Cardno Ullman&Nolan

Shaping the Future

SHUTE HARBOUR MARINA PROJECT

GEOTECHNICAL SUMMARY

May 2006
Job No. 12276.3

PORT BINNLI PTY LTD

Cardno Ullman & Nolan Geotechnic Pty Ltd

ABN 45 103 205 205

71 Connors Road

PO Box 5630 Mackay MC

Queensland 4741 Australia

Telephone: 07 4952 5255

Facsimile: 07 4952 5455

International: +61 7 4952 5255

Email: soils@uneng.com.au

Web: www.cardno.com.au

Document Control

Version	Date	Author		Reviewer	
		Name	Initials	Name	Initials
1	May 2006	P Davis		A Williams	

SHUTE HARBOUR MARINA PROJECT

GEOTECHNICAL SUMMARY

TABLE OF CONTENTS

LIST OF FIGURES

ATTACHMENTS

Our Ref 12276.1

Contact Peter Davis

23 May 2006

Cardno Ullman & Nolan Geotechnic Pty Ltd
ABN 45 103 205 205

71 Connors Road, Mackay Qld 4740
PO Box 5630, Mackay MC
Queensland 4741 Australia
Telephone: 07 4952 5255
Facsimile: 07 4952 5455
International: +61 7 4952 5255
soils@uneng.com.au
www.cardno.com.au

1. LETTER OF TRANSMITTAL

The Manager
Port Binnli Pty Ltd
PO Box 1003
SPRING HILL QLD 4004

Dear Jeff

SHUTE HARBOUR MARINA PROJECT
GEOTECHNICAL SUMMARY

Further to your recent instructions, we are pleased to present in this report a geotechnical summary of the Shute Harbour Marina project site based upon the data collected by Ullman & Nolan. The report summarises the findings of previous and recent works and notes that sea bed sediments comprise mainly very soft or soft highly plastic clays with a surface covering up to about 1m thick of more sandy / gravelly sediments. The sediments are underlain by weathered volcanics which, over the seaward part of the site, have a thin covering, typically about 1-2m thick, of residual clayey soil.

Figure 3 shows what we believe to be a typical cross section for the project site, perpendicular to the shore line.

Yours faithfully

Peter Davis
for **Cardno Ullman & Nolan**

2. SCOPE OF WORK

This report has been commissioned by Mr J Smith of Port Binnli Pty Ltd. We understand that Port Binnli has recently become involved in this project, which hitherto has been managed by Kinsmen Pty Ltd.

The report provides a summary of the geotechnical information recovered for the project site over a period of 30 years or so by the Ullman & Nolan Group, and an overview of the ground conditions as may be relevant to site development.

The following documents provide input to this compilation

- Ullman & Nolan Pty Ltd. *Club Whitsunday Project. Report on Offshore Geotechnical Investigations*. Report to Scotex Pty Ltd dated July 1989.
- Ullman & Nolan Pty Ltd. *Shute Harbour Marina. Report on Further Geotechnical Investigation*. Report to Kinsmen Pty Ltd dated June 2001.
- Ullman & Nolan Technical Services Pty Ltd. *Shute Harbour Marina. Report on Acid Sulphate Soils and Sediment Contaminated Investigation*. Report to Shute Harbour Marina Developments Pty Ltd dated January 2005.
- Cardno Ullman & Nolan Pty Ltd. *Shute Harbour Marina Project. Compilation of Geotechnical Information.* Report to Port Binnli Pty Ltd dated 12 April 2006.

Relevant extracts from these reports are appended.

In addition, the findings of recent site specific geotechnical investigation program have been utilised. This recent information has not previously been reported.

Reference should be made also to a compilation report for the nearby Shute Harbour Jetty precinct, viz

- Ullman & Nolan Consulting Pty Ltd. *Shute Harbour Ferry Terminal. Report on Geotechnical Appraisal*. Report to Shift Whitsunday Pty Ltd dated July 2005.

3. GEOMORPHOLOGY, GEOLOGY, SOILS

3.1 Regional Geology

The regional geology for the site is described in the 1:250,000 Geological Series Sheet for Proserpine. The geology of the area is typical of the surrounding Whitsunday area, comprising volcanoclastic sediments interlain with intermediate volcanic flows and minor intrusions. The rocks from part of the Whitsunday Volcanic Province, an early Cretaceous aged sequence.

Geological faults are generally NW-SE trending, with the closest known one being the submarine Molle Fault, some 5km to the east of the site. The University of Queensland reports the hazard assessment of earthquakes associated with faults such as this is difficult, primarily because of the paucity of historical seismic data and a sparse seismic network. Due to the cessation of the University of Queensland monitoring program, application of advanced forecasting or predictive methods is not possible. As a result, information is provided by:

- Queensland University Advanced Centre for Earthquake Studies, giving locations of earthquake epicentres and their magnitudes, and values of acceleration coefficients; and
- AS 1170.4 – Earthquake loads – Figure 2.3(g), acceleration coefficients.

It can be determined from this information that, while an earthquake risk exists for the Shute Harbour area, the hazard is small.

Changes to relative sea and land levels have resulted in the area becoming drowned during the Tertiary Period. Overlying the basement rock at and below the shoreline are recent to Holocene aged marine sediments. These are typically soft, dark grey, medium plasticity silty clays with shells and coral fragments.

The geology of the area to be affected is shown in Figure 1

3.2 Local Geology

The bedrock of the Shute Harbour peninsular consists of the Whitsunday Volcanics of Lower Cretaceous age (S.E. Bryan et al (1997)). This large scale volcanic unit has been folded into a large open syncline which plunges south or south-south west at a low to moderate angle. Bedrock typically consists of rhyolite, andesite, and a sequence of very similar lava flows. In some areas, the lava flows have been intruded by steeply dipping dykes. Bedrock is typically red-brown to blue-grey in colour, often porphyritic with small white anhedral phenocrysts of plagioclase. The lava is typically highly fractured, with fractures only a few centimetres apart. Flow structure is common. The andesite and rhyolite are less fractured. Fractures are usually irregular and random.

Recently published data described the rock comprising the cut batters to the Shute Harbour car park as older Triassic rhyolitic basement material.

Weathering varies from highly to moderately weathered, to slightly weathered or fresh. Where dykes are present, these are often extremely to highly weathered, 1m to 3m wide, and steeply inclined.

3.3 Topography & Geomorphology

The general topography of the site is characterised by a steep, east west trending rocky hillslope above high water mark, a narrow wave-cut platform, and beach and sea bed below high water mark. Shute Harbour Road follows the foreshore, having been constructed on a cut to fill earthworks bench at a level of between about relative level (RL) 5 metres and RL 7 metres AHD.

The rocky hillslope is up to about 35m high at the northwestern boundary of the site, but continues rising within the adjacent National Park to the north. The northeast boundary is also hillside, but only about 25m high. Again the land continues rising to the north within the National Park. In some parts, notably the lower slopes, residual and colluvial soils to about 2m maximum thickness exist.

The centre section of the northern boundary is lower lying. Two adjacent alluvial lined gulleys at about RL 5 metres AHD are located at the toe of the hillslope, immediately to the north of Shute Harbour Road.

The dominant rocks at the site have been classified as acid and intermediate pyroclastic flows of the Airlie Volcanics. The Airlie Volcanics were deposited in fresh water in the Permian Period and have subsequently been folded into a large, open syncline, which plunges south or south southwest at a low to moderate angle. Dips are moderate to low on the western limb and steeper on the eastern limb, nearer to the site.

Flow banded rhyolite is the dominant rock type observed in the road cuttings at the site. Localised folding of beds is also evident. A number of microdiorite (dolerite) dykes are recorded on the geological sheet, which strike approximately north south. These are clearly visible as relatively narrow (about 1m, but up to 5m wide) deeply weathered, subvertical zones within the flow banded rhyolite.

The predominantly fine grained nature of the marine sediments reflects the depositional environment of the Shute Bay Inlet. A slightly coarser grained material occurs for a thickness of less than about 1m over the sea bed over part of the site, predominantly the western half. This has likely resulted from a 'sorting' process where wave and tide action has washed out the finer grained clays and silts. Coarser material have also been deposited nearer the high water mark with cobbles and gravel forming a beach like shore which supports mangrove. The finer grained silts and clays generally occur below low water tide level and increase in depth to more than 10m towards the centre of the bay.

Four principal terrain units are present at this site, being

- Steep hillslopes;
- Alluvial and colluvial deposists north of Shute Harbour Road;
- Beach sediments; and
- Marine sediments (muds).

Despite the hard and resistant nature of the rocky hillslopes and the vegetation cover of low open woodland to open eucalypt forest, the combination of relatively steep slopes and fractured nature of the rock exposures is conducive to the formation of landslips and rock slides. This is the principal land forming feature in this geomorphology. As a result, colluvium on the lower footslopes is common, with the beach deposits typically being of colluvial origin. This colluvium is then reworked and broken down further by tidal action.

The rate of landform change in this land based topography as a result of erosion is variable, depending principally upon the incidence of prolonged wet weather, which exacerbates both instability and the erosion process.

The alluvial and marine sediments are likewise subject to erosion during high rainfall events and storm activity.

3.4 Soils

The soil cover is generally very thin on the hill slopes, typically less than 0.6m. The soils typically consist of pale brown-grey sandy gravels or gravely sands with some clay and silt. They are either non-plastic or of low plasticity. The soils derive from weathering of bedrock and in may places are covered by a thin veneer of angular scree. Some of this scree has accumulated at the bottom of the slopes and, together with coral, sand , gravel and mud, now forms the beach / storm deposit shown on the typical cross section (Figure 3).

Below about RL -1 AHD, the common soil type is very soft or soft highly plastic silty clay. In the upper levels it commonly contains gravel and sand sized coral and shell pieces. In other instances, the gravel comprises andesite and rhyolite, no doubt slopewash or scree from the adjacent hillsides. Coral boulders within the soft clay are not uncommon.

The surface soils overlying the soft clay tend to comprise more sandy and gravely material. In some but not all areas, this surface soil can contain very little fines and be up to 3m thick. But more commonly it is between about 0.2m and 0.5m thick.

For purposes of site characterisation, it is reasonable to assume that the stratigraphy within the reclamation area may be typified by

0.0m – 1.5m	Gravelly clayey sand. Gravel and sand components are fine to coarse grained and comprise principally shell and coral debris. The fines are medium to high plasticity and comprise some 20 – 50% of the total material. Occasional cobbles and boulders of coral to 300mm size.
1.5m – 4.0m	Gravelly sandy clay. Gravel and sand components are fine to coarse grained and comprise principally shell and coral debris. The fines are medium to high plasticity and comprise some 50 – 70% of the total material. Cobbles and boulders of coral to 600mm size are common.

Towards the shoreward edge of the reclamation area, the gravel component includes angular rock fragments, being slopewash from the fringing hillsides.

Within the marina basin, it would be prudent to assume that dredge materials will comprise a combination of gravelly clayey sand (top ≈1.7m over the western part of the site) and silt / clay (elsewhere).

3.5 Hillside

A 1993 seismic survey undertaken for Ullman & Nolan Pty Ltd by Velseis Pty Ltd indicated that weathered rock within the top 5 to 14m (but typical 8 to 10m) had a seismic velocity less than 2,000 m/s. Knowledge of local geology would suggest that this upper horizon comprises distinctly and more weathered flow banded rhyolite with a number of deeply weathered, sub-vertical microdiorite dykes.

At depth, the rock is the same type but less weathered.

It is understood that the current development proposal does not extend into the adjacent hillside, north of Shute Harbour Road hence no further comment on hillside ground conditions is offered in this geotechnical summary.

3.6 Typical Cross Section

The attached Figure 2 shows the location of a typical cross section through the project site, perpendicular to the shoreline. The cross section is shown in Figure 3.

While it is said that this cross section is typical, it is presented in the centre of the site where Shute Harbour Road is on fill. In other parts of the site, the road is in cut, but the profile seaward of the shoreline remains similar to that shown.

4. EXCAVATIONS AND FILLING

Conventional dredge excavation of the marine sediments is expected to prove effective but will have the usual disadvantage of providing reclamation fill of 'slurry' consistency. Problems of low shear strength and high settlement potential result, but may possibly be mitigated by careful selection of material for dredging.

Dredge excavation of the underlying weathered rock is unlikely to prove successful.

The quantum of post-construction settlement of fill will vary across the site as ground conditions and fill conditions vary. Our earlier evaluations have indicated a potential for 50 to 200mm post-construction settlement within the insitu sediments. This may now increase if the reclamation and revetment are to be moved seaward. Post-construction settlement within the hydraulically placed fill material may be considerably more than this.

5. REVETMENTS

Revetments may take the form of either sheet piling or conventional earth / rock embankments. It is understood that sheet piling with tie backs is the preferred revetment system.

5.1 Sheet Piling

Our recent experience with sheet pile revetments for a nearby project suggests that sheet piles will need to be either cantilevered from their penetration into residual soils and weathered rock, for which driving conditions will be relatively hard or provided with tie backs.

