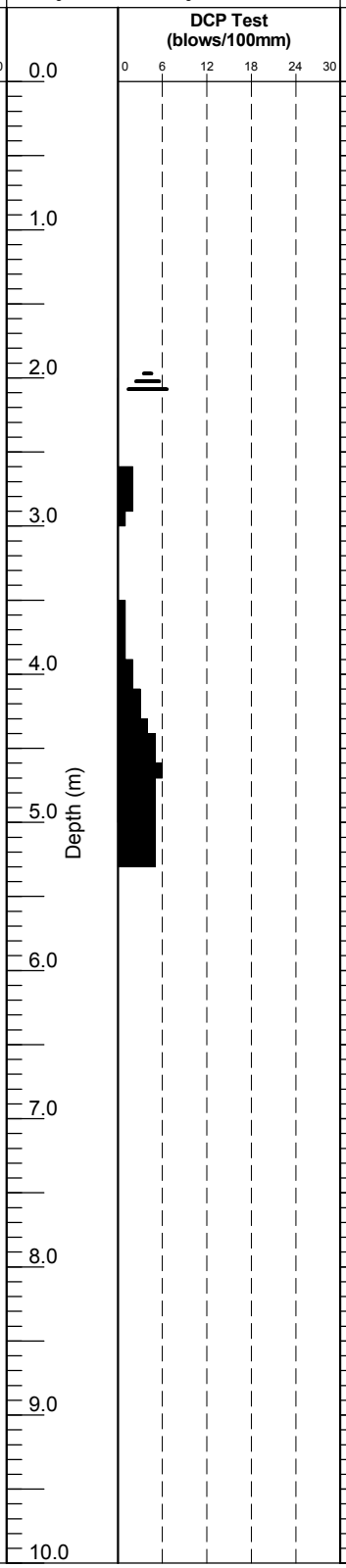
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.5m.

11/H

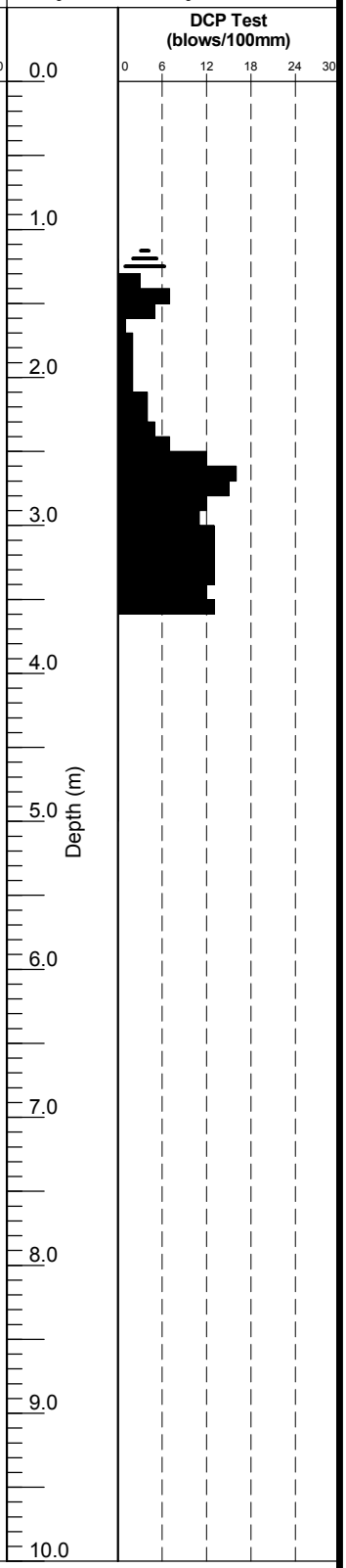
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.0m.

12/B

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.2m.

Note: Depth in metres below water level.
- Bed level.

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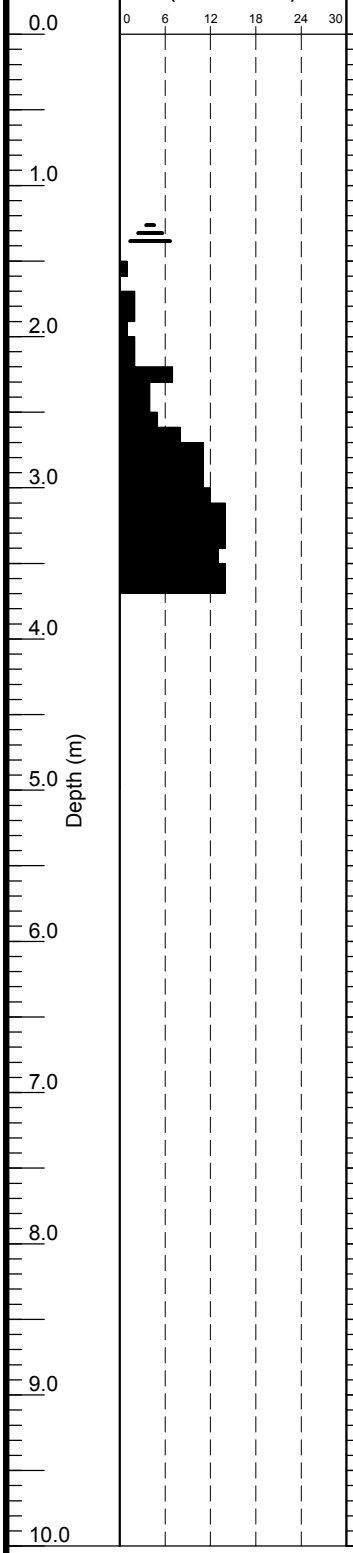
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

12/C

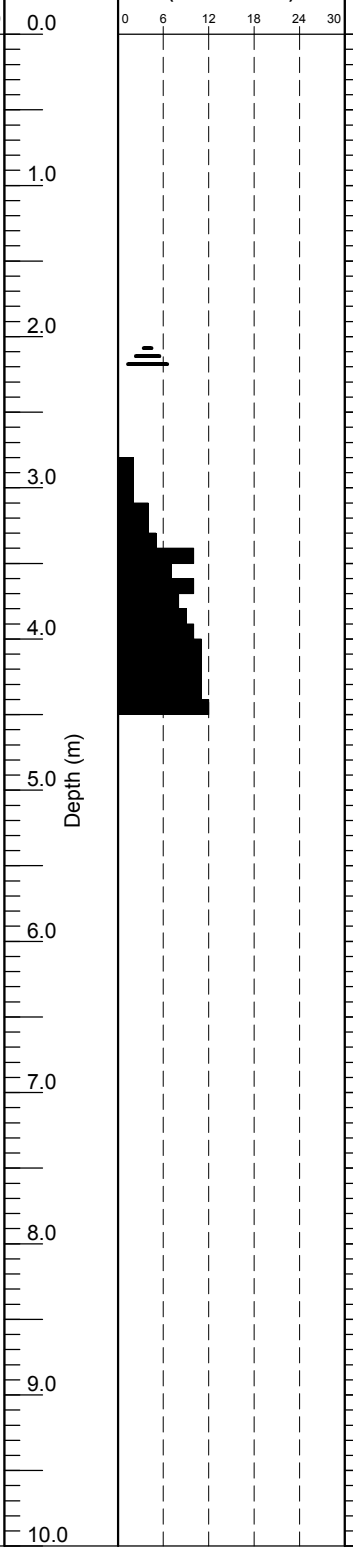
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.3m.

12/D

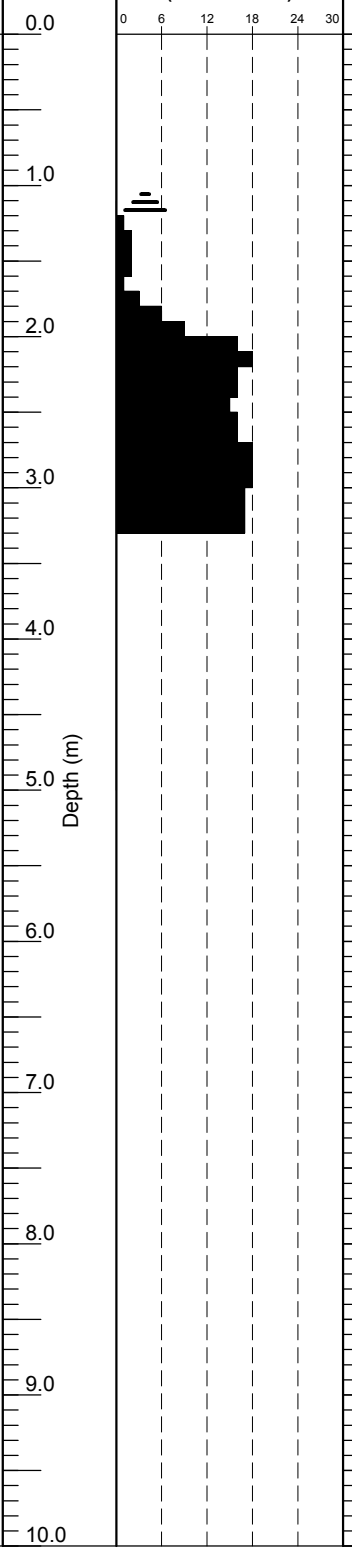
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.1m.

12/F

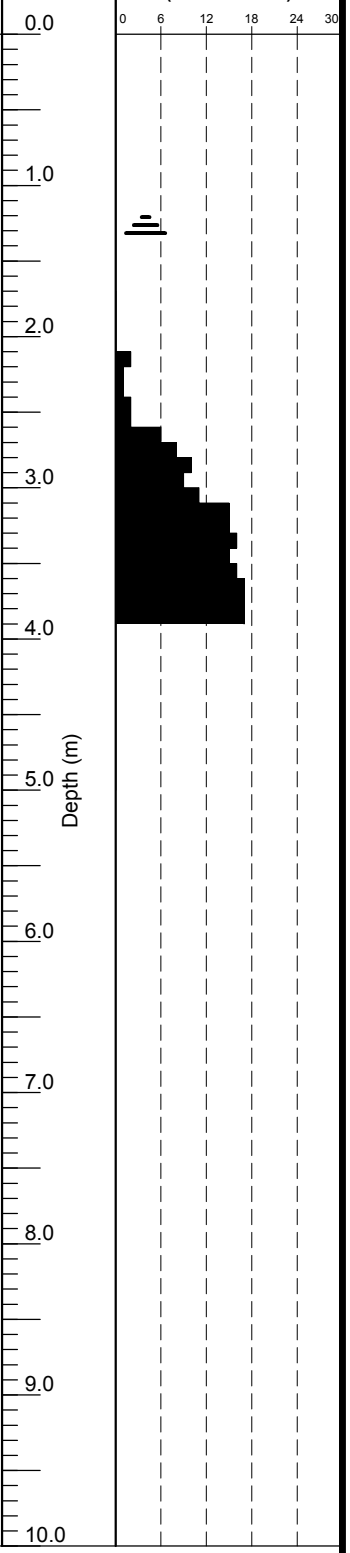
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.1m.

12/G

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.2m.

Note: Depth in metres below water level.
- Bed level.

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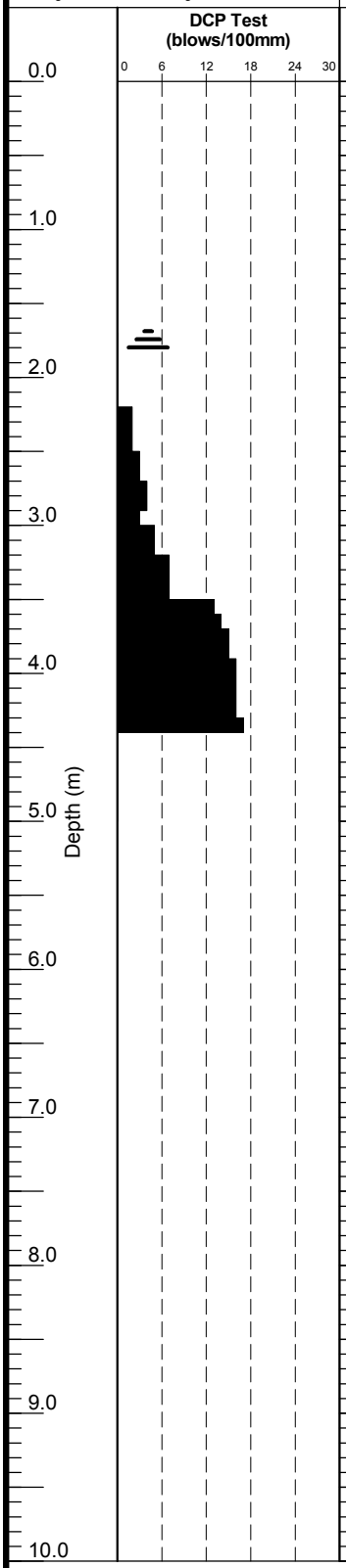
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

12/H

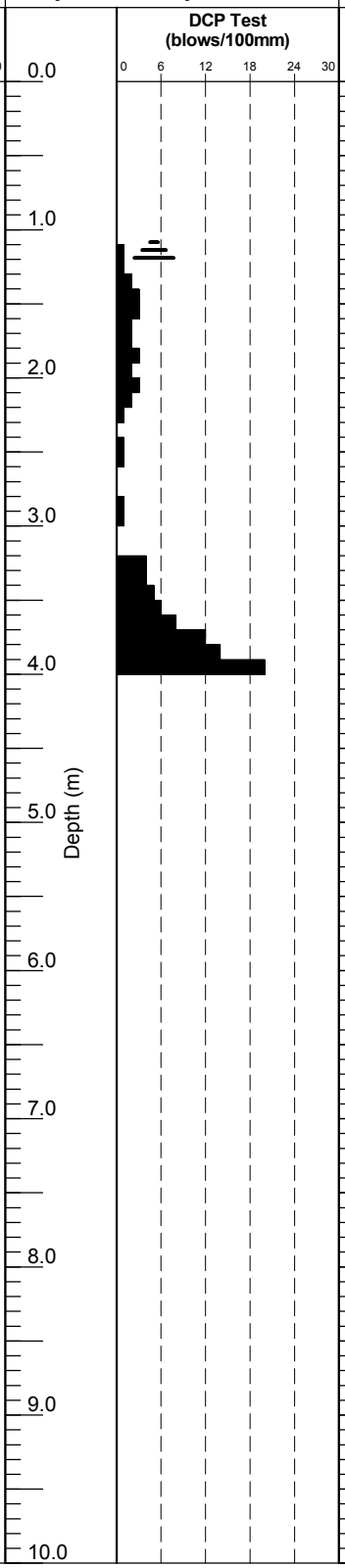
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.7m.

13/B

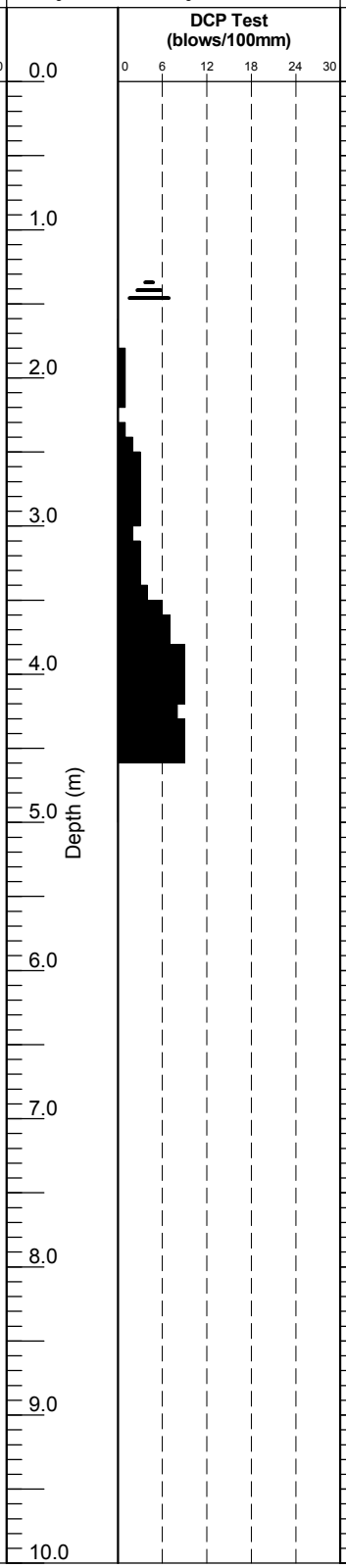
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.1m.

13/C

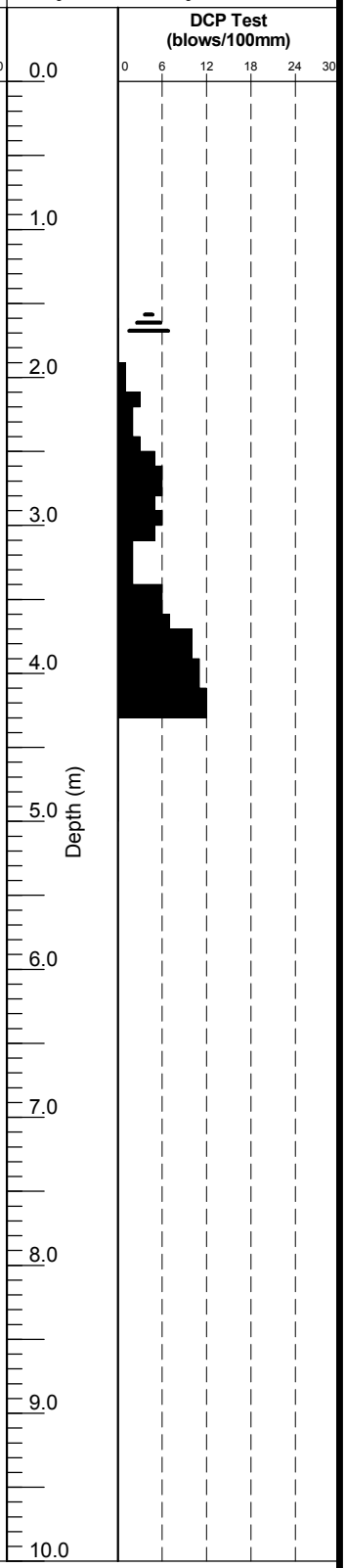
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.4m.

13/D

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.6m.

Note: Depth in metres below water level.
- Bed level.