It is unlikely that tied sheet piling can be used with passive deadman restraint in the reclamation filling. Design experience suggests that adequate stability will not be achieved using this method. It is likely that tie backs will need to be restrained by raker piles.

5.2 Rock Revetments

Conventional earth / rock revetments will prove a viable option provided the revetment embankment displaces much of the marine mud over which it is constructed.

The stability of rock revetments will be dependent on

- The height of revetment,
- The face slope of the revetment,
- The characteristics of the fill material behind the revetment,
- The method of construction of the revetment,
- The presence of weak marine sediments beneath the toe of the revetment,
- The proximity of the toe of the revetment to the dredge batter.

Revetment design will need to take these factors into account.

6. ACID SULFATE SOILS AND SEDIMENT CONTAMINATION

The likely presence and distribution of acid sulfate soils and sediment contamination has been addressed by the January 2005 report. The report notes that the need to manage acid sulfate soils is unlikely on account of the excess acid neutralising capacity of the marine sediments. This will, however, need to be checked by monitoring during excavation and a management plan be available in the event that the acid neutralising capacity is found to be insufficient.

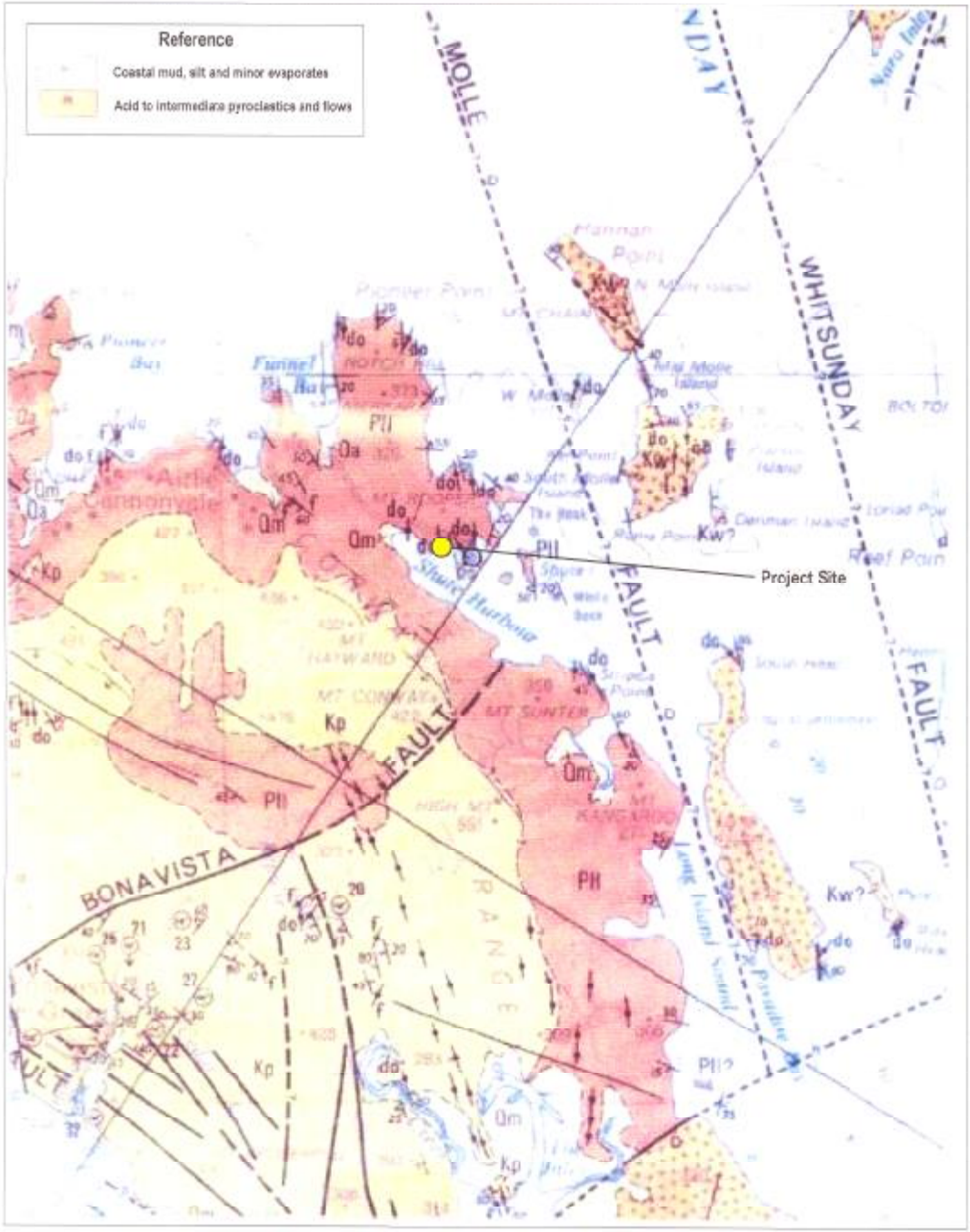
The presence of TBT has been noted, albeit in localised areas. A management strategy will be required.

7. LIMITATIONS

As noted in Section 2.0 of this report, the information contained herein is a summary of data recovered by Ullman & Nolan and others for this site. Reference is also made to a compilation report prepared by Ullman & Nolan for Shift Whitsunday Pty Ltd for the Shute Harbour Jetty precinct.

While every effort has been made to portray the geotechnical characteristics of the subject site in a representative manner, it needs to be recognised that geotechnical investigations are still under way and have not yet provided the geotechnical parameters required for design.

FIGURES



Source: 1:250,000 Geological Series, Proserpine Sheet SF/55-4

JOB No.	DWG No.	CHECKED BY	DATE
12276.1	21024.1-1A	AW	05/06

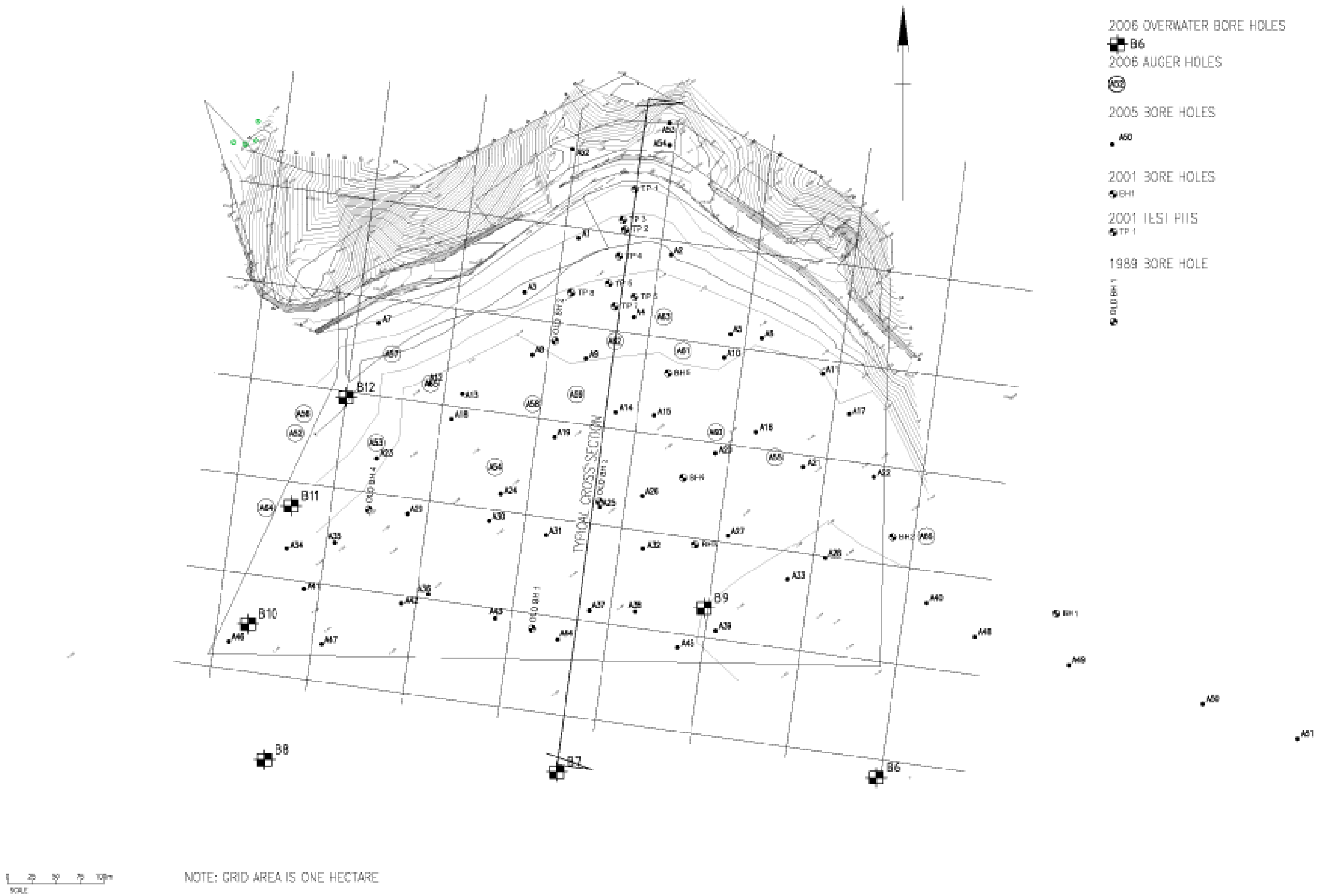
Cardno Ullman & Nolan
Cardno Ullman & Nolan Pty Ltd ACN 103 205 170
71 Connors Road, Mackay 4740
P.O. Box 5630, Mackay 4741
Email: solle@cneng.com.au
Web: www.cardno.com.au

PORT BINNLI PTY LTD

SHUTE HARBOUR MARINA
GEOLOGICAL MAP

SCALE at A4: NTS

DRAWING No.: Fig. 1



JOB No.	12276.1
UN DWG No.	MIS 9633 B
DATE	03/06
NOTES	This plan was adapted from drawing Whitsunday Passage, AUS 253
CHECKED BY	PD
DATE	24/03/06

Cardno Ullman & Nolan

Cardno Ullman & Nolan Pty Ltd ABN: 103 299 170

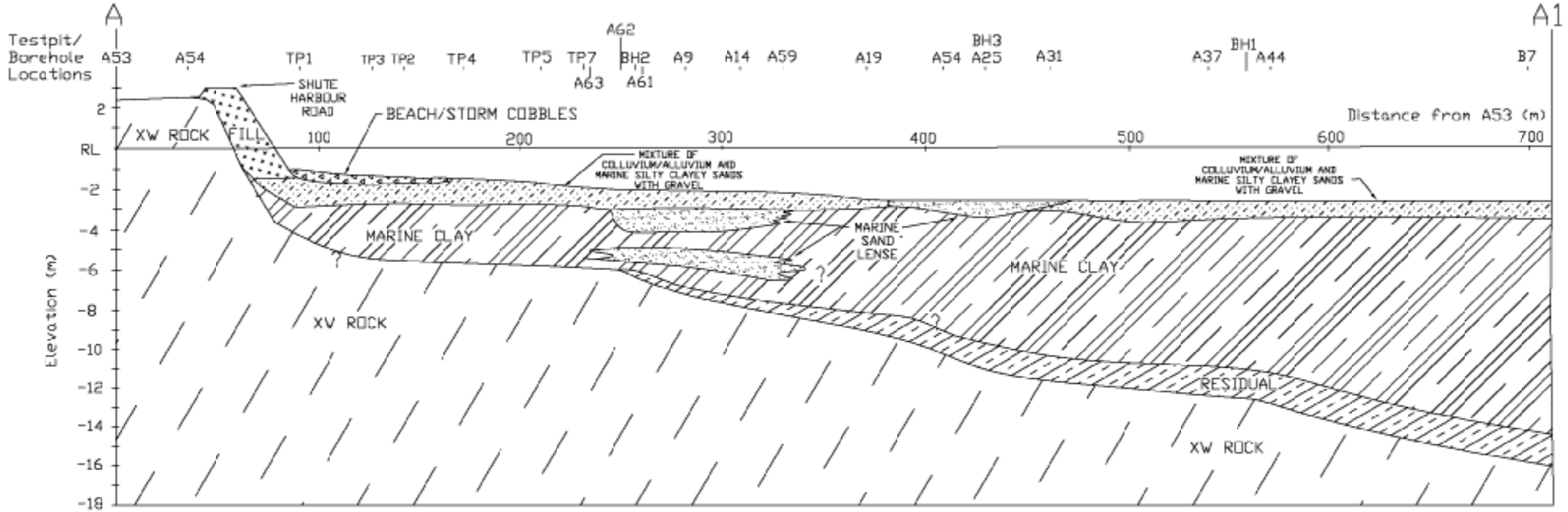
PORT BINNLI PTY LTD

SHUTE HARBOUR MARINA

BORE HOLE / TEST PIT LOCALITY PLAN

SCALE at A3: NTS

DRAWING No. Fig. 2



JOB No. 12276.1	DWG No. MIS 9644 A	DATE 03/06	NOTES CHECKED BY AN DATE 30/03/06	Cardno Ullman & Nolan Pty Ltd 68 Cannons Road, Mackay 4740 P.O. Box 5827, Mackay 4741 Email: mail@unerg.com.au Web: www.cardno.com.au	PORT BINNLI PTY LTD SHUTE HARBOUR MARINA TYPICAL CROSS SECTION A - A1	SCALE at A3 NTS DRAWING No. FIG 3

ATTACHMENT A

Descriptive Logs

ULLMAN & NOLAN (GEOTECHNIC) PTY. LTD.