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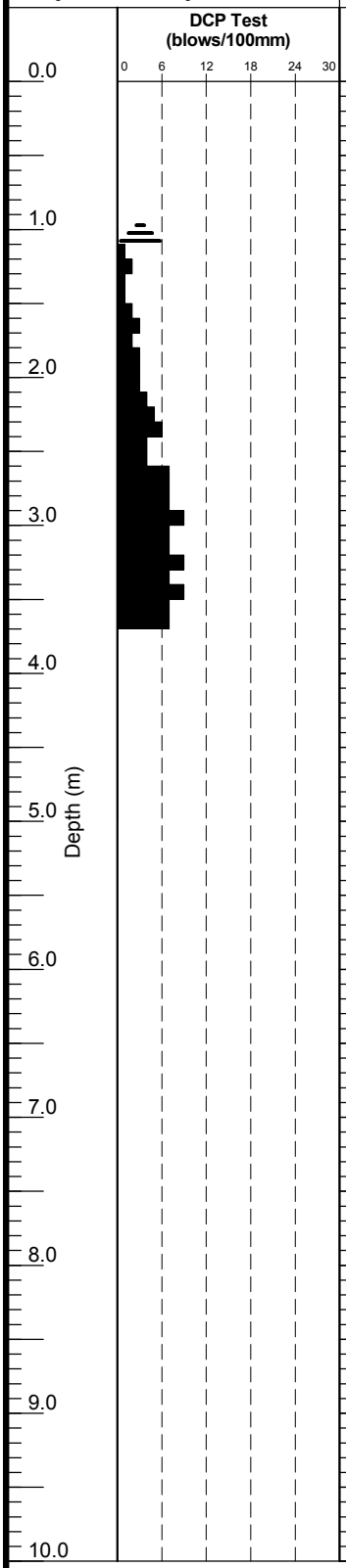
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

13/F

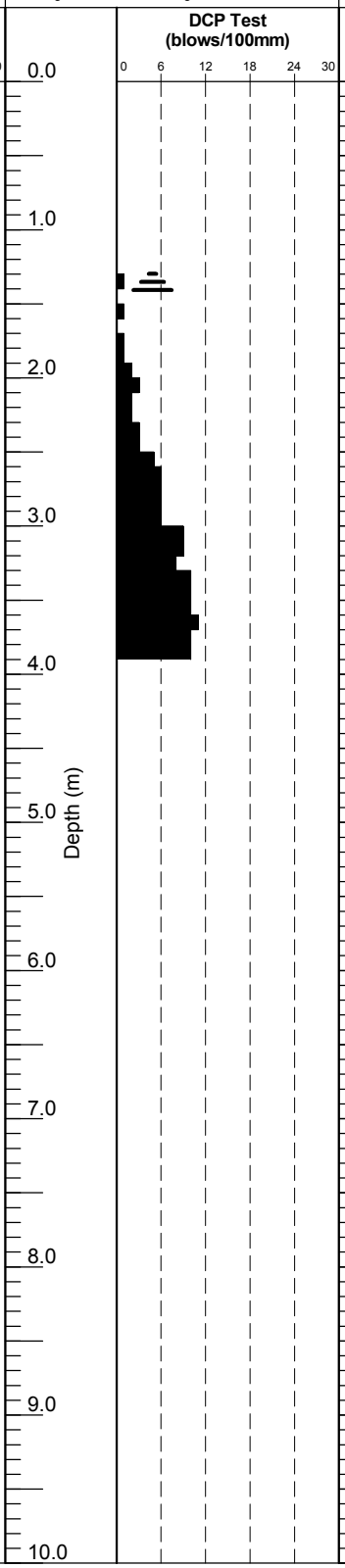
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.0m.

13/G

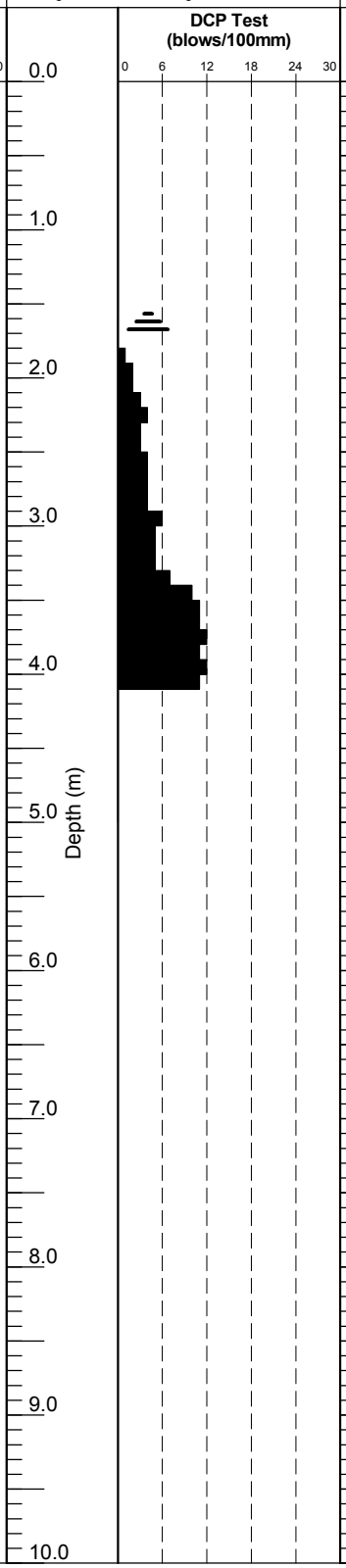
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.3m.

13/H

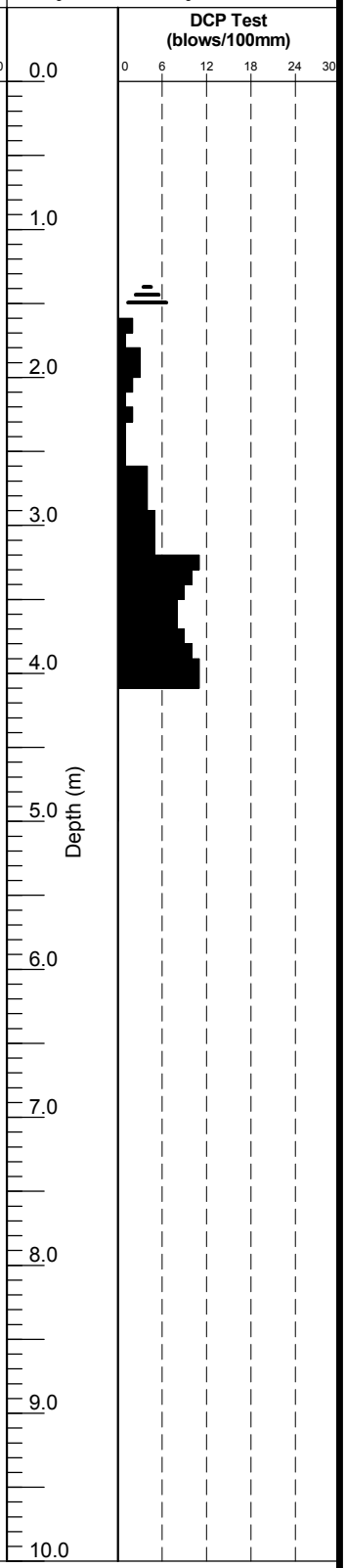
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.6m.

14/B

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.4m.

Note: Depth in metres below water level.
- Bed level.

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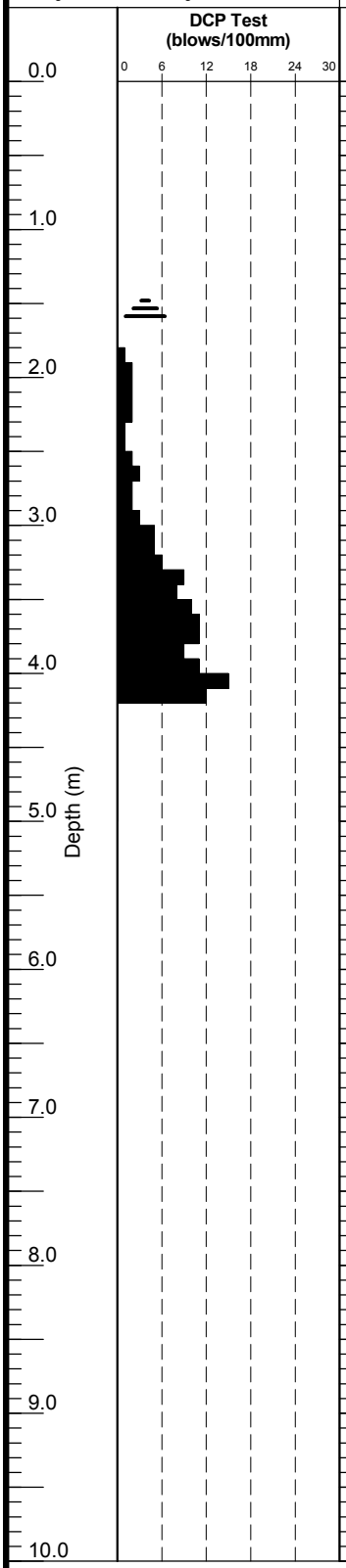
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

14/C

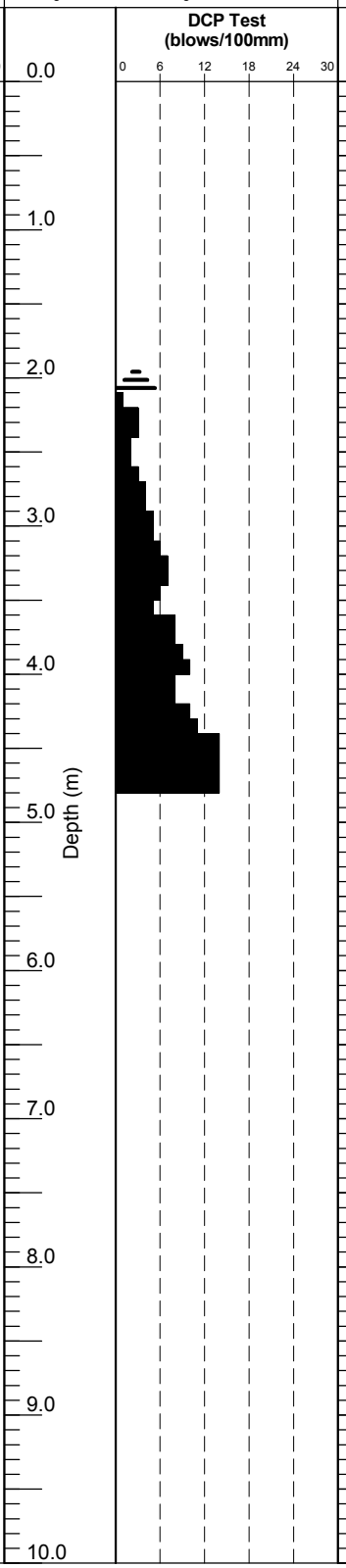
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.5m.

14/D

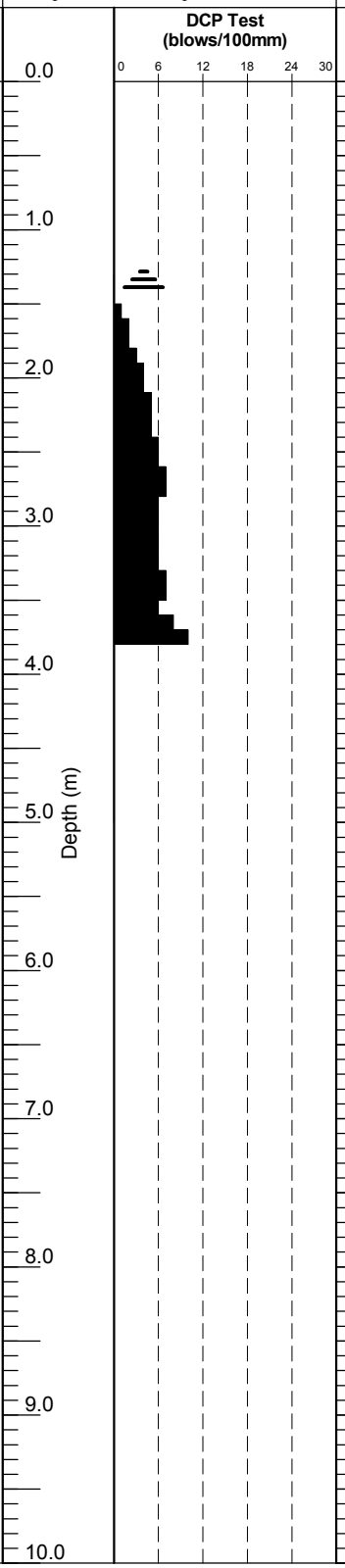
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 2.0m.

14/F

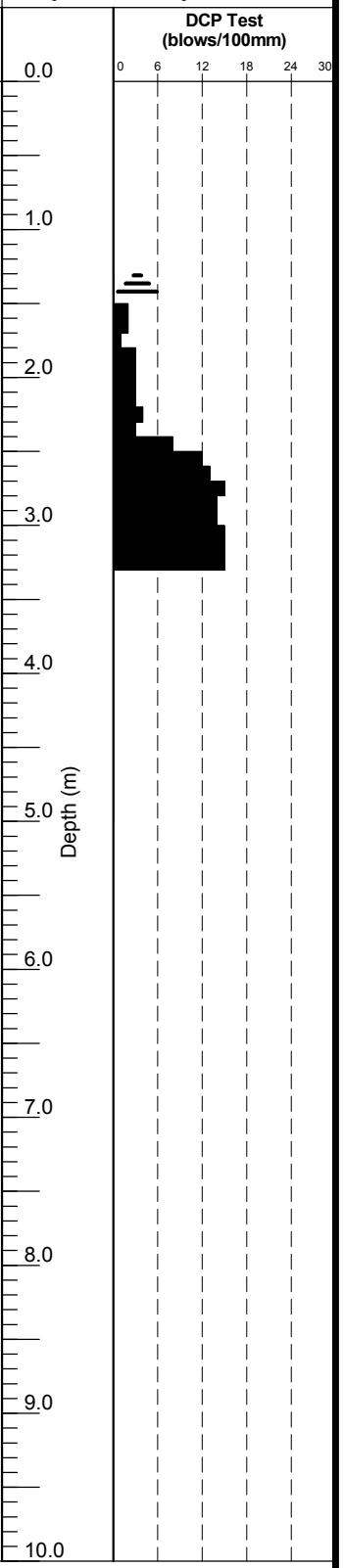
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.3m.

14/G

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.3m.

Note: Depth in metres below water level.
⏥ - Bed level.

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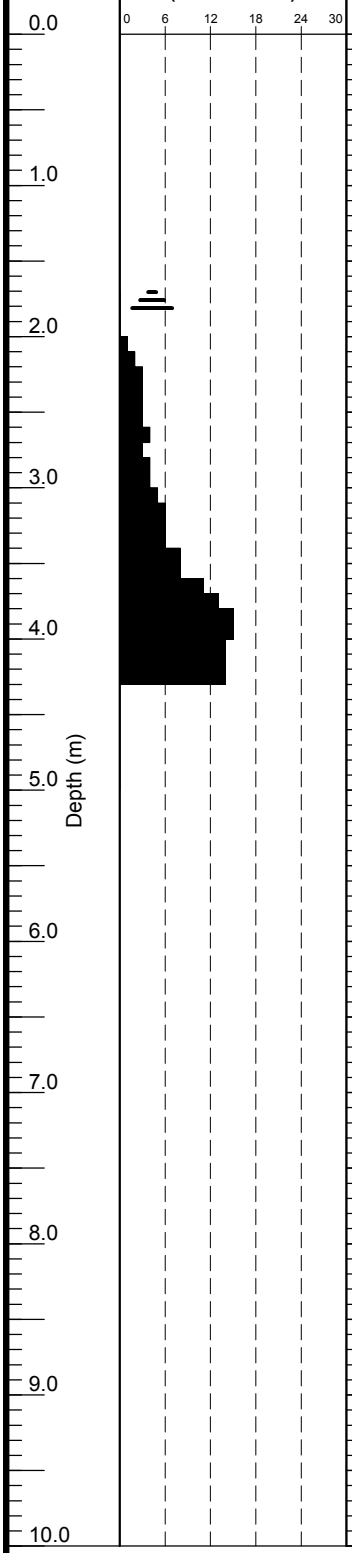
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

14/H

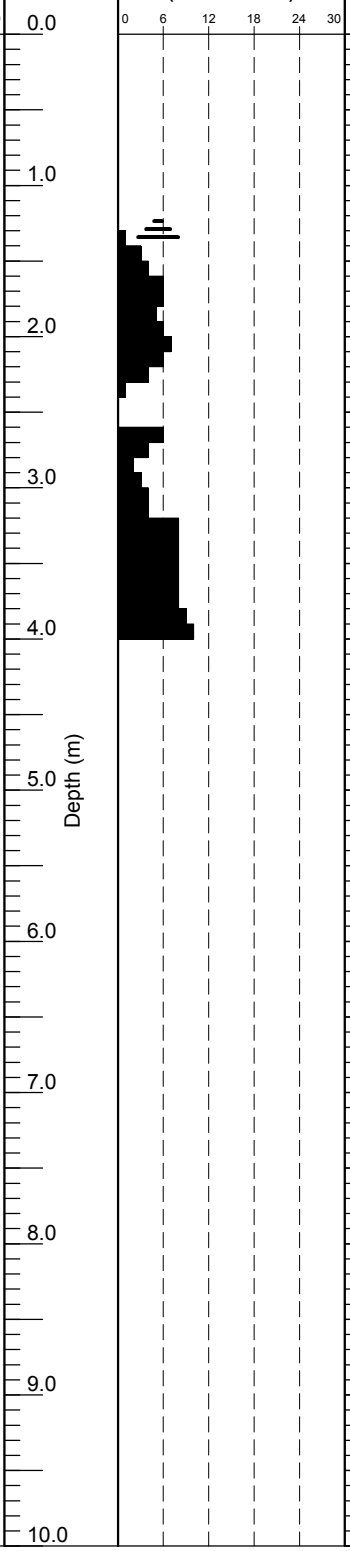
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.7m.

15/B

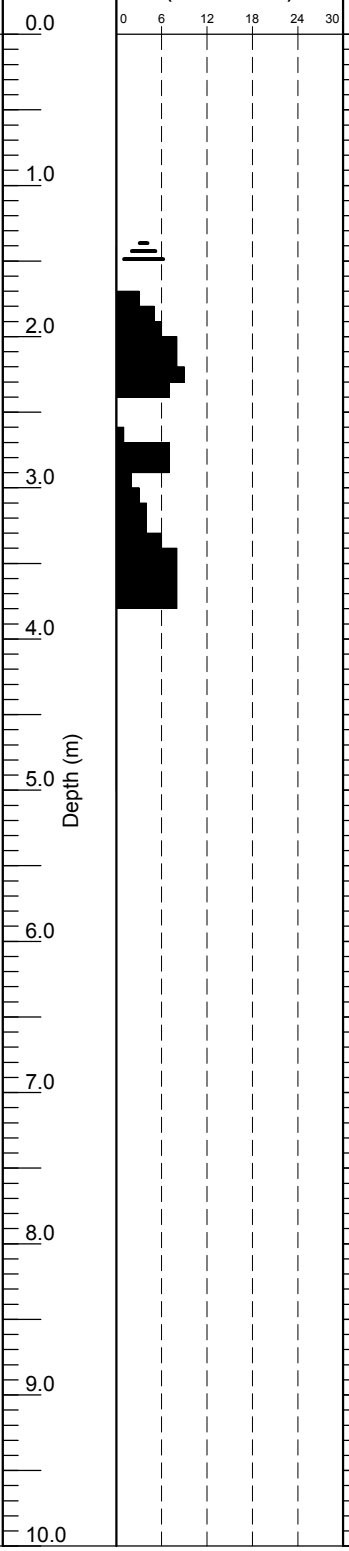
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.3m.