Borehole No 1
Sheet 1 of 2

BOREHOLE LOG

Client: Scotex Pty Limited — Date: 18.5.89 — Job No. 813050
Project: Club Whitsunday Marina — Location: Refer locality sketch
Site: Shute Harbour — Surface R.L. -2.30 — Datum: AHD.
Supervisor: SE — Chkd: AJG

Drill Contractor: CQ Geotechnical — Drill Model: Jacro 350 — Mounting: Pontoon — Diameter: N

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth m	R.L.	Log	Classification	Method & bit	Support	Sampling		Moisture	Consistency	
			SC/GC	W T	C	D		W	Very Loose	Gravelly Clayey Sand; pale grey, fine to coarse grained, shell and coral, gravel is fine to medium grained, shell and coral, angular to subangular MPS 20 LL 35 P 75 25
1.45	-3.75					D				MPS 15 LL 30 P 75 16
1.85	-4.15		CH			N=0 sunk under own weight			Very Soft	Sandy Clay; pale grey, sand is fine to coarse grained, some fine grained gravel, shell, trace of medium grained gravel MPS 3 LL 70 P 75 80
2.30										
3.52	-5.82									Clay; pale grey, some fine to coarse grained sand MPS 2 LL 80 P 75 90
3.75						U50	PP=0			
4.15										
4.75	-7.05									MPS 2 LL 75 P 75 95
4.90										
5.25						N=0 sunk under own weight				
5.70										
						D				
7.15	-9.45									MPS 3 LL 75 P 75 95
7.20						N=0 sunk under own weight				
7.65										
8						D				

METHOD: A auger; W washbore; P percussion; H hammer; C core; R rotary, air flush
BIT: R roller; B blade; V V bit; T TC bit; D diamond
SUPPORT: C casing; M mud
SAMPLING: U undisturbed sample & size in mm; D disturbed sample; N Standard Penetration Test & result
MOISTURE: D dry; M moist; W wet
VISUAL DESCRIPTION: MPS max particle size; LL Liquid Limit; P75 % passing 75 µm sieve

ULLMAN & NOLAN (GEOTECHNIC) PTY. LTD.

Borehole No 1
Sheet 2 of 2

BOREHOLE LOG

Client: Scotex Pty Limited — Date: 18.5.89 — Job No: 81305G
Project: Club Whitsunday Marina — Location: Refer locality sketch
Site: Shute Harbour — Surface R.L.: -2.30 — Datum: AHD — Supervisor: SE — Chkd: AJG
Drill Contractor: CQ Geotechnical — Drill Model: Jacro 350 — Mounting: Pontoon — Diameter: N

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth m	R.L.	Log	Classification	Method & bit	Support	Sampling		Moisture	Consistency	
8			CH	W T		D		W	Very Soft	Clay; refer Sheet 1, 7.15m
9.25	-11.55									
9.45									Stiff	Gravelly Sandy Clay; pale yellow grey, gravel is fine grained subangular to angular, mostly andesite, sand is fine to coarse grained (residual)
9.63	-11.93					D			Very Stiff	
10.07	-12.37									
10.20						N=26				MPS 4 LL 55 P 75 52
10.65						8,11,15				Andesite; red brown and pale grey, highly to completely weathered, porphyritic, extremely low to low strength, abundant metal oxides throughout rock fabric
						D				
11.95	-14.25									

METHOD: A auger; W washbore; P percussion; H hammer; C core; R rotary, air flush
BIT: R roller; B blank; V V bit; T TC bit; D diamond
SUPPORT: C casing; M mud
SAMPLING: U undisturbed sample & size in mm; D disturbed sample; N Standard Penetration Test & result
MOISTURE: D dry; M moist; W wet
VISUAL DESCRIPTION: MPS max particle size; LL Liquid Limit; P75 % passing 75 µm sieve

ULLMAN & NOLAN (GEOTECHNIC) PTY. LTD.

Borehole No 2
Sheet 1 of 1

BOREHOLE LOG

Client: Scotex Pty Limited Date: 19.5.89 Job No: 813050
Project: Club Whitsunday Marina Location: Refer locality sketch
Site: Shute Harbour Surface R.L.: -1.90 Datum: AHD
Supervisor: SE Chkd: AJG
Drill Contractor: CQ Geotechnical Drill Model: Jacro 350 Mounting: Pontoon Diameter: N

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth m	R.L.	Log	Classification	Method & bit	Support	Sampling		Moisture	Consistency	
			SC/GC	W T	C	D		W	Very Loose	Gravelly Clayey Sand; pale grey, fine to coarse grained, shell, gravel is fine to medium grained, angular, shell and coral MPS 13 LL 35 P 75 25
1.22	-3.12		CH			D			Very Soft	Sandy Clay; pale grey, sand is fine to coarse grained, shell and coral, some fine grained gravel MPS 2 LL 70 P 75 75
2.70						U50	PP = 0			
3.10										
3.22	-5.22									Andesite; red brown, mostly completely weathered, extremely low strength
3.30						D				
3.95	-5.85									red brown and pale green grey in bands, highly to completely weathered, extremely low to low strength, abundant metal oxides throughout rock fabric
4.70						R>120 mm				
4.91	-6.81					5.25 for 60mm				

METHOD: A auger; W washbore; P percussion; H hammer; C core; R rotary, air flush
BIT: R roller; B blank; V V bit; T TC bit; D diamond
SUPPORT: C casing; M mud
SAMPLING: U undisturbed sample & size in mm; D disturbed sample; N Standard Penetration Test & result
MOISTURE: D dry; M moist; W wet
VISUAL DESCRIPTION: MPS max. particle size; LL Liquid Limit; P75 % pass 75 µm sieve

ULLMAN & NOLAN (GEOTECHNIC) PTY. LTD.

Borehole No 3
Sheet 1 of 2

BOREHOLE LOG

Client: Scotex Pty Limited — Date: 19.5.89 — Job No: 81305G
Project: Club Whitsunday Marina — Location: Refer locality sketch
Site: Shute Harbour — Surface R.L: -2.40 — Datum: AHD — Supervisor: SE — Chkd: AJG
Drill Contractor: CQ Geotechnical — Drill Model: Jacro 350 — Mounting: Pontoon — Diameter: N

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth m	R.L.	Log	Classification	Method & bit	Support	Sampling		Moisture	Consistency	
0			SC/GC	W/T	C			W	Very Loose	Gravelly Clayey Sand; pale grey, fine to coarse grained, gravel is fine grained, angular, shell and coral MPS 6 LL 35 P 75 25
1						D				
2										
2.78	-5.18									
2.90			CH			N=0 sunk under own weight			Very Soft	Clay; pale grey, some fine to coarse grained sand, shell and coral MPS 2 LL 75 P 75 94
3.35										
3.74	-6.14									trace of fine grained gravel, shell MPS 2 LL 70 P 75 90
5						D				
6.00										
6.45						N=0 sunk under own weight				
7						D				
8										

METHOD: A auger; W washbore; P percussion; H hammer; C core; R rotary, air flush
BIT: R roller; B blank; V V bit; T TC bit; D diamond
SUPPORT: C casing; M mud
SAMPLING: U undisturbed sample & size in mm; D disturbed sample; N Standard Penetration Test & result
MOISTURE: D dry; M moist; W wet
VISUAL DESCRIPTION: MPS max particle size; LL Liquid Limit; P75 % pass 75 um sieve

ULLMAN & NOLAN (GEOTECHNIC) PTY. LTD.

Borehole No 3
Sheet 2 of 2

BOREHOLE LOG

Client: Scotex Pty Limited — Date: 19.5.89 — Job No: 81305G
Project: Club Whitsunday Marina — Location: Refer locality sketch
Site: Shute Harbour — Surface R.L.: -2.40 — Datum: AHD
Supervisor: SE — Chkd: AJG
Drill Contractor: CQ Geotechnical — Drill Model: Jacro 350 — Mounting: Pontoon — Diameter: N

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth m	R.L.	Log	Classification	Method & bit	Support	Sampling		Moisture	Consistency	
8.30	-10.70		CH	W				W	Very Soft	Clay; refer Sheet 1, 3.74m
			SP-SC						Medium Dense	Sand; pale grey, fine to coarse grained, some fine grained gravel, some clay, (residual-derives from completely weathered andesite) MPS 4 LL NP P 75 8
8.75	-11.15					D			Dense	
9.32	-11.72									Andesite; pink brown and pale grey, highly to completely weathered, extremely low to low strength, abundant metal oxides throughout rock fabric
10						D				
11.10	-13.50					30 for 100mm R290				

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary, air flush

BIT
R roller
B blade
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & result

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS max particle size
LL Liquid Limit
P75 % pass 75 um sieve

ULLMAN & NOLAN (GEOTECHNIC) PTY. LTD.

Borehole No 4

Sheet 1 of 1

BOREHOLE LOG

Client Scotex Pty Limited Date 20.5.89 Job No. 813050

Project Club Whitsunday Marina Location Refer locality sketch

Site Shute Harbour Surface R.L. -2.00 Datum AHD

Supervisor SB Chkd. AJC

Drill Contractor CQ Geotechnical Drill Model Jacro 350 Mounting Pontoon Diameter N

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth m	R.L	Log	Classification	Method & bit	Support	Sampling		Moisture	Consistency	
0.50			SC	W T	C	D		W	Very Loose	Clayey Sand; pale grey, fine to coarse grained, some fine to mediu grained gravel, shell and coral MPS 7 LL 40 P 75 30
1						D				
2.15	-4.15		CH						Very Soft	Sandy Clay; pale grey, sand is fine to coarse grained, shell and coral MPS 2 LL 70 P 75 85
3										
4						D				
5										
2.80	-7.80								Medium Dense	Clayey Sand; red brown and pale grey, fine to coarse grained, (residual) MPS 2 LL 30 P 75 25
6.18	-8.18		SC						Dense	
6.60	-8.60									Andesite; red brown and pale grey, highly to completely weathered, extremely low to low strength
7.60	-9.60					D				

METHOD
A auger
W washbore
P percussion
H hammer
C core
R return air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & result

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS max particle size
LL Liquid Limit
P75 % pass 75 μm sieve

ULLMAN & NOLAN GEOTECHNIC

BOREHOLE LOG

Borehole No. 1
Sheet 1 of 1

Client: Kinsmen Pty Ltd
Project: Shute Harbour Marina
Site: Shute Harbour

Date: 21.5.01 Job No: 10474.1
Location: Access Channel East End, N7755088
Surface R.L.: -1.0m Datum: LAT E686238
Supervisor MS Chkd: AW

Drill Contractor: Ullman & Nolan Geotechnic | Drill Model: Jacro 350 | Mounting: Barge | Diameter:

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	Field ASS Screening pH_f pH_{ox}	Moisture	Consistency		
	-1.0		SP	W	C	From 0.00 to 2.0m Depth samples taken by SPT being manually pushed at 0.25m intervals (N<1)	7.7 5.0	W	Loose to Very Loose	**Silty Sand;** grey, fine to coarse grained, trace of shells MPS 1 LL NP P75 20	
							7.2 5.0				
							7.6 4.7				
1.00							7.9 4.8				
							7.8 4.7				
							7.3 4.7				
							7.3 5.2				
1.90											
2.00							7.0 5.0				
2.50	-3.5									Borehole complete at 2.50m	
3.00											
4.00											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN GEOTECHNIC

BOREHOLE LOG

Borehole No. 2
Sheet 1 of 1

Client: Kinsmen Pty Ltd
Project: Shute Harbour Marina
Site: Shute Harbour

Date: 21.5.01 Job No: 10474.1
Location: Access Channel West End, N7755172
Surface R.L.: -0.7m Datum: LAT E686152
Supervisor MS Chkd: AW

Drill Contractor Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Barge Diameter 90

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	Field ASS Screening pH_f	pH_{ox}	Moisture	Consistency	
	-0.7		SP/SM	W	C	From 0.00 to 4.0m Depth samples taken by SPT being manually pushed at 0.25m intervals (N<1)	8.7	5.8	W	Very Loose	**Sand;** grey, fine to coarse grained, with silt, with trace shells MPS 1 LL 15 P75 10
0.42	-1.12		ML				8.5	5.8		Very Soft	**Silty Clay;** grey, with fine to medium grained sand MPS 2 LL 35 P75 80
							8.5	6.4			
1.00							8.3	6.1			
							7.9	6.3			
							7.6	5.9			
							7.6	6.1			with increasing shells and coral
1.80	-2.5						8.1	5.8			
2.00	-2.8										
2.10			SM				8.3	5.5		Soft	**Silty Sand;** grey, fine to medium grained, with shell MPS 0.5 LL 25 P75 35
							8.4	5.5			
							8.3	5.6			
2.90	-3.6										
3.00			ML				8.3	5.6		Very Soft	**Clayey Silt;** grey, with fine to coarse grained sand, with shell MPS 0.5 LL 35 P75 80
							7.4	5.3			
							8.1	5.2			
							7.7	5.2			
4.00	-4.7						8.1	5.5			Borehole complete at 4.0m depth

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN GEOTECHNIC

BOREHOLE LOG

Borehole No. 3
Sheet 1 of 1

Client: Kinsmen Pty Ltd
Project: Shute Harbour Marina
Site: Shute Harbour

Date: 21.5.01 Job No: 10474.1
Location: Basin Stage 1-South, E 775511, N685958
Surface R.L.: -0.8m Datum: LAT
Supervisor MS Chkd: AW

Drill Contractor Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Barge Diameter 90

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	Field ASS Screening pH_f	pH_{ox}	Moisture	Consistency	
1.00			MH	W T	C	From 0.00 to 4.0m Depth samples taken by SPT being manually pushed at 0.25m intervals (N<1)	9.0	6.0	W	Very Soft	**Clayey Silty Sand;** grey, with fine grained sand, with shells MPS 8 LL 55 P75 60
							9.1	5.7			
							8.9	5.9			
							8.8	5.7			
							8.7	5.7			
							8.4	5.6			
1.65	-2.45										
2.00			SM				8.6	5.5		Soft	**Silt;** grey, with fine to medium grained sand, with shells MPS 1 LL 55 P75 70
							8.8	6.0			
							8.9	5.6			
2.60	-3.4						8.8	5.6			
3.00			CH				9.3	6.3	M to W	Soft to Firm	**Sandy Clay;** grey, sand is fine grained to medium grained, with shells MPS 0.5 LL 55 P75 60
							9.3	5.9			
3.30	-4.1						9.0	5.8			
			CI				8.7	5.9			sand is fine to coarse grained MPS 1 LL 50 P75 50
							8.8	6.0			
4.00	-4.8						9.1	6.0			Borehole complete at 4.0m Depth

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN GEOTECHNIC

BOREHOLE LOG

Borehole No. 4
Sheet 1 of 1

Client: Kinsmen Pty Ltd
Project: Shute Harbour Marina
Site: Shute Harbour
Date: 21.5.01 Job No: 10474.1
Location: Basin Stage 1-Central N7755174 E685928
Surface R.L.: -0.7 Datum: LAT
Supervisor MS Chkd: AW

Drill Contractor Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Barge Diameter 90mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	Field ASS Screening pH_f	pH_{ox}	Moisture	Consistency	
			CH	W T	C	From 0.00 to 4.0m Depth samples taken by SPT being manually pushed at 0.25m intervals (N<1)	8.9	5.6	W	Very Soft	**Silty Clay**; grey, with fine to coarse grained sand, with shells MPS 1 LL 55 P75 80
							8.7	5.7			
							8.7	5.6			
1.00							8.7	5.8			
							8.8	5.7			
							8.7	5.6			
							9.2	5.6			
2.00							9.0	5.6			
							9.1	5.7			
							9.0	5.7			
							8.7	5.9			
3.00	-3.8						9.2	5.8			
3.10			SP				8.5	5.9		Soft	**Silty Sand**; grey, fine to coarse grained, with shells MPS 2 LL 35 P75 40
							8.5	6.0			
							8.6	5.6			
4.00	-4.7						8.9	5.6			Borehole complete at 4.0m Depth

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN GEOTECHNIC

BOREHOLE LOG

Borehole No. 5
Sheet 1 of 1

Client: Kinsmen Pty Ltd
Project: Shute Harbour Marina
Site: Shute Harbour
Date: 21.5.01 Job No: 10474.1
Location: Basin Stage 1-North, N7755274 E685885
Surface R.L.: 0.0 Datum: LAT
Supervisor MS Chkd: AW

Drill Contractor Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Barge Diameter 90mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	Field ASS Screening pH_f	pH_{ox}	Moisture	Consistency	
	0.0		CH	W T	C	From 0.00 to 4.0m Depth samples taken by SPT beirg manually pushed at 0.25m intervals (N<1)	9.0	5.4	W	Very Soft	**Clayey Silt**; grey, with fine to medium grained sand, with shells MPS 3 LL 60 P75 80
							9.1	5.7			
							9.0	5.9			
1.00							9.1	5.8			
							8.8	5.7			
1.55							8.9	5.7			
							8.9	5.8			
2.00							8.9	5.7			
							8.8	6.1			
2.40	-2.4		SM				9.1	5.8		Loose	**Silty Sand**; grey, fine to coarse grained, with shells MPS 5 LL 30 P75 30
2.70	-2.7		ML				9.0	5.9		Soft	
3.00							9.0	6.0			**Clayey Silt**; grey, with fine to coarse grained sand, with shells MPS 6 LL 55 P75 70
							9.2	5.8			
							8.6	5.5			
							8.5	5.7			
4.00	-4.0						8.6	5.8			Borehole complete at 4.0m Depth

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN GEOTECHNIC

TEST PIT LOG

Pit No. 1

Sheet 1 of 1

Client:	Kinsmen Pty Ltd	Date:	7.5.01	Job No:	10474.1
Project:	Proposed Shute Harbour Marina	Location:	GPS UTM 7755448N 55685803E		
		Surface R.L.:	+0.50m	Datum:	LAT
Site:	Reclamation Area	Supervisor	PAJD	Chkd:	AW

Contractor: Demol Pty Ltd — Equipment: Samsung 21t Tracked Excavator — Bucket Size: 450mm

STRATA				SAMPLING	TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification		Field ASS Screening	Moisture	Consistency	
	+0.60					W	Loose	Grey to light brown, low to medium plasticity interstitial material, fine to medium grained, gravelly silty clayey SAND. Gravels being (15%) shell and coral fragment and (15%) angular volcanics MPS 250mm LL 30 P75 25
0.40	+0.20						Very Loose	
1								Dark grey, medium plasticity, gravelly clayey SAND, Gravels being (20%) shell and coral fragments and (5%) angular acid volcanic MPS 50 LL 45 P75 30
1.10	-0.5							
							Soft	Light grey, high plasticity, slightly gravelly sandy silty CLAY with lenses of grey gravelly SAND MPS 10 LL 60 P75 80
1.50				1.50-2.00 D1	pH_f = 8.02 pH_{ox}=6.96			
2								
2.50	-1.90						Soft	Grey, medium to high plasticity, fine to medium grained, gravelly clayey SAND MPS 15 LL 40 P75 40
3								
3.80	-3.20							Test pit complete at 3.80m
4								

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
PP Pocket Pentrometer Valve

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN GEOTECHNIC

TEST PIT LOG

Pit No. 2

Sheet 1 of 1

Client:	Kinsmen Pty Ltd	Date:	12.3.01	Job No:	10474.1
		Location:	GSP UTM 7755405N 685804E		
Project:	Proposed Shute Harbour Marina	Surface R.L.:	+0.5m	Datum:	LAT
Site:	Reclamation Area	Supervisor	PAJD	Chkd:	AW

Contractor: Demol Pty Ltd | Equipment: Samsung 21t Tracked Excavator | Bucket Size: 450mm

Depth (m)	R.L	Log	Classification	SAMPLING	TESTING	Moisture	Consistency	VISUAL SOIL DESCRIPTION
	STRATA				Field ASS Screening			
0	+0.5					W	Loose	Grey to brown, low to medium plasiticity, fine to medium grained, gravelly clayey SAND. Gravel being (20%) shell and (10%) angular country rock fragments MPS 175 LL 30 P75 20
0.50								
0.90	-0.4						Very Soft	Light grey, medium to high plasticity, sandy slightly gravelly CLAY MPS 10 LL 60 P75 85
1								
1.25	-0.7			1.2-1.5 D1	pH_f = 8.4 pH_{ox}=7.2			Grey, medium plasticity, clayey gravelly SAND with some coral boulders MPS 450 LL 20 P75 35
1.50	-1.1							Test pit terminated at 1.60m due to excavator sinking in muds.
2								
3								
4								

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
PP Pocket Pentrometer Valve

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN GEOTECHNIC

TEST PIT LOG

Pit No. 3

Sheet 1 of 1

Client:	Kinsmen Pty Ltd	Date:	12.3.01	Job No:	10474.1
		Location:	GSP UTM 7755414N		685799E
Project:	Proposed Shute Harbour Marina	Surface R.L.:	0.6	Datum:	LAT
Site:	Reclamation Area	Supervisor	PAJD	Chkd:	AW

Contractor: Demol Pty Ltd | Equipment: Samsung 21t Tracked Excavator | Bucket Size: 450mm

Depth (m)	R.L	Log	Classification	SAMPLING	TESTING	Moisture	Consistency	VISUAL SOIL DESCRIPTION
	+0.6					W	Loose to Soft	Grey (light brown surface to 75mm only) to dark grey, low to medium plasticity, gravelly silty clayey SAND. Gravels being (10%) shells and (20%) angular acidic volcanics MPS 180 LL 40 P75 30
0.50								
1								1.0m becoming very soft with decreasing angular rock gravels
2								
2.25	-1.65							2.25 gradual transition to darker grey with occasional large (400mm) coral fragment and clayey silt lenses MPS 400 LL 50 P75 50
2.50				2.50-3.0 D1				
3								
3.50	-2.9							Test pit complete at 3.50m
4								

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
PP Pocket Pentrometer Valve

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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ULLMAN & NOLAN GEOTECHNIC

TEST PIT LOG

Pit No. 4

Sheet 1 of 1

Client:	Kinsmen Pty Ltd	Date:	12.3.01	Job No:	10474.1
		Location:	GPS UTM 7755377N 685805E		
Project:	Proposed Shute Harbour Marina	Surface R.L.:	0.3	Datum:	LAT
Site:	Reclamation Area - Central	Supervisor	PAJD	Chkd:	AW

Contractor Demol Pty Ltd | Equipment Samsung 21t Tracked Excavator | Bucket Size 450mm

STRATA				SAMPLING	TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification		Field ASS Screenings	Moisture	Consistency	
	+0.3					W	Loose	Light grey becoming grey, fine to coarse grained, silty, slightly clayey sandy GRAVEL. Particles being shells and coral fragments (25%) and angular country rock (5%) with occassional cobbles and boulder sized coral heads MPS 600 LL 25 P75 25
1								
1.50							Soft	1.5 becoming less gravelly with increasing clay lenses MPS 300 LL 45 P75 45
2								
2.50	-2.2						Very Soft	Grey, medium to high plasticity, gravelly sandy silty CLAY MPS 75 LL 50 P75 50
3				3.2-3.8 D1	pH_f = 8.3 pH_{ox}=7.4			3.5 ocassional larger coral fragments up to 700mm long
4	-3.9							Test pit complete at 4.0m

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
PP Pocket Pentrometer Valve

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN GEOTECHNIC

TEST PIT LOG

Pit No. 5

Sheet 1 of 1

Client:	Kinsmen Pty Ltd	Date:	12.3.01	Job No:	10474.1
		Location:	GPS UTM 7755347N 685802E		
Project:	Proposed Shute Harbour Marina	Surface R.L.:	0.2	Datum:	LAT
Site:	Reclamation Area	Supervisor	PAJD	Chkd:	AW

Contractor: Demol Pty Ltd | Equipment: Samsung 21t Tracked Excavator | Bucket Size: 450mm

Depth (m)	R.L	Log	Classification	Sampling	Testing (Field ASS Screenings)	Moisture	Consistency	Visual Soil Description
	+0.2					W	Very Loose	Grey, fine to coarse grained, poorly sorted, silty, angular, sandy GRAVEL. Particles being shells and coral fragments (30%) with country rock (5%) with occasional boulders of corals MPS 450 LL 25 P75 30
1								
	-1.05							
1.25							Soft to Very Soft	Grey, moderate plasticity, gravelly sandy clayey SILT MPS 100 LL 40 P75 45
2								
2.25								2.25 becoming increasingly clayey and light grey
2.50				2.5-3.0 D1	pH_f = 8.1 pH_{ox}=7.2			
3								3.25 increasing content of coral fragments up to 500mm length (debris not reef)
2.25								
4	-4.0							Test pit complete at 4.0m

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
PP Pocket Pentrometer Valve

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN GEOTECHNIC

TEST PIT LOG

Pit No. 6

Sheet 1 of 1

Client:	Kinsmen Pty Ltd	Date:	12.3.01	Job No:	10474.1
		Location:	GPS UTM 7755351N 685831E		
Project:	Proposed Shute Harbour Marina	Surface R.L.:	0.1	Datum:	LAT
Site:	Reclamation Area	Supervisor	PAJD	Chkd:	AW