15/C

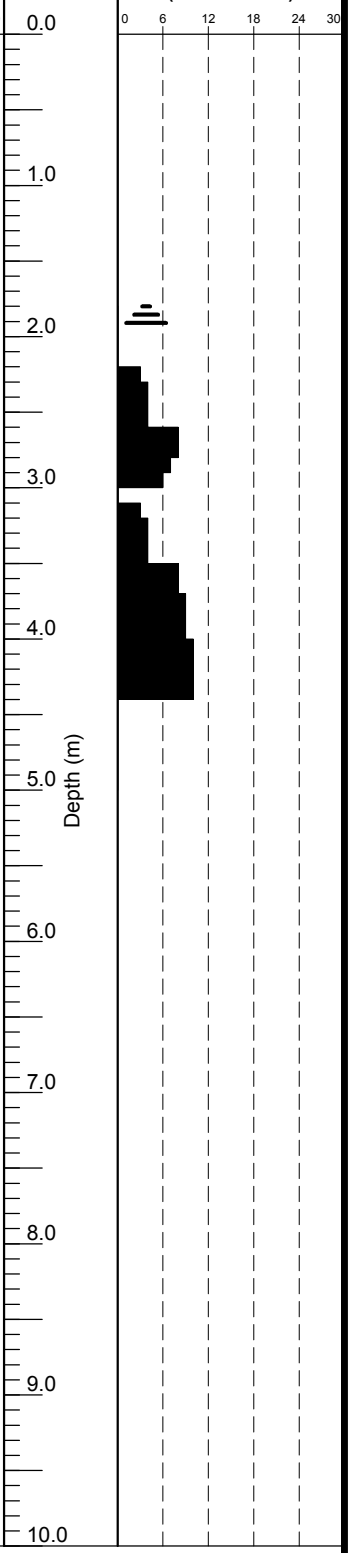
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.4m.

15/D

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.8m.

Note: Depth in metres below water level.
- Bed level.

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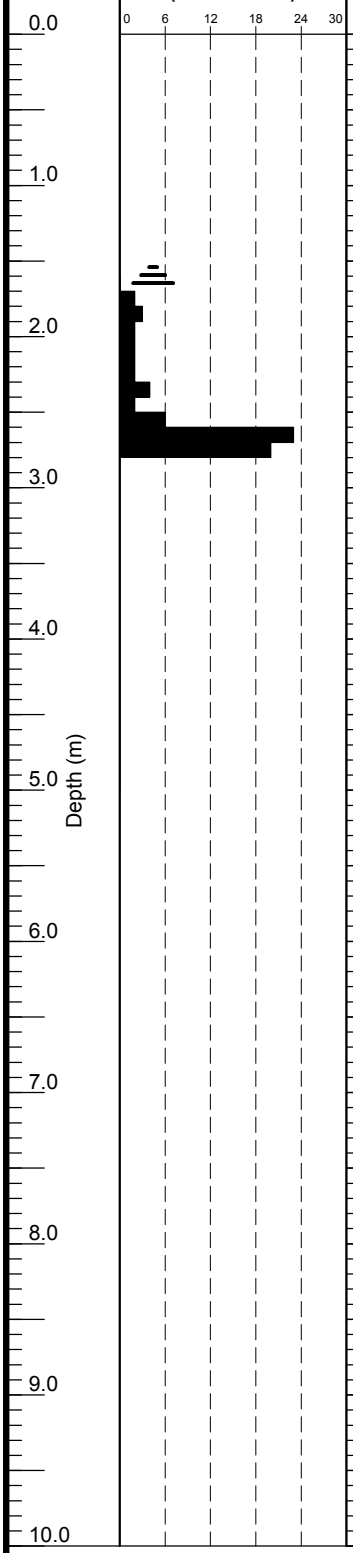
DYNAMIC CONE PENTROMETER TESTING

Project Number: 112-14835
Project Name: Noosa Waters Estate
Location: Noosaville
Client: Sunshine Coast Council

15/G

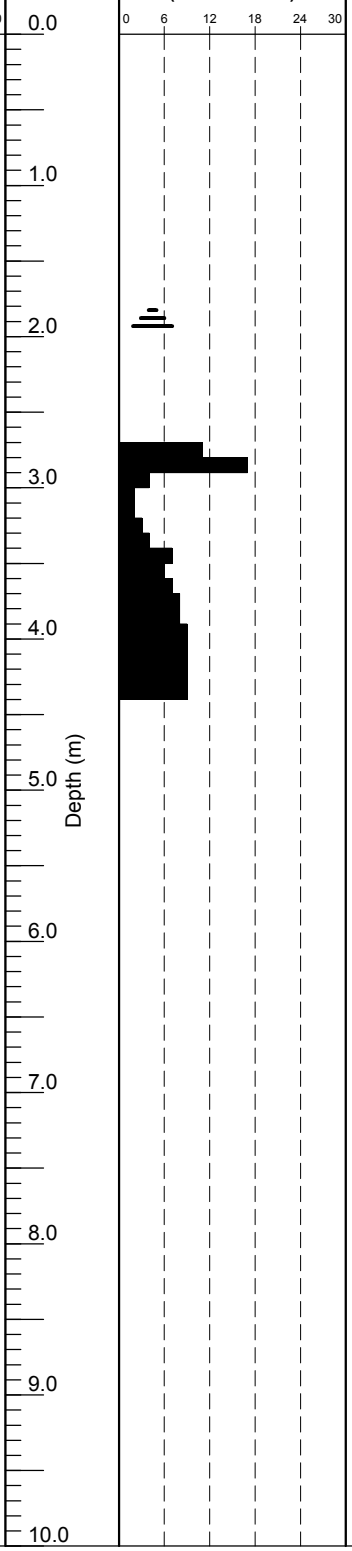
Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.6m.

15/H

Easting: Northing: RL



Notes
1. Operator : KM
2. Date: 18/01/2013
3. Test commenced at 1.9m.

Note: Depth in metres below water level.
- Bed level.

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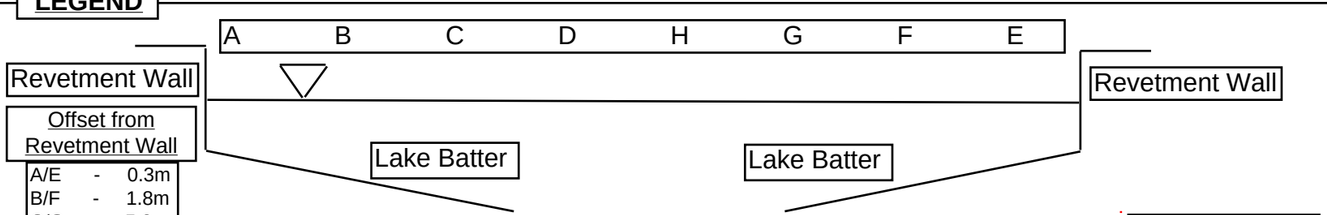
APPENDIX D

SECTIONS -

GEOTECHNICAL INVESTIGATION

DRAWING NO. 112-14835-01

LEGEND



Offset from Revetment Wall

A/E	-	0.3m
B/F	-	1.8m
C/G	-	5.0m
D/E	-	10.0m

Not To Scale

SOIL SURVEYS
Soil Surveys Engineering Pty Limited
A.C.N. 054 043 631
Consulting Geotechnical Engineers

Drawn TP	**Project**	**Geotechnical Investigation - Sections**	Drawing No. 112-14835-01
Date 2013	**Location**	**Noosa Waters Estate - Noosaville**	**A3**
Checked	**Client**	**Sunshine Coast Council**	

APPENDIX E

LABORATORY TEST RESULTS

SOIL & WATER
LABORATORIES PTY LTD

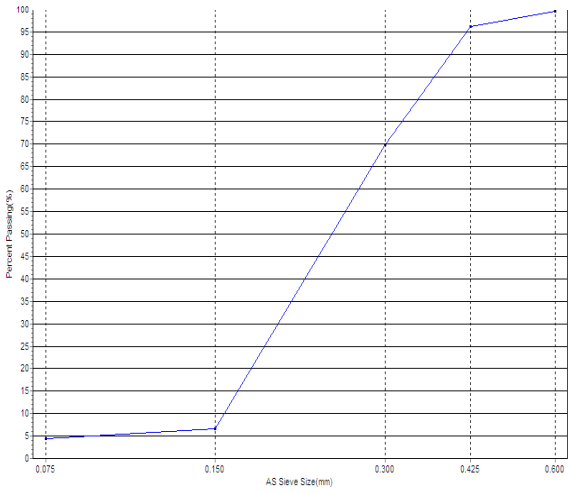
Unit 8, 140 Millaroo Drive
HELENSVALE QLD 4212
PHONE 07 55026795
FAX 07 55026724

soil and water
LABORATORIES

Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46566 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46566**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #15C	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm			
0.600 mm		**100**	
0.425 mm		**96**	
0.300 mm		**70**	
0.150 mm		**7**	
0.075 mm		**4**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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CRAIG FERGUSON HANNAH
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REP ASQUAL-1-37

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LABORATORIES PTY LTD

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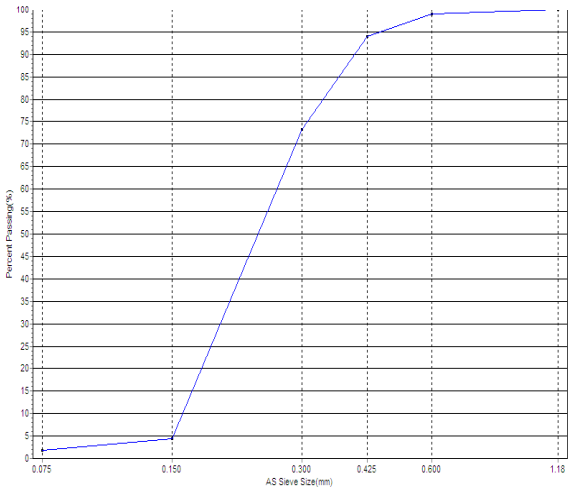
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46565 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46565**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #14G	
Sample Method:	**AS SUPPLIED**	Depth:0.0-0.5m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**94**	
0.300 mm		**73**	
0.150 mm		**4**	
0.075 mm		**2**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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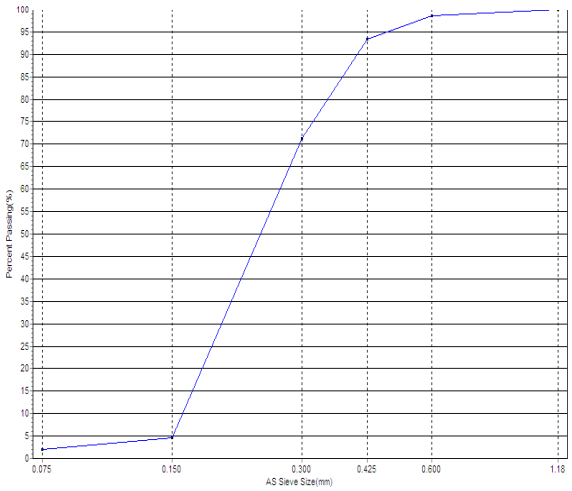
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46564 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46564**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #14D	
Sample Method:	**AS SUPPLIED**	Depth:0.0-0.7m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**93**	
0.300 mm		**71**	
0.150 mm		**5**	
0.075 mm		**2**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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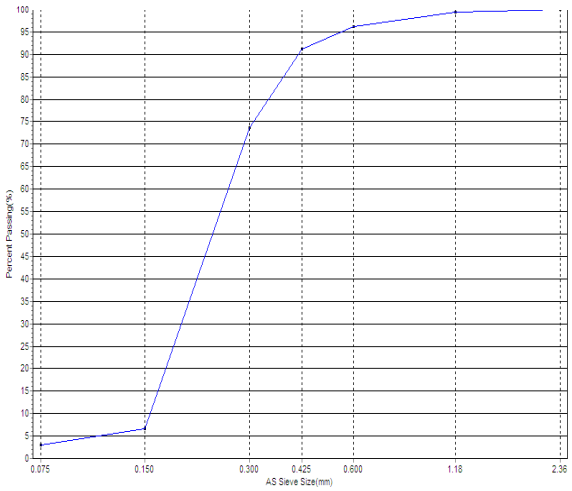
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46563 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**

Lab No:	**SL46563**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #13H	
Sample Method:	**AS SUPPLIED**	Depth:0.0-0.7m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm		**100**	
1.18 mm		**99**	
0.600 mm		**96**	
0.425 mm		**91**	
0.300 mm		**74**	
0.150 mm		**7**	
0.075 mm		**3**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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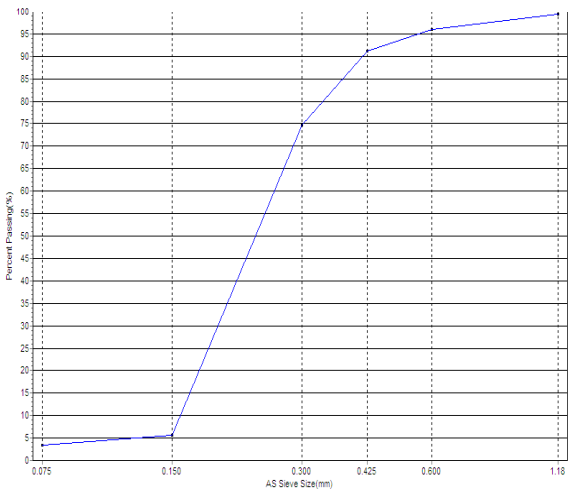
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46562 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46562**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #13D	
Sample Method:	**AS SUPPLIED**	Depth:0.3-0.8m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm		**100**	
1.18 mm		**99**	
0.600 mm		**96**	
0.425 mm		**91**	
0.300 mm		**75**	
0.150 mm		**6**	
0.075 mm		**3**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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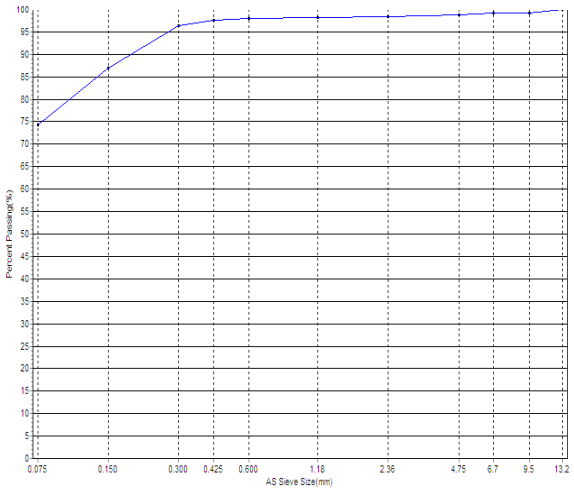
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46561 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46561**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #12H	
Sample Method:	**AS SUPPLIED**	Depth:0.2-0.4m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SILTY SANDY CLAY(CI) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm		**100**	
9.50 mm		**99**	
6.7 mm		**99**	
4.75 mm		**99**	
2.36 mm		**98**	
1.18 mm		**98**	
0.600 mm		**98**	
0.425 mm		**98**	
0.300 mm		**96**	
0.150 mm		**87**	
0.075 mm		**74**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	**AS1289.3.1.2**		**43**	
Plastic Limit (%)	**AS1289.3.2.1**		**19**	
Plasticity Index	**AS1289.3.3.1**		**24**	
Linear Shrinkage (%)	**AS1289.3.4.1**		**12**	

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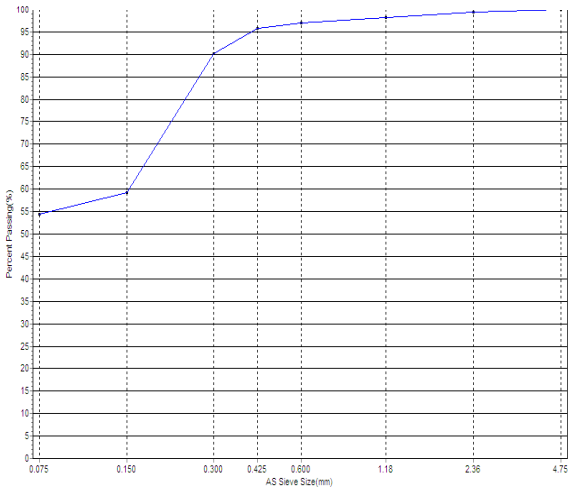
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46560 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	**-**
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46560**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #12D	
Sample Method:	**AS SUPPLIED**	Depth:1.0-1.5m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SILTY SANDY CLAY(CL) GREY, RED MOTTLE**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm		**100**	
2.36 mm		**99**	
1.18 mm		**98**	
0.600 mm		**97**	
0.425 mm		**96**	
0.300 mm		**90**	
0.150 mm		**59**	
0.075 mm		**54**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	**AS1289.3.1.2**		**34**	
Plastic Limit (%)	**AS1289.3.2.1**		**15**	
Plasticity Index	**AS1289.3.3.1**		**19**	
Linear Shrinkage (%)	**AS1289.3.4.1**		**8**	

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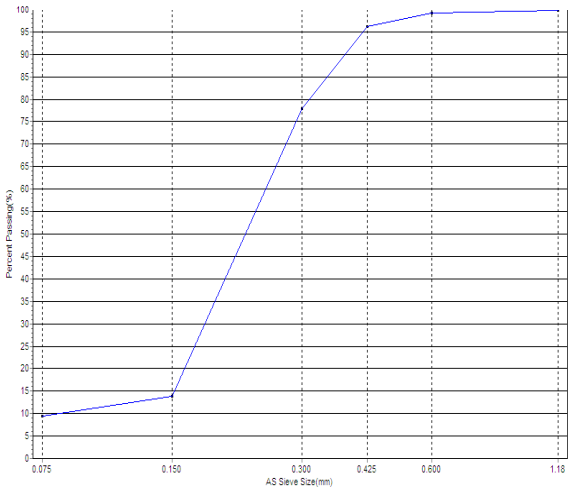
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46559 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**

Lab No:	**SL46559**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #11H	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**96**	
0.300 mm		**78**	
0.150 mm		**14**	
0.075 mm		**9**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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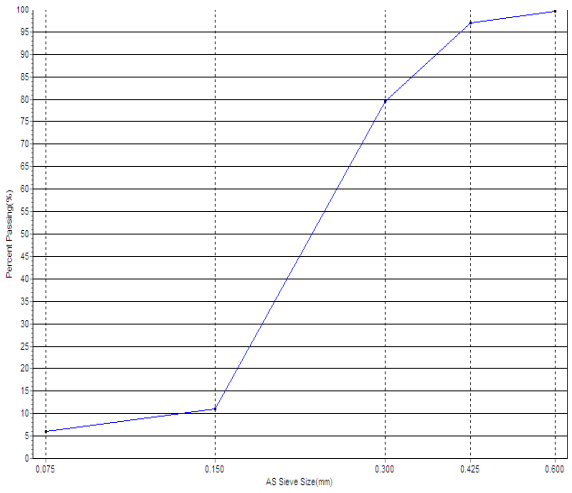
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46558 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46558**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #11D	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm			
0.600 mm		**100**	
0.425 mm		**97**	
0.300 mm		**80**	
0.150 mm		**11**	
0.075 mm		**6**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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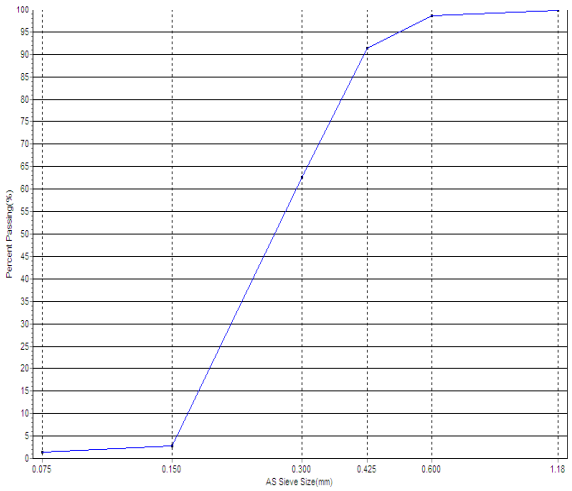
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46557 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**

Lab No:	**SL46557**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #10C	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.2m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**91**	
0.300 mm		**63**	
0.150 mm		**3**	
0.075 mm		**1**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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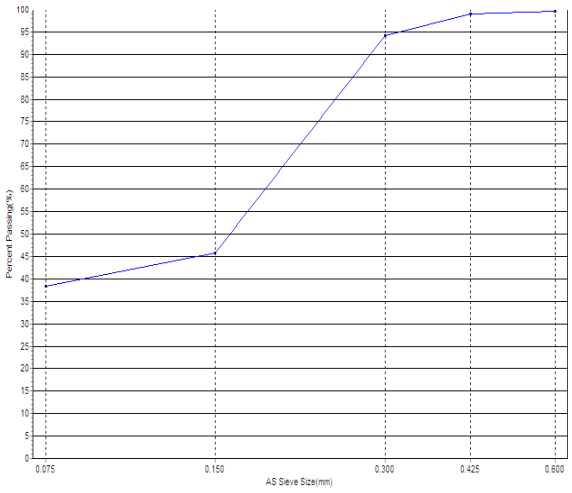
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46556 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46556**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #9H	
Sample Method:	**AS SUPPLIED**	Depth:0.5-1.5m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**CLAYEY SAND(SC) GREY**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm			
0.600 mm		**100**	
0.425 mm		**99**	
0.300 mm		**94**	
0.150 mm		**46**	
0.075 mm		**38**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)	**AS1289.3.1.2**		**31**	
Plastic Limit (%)	**AS1289.3.2.1**		**17**	
Plasticity Index	**AS1289.3.3.1**		**14**	
Linear Shrinkage (%)	**AS1289.3.4.1**		**6**	

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REP ASQUAL-1-37

SOIL & WATER
LABORATORIES PTY LTD

Unit 8, 140 Millaroo Drive
HELENSVALE QLD 4212
PHONE 07 55026795
FAX 07 55026724

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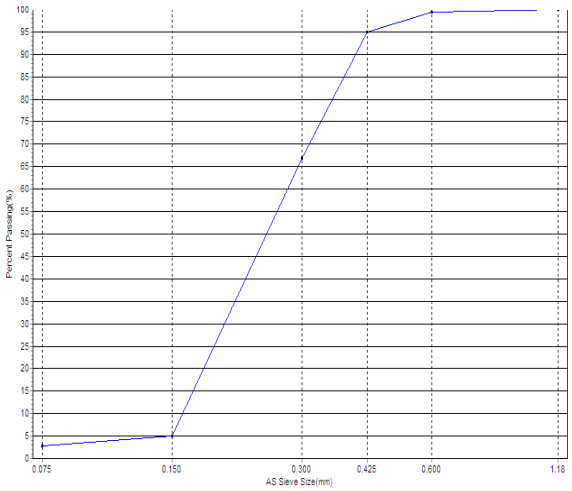
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46555 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46555**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #9D	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.2m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**95**	
0.300 mm		**67**	
0.150 mm		**5**	
0.075 mm		**3**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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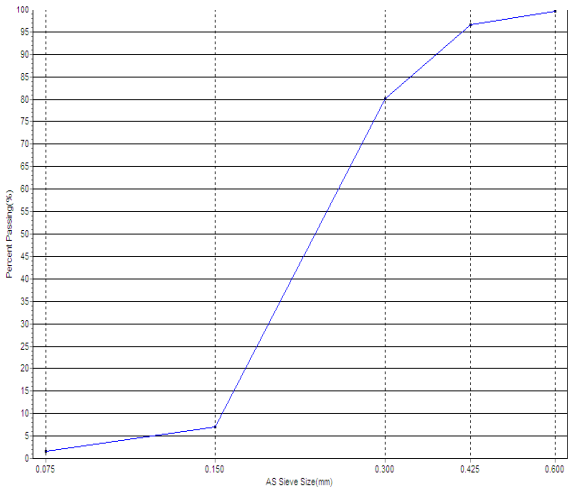
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46554 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46554**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #8G	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm			
0.600 mm		**100**	
0.425 mm		**97**	
0.300 mm		**80**	
0.150 mm		**7**	
0.075 mm		**2**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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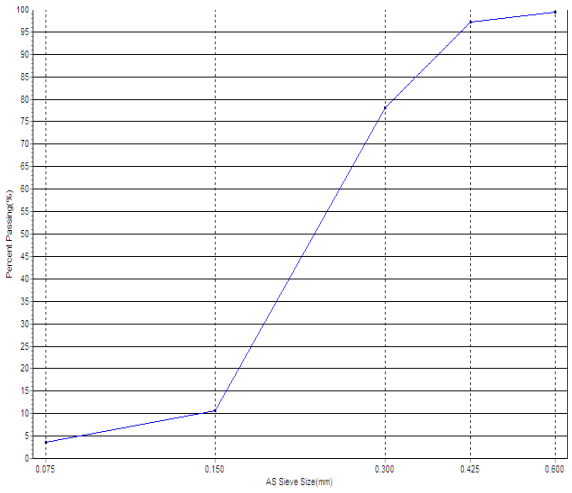
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46553 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46553**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #8D	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**97**	
0.300 mm		**78**	
0.150 mm		**11**	
0.075 mm		**4**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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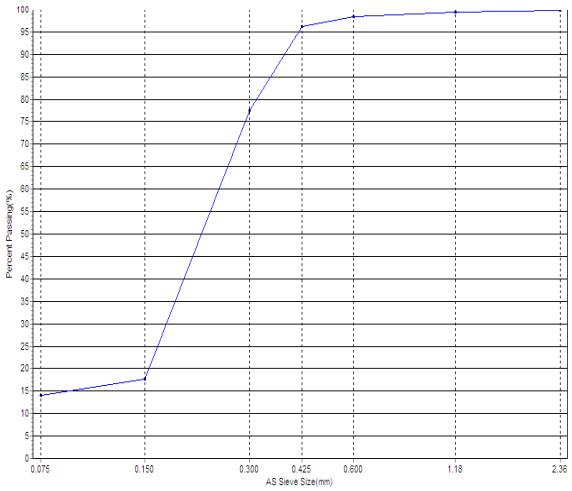
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46552 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46552**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #7H	
Sample Method:	**AS SUPPLIED**	Depth:0.8-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm		**100**	
1.18 mm		**99**	
0.600 mm		**98**	
0.425 mm		**96**	
0.300 mm		**78**	
0.150 mm		**18**	
0.075 mm		**14**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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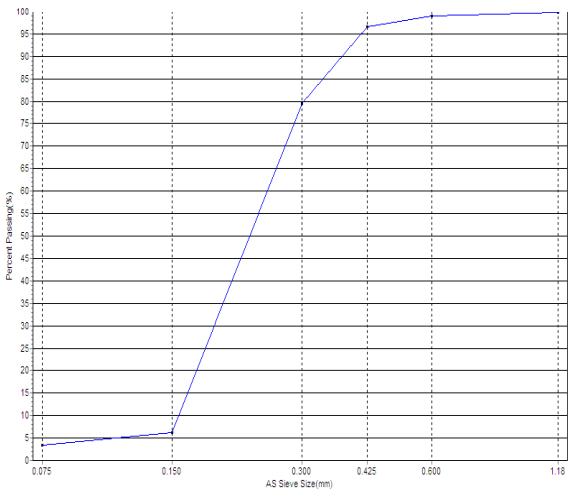
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46551 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**

Lab No:	**SL46551**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #6H	
Sample Method:	**AS SUPPLIED**	Depth:0.0-0.5m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**97**	
0.300 mm		**80**	
0.150 mm		**6**	
0.075 mm		**3**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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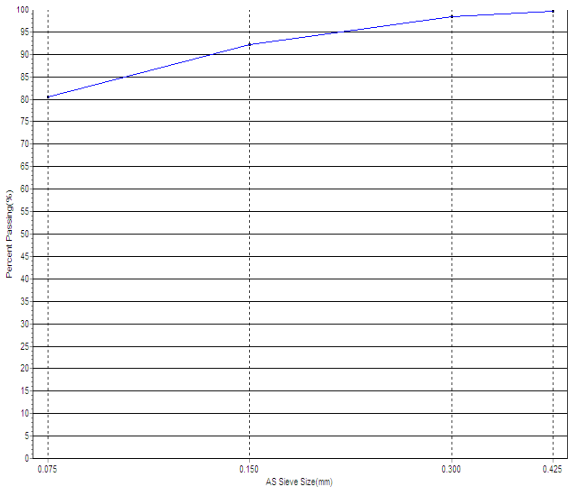
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46550 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46550**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #6D	
Sample Method:	**AS SUPPLIED**	Depth:0.0-0.5m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SANDY SILTY CLAY(CL) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm			
0.600 mm			
0.425 mm		**100**	
0.300 mm		**98**	
0.150 mm		**92**	
0.075 mm		**81**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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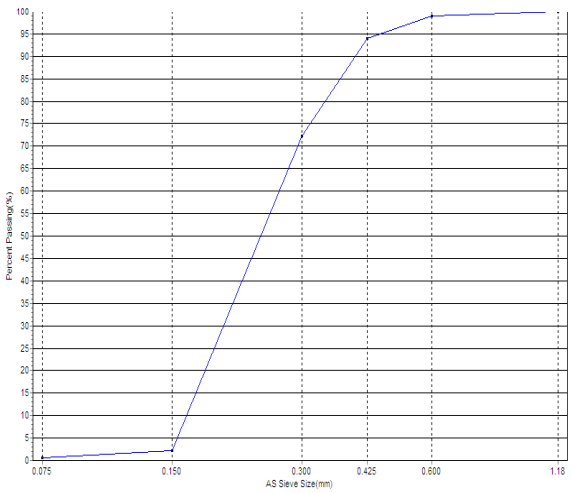
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46549 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46549**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #5G	
Sample Method:	**AS SUPPLIED**	Depth:0.0-0.7m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**94**	
0.300 mm		**72**	
0.150 mm		**2**	
0.075 mm		**1**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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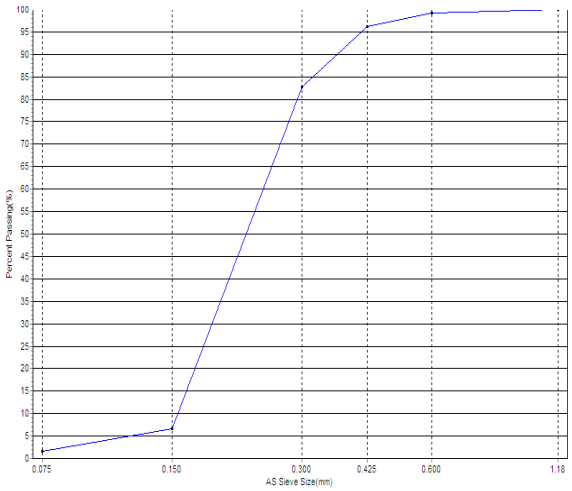
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46548 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46548**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #5C	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**96**	
0.300 mm		**83**	
0.150 mm		**7**	
0.075 mm		**2**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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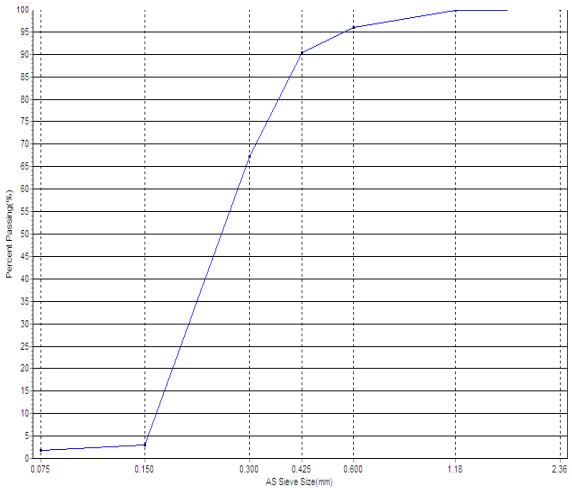
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46547 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**

Lab No:	**SL46547**		Sample Location
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #4F	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm		**100**	
1.18 mm		**100**	
0.600 mm		**96**	
0.425 mm		**90**	
0.300 mm		**67**	
0.150 mm		**3**	
0.075 mm		**2**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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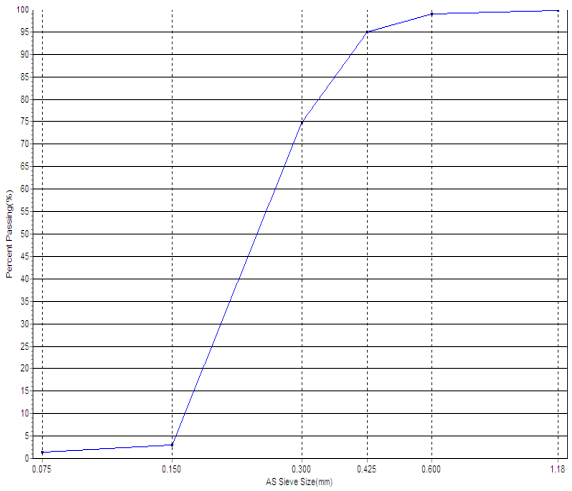
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46546 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46546**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #4C	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**95**	
0.300 mm		**75**	
0.150 mm		**3**	
0.075 mm		**1**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

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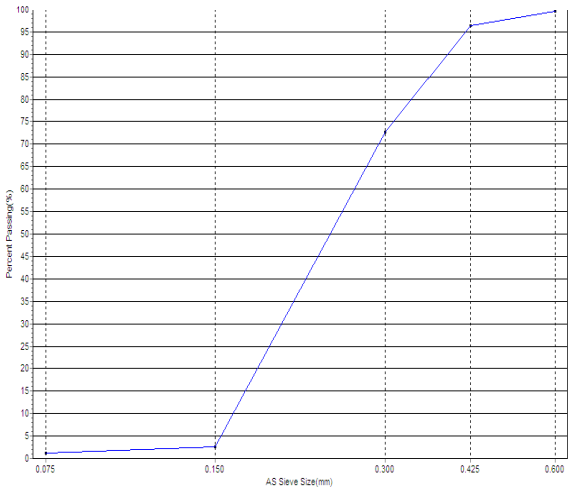
Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46545 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46545**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #3H	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm			
0.600 mm		**100**	
0.425 mm		**96**	
0.300 mm		**73**	
0.150 mm		**3**	
0.075 mm		**1**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory

CRAIG FERGUSON HANNAH
NATA Accred No:15301

Form Number

REP ASQUAL-1-37

SOIL & WATER
LABORATORIES PTY LTD

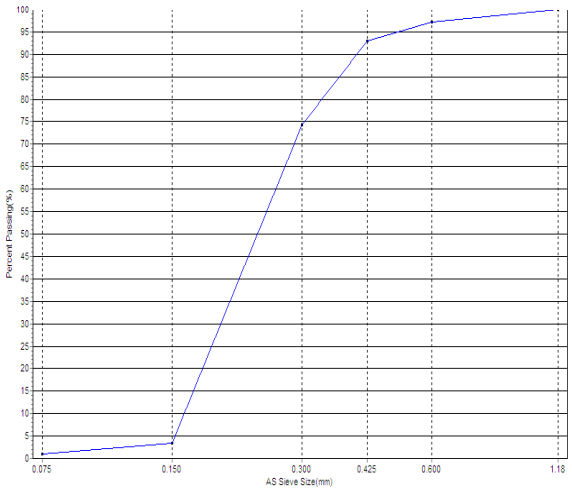
Unit 8, 140 Millaroo Drive
HELENSVALE QLD 4212
PHONE 07 55026795
FAX 07 55026724

soil and water
LABORATORIES

Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46544 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46544**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #3D	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**97**	
0.425 mm		**93**	
0.300 mm		**74**	
0.150 mm		**3**	
0.075 mm		**1**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory

CRAIG FERGUSON HANNAH
NATA Accred No:15301

Form Number

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SOIL & WATER
LABORATORIES PTY LTD

Unit 8, 140 Millaroo Drive
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PHONE 07 55026795
FAX 07 55026724

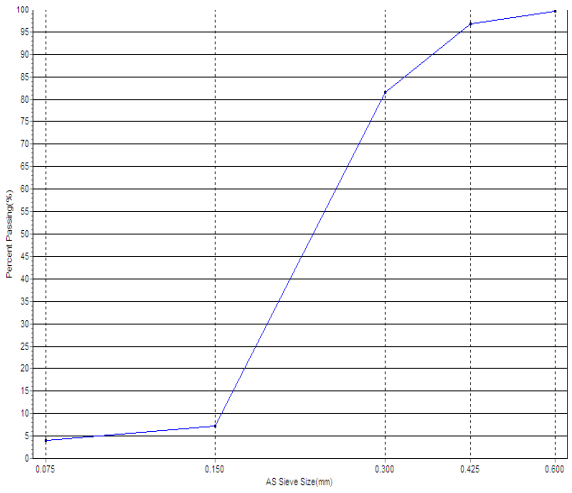
soil and water
LABORATORIES

Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46543 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**

Lab No:	**SL46543**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #2H	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm			
0.600 mm		**100**	
0.425 mm		**97**	
0.300 mm		**81**	
0.150 mm		**7**	
0.075 mm		**4**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory

CRAIG FERGUSON HANNAH
NATA Accred No:15301

Form Number

REP ASQUAL-1-37

SOIL & WATER
LABORATORIES PTY LTD

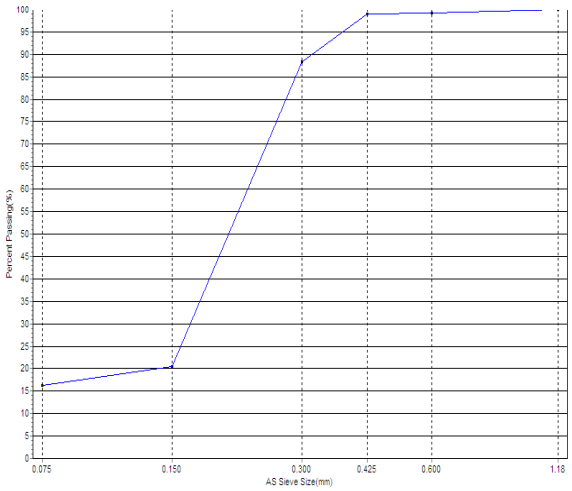
Unit 8, 140 Millaroo Drive
HELENSVALE QLD 4212
PHONE 07 55026795
FAX 07 55026724

soil and water
LABORATORIES

Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46542 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46542**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #2C	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm		**100**	
0.600 mm		**99**	
0.425 mm		**99**	
0.300 mm		**88**	
0.150 mm		**20**	
0.075 mm		**16**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

NATA
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Approved Signatory

CRAIG FERGUSON HANNAH
NATA Accred No:15301

Form Number

REP ASQUAL-1-37

SOIL & WATER
LABORATORIES PTY LTD

Unit 8, 140 Millaroo Drive
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PHONE 07 55026795
FAX 07 55026724

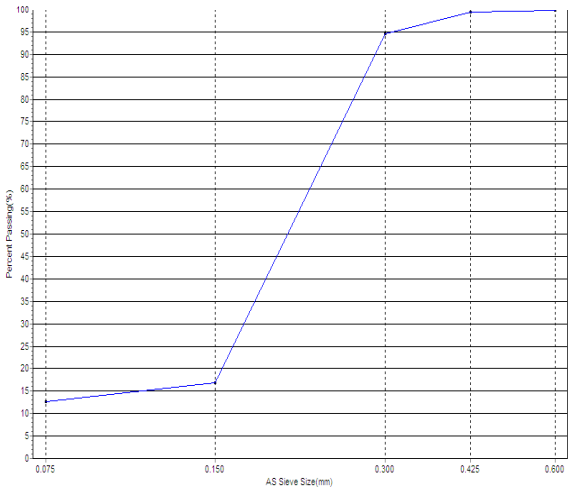
soil and water
LABORATORIES

Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46541 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**

Lab No:	**SL46541**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #1G	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm			
0.600 mm		**100**	
0.425 mm		**99**	
0.300 mm		**95**	
0.150 mm		**17**	
0.075 mm		**13**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory

CRAIG FERGUSON HANNAH
NATA Accred No:15301

Form Number

REP ASQUAL-1-37

SOIL & WATER
LABORATORIES PTY LTD

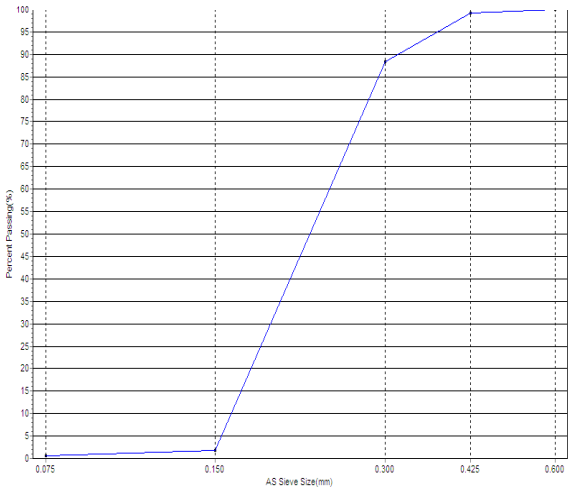
Unit 8, 140 Millaroo Drive
HELENSVALE QLD 4212
PHONE 07 55026795
FAX 07 55026724

soil and water
LABORATORIES

Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46540 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46540**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #1C	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm			
0.600 mm		**100**	
0.425 mm		**99**	
0.300 mm		**88**	
0.150 mm		**2**	
0.075 mm		**1**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory

CRAIG FERGUSON HANNAH
NATA Accred No:15301

Form Number

REP ASQUAL-1-37

SOIL & WATER
LABORATORIES PTY LTD

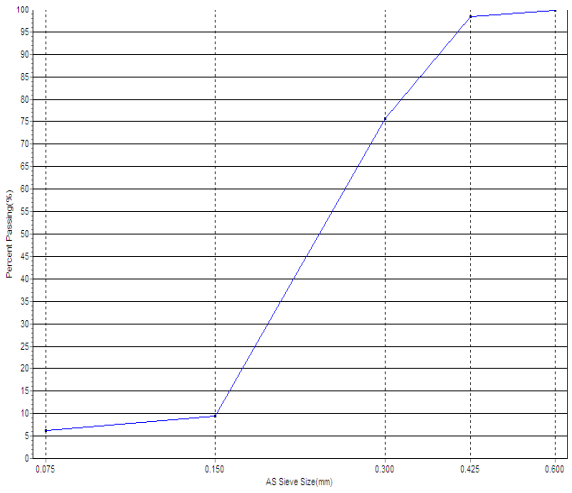
Unit 8, 140 Millaroo Drive
HELENSVALE QLD 4212
PHONE 07 55026795
FAX 07 55026724

soil and water
LABORATORIES

Quality of Materials Report

Client:	**SOIL SURVEYS ENGINEERING PTY LTD - MILTON**	Report Number:	**SL46567 Q**
Client Address:	**LEVEL 2, 19 FINCHLEY ST MILTON QLD 4064**		
Job Number:	**1-14835**	Report Date:	**11/02/2013**
Project:	**NOOSA WATERS ESTATE**	Order Number:	-
Location	**, NOOSAVILLE**		**Page 1 of 1**
Lab No:	**SL46567**	Sample Location	
Date Sampled:	**31/01/2013**	Allotment No :	
Date Tested:	**08/02/2013**	Offset :	
Sampled By:	**CLIENT**	Location :SAMPLE #15H	
Sample Method:	**AS SUPPLIED**	Depth:0.0-1.0m	
Material Source:	**UNKNOWN**	Spec Description:	-
For Use As:	**UNKNOWN**	Lot Number:	-
Remarks:	**SAND(SP) GREY BROWN**	Spec Number:	-

Test Method: **AS1289.3.6.1**



A.S. Sieve Sizes	Specification Minimum	Percent Passing	Specification Maximum
75.00 mm			
53.00 mm			
37.50 mm			
26.50 mm			
19.00 mm			
13.2 mm			
9.50 mm			
6.7 mm			
4.75 mm			
2.36 mm			
1.18 mm			
0.600 mm		**100**	
0.425 mm		**98**	
0.300 mm		**76**	
0.150 mm		**10**	
0.075 mm		**6**	

Atterberg Tests	Test Method	Specification Minimum	Result	Specification Maximum
Liquid Limit (%)			-	
Plastic Limit (%)			-	
Plasticity Index			-	
Linear Shrinkage (%)			-	

NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory

CRAIG FERGUSON HANNAH
NATA Accred No:15301

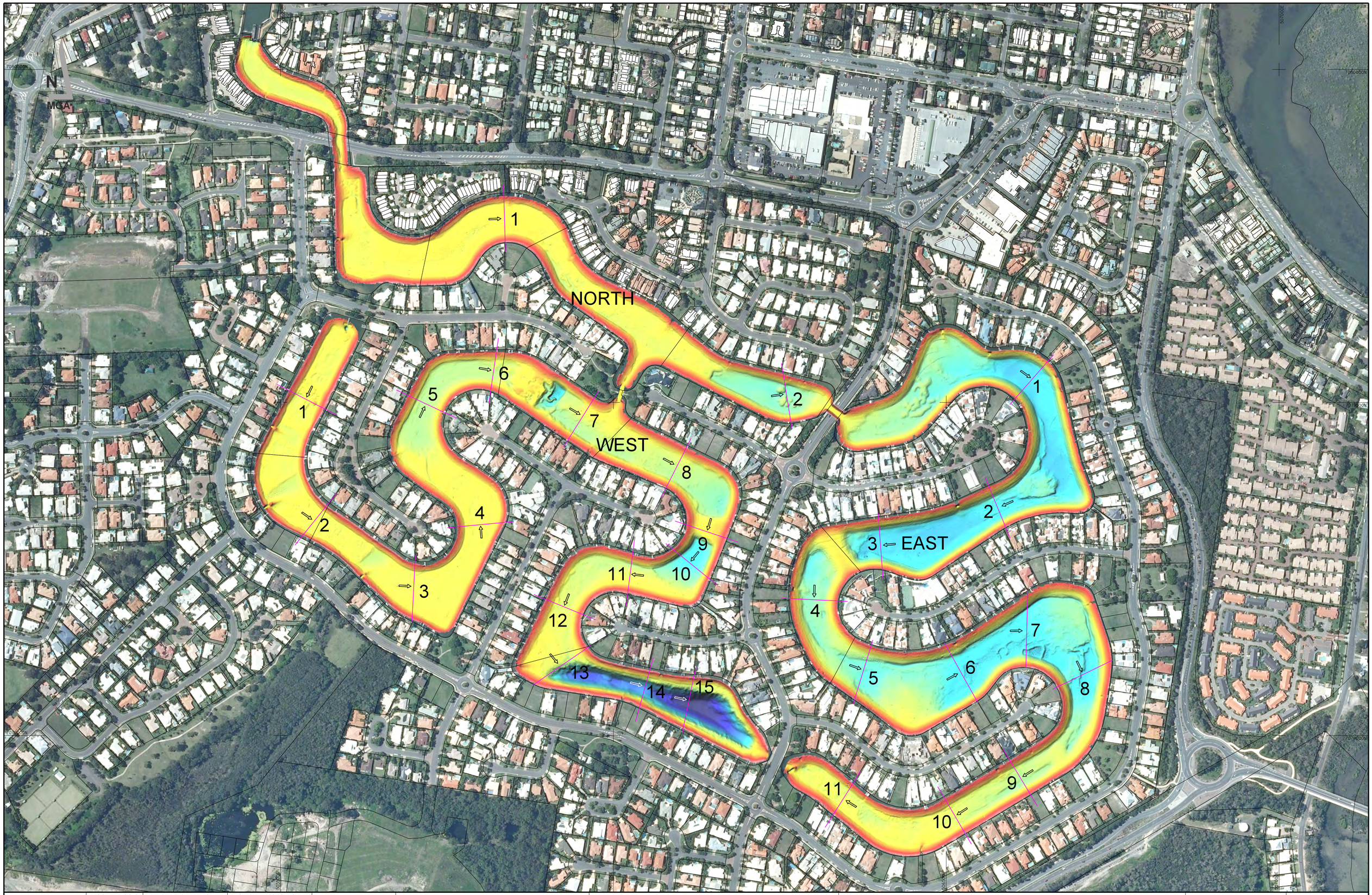
Form Number

REP ASQUAL-1-37

APPENDIX F

HYDROGRAPHIC SURVEY -

DRAWING NO'S. 127632, 127625 1-6



Surveyor: D INGLIS
Field Book: H13641
Vessel: Investigator/Curlew II
Data Type: MINIMUM DEPTHS
Data File: 15361003

DESIGN DIMENSIONS
Depth: N/A
Ins. Depth: N/A

Notes:
Cross Section data close to the revetment wall contains INTERPOLATED DATA - Survey coverage outside of the Multibeam Data to the revetment wall was from single beam profiles and as such, Cross Sections have been calculated by interpolating between survey data.
Cross Section Direction of Viewing (into the page).

VERTICAL MEASUREMENTS
Equipment: RESON 8125/Hydrotrac
Calibration: 24/10/2011 - DAILY
Tide Gauge: LOCAL RBR GAUGE
Benchmark: PSM 101464 (RL = 1.958)
Datum: A.H.D

HORIZONTAL POSITIONING
Equipment: POS MV/TRIMBLER7
Mode: RTK FLOAT
Base Station: COOROY SMARTNET
Datum: MGA

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ± 0.15 m
Horizontal Tolerance (95%): ± 0.5 m
Typical Coverage: 100
Survey Class: A/C (Multibeam/Singlebeam)

DAN INGLIS
SURVEYOR DATE

ROBERT SLATER
SURVEYING SURVEYOR DATE

GILES STIMSON
MANAGER GEOGRAPHIC SERVICES DATE

Noosa Waters Depth Colour Legend
Positive Depths (A.H.D)m
0,0 1,0 2,0 4,0 7,0 10,0

SCALE 1:2500 (Before Reduction from A1 sheet)
Metres
0 50 100 150 200 250

LEVEL DATUM: A.H.D

AZIMUTH DATUM: GDA 94

Noosa Waters Canal Estate

CROSS SECTION OVERVIEW

HYDROGRAPHIC SURVEY 17 - 31 January 2012

PORT of BRISBANE
Here for the future

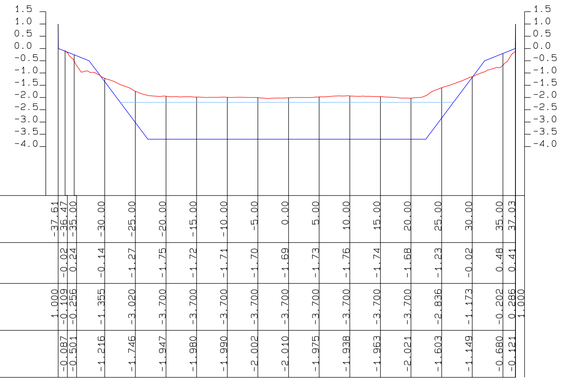
PORT OF BRISBANE PTY LTD
PORT OFFICE:
3 PORT CENTRAL AVENUE
PORT OF BRISBANE
QUEENSLAND 4178

Phone 07 32584888
Fax 07 32584704
Email portbris@portbris.com.au

Dwg. No.
127632
Proj. File: Noosa Waters

Cross Section 1
Scale(H) 1 : 500
Scale(V) 1 : 125

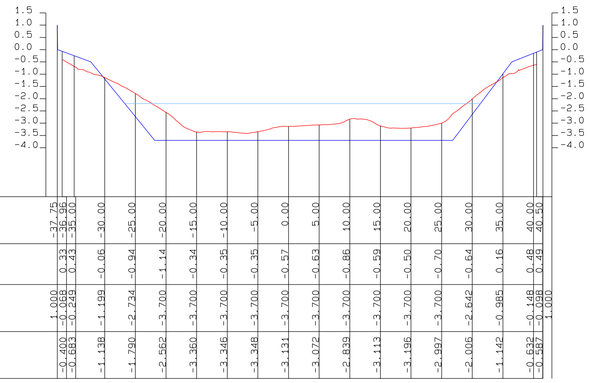
CL Coordinates
E = 505836.373
N = 7079777.000



DATUM LEVEL -6.00																		
OFFSET	-37.61	-36.27	-35.00	-30.00	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	35.00	37.03
DIFF Design - Survey	1.000	1.000	0.256	-1.355	-3.020	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-2.836	-1.173	0.202	1.000
DESIGN SURFACE	-0.087	-0.140	-0.256	-1.216	-1.746	-1.947	-1.980	-1.990	-2.002	-2.010	-1.975	-1.938	-1.963	-2.021	-1.603	-1.149	-0.680	-0.121
HYDRO SURVEY 12	-0.087	-0.140	-0.501	-1.216	-1.746	-1.947	-1.980	-1.990	-2.002	-2.010	-1.975	-1.938	-1.963	-2.021	-1.603	-1.149	-0.680	-0.121

Cross Section 2
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 506260.405
N = 7079509.360



DATUM LEVEL -6.00																			
OFFSET	-37.25	-36.06	-35.00	-30.00	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	40.30
DIFF Design - Survey	1.000	0.660	0.249	-1.199	-2.734	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-2.642	-0.985	0.148	1.000
DESIGN SURFACE	-0.400	-0.683	-1.138	-1.790	-2.562	-3.360	-3.346	-3.348	-3.131	-3.072	-2.839	-3.113	-3.196	-2.997	-2.006	-1.142	-0.632	-0.197	-0.197
HYDRO SURVEY 12	-0.400	-0.683	-1.138	-1.790	-2.562	-3.360	-3.346	-3.348	-3.131	-3.072	-2.839	-3.113	-3.196	-2.997	-2.006	-1.142	-0.632	-0.197	-0.197

Surveyor: D INGLIS
Field Book: H13641
Vessel: Investigator/Curlew II
Data Type: MINIMUM DEPTHS
Data File: 1536103

DESIGN DIMENSIONS
Depth: N/A
Ins. Depth: N/A

Notes:
Vertical Exaggeration = 4
Hydrographic Survey 2012
3.7m Design Surface
2.2m Design Surface

VERTICAL MEASUREMENTS
Equipment: Reson 8125/Hydrotrac
Calibration: 24/10/2012/Daily
Tide Gauge: LOCAL TIDE GAUGE
Benchmark: PSM101464 (RL=1.958m)
Datum: AHD

HORIZONTAL POSITIONING
Equipment: POSMV/TRIMBLE R7
Mode: RTK Float
Base Station: COOROY SMARTNET
Datum: MGA

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ± 0.15 m
Horizontal Tolerance (95%): ± 0.5 m
Typical Coverage: 100%
Survey Class: A/C (Multibeam/Singlebeam)

DAN INGLIS
SURVEYOR DATE

ROBERT SLATER
SUPERVISING SURVEYOR DATE

GILES STIMSON
MANAGER PORT SURVEYS DATE

SCALE 1:500 (Before Reduction from A1 sheet)
Metres
0 10 20 30 40 50

LEVEL DATUM: AHD
AZIMUTH DATUM: GDA 94

Noosa Waters Canal Estate - North

Cross Sections

INVESTIGATION SURVEY 17 - 31 January 2012

GDA

PORT of BRISBANE
Here for the future

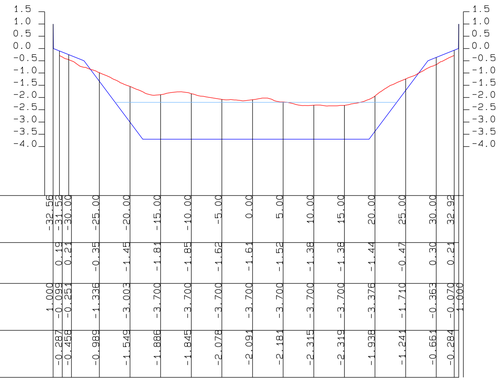
PORT OF BRISBANE PTY LTD
PORT OFFICE:
3 PORT CENTRAL AVENUE
PORT OF BRISBANE
QUEENSLAND 4178

Phone 07 32584888
Fax 07 32564704
Email portbris@portbris.com.au

Dwg. No. 127625 - 1
Proj. File: Noosa Waters

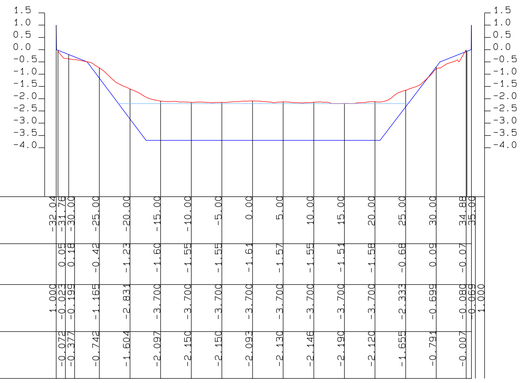
Cross Section 1
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 505538.964
N = 7079504.311