Contractor: Demol Pty Ltd | Equipment: Samsung 21t Tracked Excavator | Bucket Size: 450mm

STRATA				SAMPLING	TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification		Field ASS Screenings	Moisture	Consistency	
	+0.1					W	Very Loose	Grey, fine to coarse grained, poorly sorted, angular, silty sandy GRAVEL. All particles are carbonate (30%) MPS 200 LL 30 P75 30
1	-0.9						Soft	dark grey becoming grey, moderate plasticity, gravelly sandy clayey SILT MPS 325 LL 50 P75 65
2								
2.50	-2.4							2.5 increasing proportion of coral fragments up to 500mm size with interstital clay
3								
				3.5-4.0 D1	pH_f = 8.0 pH_{ox}=7.4			
4	-3.9							Test pit complete at 4.0m

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
PP Pocket Pentrometer Valve

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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ULLMAN & NOLAN GEOTECHNIC

TEST PIT LOG

Pit No. 7

Sheet 1 of 1

Client:	Kinsmen Pty Ltd	Date:	12.3.01	Job No:	10474.1
		Location:	GPS UTM 7755326N 685814E		
Project:	Proposed Shute Harbour Marina	Surface R.L.:	0.0	Datum:	LAT
Site:	Reclamation Area South	Supervisor	PAJD	Chkd:	AW

Contractor: Demol Pty Ltd | Equipment: Samsung 21t Tracked Excavator | Bucket Size: 450mm

Depth (m)	R.L	Log	Classification	SAMPLING	TESTING: Field ASS Screenings	Moisture	Consistency	VISUAL SOIL DESCRIPTION
	0.0					W	Very Loose	Grey, fine to coarse grained, poorly sorted, angular, silty sandy GRAVEL. All particles are carbonate (30%) MPS 150 LL 20 P75 30
1								
1.50	-1.5						Soft	Grey to light grey, medium to highly plastic, gravelly sandy silty CLAY (15% carbonates) MPS 110 LL 60 P75 70
2								
3								3.0 becoming medium plasticity, gravelly clayey SILT (15% carbonate) MPS 80 LL 40 P75 45
				3.5-4.0 D1	pH_f = 8.0 pH_{ox}=6.9			
4	-4.0							Test pit complete at 4.0m

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
PP Pocket Pentrometer Valve

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN GEOTECHNIC

TEST PIT LOG

Pit No. 8

Sheet 1 of 1

Client:	Kinsmen Pty Ltd	Date:	12.3.01	Job No:	10474.1
		Location:	GPS UTM 7755348N 685767E		
Project:	Proposed Shute Harbour Marina	Surface R.L.:	0.0	Datum:	LAT
Site:	Reclamation Area	Supervisor	PAJD	Chkd:	AW

Contractor Demol Pty Ltd | Equipment Samsung 21t Tracked Excavator | Bucket Size 450mm

STRATA				SAMPLING	TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification			Moisture	Consistency	
	0.0					W	Very Loose	grey to light grey, fine to coarse grained, poorly sorted, silty clayey GRAVEL. All particles are carbonate (20%) MPS 125 LL 20 P75 30
1								
1.25	-1.25						Soft to Very Soft	grey, medium plasticity, gravelly sandy clayey SILT (20% carbonates) MPS 240 LL 45 P75 60
2								
2.50	-2.50							2.5 becoming more clayey with increasing boulders of coral up to 500mm
3								
4	-4.0							Test pit complete at 4.0m

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
PP Pocket Pentrometer Valve

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

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Borehole No. A1
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 12.7.04 Job No: 21024.1/10474.3
Location: E550685742 N7755451
Surface R.L.: 1.00 Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	
			GP/GM	A T		Field screening at 0.25m intervals	8.0	6.1	W	Loose	**Fill Site** **Sandy Gravel;** grey, fine to coarse grained, angular, sand is fine to coarse grained (Marine/Colluvium) MPS 200 LL NP P75 15
						ASS and environmental sampling at 0.5m intervals	8.0	5.8			
							8.2	5.9			
0.90											
1			GC				8.5	5.9			**Clayey Sandy Gravel;** grey, fine to coarse grained, angular, sand is fine to coarse grained (Marine) MPS 20 LL 20 P75 30
							8.3	5.9			
							8.4	5.7			
							8.2	5.9			
2							8.1	5.8			**Borehole complete at 2.00m**
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A2
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 12.7.04 Job No: 21024.1/10474.3
Location: E550685838 N7755434
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: 0.00 Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Fill Site
0			GP	A T		Field screening at 0.25m intervals ASS and environmental sampling at 0.5m intervals	8.5	6.1	W	Loose	**Sandy Gravel;** grey, fine to coarse grained, angular, sand is fine to coarse grained, with silt (Colluvium/Marine) MPS 10 LL NP P75 10
							8.5	6.0			
							8.7	6.1			
0.80											
1			SC				8.8	6.2			**Clayey Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular (Colluvium/Marien) MPS 20 LL 30 P75 30
							8.2	6.0			
							8.6	6.1			
							8.4	6.1			
2							8.4	6.0			
											Borehole complete at 2.00m
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A3
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 12.7.04 Job No: 21024.1/10474.3
Location: E550685686 N7755395
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -0.50 m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency/	Fill Site
			SP/SM	A T		Field screening at 0.25m intervals	8.5	5.9	W	Loose	**Gravelly Sand;** fien to coarse grained, gravel is fine to coarse grained, angular (Colluvium/Marine) MPS 20 LL 15 P75 15
						ASS and environmental sampling at 0.5m intervals	8.4	5.9			
							8.3	5.8			
0.90											
1			SC				8.5	5.8			**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular (Colluvium/Marine) MPS 10 LL 30 P75 30
							8.5	6.0			
1.30							7.6	6.3			
1.39											**Clayey Sand;** grey, fine to coarse grained (Residual) MPS 2 LL 30 P75 30
											Hand Auger refusal at 1.39m
2											
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A4
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 17.7.04 Job No: 21024.1/10474.3
Location: E550685799 N7755370
Surface R.L.: -1.50m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
			GP	A T		Field screening at 0.25m intervals	8.6	5.8	W	Loose	**Sandy Gravel;** grey, fine to coarse grained, angular, sand is fine to coarse grained (Colluvium/Marine) MPS 200 LL NP P75 5
						ASS and environmental sampling at 0.5m intervals	8.7	5.8			
0.60			SC				8.7	6.0			**Clayey Sand;** grey, fine to coarse grained, with fine to medium grained gravel, angular (Marine) MPS 10 LL 25 P75 30
1							8.7	5.9			
							8.8	5.8			
							8.8	5.8			
							8.8	5.9			
2							8.9	5.9			
							9.0	6.1			
							9.1	6.2			
							9.0	6.3			
3							9.1	6.3			
							No sample recovery				**Clayey Sand;** purple-brown, fine to coarse grained (Residual) MPS 2 LL 20 P75 25
3.40											
3.50											**Hand Auger refusal at 3.50m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 3.7m depth in this borehole.
No sample recovery 3.0m

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A5
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 15.7.04 Job No: 21024.1/10474.3
Location: E550685899 N7755352
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -1.80m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Fill Site
0			GP	A T		Field screening at 0.25m intervals ASS and environmental sampling at 0.5m intervals	9.0	6.3	W	Loose	**Sandy Gravel;** grey, fine to coarse grained, angular, sand is fine to coarse grained (Colluvium/Marine) MPS 40 LL NP P75 5
							8.9	6.6			
							8.9	6.5			
1							8.6	6.6			
1.20			SC				8.7	6.5		Very Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine grained gravel, angular (Marine) MPS 5 LL 45 P75 30
							8.6	6.3			
							8.6	6.5			
2							8.5	6.5			**Borehole complete at 2.00m**
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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UNGR 103G
(-/1/03)

Borehole No. A6
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 15.7.04 Job No: 21024.1/10474.3
Location: E550685931 N7755348
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -1.90m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Fill Site
0.20			GP	A T		Field screening at 0.25m intervals	8.7	6.1	W	Loose	**Sandy Gravel;** grey, fine to coarse grained, angular, sand is fine to coarse grained, with silt (Colluvium/Marine) MPS 200 LL NP P75 10
						ASS and environmental sampling at 0.5m intervals	8.8	6.3			**Clayey Sandy Gravel;** grey, fine to coarse grained, angular, sand is fine to coarse grained (Colluvium/Marine) MPS 40 LL 20 P75 30
							8.9	6.2			
1							9.1	6.3			**Sandy Gravel;** grey, fine to coarse grained, angular, sand is fine to coarse grained, with silt (Colluvium/Marine) MPS 100 LL 30 P75 10
1.10							9.2	6.4			**Sandy Gravel;** grey, fine to coarse grained, angular, sand is fine to coarse grained, with silt (Colluvium/Marine) MPS 40 LL 15 P75 10
1.40							9.1	6.5			
1.50											
1.60			SC				No sample recovery		M	Very Stiff	**Clayey Sand;** purple-brown, fine to coarse grained (Residual) MPS 2 LL 25 P75 20
1.67											**Hand Auger Refusal at 1.67m**
2											
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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UNGR 103G
(-/1/03)

Borehole No. A7
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 6.8.04 Job No: 21024.1/10474.3
Location: E550685536 N7755363
Surface R.L.: 2.00 m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	
											Fill Site
0.20			SP	A T		Field screening at 0.25m intervals	8.9	6.3	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse graiend, angular to rounded, trace of silt (Colluvium/Marine) MPS 100 LL NP P75 5
			SC			ASS and environmental sampling at 0.5m intervals	9.1	6.3			**Clayey Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, shells and coral (Marine) MPS 20 LL 20 P75 20
							9.0	6.3			
1							8.8	6.1			**Hand Auger Refusal at 1.0m**
2											
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A8
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 12.7.04 Job No: 21024.1/10474.3
Location: E550685695 N7755331
Surface R.L.: -2.20m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
			SC	A T		Field screening at 0.25m intervals	9.2	6.3	W	Loose	**Clayey Gravelly Sand;** grey, fine to coarse grained, gravel is fine to medium grained, angular, shells (Colluvium/Marine) MPS 15 LL 15 P75 25
0.50						ASS and environmental sampling at 0.5m intervals	9.0	6.5			
			CI				9.3	6.4		Soft	**Clay;** grey, with fine to coarse grained sand, trace of fine grained gravel, angular (Marine) MPS 3 LL 45 P75 70
1							9.1	6.6			
1.20							8.8	6.8			
							9.0	6.5		Very Soft	**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine grained gravel, angular (Marine) MPS 3 LL 35 P75 55
							8.8	6.5			
2							8.6	6.4			
2.30							8.6	6.5			
							8.5	6.2			**Clay;** grey, with fine to coarse grained sand, trace of fine grained gravel, angular (Marine) MPS 3 LL 45 P75 70
							8.7	6.5			
3	PDL						8.7	6.4			
							8.6	6.6			
							8.6	6.4			
							8.4	6.2			
3.80			SC			No ASS sample recovery				Very Stiff to Hard	**Gravelly Clayey Sand;** purple-brown, fine to coarse grained, gravel is fine to medium grained, angular (Residual) MPS 10 LL 25 P75 20
4							8.7	6.3			

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 3.0m depth in this borehole.

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A9
Sheet 1 of 2

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 20.7.04 Job No: 21024.1/10474.3
Location: E550685750 N7755327
Surface R.L.: -2.00m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0			SP	A T		Field screening at 0.25m intervals	9.0	6.3	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, shells (Marine) MPS 5 LL NP P75 5
0.30			SC			ASS and environmental sampling at 0.5m intervals	9.0	6.4		Soft	**Gravelly Clayey Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, shells (Colluvium/Marine) MPS 20 LL 20 P75 20
0.80							8.6	6.6			
1							8.5	6.5			**Clayey Sand;** grey, fine to coarse grained, trace of fine grained gravel, angular (Marine) MPS 4 LL 40 P75 45
							8.9	6.6			
							8.7	6.6			
							8.8	6.5			
2							8.7	6.4			
							8.8	6.4			
2.50							8.7	6.3			
			CH				8.6	6.5			**Clay;** grey, with fin to coarse grained sand, trace of fine grained gravel, angular (Marine) MPS 4 LL 55 P75 75
3							8.6	6.5			
3.10											
3.20	PDL		GC				8.7	6.3		Loose	**Sandy Gravel;** grey, fien to medium grained, subrounded, sand is fine to coarse grained, with clay (Marine) MPS 10 LL 30 P75 10
							8.7	6.3			
							8.8	6.2			
4							8.7	6.1			

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 3.2m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A9
Sheet 2 of 2

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 20.7.04 Job No: 21024.1/10474.3
Location: E550685750 N7755327
Surface R.L.: -2.00m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F pH_{FOX}		Moisture	Consistency	
			GC	A T					W	Loose	**Dredge Site** **Sandy Gravel**; refer sheet 1, depth 3.10m
4.15											**Hand Auger Refusal at 4.15m**
5											
6											
7											
8											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 3.2m depth in this borehole.