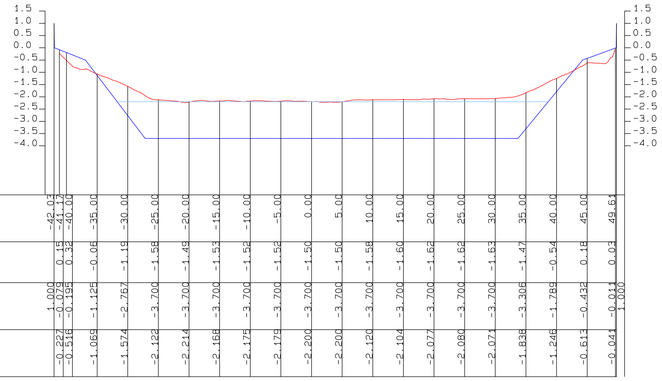
Cross Section 2
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 505552.836
N = 7079324.604



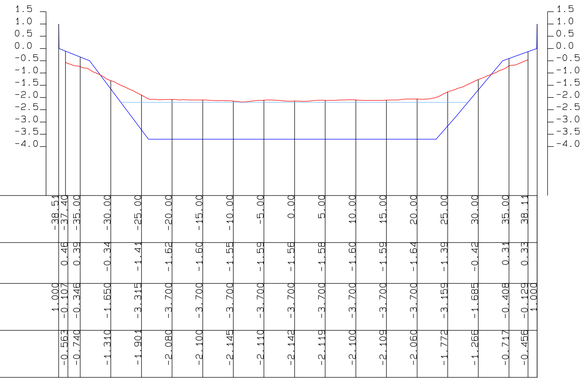
Cross Section 3
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 505699.973
N = 7079220.762



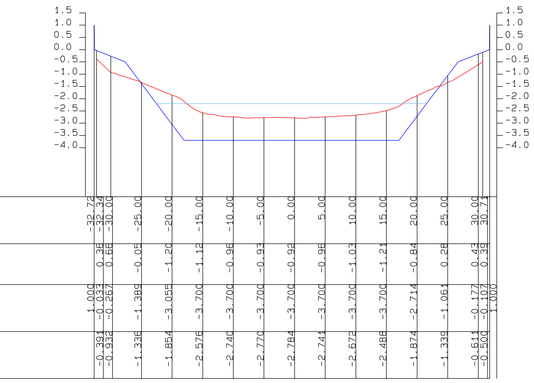
Cross Section 4
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 505800.295
N = 7079316.448



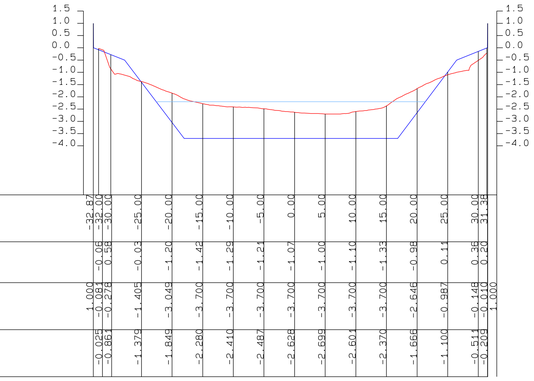
Cross Section 5
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 505719.105
N = 7079497.532



Cross Section 6
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 505820.019
N = 7079547.327



Surveyor: D INGLIS
Field Book: H13641
Vessel: Investigator/Curlew II
Data Type: MINIMUM DEPTHS
Data File: 1536103

Notes:

Vertical Exaggeration = 4
Hydrographic Survey 2012
3.7m Design Surface
2.2m Design Surface

DESIGN DIMENSIONS
Depth: N/A
Ins. Depth: N/A

VERTICAL MEASUREMENTS
Equipment: Reson 8125/Hydrotrac
Calibration: 24/10/2012/Daily
Tide Gauge: LOCAL TIDE GAUGE
Benchmark: PSM101464 (RL=1.958m)
Datum: AHD

HORIZONTAL POSITIONING
Equipment: POSMV/TRIMBLE R7
Mode: RTK Float
Base Station: COOROY SMARTNET
Datum: MGA

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ± 0.15 m
Horizontal Tolerance (95%): ± 0.5 m
Typical Coverage: 100%
Survey Class: A/C (Multibeam/Singlebeam)

DAN INGLIS — SURVEYOR — DATE
ROBERT SLATER — SUPERVISING SURVEYOR — DATE
GILES STIMSON — MANAGER PORT SURVEYS — DATE

SCALE 1:500 (Before Reduction from A1 sheet)
Metres
0 10 20 30 40 50

LEVEL DATUM: AHD
AZIMUTH DATUM: GDA 94

Noosa Waters Canal Estate - West
Cross Sections
INVESTIGATION SURVEY 17 - 31 January 2012

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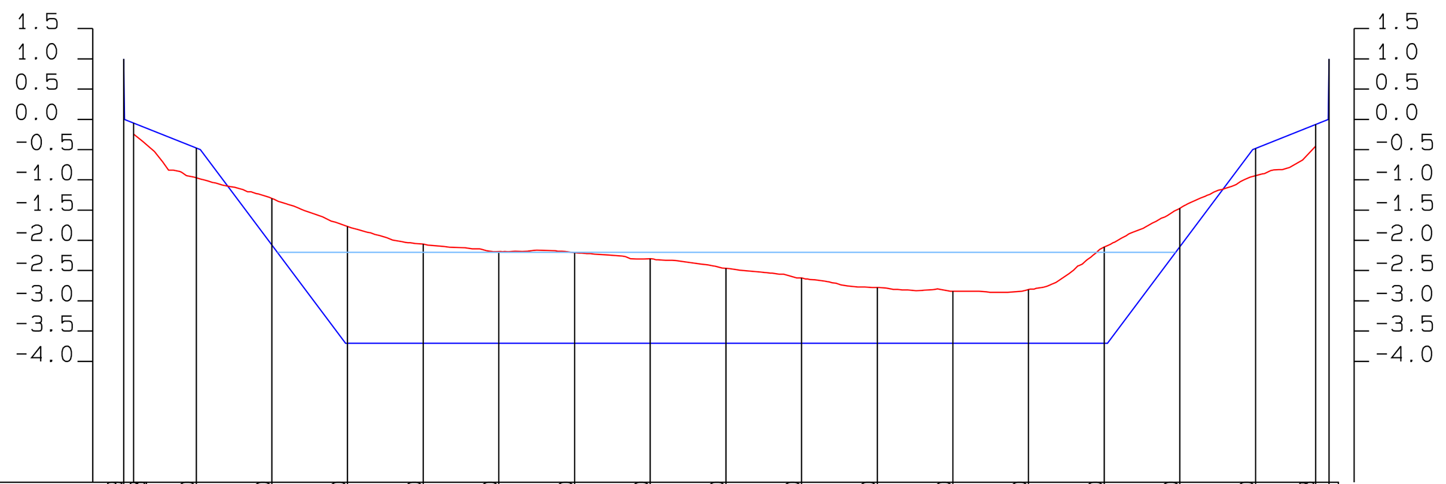
Dwg. No. 127625 - 2
Proj. File: Noosa Waters

Cross Section 7
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 505951.572
N = 7079475.317

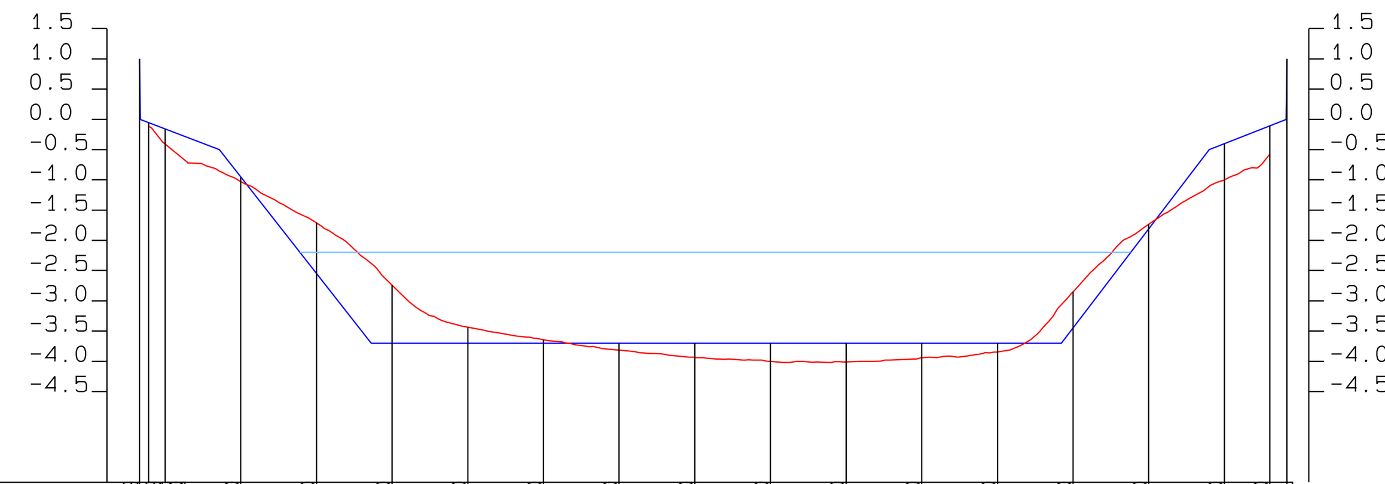


DATUM LEVEL -6.00

OFFSET	-39.79	-39.13	-35.00	-30.00	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	35.00	38.98	
DIFF Design - Survey		0.18	0.49	-0.77	-1.93	-1.64	-1.51	-1.50	-1.40	-1.24	-1.08	-0.92	-0.86	-0.89	-1.59	-0.63	0.45	0.36	
DESIGN SURFACE	1.000	-0.060	-0.473	-2.077	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-2.104	-0.481	-0.083	1.000
HYDRO SURVEY 12		-0.242	-0.966	-1.309	-1.770	-2.061	-2.187	-2.203	-2.303	-2.463	-2.622	-2.780	-2.840	-2.814	-2.110	-1.470	-0.931	-0.444	

Cross Section 10
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 506117.511
N = 7079256.752

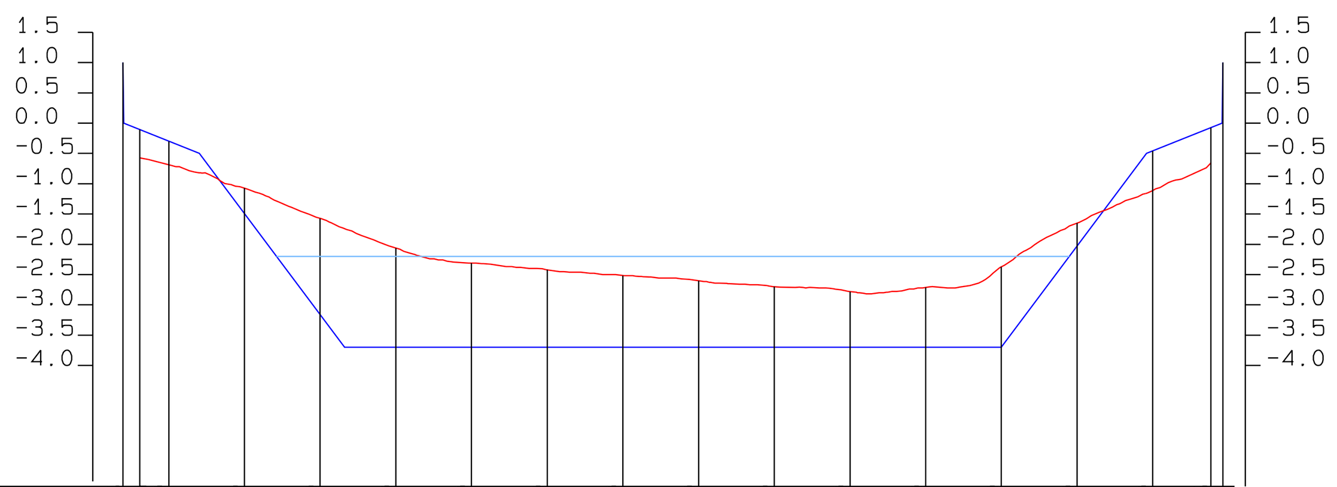


DATUM LEVEL -6.00

OFFSET	-36.69	-36.09	-35.00	-30.00	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	35.00	38.00	
DIFF Design - Survey		0.06	0.25	0.08	-0.84	-0.96	-0.26	-0.06	0.11	0.24	0.30	0.31	0.24	0.14	-0.59	-0.07	0.60	0.47	
DESIGN SURFACE	1.000	-0.053	-0.157	-0.953	-2.547	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.443	-1.806	-0.401	-0.105	1.000
HYDRO SURVEY 12		-0.110	-0.408	-1.031	-1.710	-2.739	-3.437	-3.643	-3.813	-3.936	-4.001	-4.010	-3.940	-3.844	-2.852	-1.734	-1.003	-0.574	

Cross Section 8
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 506094.250
N = 7079401.675

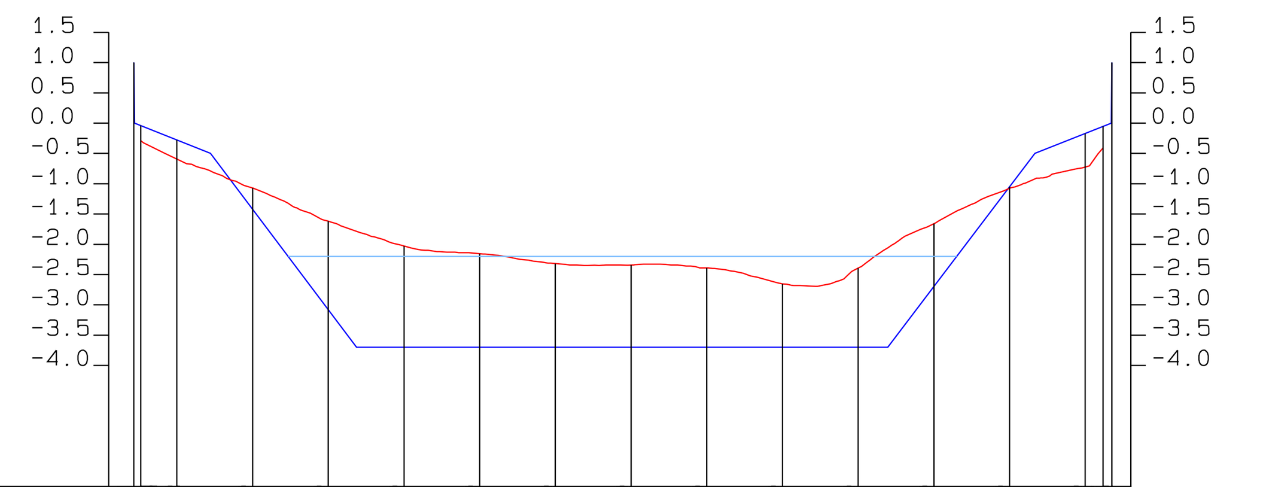


DATUM LEVEL -6.00

OFFSET	-38.03	-36.91	-35.00	-30.00	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	33.85	
DIFF Design - Survey		0.47	0.39	-0.42	-1.59	-1.64	-1.39	-1.28	-1.18	-1.10	-1.00	-0.92	-0.99	-1.33	-0.38	0.65	0.58	
DESIGN SURFACE	1.000	-0.107	-0.299	-1.497	-3.163	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.698	-2.032	-0.460	-0.074	1.000
HYDRO SURVEY 12		-0.574	-0.689	-1.073	-1.573	-2.062	-2.310	-2.422	-2.517	-2.602	-2.700	-2.782	-2.712	-2.371	-1.651	-1.111	-0.656	

Cross Section 11
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 506025.426
N = 7079244.285

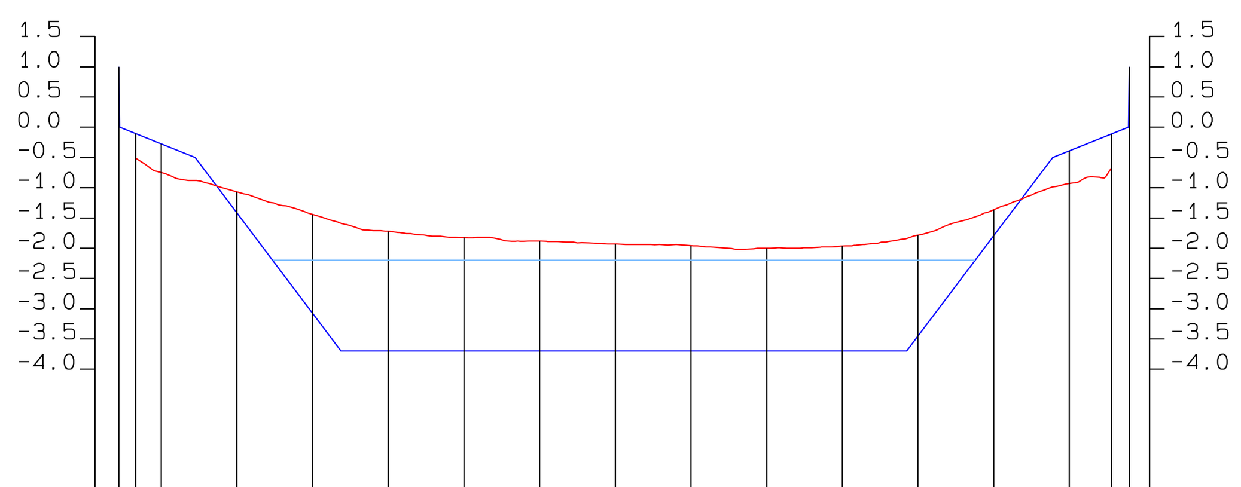


DATUM LEVEL -6.00

OFFSET	-32.84	-32.38	-30.00	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	31.17	
DIFF Design - Survey		0.25	0.31	-0.35	-1.46	-1.67	-1.54	-1.38	-1.36	-1.31	-1.05	-1.31	-1.04	0.03	0.55	0.36	
DESIGN SURFACE	1.000	-0.041	-0.278	-1.421	-3.079	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-2.698	-1.050	-0.170	-0.054	1.000
HYDRO SURVEY 12		-0.291	-0.592	-1.070	-1.620	-2.030	-2.155	-2.319	-2.341	-2.390	-2.654	-2.393	-1.659	-1.076	-0.723	-0.409	

Cross Section 9
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 506140.077
N = 7079306.061

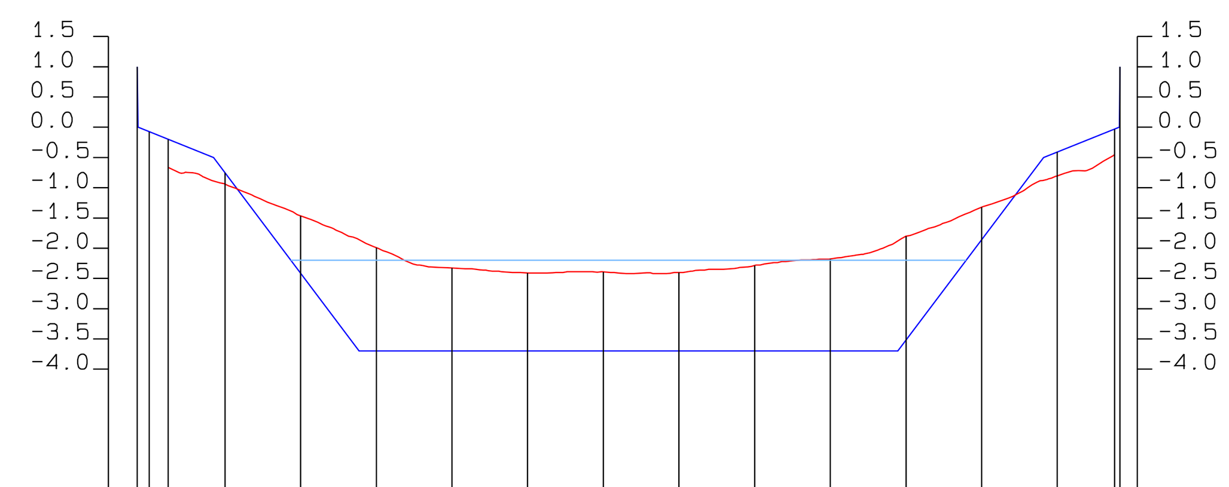


DATUM LEVEL -6.00

OFFSET	-32.80	-31.70	-30.00	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	32.79	
DIFF Design - Survey		0.40	0.48	-0.35	-1.64	-1.98	-1.88	-1.82	-1.77	-1.74	-1.70	-1.74	-1.67	-0.43	0.54	0.56	
DESIGN SURFACE	1.000	-0.105	-0.275	-1.416	-3.079	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.453	-1.794	-0.391	-0.113	1.000
HYDRO SURVEY 12		-0.509	-0.751	-1.068	-1.442	-1.720	-1.825	-1.880	-1.930	-1.957	-2.000	-1.964	-1.785	-1.364	-0.930	-0.672	

Cross Section 12
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 505926.839
N = 7079192.651



DATUM LEVEL -6.00

OFFSET	-30.80	-30.00	-28.76	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	33.78	
DIFF Design - Survey			0.47	0.19	-0.95	-1.71	-1.37	-1.29	-1.31	-1.30	-1.41	-1.52	-1.72	-0.54	0.39	0.42	
DESIGN SURFACE	1.000	-0.075	-0.199	-0.752	-2.416	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.523	-1.860	-0.409	-0.032	1.000
HYDRO SURVEY 12			-0.666	-0.940	-1.466	-1.992	-2.325	-2.409	-2.392	-2.400	-2.286	-2.176	-1.800	-1.320	-0.802	-0.453	

Surveyor: D INGLIS
Field Book: H13641
Vessel: Investigator/Curlew II
Data Type: MINIMUM DEPTHS
Data File: 1536103

DESIGN DIMENSIONS
Depth: N/A
Ins. Depth: N/A

Notes:
Vertical Exaggeration = 4
Hydrographic Survey 2012
3.7m Design Surface
2.2m Design Surface

VERTICAL MEASUREMENTS
Equipment: Reson 8125/Hydrotrac
Calibration: 24/10/2012/Daily
Tide Gauge: LOCAL TIDE GAUGE
Benchmark: PSM101464 (RL=1.958m)
Datum: AHD

HORIZONTAL POSITIONING
Equipment: POSMV/TRIMBLE R7
Mode: RTK Float
Base Station: COOROY SMARTNET
Datum: MGA

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ± 0.15 m
Horizontal Tolerance (95%): ± 0.5 m
Typical Coverage: 100%
Survey Class: A/C (Multibeam/Singlebeam)

DAN INGLIS — SURVEYOR — DATE
ROBERT SLATER — SUPERVISING SURVEYOR — DATE
GILES STIMSON — MANAGER PORT SURVEYS — DATE

SCALE 1:500 (Before Reduction from A1 sheet)
Metres
0 10 20 30 40 50

LEVEL DATUM: AHD
AZIMUTH DATUM: GDA 94

Noosa Waters Canal Estate - West

Cross Sections

INVESTIGATION SURVEY 17 - 31 January 2012

GDA

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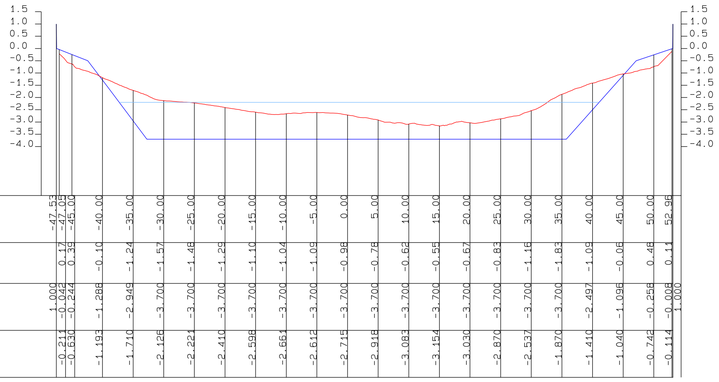
Dwg. No. 127625 - 3
Proj. File: Noosa Waters

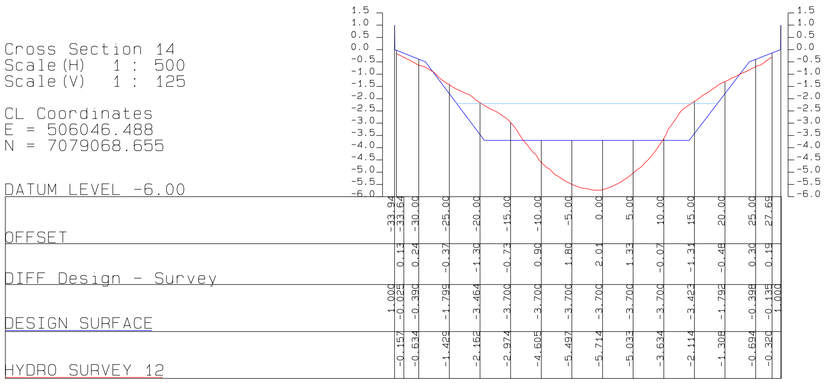
Cross Section 13
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 505924.413
N = 7079106.451



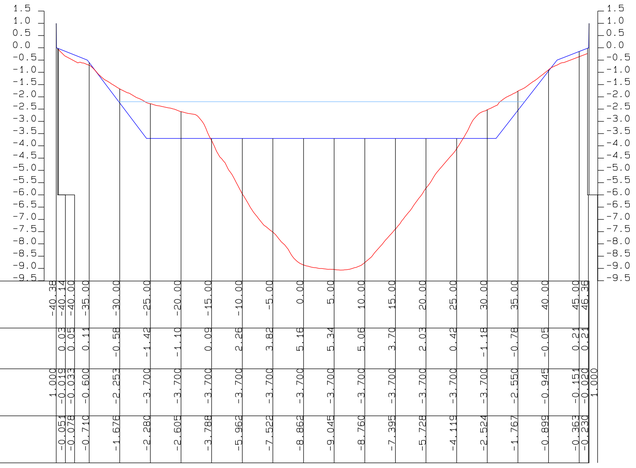
Cross Section 14
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 506046.488
N = 7079068.655



Cross Section 15
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 506113.503
N = 7079052.463



Surveyor: D INGLIS Field Book: H13641 Vessel: Investigator/Curlew II Data Type: MINIMUM DEPTHS Data File: 1536103	DESIGN DIMENSIONS Depth: N/A Ins. Depth: N/A	VERTICAL MEASUREMENTS Equipment: Reson 8125/Hydrotrac Calibration: 24/10/2012/Daily Tide Gauge: LOCAL TIDE GAUGE Benchmark: PSM101464 (RL=1.958m) Datum: AHD	HORIZONTAL POSITIONING Equipment: POSMV/TRIMBLE R7 Mode: RTK Float Base Station: COOROY SMARTNET Datum: MGA	DAN INGLIS SURVEYOR DATE ROBERT SLATER SUPERVISING SURVEYOR DATE GILES STIMSON MANAGER PORT SURVEYS DATE

Notes:
Vertical Exaggeration = 4
Hydrographic Survey 2012
3.7m Design Surface
2.2m Design Surface

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ± 0.15 m
Horizontal Tolerance (95%): ± 0.5 m
Typical Coverage: 100%
Survey Class: A/C (Multibeam/Singlebeam)

SCALE 1:500 (Before Reduction from A1 sheet)
Metres
0 10 20 30 40 50

LEVEL DATUM: AHD
AZIMUTH DATUM: GDA 94

Noosa Waters Canal Estate - West

Cross Sections

INVESTIGATION SURVEY 17 - 31 January 2012

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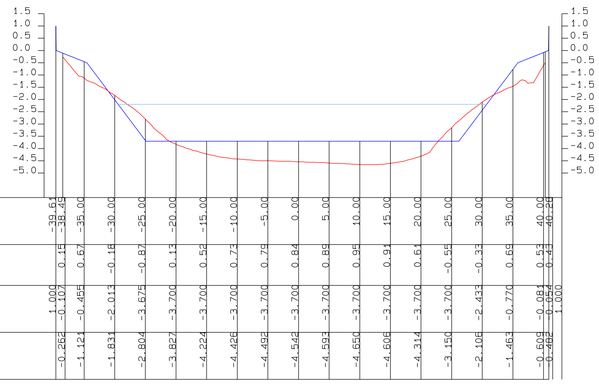
Email portbris@portbris.com.au

Dwg. No. 127625 - 4
Proj. File: Noosa Waters

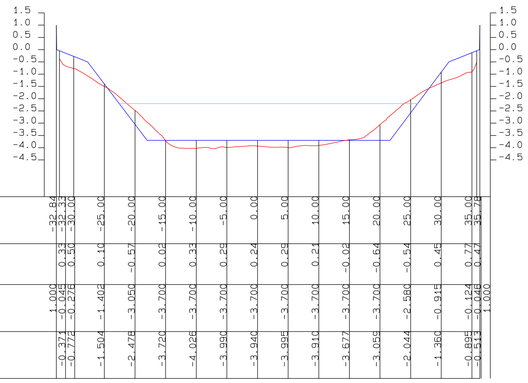
Cross Section 1
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 506628.649
N = 7079534.428



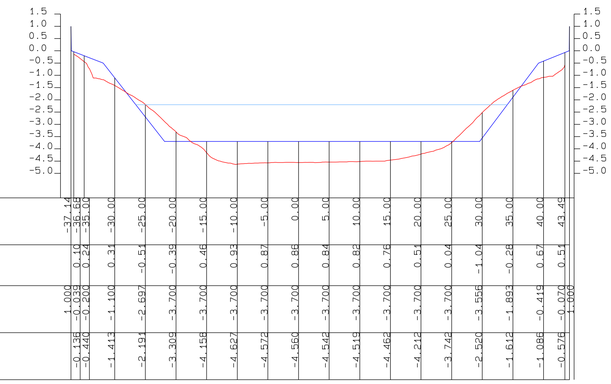
Cross Section 2
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 506577.205
N = 7079342.031



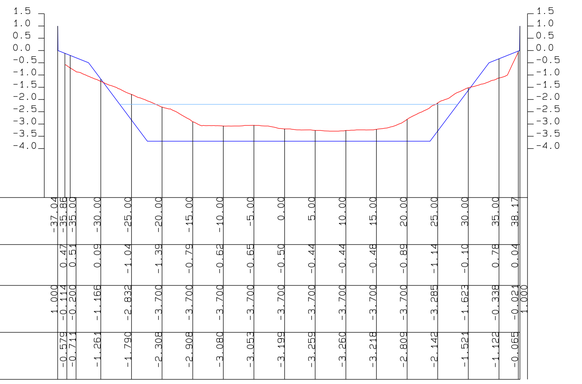
Cross Section 3
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 506401.311
N = 7079284.957



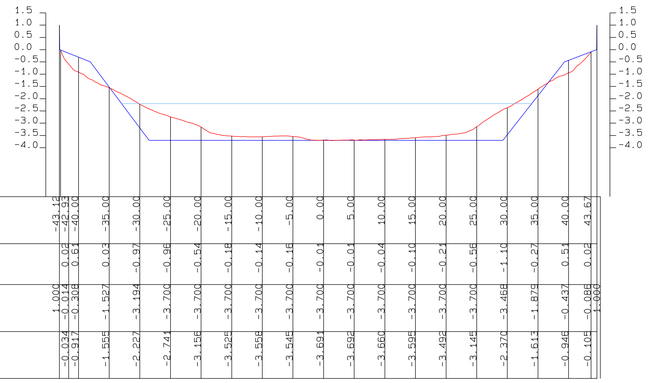
Cross Section 4
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 506301.805
N = 7079203.663



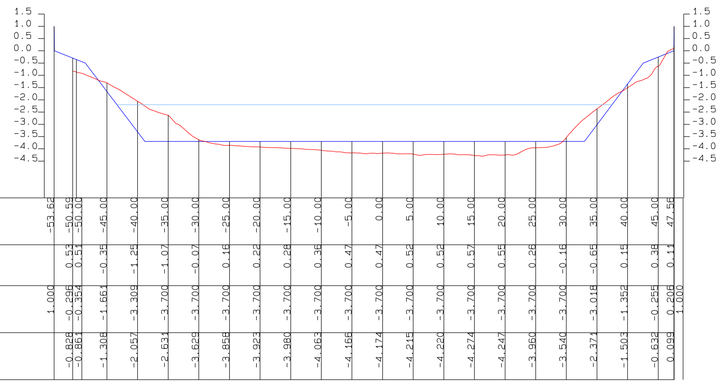
Cross Section 5
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 506375.061
N = 7079095.377



Cross Section 6
Scale(H) 1 : 500
Scale(V) 1 : 125

CL Coordinates
E = 506523.351
N = 7079092.480



Surveyor: D INGLIS
Field Book: H13641
Vessel: Investigator/Curlew II
Data Type: MINIMUM DEPTHS
Data File: 1536103

Notes:

Vertical Exaggeration = 4
Hydrographic Survey 2012
3.7m Design Surface
2.2m Design Surface

DESIGN DIMENSIONS
Depth: N/A
Ins. Depth: N/A

VERTICAL MEASUREMENTS
Equipment: Reson 8125/Hydrotrac
Calibration: 24/10/2012/Daily
Tide Gauge: LOCAL TIDE GAUGE
Benchmark: PSM101464 (RL=1.958m)
Datum: AHD

HORIZONTAL POSITIONING
Equipment: POSMV/TRIMBLE R7
Mode: RTK Float
Base Station: COOROY SMARTNET
Datum: MGA

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ± 0.15 m
Horizontal Tolerance (95%): ± 0.5 m
Typical Coverage: 100%
Survey Class: A/C (Multibeam/Singlebeam)

DAN INGLIS
SURVEYOR DATE

ROBERT SLATER
SUPERVISING SURVEYOR DATE

GILES STIMSON
MANAGER PORT SURVEYS DATE

SCALE 1:500 (Before Reduction from A1 sheet)
Metres
0 10 20 30 40 50

LEVEL DATUM: AHD
AZIMUTH DATUM: GDA 94

Noosa Waters Canal Estate - East
Cross Sections
INVESTIGATION SURVEY 17 - 31 January 2012

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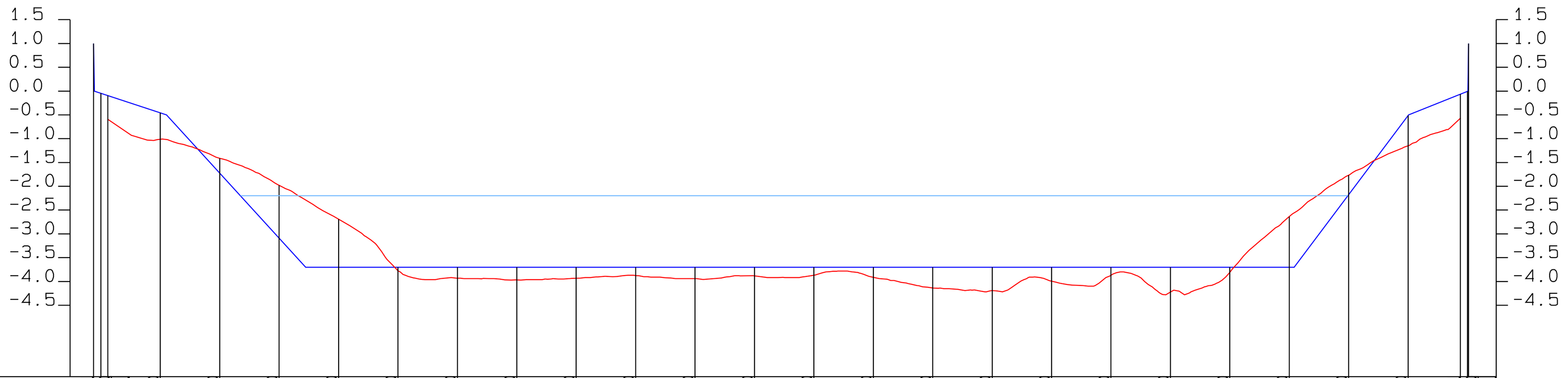
Dwg. No.
127625 - 5
Proj. File: Noosa Waters

Cross Section 7
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 506620.880
N = 7079152.109