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A10
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 16.7.04 Job No: 21024.1/10474.3
Location: E550685893 N7755328
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.00m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0.00			GP	A T		Field screening at 0.25m intervals	9.0	6.5	W	Soft	**Sandy Gravel**; grey, fine to coarse grained, gravel is fine to medium grained, angular, shells (Colluvium/Marine) MPS 10 LL NP P75 10
0.40			CH			ASS and environmental sampling at 0.5m intervals	9.0	6.4			**Gravelly Sandy Clay**; grey, gravel is fine grained, angular, sand is fine to coarse grained, shells (Marine) MPS 5 LL 55 P75 60
							8.6	6.5			
1							8.7	6.5			
							8.9	6.8			
							9.1	6.4			
							9.0	6.6			
2							9.1	6.7			**Hand Auger Refusal at 2.0m depth**
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 3.2m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A11
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 16.7.04 Job No: 21024.1/10474.3
Location: E550685994 N7755311
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.15m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Fill Site
0.20			GP	A T		Field screening at 0.25m intervals	9.1	6.4	W	Loose	**Sandy Gravel**; grey, fine to coarse grained, angular, sand is fine to coarse grained, with silt, coral and shells (Colluvium/Marine) MPS 100 LL NP P75 10
			GC			ASS and environmental sampling at 0.5m intervals	8.9	6.3			
0.70							9.2	6.6			**Clayey Sandy Gravel**; grey, fine to coarse grained, angular, sand is fine to coarse grained, coral and shells (Marine) MPS 40 LL 20 P75 20
1							9.1	6.5		Soft	MPS 20 LL 45 P75 30
							8.9	6.5			
							8.9	6.6			
							8.7	6.7			
2							8.9	6.9			
											Borehole complete at 2.00m
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A12
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 19.7.04 Job No: 21024.1/10474.3
Location: E550685589 N7755301
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.50m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
			SC	A T		Field screening at 0.25m intervals ASS and environmental sampling at 0.5m intervals	9.2	6.4	W	Loose	**Clayey Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, shells (Marine) MPS 5 LL 35 P75 25
							9.5	5.9			
0.80							9.1	6.1			
1							8.7	6.4			**Gravelly Clayey Sand;** grey, fine to coarse grained, gravel is fine grained, angular, shells (Marine) MPS 5 LL 45 P75 35
							9.0	5.4			
							8.6	5.7			
1.80							8.2	6.2			
2			CI				8.6	6.1		Soft	**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 45 P75 60
							8.7	6.5			
							8.6	6.6			
2.70	PDL						8.7	6.6			
2.90							8.8	6.7			
3			CH								**Clay;** with fine to coarse grained sand (Marine) MPS 2 LL 60 P75 80
							8.7	6.5			
							8.9	6.6			
3.75							9.1	6.8			**Borehole complete at 3.75m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.7m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A13
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 21.7.04 Job No: 21024.1/10474.3
Location: E550685623 N7755291
Surface R.L.: -2.60m Datum: AHD
Supervisor VJ Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SM	A T		Field screening at 0.25m intervals	8.8	6.5	W	Soft	**Silty Sand;** pale grey, fine to coarse grained, with fine grained gravel, subrounded, shells (Marine) MPS 4 LL 45 P75 35
			SC			ASS and environmental sampling at 0.5m intervals	8.7	6.5			
0.60			CH				8.8	6.6			**Clayey Silty Sand;** grey, fine to coarse grained, shells (Marine) MPS 4 LL 50 P75 45
1							8.8	6.7			**Sandy Silty Clay;** grey, sand is fine to coarse grained, shells (Marine) MPS 4 LL 55 P75 60
1.10							8.8	6.5			
							8.9	6.6			**Silty Clay;** grey, with fine to coarse grained sand, shells (Marine) MPS 4 LL 60 P75 80
							8.7	6.4			
2							8.8	6.3			
							8.6	6.6			
2.60	PDL						8.5	6.3			
							8.9	6.5			**Silty Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 1 LL 60 P75 90
3							8.9	6.5			
							8.6	6.7			
							8.6	6.4			
3.75							8.8	6.6			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.6m depth in this borehole.

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A14
Sheet 1 of 2

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 12.7.04 Job No: 21024.1/10474.3
Location: E550685781 N7755271
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.70m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0			SC	A T		Field screening at 0.25m intervals	9.1	6.7	W	Loose	**Clayey Sand;** grey, fine to coarse grained (Marine) MPS 2 LL 20 P75 25
0.60						ASS and environmental sampling at 0.5m intervals	9.9	7.3			
			CI				9.5	6.6			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 40 P75 55
1							9.4	6.9			
							9.5	6.6			
1.40							9.5	6.7			
			CH				8.9	6.6			**Clay;** grey, with fine to coarse grained sand, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 65 P75 75
2							8.9	6.6			
							8.8	6.4			
2.50	PDL						8.7	6.7			
							8.9	6.3			**Clay;** grey, trace of fine to coarse grained sand, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 70 P75 90
3							8.8	6.5			
3.10						No further ASS and environmental samples collected	8.7	6.3			
3.50							8.7	6.4			
							8.5	6.3			
4							8.6	6.1			

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.5m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A14
Sheet 2 of 2

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 20.7-6.8.04 Job No: 21024.1/10474.3
Location: E550685781 N7755271
Surface R.L.: -2.70m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
4.20			SC	A T		No further ASS and environmental samples collected	8.7	5.7	W		**Clay**; refer sheet 1, 2.50m depth
							8.7	5.7		Soft	**Clayey Sand**; grey, fine to coarse grained, trace of fine to coarse grained gravel, subrounded to rounded (Residual?) MPS 3 LL 25 P75 40
4.80							8.7	6.1			**Rock**; extremely weathered to **Clayey Gravelly Sand**; grey-purple, fine to coarse grained, gravel is fine to coarse, angular (Residual)
5							8.7	6.1		Stiff	MPS 3 LL 25 P75 40
5.10			GP				8.7	6.1		Very Dense to Hard	**Rock**; extremely weathered to **Sandy Gravel**; red-purple, fine to coarse grained, angular, sand is fine to coarse grained (Residual) MPS 20 LL NP P75 10
5.50							8.8	6.1			
											Hand Auger Refusal at 5.50m
6											
7											
8											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.5m depth in this borehole.

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UNGR 103G
(-/1/03)

Borehole No. A15
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 27.7.04 Job No: 21024.1/10474.3
Location: E550685820 N7755268
Surface R.L.: -2.70m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.00			SP	A T		Field screening at 0.25m intervals	8.7	6.5	W	Loose	**Sand;** grey, fine to coarse grained, with fine to coarse grained gravel, angular, trace of silt, shells (Marine) MPS 20 LL NP P75 5
0.20			SC			ASS and environmental sampling at 0.5m intervals	9.2	6.4		Soft	**Clayey Sand;** grey, fine to coase grained, trace of fine to medium grained, angular, shells (Marine) MPS 7 LL 25 P75 25
0.50							8.8	6.2			
1							8.8	6.4			**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 35 P75 35
1.20			CI				8.8	6.3			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 45 P75 55
							8.9	6.3			
							8.9	6.4			
2							8.8	6.4			
							8.8	6.4			
2.30			CH				8.8	6.4			**Clay;** grey, with fine to coarse grained sand, trace of fine grained gravel, shells (Marine) MPS 4 LL 55 P75 70
2.50	PDL						8.9	6.0			**Clay;** grey, with fine to coarse grained sand (Marine) MPS 2 LL 65 P75 85
2.60							8.9	6.1			
3							9.1	6.2			
3.50							9.1	6.3			**Borehole complete at 3.50m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.5m depth in this borehole.