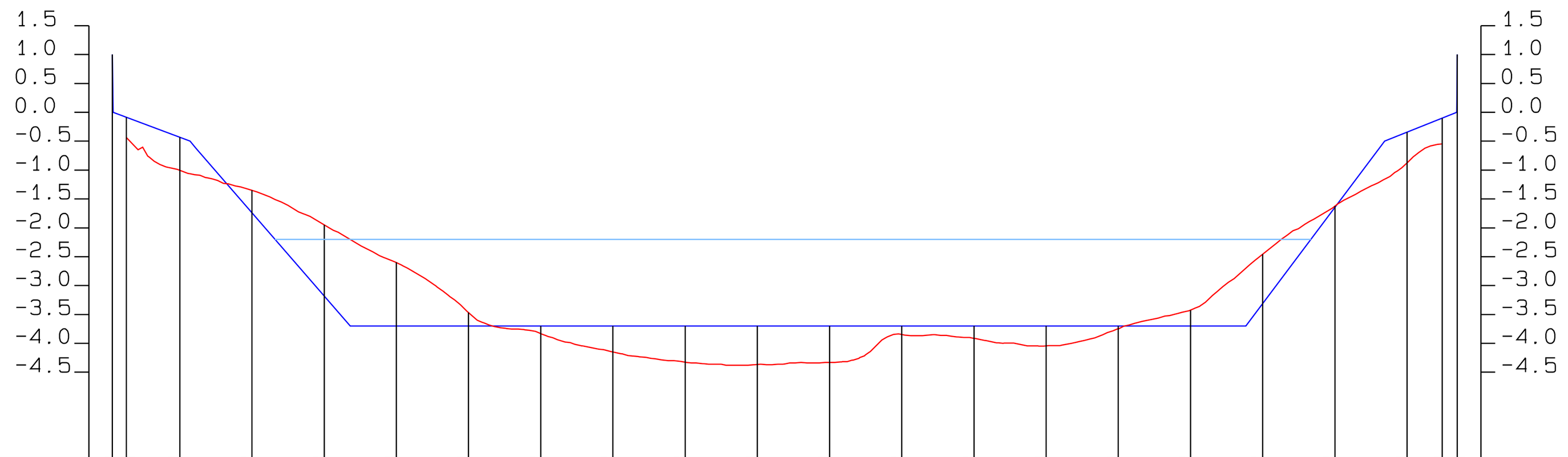


DATUM LEVEL -6.00

OFFSET	-65.61	-65.00	-64.41	-60.00	-55.00	-50.00	-45.00	-40.00	-35.00	-30.00	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	49.41	50.00	
DIFF Design - Survey			0.50	0.56	-0.31	-1.11	-1.01	0.07	0.23	0.27	0.23	0.18	0.24	0.18	0.17	0.21	0.44	0.49	0.29	0.17	0.52	0.11	-1.06	-0.41	0.63	0.50		
DESIGN SURFACE	1.000	-0.045	-0.094	-0.456	-1.723	-3.090	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-2.175	-0.513	-0.064	-0.004	1.000
HYDRO SURVEY 12			-0.594	-1.014	-1.412	-1.981	-2.691	-3.774	-3.930	-3.967	-3.931	-3.877	-3.940	-3.884	-3.870	-3.913	-4.139	-4.194	-3.995	-3.869	-4.223	-3.809	-2.638	-1.768	-1.148	-0.562		

Cross Section 8
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 506704.927
N = 7079091.137

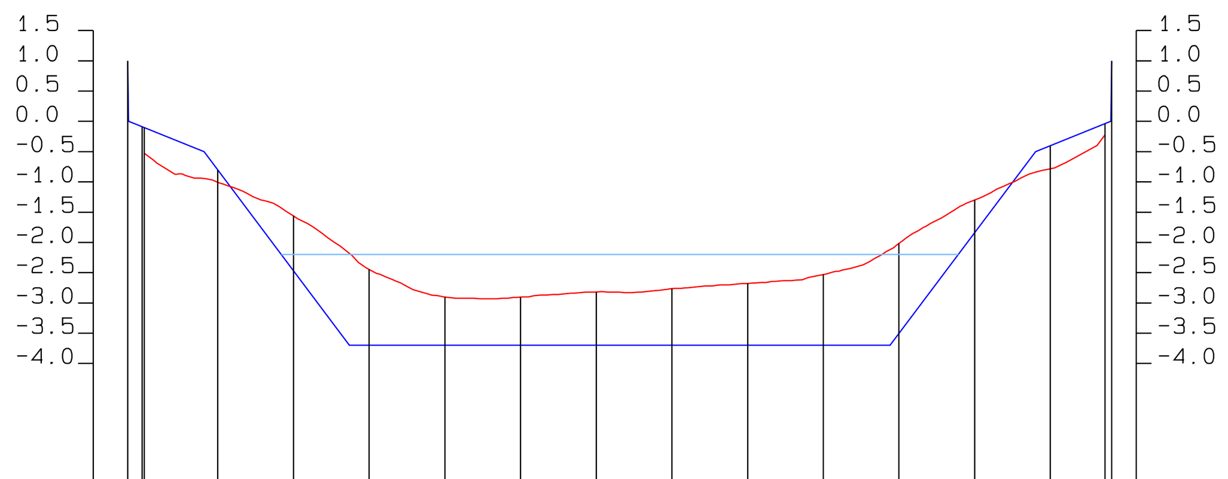


DATUM LEVEL -6.00

OFFSET	-49.68	-48.69	-45.00	-40.00	-35.00	-30.00	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	42.43	
DIFF Design - Survey		0.35	0.57	-0.39	-1.23	-1.10	-0.23	0.13	0.45	0.63	0.67	0.63	0.15	0.22	0.34	0.05	-0.28	-0.86	-0.02	0.53	0.45	
DESIGN SURFACE	1.000	-0.087	-0.433	-1.743	-3.182	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.313	-1.646	-0.344	-0.100	1.000
HYDRO SURVEY 12		-0.436	-1.003	-1.351	-1.949	-2.599	-3.468	-3.831	-4.152	-4.327	-4.366	-4.330	-3.847	-3.915	-4.042	-3.748	-3.425	-2.456	-1.624	-0.876	-0.548	

Cross Section 9
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 506610.988
N = 7078936.897

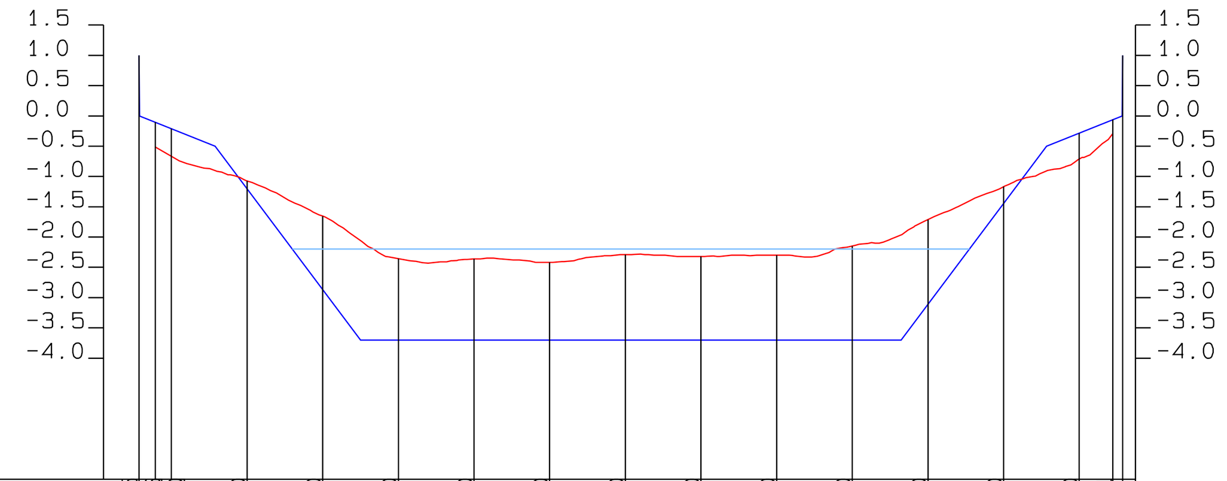


DATUM LEVEL -6.00

OFFSET	-30.95	-30.00	-29.86	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	33.61	
DIFF Design - Survey			0.42	0.20	-0.91	-1.25	-0.80	-0.80	-0.88	-0.94	-1.02	-1.17	-1.49	-0.54	0.38	0.18	
DESIGN SURFACE	1.000	-0.091	-0.105	-0.805	-2.471	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.506	-1.840	-0.402	-0.040	1.000
HYDRO SURVEY 12			-0.527	-1.006	-1.562	-2.447	-2.902	-2.903	-2.819	-2.764	-2.680	-2.531	-2.016	-1.301	-0.782	-0.225	

Cross Section 10
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 506512.565
N = 7078879.842

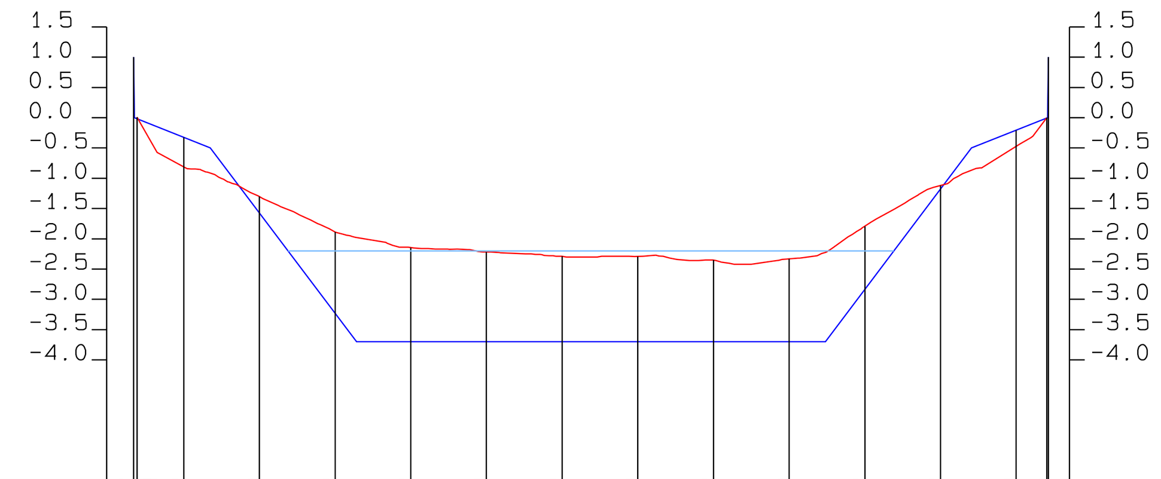


DATUM LEVEL -6.00

OFFSET	-32.15	-31.06	-30.00	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	32.21	
DIFF Design - Survey		0.41	0.46	-0.13	-1.21	-1.34	-1.34	-1.28	-1.41	-1.38	-1.40	-1.55	-1.40	-0.28	0.43	0.23	
DESIGN SURFACE	1.000	-0.104	-0.210	-1.202	-2.869	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-3.111	-1.444	-0.283	-0.061	1.000
HYDRO SURVEY 12		-0.513	-0.666	-1.075	-1.655	-2.356	-2.360	-2.420	-2.290	-2.320	-2.300	-2.149	-1.714	-1.168	-0.710	-0.292	

Cross Section 11
Scale (H) 1 : 500
Scale (V) 1 : 125

CL Coordinates
E = 506344.818
N = 7078903.992



DATUM LEVEL -6.00

OFFSET	-28.32	-28.09	-25.00	-20.00	-15.00	-10.00	-5.00	0.00	5.00	10.00	15.00	20.00	25.00	30.00	32.03	
DIFF Design - Survey		-0.03	0.49	-0.27	-1.34	-1.55	-1.48	-1.41	-1.41	-1.35	-1.37	-1.04	-0.06	0.27	-0.00	
DESIGN SURFACE	1.000	-0.018	-0.325	-1.574	-3.230	-3.700	-3.700	-3.700	-3.700	-3.700	-3.700	-2.835	-1.179	-0.206	-0.005	1.000
HYDRO SURVEY 12		0.008	-0.815	-1.303	-1.886	-2.146	-2.220	-2.290	-2.292	-2.352	-2.332	-1.793	-1.119	-0.472	0.000	

Surveyor: D INGLIS
Field Book: H13641
Vessel: Investigator/Curlew II
Data Type: MINIMUM DEPTHS
Data File: 1536103

Notes:
Vertical Exaggeration = 4
Hydrographic Survey 2012
3.7m Design Surface
2.2m Design Surface

DESIGN DIMENSIONS
Depth: N/A
Ins. Depth: N/A

VERTICAL MEASUREMENTS
Equipment: Reson 8125/Hydrotrac
Calibration: 24/10/2012/Daily
Tide Gauge: LOCAL TIDE GAUGE
Benchmark: PSM101464 (RL=1.958m)
Datum: AHD

HORIZONTAL POSITIONING
Equipment: POSMV/TRIMBLE R7
Mode: RTK Float
Base Station: COOROY SMARTNET
Datum: MGA

SPECIFIED SYSTEM ACCURACY
Vertical Tolerance (95%): ± 0.15 m
Horizontal Tolerance (95%): ± 0.5 m
Typical Coverage: 100%
Survey Class: A/C (Multibeam/Singlebeam)

DAN INGLIS
SURVEYOR DATE

ROBERT SLATER
SUPERVISING SURVEYOR DATE

GILES STIMSON
MANAGER PORT SURVEYS DATE

SCALE 1:500 (Before Reduction from A1 sheet)
Metres
0 10 20 30 40 50

LEVEL DATUM: AHD
AZIMUTH DATUM: GDA 94

Noosa Waters Canal Estate - East

Cross Sections

INVESTIGATION SURVEY 17 - 31 January 2012

GDA

PORT of BRISBANE
Here for the future

PORT OF BRISBANE PTY LTD
"PORT OFFICE"
3 PORT CENTRAL AVENUE
PORT OF BRISBANE
QUEENSLAND 4178

Phone 07 32584888
Fax 07 32584704
Email portbris@portbris.com.au

Dwg. No.
127625 - 6
Proj. File: Noosa Waters

APPENDIX G

LAKE BED LEVELS

DRAWING NO. 112-14835-02

Legend:

RL - 0.15m to + RL - 0.3m

RL ⩾ - 0.3m (ie >150mm void below wall)

Note:

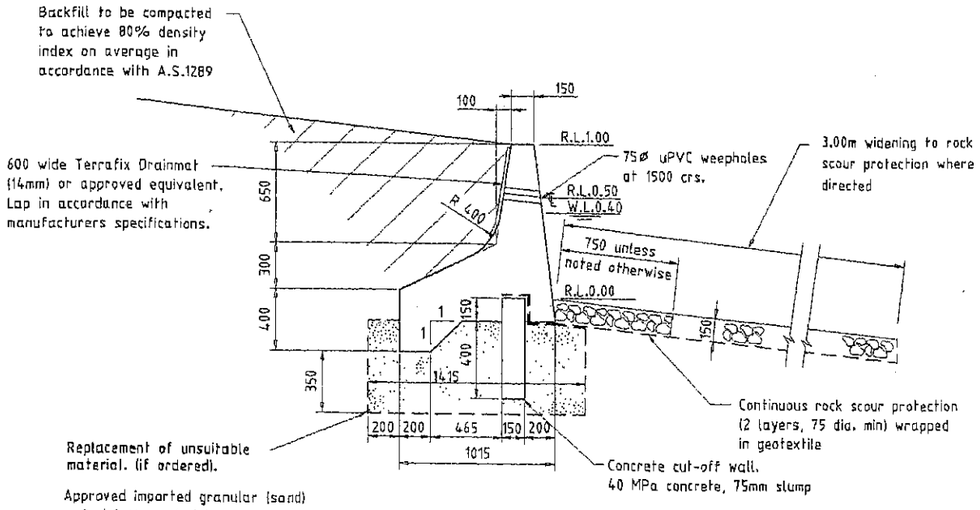
Measurements provided by Noosa Waters Residents Association.
Measurements recorded from top of revetment wall with an assumed RL of 1.00m.
Base of Revetment Wall RL - 0.15m.
(as per construction drawings)

SOIL SURVEYS
Soil Surveys Engineering Pty Limited
A.C.N. 054 043 631
Consulting Geotechnical Engineers

Drawn TP	Project	Geotechnical Investigation - Lake Bed Levels	Drawing No. 112-14835-02
Date 2013	Location	Noosa Waters Estate - Noosaville	A3
Checked	Client	Sunshine Coast Council	

APPENDIX H

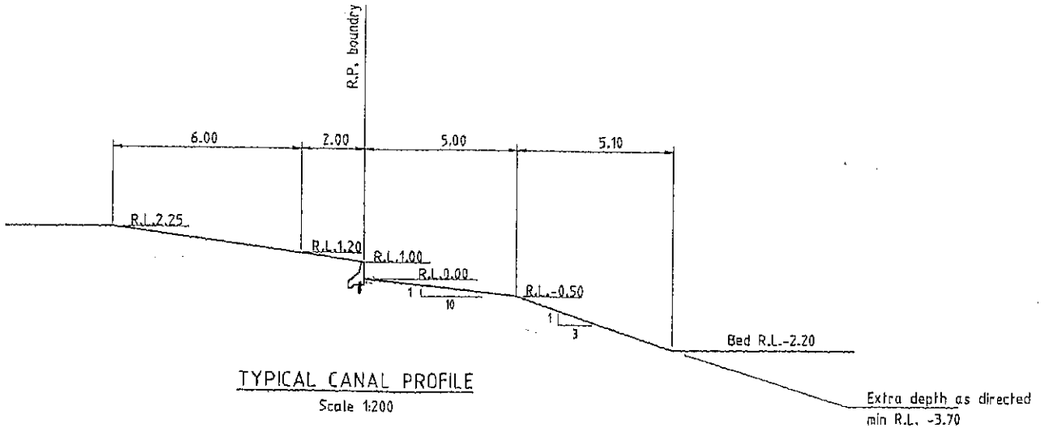
TYPICAL SECTIONS/ TYPICAL CANAL PROFILE - DRAWING NO. 1754/6-11



TYPICAL SECTION

REVETMENT WALL AND ROCK PROTECTION

Scale 1:20



TYPICAL CANAL PROFILE

Scale 1:200

NOTES:

1. Filter Fabric 300 wide shaill be place behind each construction joint.
2. Scour protection critical stone size 75mm. 2/3 of stones to be equal to or larger than 75mm.
3. Concrete strength shall be N40 MPa at 28 days, Type FA, 20mm aggregate (max.). All construction shall be in accordance with A.S.3600 Slump 80mm. Minimum cement content 360 kg/m³, Flyash 100 kg/m³, W/C ratio 0.50. Walls to be mass concrete cast insitu or approved precast equivalent.
4. Where revetment walls are constructed using the continuous slip form method, curing shall be carried out as directed.
5. Contraction joints to be at 3.00m centres. (Saw cut.)
6. All geotextile fabric shall be 'Bidim' A14 or approved equivalent unless noted otherwise.
7. A 3.00m return wall shall be constructed at the end of each stage of construction and backfilled to the specified standards.
8. All exposed vertical edges shall be chamfered 25mm.

AUTOCAD NAME: NRWFW.DWG
DATE : 28-7-1994 TIME : 12:11 AM

REV.	DATE	REVISIONS	REC.	APPR.
RV.	DATE		REC.	APPR.

DESIGNED:
DRAWN:
CHECKED:
RECOMMENDED: PROJ. MAN. 31/1/95
A1 DATUM: A.H.D.
APPROVED: PROJ. 8/97

Cardno & Davies
Queensland Pty. Ltd.
ACN 057 274 148
Consulting Engineers & Planners

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Gold Coast	(075) 39 9333	(075) 39 4647
Sunshine Coast	(074) 43 5505	(074) 43 5862
Townsville	(077) 71 5012	(077) 71 2508
Mide Bay	(071) 23 2200	(071) 21 4991
Port Moresby	(0811) 75125 2322	(675) 25 0951

SUNSHINE COAST OFFICE:
66 Duporth Avenue, Maroochydore
Postal Address: PO Box 152,
Maroochydore, Queensland 4558

NOOSA WATERS PTY. LTD.

NOOSA WATERS DEVELOPMENT - STAGES 6B, 6C, 8C, 8D AND 9 TO 15

WATERWAY PROTECTION DETAILS AND TYPICAL PROFILE

DATE: 23 - 08 - 1994

DRAWING No: 1754/6-11

Rv.