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A16
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 29.7.04 Job No: 21024.1/10474.3
Location: E550685925 N7755251
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.65m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.00			SP	A T		Field screening at 0.25m intervals	9.0	6.4	W	Loose	**Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, trace of silt, shells (Marine) MPS 10 LL NP P75 5
0.20			SC			ASS and environmental sampling at 0.5m intervals	9.0	6.5		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 25 P75 20
0.70							9.0	6.4			
1							8.9	6.5			MPS 5 LL 40 P75 35
1.20			CI				8.9	6.5			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 50 P75 60
							8.8	6.3			
							8.8	6.1			
2			CH				8.6	6.1			**Clay;** grey, with fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 60 P75 80
							8.6	6.1			
2.50	PDL						8.6	6.1			
2.55											**Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 4 LL 65 P75 95
							8.4	6.1			
3							8.4	6.3			
							8.4	6.2			
							8.7	6.3			
3.75							8.4	6.1			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.55m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A17
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 16.7.04 Job No: 21024.1/10474.3
Location: E550686021 N7755270
Surface R.L.: -2.65m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0			SP	A T		Field screening at 0.25m intervals	8.6	6.3	W	Loose	**Sand;** grey, fine to coarse grained, with silt, trace of fine grained gravel, angular (Colluvium/Marine) MPS 20 LL NP P75 10
0.30			CH			ASS and environmental sampling at 0.5m intervals	9.1	6.5		Soft	**Clay;** grey, with fine to coarse grained sand, trace of medium to coarse grained gravel, angular, shells 20% (Marine) MPS 5 LL 55 P75 70
							8.7	6.4			
1							8.6	6.3			
							8.8	6.6			
							8.8	6.2			
							9.1	6.8			
2							9.0	6.8			
2.10							8.9	6.8			trace of fine grained sand, shells 20% (Marine) MPS 4 LL 65 P75 85
							8.8	6.6			
2.55	PDL						8.8	6.5			
3							8.7	6.5			
							8.8	6.6			
							8.8	6.8			
3.75							8.7	6.7			**Borehole complete at 3.75m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.55m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A18
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 29.7.04 Job No: 21024.1/10474.3
Location: E550685611 N7755264
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.60m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Visual Soil Description
											Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	9.0	6.2	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, shells (Marine) MPS 20 LL NP P75 5
			SC			ASS and environmental sampling at 0.5m intervals	8.6	5.9		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 15 LL 25 P75 35
0.60			CI				8.7	6.0			
1							8.8	5.9			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 45 P75 60
							8.7	6.2			
1.50							8.4	6.5			
			CH				8.3	6.2			**Clay;** grey, with fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 4 LL 55 P75 80
2							8.6	6.1			
2.20							8.5	5.9			
	PDL						8.5	5.6			
2.60							8.5	5.6			**Clay;** grey, with fine to coarse grained sand (Marine) MPS 2 LL 65 P75 90
3							8.5	5.6			
							8.5	5.6			
							8.5	5.7			
3.75							8.5	5.7			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.6m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A19
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 15.7.04 Job No: 21024.1/10474.3
Location: E550685718 N7755246
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.70m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Visual Soil Description
											Dredge Site
0.00			SC	A T		Field screening at 0.25m intervals	8.8	6.5	W	Loose	**Clayey Sand**; grey, fine to coarse grained, trace of medium to coarse grained gravel, angular (Colluvium/Marine) MPS 20 LL 20 P75 30
0.50						ASS and environmental sampling at 0.5m intervals	8.6	6.6			trace of fine grained gravel, angular MPS 5 LL 40 P75 40
1							9.0	6.4			
							8.9	6.8			
							8.7	6.3			
1.50							8.5	6.4			
			CH							Very Soft	**Clay**; grey, with fine to coarse grained sand, trace of fine grained gravel, angular (Marine) MPS 5 LL 60 P75 70
2							8.4	6.9			
							8.6	6.7			
							8.4	6.8			
2.50	PDL						8.8	6.3			
							8.6	6.4			
3							8.9	6.5			
							9.0	6.6			
3.50							8.8	6.3			**Borehole complete at 3.50m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.5m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A20
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 29.7.04 Job No: 21024.1/10474.3
Location: E550685883 N7755229
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.80m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	9.1	6.3	W	Loose	**Sand;** grey, fine to coarse grained, with fine to coarse grained gravel, angular, trace of silt, shells (Marine) MPS 20 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	9.0	6.3		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 15 LL 25 P75 35
1							9.0	6.3			
1.10			CI				8.8	6.2			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 4 LL 50 P75 65
1.50							8.9	6.1			**Clay;** grey, with fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 55 P75 80
1.90							8.9	6.0			
2			CH				8.8	5.9			**Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 2 LL 65 P75 90
2.40	PDL						8.8	5.8			
							8.8	5.9			
							8.6	5.9			
3							8.5	6.1			
							8.6	6.2			
3.50							8.6	6.3			
							8.4	6.4			
4											**Borehole complete at 3.50m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.4m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A21
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 21.7.04 Job No: 21024.1/10474.3
Location: E550685974 N7755215
Surface R.L.: -2.90m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SM	A T		Field screening at 0.25m intervals	9.1	6.6	W	Soft	**Silty Sand**; grey, fine to coarse grained, shells 40% (Marine) MPS 4 LL 30 P75 30
			SC			ASS and environmental sampling at 0.5m intervals	8.8	6.5			
							8.8	6.7			**Silty Clayey Sand**; grey, fine to coarse grained, shells 25% (Marine) MPS 4 LL 40 P75 45
1							8.7	6.6			
1.20							8.7	6.6			
			CI				8.7	6.6			**Silty Clay**; grey, with fine to coarse grained sand, shells 15% (Marine) MPS 3 LL 50 P75 55
							8.8	6.6			
2							8.6	6.7			
2.10											dark grey,shells 5% MPS 3 LL 60 P75 80
2.30	PDL		CH				8.3	6.4			**Silty Clay**; dark grey (Marine) MPS 1 LL 70 P75 90
							8.7	6.5			
							8.5	6.5			
3							8.2	6.5			
							8.7	6.4			
3.50							8.5	6.5			
											Borehole complete at 3.50m
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.3m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A22
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 19.7.04 Job No: 21024.1/10474.3
Location: E550686047 N7755205
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.80m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Visual Soil Description
											Dredge Site
0.10			SP	A		Field screening at 0.25m intervals	8.8	6.4	W	Loose	**Sand;** grey, fine to coarse grained, with silt, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL NP P75 10
			SC	T							
						ASS and environmental sampling at 0.5m intervals	9.2	6.4		Firm	
0.60											**Clayey Sand;** grey,fine to coarse grained (Marine) MPS 2 LL 20 P75 20
			CH				8.8	6.5			
										Soft	
1							8.7	6.4			**Clay;** grey, with fine to coarse grained sand (Marine) MPS 2 LL 65 P75 70
							8.7	6.2			
							9.0	6.4			
							8.7	6.0			
2							8.7	6.1			
							8.5	6.2			
2.40	PDL										
2.50							8.4	6.3			**Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 2 LL 65 P75 90
							8.5	6.2			
3							8.5	6.2			
							8.6	6.4			
3.50							8.3	6.0			**Borehole complete at 3.50m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.4m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A23
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 29.7.04 Job No: 21024.1/10474.3
Location: E550685534 N7755224
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.00m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.10			SP	A		Field screening at 0.25m intervals	9.1	5.9	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained gravel, angular, with silt, shells (Marine) MPS 20 LL NP P75 10
			SC	T		ASS and environmental sampling at 0.5m intervals	9.0	5.9		Soft	**Clayey Sand;** grey, fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine) MPS 15 LL 20 P75 25
0.90							8.8	5.8			
1			CI				8.5	5.8			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular (Marine) MPS 7 LL 40 P75 55
1.20			CH				8.4	5.8			
							8.5	5.9			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 55 P75 75
							8.3	5.6			
2							8.3	5.5			
							8.3	5.7			
2.40							8.4	5.7			**Clay;** grey, trace of fine to coarse grained sand (Residual) MPS 2 LL 65 P75 95
							8.5	5.8			
3							8.6	5.7			**Hand Auger Refusal at 3.0m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 3.2m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A24
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 30.7.04 Job No: 21024.1/10474.3
Location: E550685662 N7755187
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.72m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.00			SP	A T		Field screening at 0.25m intervals	8.5	5.6	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, with silt, shells (Marine) MPS 20 LL NP P75 10
0.20			SC			ASS and environmental sampling at 0.5m intervals	8.5	5.5		Soft	**Clayey Sand;** grey, fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine) MPS 15 LL 20 P75 25
0.60			CI				8.6	5.4			
1							8.5	5.4			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 40 P75 50
1.20			CH				8.4	5.5			
							8.2	5.6			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 60 P75 75
							8.3	6.1			
2							8.3	6.2			**Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 2 LL 70 P75 95
							8.5	5.7			
2.48	PDL						8.6	5.6			
							8.5	5.8			
3							8.4	5.7			
							8.3	5.7			
3.50							8.4	5.6			**Borehole complete at 3.50m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.48m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A25
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 4.8.04 Job No: 21024.1/10474.3
Location: E550685764 N7755173
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.85m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	8.8	5.8	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, trace of silt, shells (Marine) MPS 25 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	8.6	5.8		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 25 LL 20 P75 25
0.80							8.6	6.1			
1			CI				8.7	6.0			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 40 P75 55
1.20			CH				8.7	6.0			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 55 P75 70
							8.7	5.9			
							8.4	5.8			
1.90											
2							8.5	5.7			**Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 4 LL 70 P75 90
							8.4	5.8			
2.34	PDL										
							8.5	5.9			
							8.4	6.0			
3							8.6	5.9			
							8.6	6.0			
3.50							8.6	6.1			
4											**Borehole complete at 3.50m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.34m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A26
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 3.8.04 Job No: 21024.1/10474.3
Location: E550685808 N7755185
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.80m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals. ASS and environmental sampling at 0.5m intervals	8.1	6.1	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 20 LL NP P75 10
			SC				9.1	6.1		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 20 LL 20 P75 25
0.60			CI				8.7	5.8			
1							8.6	5.9			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 40 P75 55
1.20			CH				8.6	5.6			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 55 P75 75
							8.6	5.7			
1.80							8.5	5.8			
2							8.6	5.7			**Clay;** grey, trace of fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 2 LL 65 P75 90
							8.6	5.9			
2.40	PDL						8.6	5.6			
							8.6	5.8			
3							8.4	5.9			
3.25							8.5	5.8			
											Hand Auger Refusal at 3.25m
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.4m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A27
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 30.7.04 Job No: 21024.1/10474.3
Location: E550685897 N7755144
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.80m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Mounting Boat Diameter 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0.10			SP	A		Field screening at 0.25m intervals	8.7	5.8	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, with silt, shells (Marine) MPS 25 LL NP P75 15
			SC	T							
						ASS and environmental sampling at 0.5m intervals	8.6	5.6		Soft	**Clayey Sand;** grey, fine to coarse grained, with fine grained gravel, angular, shells Marine) MPS 15 LL 25 P75 20
0.60			CI				8.6	5.7			
1							8.7	5.8			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 45 P75 50
1.20			CH				8.6	5.8			**Clay;** grey, with fine to coarse grained sand, trace of medium to coarse grained gravel, angular, shells (Marine) MPS 7 LL 65 P75 75
							8.6	5.8			
1.80							8.7	5.7			
2							8.6	5.7			**Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 2 LL 75 P75 95
							8.6	5.6			
2.40	PDL						8.5	5.6			
							8.6	5.6			
3							8.6	5.8			
							8.6	5.6			
3.50							8.5	5.7			
											Borehole complete at 3.50m
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.4m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A28
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 29.7.04 Job No: 21024.1/10474.3
Location: E550685997 N7755121
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -3.10m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	8.8	6.0	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, trace of silt, shells (Marine) MPS 20 LL NP P75 5
0.60			SC			ASS and environmental sampling at 0.5m intervals	8.7	6.0		Soft	**Clayey Sand;** grey, fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine) MPS 15 LL 25 P75 35
1			CI				8.3	5.6			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 45 P75 60
1.20							8.2	5.5			
1.70			CH				8.3	5.7			**Clay;** grey, with fine to coarse grained sand, trace of fine grained gravel, angular, shells (Marine) MPS 4 LL 55 P75 80
2							8.4	5.7			
2.10	PDL						8.4	5.7			**Clay;** grey, with fine to coarse grained sand (Marine) MPS 2 LL 65 P75 90
3							8.4	5.5			
3.50							8.3	5.6			
4							8.3	5.7			
							8.2	5.4			
							8.1	5.3			
							8.2	5.5			
							8.2	5.6			
											Borehole complete at 3.50m

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.1m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A29
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 3.8.04 Job No: 21024.1/10474.3
Location: E550685566 N7755167
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.60m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	9.3	6.2	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 20 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	9.2	6.1			**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 20 LL 20 P75 25
0.90							9.0	6.1			
1			CI				9.0	6.1			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 45 P75 55
1.30			CH				8.8	6.0			
							8.7	5.9			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 55 P75 70
1.90							8.9	6.0			
2							8.8	6.0			**Clay;** grey, trace of fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 4 LL 60 P75 90
							8.7	5.9			
2.60	PDL						8.6	5.8			
							8.7	5.9			
3							8.6	6.0			
							8.7	6.1			
							8.7	6.4			
3.75							8.8	6.3			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.6m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A30
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 3.8.04 Job No: 21024.1/10474.3
Location: E550685650 N7755160
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.70m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0.10			SP	A T		Field screening at 0.25m intervals	8.9	6.0	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 25 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	8.8	6.0		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 20 LL 20 P75 25
0.70							8.7	6.5			
			CI				8.8	6.4			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 40 P75 50
1											
1.20			CH				8.7	6.4			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 60 P75 75
							8.7	6.2			
							8.7	6.1			
1.90											
2							8.7	6.1			**Clay;** grey, trace of fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 4 LL 65 P75 90
							8.6	6.1			
2.50	PDL						8.7	6.0			
							8.7	6.0			
3							8.6	6.0			
							8.6	5.9			
3.50							8.6	5.9			
											Borehole complete at 3.50m
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.5m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A31
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 4.8.04 Job No: 21024.1/10474.3
Location: E550685709 N7755145
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.70m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	9.0	5.9	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 20 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	9.0	5.9		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 25 LL 20 P75 25
0.90							8.5	6.2			
1			CI				8.6	6.1			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 40 P75 50
1.20			CH				8.6	5.9			
							8.7	5.9			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 50 P75 70
							8.8	5.9			
1.90							8.7	5.7			
2							8.7	5.8			**Clay;** grey, trace of fine to coarse grained sand, shells (Marine) MPS 5 LL 75 P75 95
2.50	PDL						8.6	5.7			
							8.7	5.9			
3							8.6	5.9			
							8.7	6.0			
3.50							8.7	6.0			
4											**Borehole complete at 3.50m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.5m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A32
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 4.8.04 Job No: 21024.1/10474.3
Location: E550685809 N7755131
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.80m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0.10			SP	A T		Field screening at 0.25m intervals	8.9	5.9	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 25 LL NP P75 15
			SC			ASS and environmental sampling at 0.5m intervals	9.0	5.8		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 20 LL 25 P75 25
0.80							8.9	5.9			
1			CI				8.7	5.9			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 45 P75 50
1.20			CH				8.9	5.7			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 60 P75 75
							8.9	5.8			
							8.8	6.1			
1.90											
2							8.7	6.3			**Clay;** grey, trace of fine to coarse grained sand, shells (Marine) MPS 4 LL 75 P75 90
							8.7	6.1			
2.40	PDL						8.7	6.1			
							8.8	6.0			
3							8.9	5.8			
							8.8	5.9			
3.50							8.8	5.8			
											Borehole complete at 3.50m
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.4m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A33
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 30.7.04 Job No: 21024.1/10474.3
Location: E550685958 N7755100
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -3.10m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Mounting Boat Diameter 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.10			SP	A		Field screening at 0.25m intervals	8.6	6.0	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, with silt, shells (Colluvium/Marine) MPS 20 LL NP P75 15
			SC	T						Soft	
0.50						ASS and environmental sampling at 0.5m intervals	8.7	6.0			**Clayey Sand;** grey, fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine) MPS 15 LL 20 P75 25
			CI				8.5	5.9			
1							8.4	6.0			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 40 P75 55
							8.4	5.9			
1.60							8.4	5.9			
1.80			CH				8.2	5.6			**Clay;** grey, with fine to coarse grained sand, trace of medium to coarse grained gravel, angular, shells (Marine) MPS 7 LL 65 P75 70
2							8.1	5.7			
2.10	PDL						8.2	5.6			**Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 2 LL 75 P75 95
							8.3	5.6			
							8.4	5.6			
3							8.3	6.7			
3.25							8.2	5.7			
											Borehole complete at 3.25m
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.1m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A34
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 2.8.04 Job No: 21024.1/10474.3
Location: E550685441 N7755131
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.40m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	8.8	6.2	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with clay, shells (Marine) MPS 25 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	8.9	6.2		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 15 LL 25 P75 30
0.80							8.8	5.9			
			CI				8.9	6.0			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 40 P75 75
1											
1.20			CH				8.9	5.9			MPS 7 LL 55 P75 80
							9.0	5.9			
							9.0	6.3			
1.80											
2							9.0	6.3			**Clay;** grey, trace of fine to coarse grained sand, trace of fine grained gravel, angular, shells (Marine) MPS 4 LL 65 P75 95
							9.0	5.9			
							8.8	5.8			
2.80	PDL						8.8	5.9			
3							8.8	5.8			
							8.8	5.9			
							8.8	5.8			
							8.8	5.8			
4							8.7	5.8			**Borehole complete at 4.00m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.8m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A35
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 2.8.04 Job No: 21024.1/10474.3
Location: E550685491 N7755137
Surface R.L.: -2.50m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	9.0	5.9	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 20 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	8.9	6.0		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 15 LL 25 P75 30
0.90							8.9	6.3			
1			CI				8.9	6.2			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 40 P75 70
1.30			CH				8.8	6.2			
							8.8	6.2			MPS 7 LL 55 P75 75
1.80							8.8	6.0			
2							8.8	6.0			**Clay;** grey, trace of fine to coarse grained sand, trace of fine grained gravel, angular, shells (Marine) MPS 4 LL 70 P75 95
							8.7	6.1			
							8.7	6.0			
2.70	PDL						8.6	6.1			
3							8.6	6.2			
							8.7	6.1			
							8.6	6.2			
3.75							8.7	6.0			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.7m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A36
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 4.8.04 Job No: 21024.1/10474.3
Location: E550685587 N7755084
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.70m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.10			SP	A T		Field screening at 0.25m intervals	9.1	6.0	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 25 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	9.1	6.0		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells MPS 25 LL 25 (Marine) P75 20
0.80							9.0	6.0			
			CI				8.9	6.0			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 45 P75 50
1							8.7	6.1			
							8.7	6.2			
1.50			CH								**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 60 P75 70
1.80							8.8	6.3			
2							8.7	6.2			**Clay;** grey, trace of fine to coarse grained sand, shells (Marine) MPS 4 LL 75 P75 95
							8.5	6.4			
2.50	PDL						8.6	6.6			
							8.7	6.4			
3							8.5	6.2			
							8.7	5.9			
3.50							8.6	6.0			**Borehole complete at 3.50m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.5m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A37
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 5.8.04 Job No: 21024.1/10474.3
Location: E550685754 N7755067
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.80m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency/	Dredge Site	
0.10			SP	A T		Field screening at 0.25m intervals	8.6	6.0	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Colluvium/Marine) MPS 25 LL NP P75 10	
			SC			ASS and environmental sampling at 0.5m intervals	8.6	5.9		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 25 LL 20 P75 30	
0.70							9.0	6.3				
			CI				8.9	6.3			**Sandy Clay;** grey, sand is fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 40 P75 55	
1												
1.20			CH				9.0	6.4			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 55 P75 70	
							9.0	6.4				
							8.9	6.2				
1.90												
2							8.7	6.1			**Clay;** grey, trace of fine to coarse grained sand, shells (Marine) MPS 4 LL 75 P75 95	
							8.9	6.2				
2.40	PDL						9.1	6.3				
							8.9	6.2				
3							9.0	6.2				
							8.6	6.3				
3.50							8.7	6.2				
											Borehole complete at 3.50m	
4												

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.4m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A38
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 5.8.04 Job No: 21024.1/10474.3
Location: E550685800 N7755066
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.80m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.10			SP	A T		Field screening at 0.25m intervals	9.2	6.2	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 25 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	9.1	6.1		Soft	
0.70							8.8	6.3			**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 20 LL 25 P75 30
			CI				8.7	6.4			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 45 P75 55
1							8.7	6.4			
1.30			CH				8.7	6.0			**Clay;** grey, with fine to coarse grained sand, with fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 60 P75 70
							8.7	6.0			
2							8.7	6.0			
							8.7	6.1			**Clay;** grey, trace of fine to coarse grained sand, shells (Marine) MPS 4 LL 75 P75 90
2.40	PDL						8.7	6.1			
							8.7	6.1			
							8.7	6.1			
3							8.6	6.2			
							8.7	6.1			
3.50							8.7	6.0			
											Borehole complete at 3.50m
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.4m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A39
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 5.8.04 Job No: 21024.1/10474.3
Location: E550685884 N7755047
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -3.00m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	9.0	6.2	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 25 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	9.1	6.3		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 25 LL 25 P75 30
0.70			CI				8.9	6.2			**Sandy Clay;** grey, sand is fine to coarse grained, withf fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 45 P75 60
1							8.7	6.1			
1.25			CH				8.6	6.1			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 55 P75 75
1.70							8.7	6.1			
2							8.8	6.1			**Clay;** grey, trace of fine to coarse grained sand, trace of fine to medium grained gravel, angularshells (Marine) MPS 5 LL 75 P75 95
2.20	PDL						8.7	6.1			
							8.6	6.2			
							8.6	6.2			
							8.6	5.9			
3							8.6	5.8			
3.25							8.5	5.7			**Borehole complete at 3.25m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.2m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A40
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 22.7.04 Job No: 21024.1/10474.3
Location: E550686101 N7755075
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -3.40m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0			SC	A T		Field screening at 0.25m intervals	8.3	6.4	W	Soft	**Clayey Silty Sand;** grey spotted whtie, fine to coarse grained, shells (Marine) MPS 2 LL 35 P75 35
						ASS and environmental sampling at 0.5m intervals	8.6	6.5			
							8.7	6.4			
1							8.4	6.3			
1.10			CH				8.1	6.5			**Silty Clay;** grey, with fine to coarse grained sand, shells 10% (Marine) MPS 2.5 LL 60 P75 75
							8.7	6.4			
	PDL						8.5	6.3			
1.80							8.5	6.3			
2							8.8	6.3			
2.30							8.6	6.3			**Silty Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 1 LL 75 P75 90
							8.4	6.3			
3							8.3	6.4			
4											**Borehole complete at 3.00m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 1.8m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A41
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 29.7.04 Job No: 21024.1/10474.3
Location: E550685459 N7755090
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.60m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0.10			SP	A T		Field screening at 0.25m intervals	8.5	5.6	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, trace of silt, shells (Marine) MPS 20 LL NP P75 5
0.60			SC			ASS and environmental sampling at 0.5m intervals	8.5	5.7		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine grained gravel, angular, shells Marine) MPS 15 LL 25 P75 35
1			CI				8.4	5.7			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 45 P75 65
1.10			CH				8.5	5.8			
							8.4	5.6			**Clay;** grey, with fine to coarse grained sand, shells (Marine) MPS 7 LL 55 P75 80
							8.3	5.6			
							8.4	5.4			
2							8.3	5.5			**Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 4 LL 65 P75 95
							8.3	5.4			
2.60	PDL						8.2	5.3			
							8.0	5.2			
3							7.9	5.2			
							8.2	5.5			
							8.4	5.6			
3.75							8.5	5.9			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.6m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A42
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 5.8.04 Job No: 21024.1/10474.3
Location: E550685559 N7755075
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.60m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	9.0	6.1	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Colluvium/Marine) MPS 25 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	9.0	6.2		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 20 LL 20 P75 25
0.90							9.0	6.0			
1			CI				8.9	6.1			**Sandy Clay;** grey, sand is fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 45 P75 60
1.30							8.7	6.0			
			CH				9.0	6.0			**Clay;** grey, with fine to coarse grained sand, with fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 60 P75 70
2							8.9	6.1			
2.10							8.7	6.3			
							8.8	6.0			**Clay;** grey, trace of fine to coarse grained sand, trace of fine grained gravel, angular, shells (Marine) MPS 4 LL 75 P75 90
2.60	PDL						8.7	5.9			
							8.7	6.0			
3							8.6	5.9			
							8.5	6.0			
							8.5	6.0			
3.75							8.6	6.0			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.6m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A43
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 28.7.04 Job No: 21024.1/10474.3
Location: E550685656 N7755059
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.80m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.00			SP	A T		Field screening at 0.25m intervals	9.0	6.1	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to medium grained, angular, trace of silt, shells (Marine) MPS 15 LL NP P75 5
0.20			SC			ASS and environmental sampling at 0.5m intervals	8.8	6.1		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 15 LL 25 P75 35
0.90							9.3	6.1			
1			CI				9.3	6.2			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 10 LL 45 P75 60
1.20							9.2	6.2			
							9.2	6.3			**Clay;** grey, with fine to coarse grained sand, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 45 P75 80
							8.8	6.4			
2							8.7	6.0			
2.10			CH				8.8	6.0			
2.40	PDL						9.0	5.6			**Clay;** grey, with fine to coarse grained sand (Marine) MPS 2 LL 65 P75 90
							8.7	6.1			
3							8.7	6.1			
							8.5	6.1			
3.50							8.6	6.1			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.4m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A44
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 26.7.04 Job No: 21024.1/10474.3
Location: E550685721 N7755038
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.70m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.10			SP	A T		Field screening at 0.25m intervals	9.0	6.4	W	Loose	**Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, trace of silt, shells (Marine) MPS 10 LL NP P75 5
			SC			ASS and environmental sampling at 0.5m intervals	8.9	6.5		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 20 P75 25
1							8.9	6.5			
1.10			CI				8.6	6.3			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 40 P75 60
1.60			CH				8.7	6.2			
							8.9	6.5			**Clay;** grey, with fine to coarse grained sand, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 60 P75 75
2							8.7	6.8			
							8.5	6.5			
2.50	PDL						8.5	6.4			
2.60							8.5	6.6			**Clay;** grey, with fine to coarse grained sand (Marine) MPS 2 LL 65 P75 95
3							8.5	6.4			
							8.7	6.4			
3.50							8.4	6.7			
4											**Borehole complete at 3.50m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.5m depth in this borehole.

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Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A45
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 26.7.04 Job No: 21024.1/10474.3
Location: E550685844 N7755029
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.95m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING		VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0			SP	A T		Field screening at 0.25m intervals ASS and environmental sampling at 0.5m intervals	8.4	6.2	W	Loose	**Silty Sand;** grey, fine to coarse grained, trace of fine grained gravel, angularshells (Marine) MPS 5 LL NP P75 15
							8.8	6.3			
0.70			SC				8.9	6.4		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 3 LL 30 P75 40
1							8.9	6.3			
1.20			CH				8.8	6.1			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 55 P75 70
1.50							8.6	5.9			
							8.6	6.3			
2							8.8	6.7			
2.25	PDL						8.7	6.8			**Clay;** grey, with fine to coarse grained sand (Marine) MPS 2 LL 65 P75 85
							8.6	6.3			
							8.7	6.3			
3							8.8	6.2			
3.25							8.9	6.1			**Borehole complete at 3.25m**
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.25m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A46
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 27.7.04 Job No: 21024.1/10474.3
Location: E550685381 N7755036
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.30m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	9.0	6.9	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to medium grained, angular, trace of silt, shells (Marine) MPS 20 LL NP P75 5
			SC			ASS and environmental sampling at 0.5m intervals	9.2	6.2		Soft	**Clayey Sand;** grey, fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 25 P75 25
							9.1	6.4			
1							8.9	6.3			
1.20							9.0	6.3			
			CI				8.7	6.4			**Clay;** grey, with fine to coarse grained sand, with fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 45 P75 60
1.60			CH				8.7	6.3			**Clay;** grey, with fine to coarse grained sand, shells (Marine) MPS 2 LL 60 P75 80
2							8.9	6.3			
2.20							8.9	6.2			**Clay;** grey, trace of fine to coarse grained sand, shells (Marine) MPS 2 LL 65 P75 90
							8.8	6.4			
							8.8	6.4			
2.90	PDL						8.9	6.2			
3							8.9	6.3			
							8.5	6.4			
							8.3	6.2			
4							8.2	6.1			**Borehole complete at 4.00m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.9m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A47
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 27.7.04 Job No: 21024.1/10474.3
Location: E550685477 N7755033
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -2.60m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Dredge Site
0.20			SP	A T		Field screening at 0.25m intervals	8.9	6.3	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, trace of silt, shells (Marine) MPS 20 LL NP P75 5
			SC			ASS and environmental sampling at 0.5m intervals	9.1	6.5		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 20 P75 20
1							9.1	6.5			
1.10							9.0	6.3			
			CI				8.9	6.2			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 15 LL 45 P75 55
1.65							8.7	6.2			
			CH				8.8	6.4			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 7 LL 55 P75 70
2							8.9	6.4			
2.20							8.8	6.5			**Clay;** grey, trace of fine to coarse grained sand, trace of fine grained gravel (Marine) MPS 3 LL 65 P75 90
2.60	PDL						8.8	6.5			
							8.9	6.6			
3							8.7	6.3			
							8.8	6.1			
							8.6	6.2			
3.75							8.3	6.2			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.6m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A48
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 10.8.04 Job No: 21024.1/10474.3
Location: E551686151 N7755040
Surface R.L.: -2.94m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Access Channel
0.20			SP	A T		Field screening at 0.25m intervals	9.0	6.2	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 25 LL NP P75 10
			SC			ASS and environmental sampling at 0.5m intervals	9.0	6.1		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 25 P75 25
0.70							8.3	6.0			
			CI				8.5	5.9			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine grained gravel, angular, shells (Marine) MPS 5 LL 45 P75 60
1											
1.20			CH				8.6	6.0			**Clay;** grey, with fine to coarse grained sand, with fine grained gravel, angular, shells (Marine) MPS 3 LL 55 P75 70
							8.7	6.0			
							8.5	5.8			
1.90											
2							8.6	5.7			**Clay;** grey, trace of fine to coarse grained sand (Marine) MPS 2 LL 65 P75 90
							8.5	5.8			
							8.5	5.8			
2.75	PDL						8.6	5.8			
3							8.5	5.7			
							8.5	5.8			
							8.3	5.9			
3.75							8.2	5.9			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.75m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A49
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 10.8.04 Job No: 21024.1/10474.3
Location: E550686248 N7755011
Surface R.L.: -3.04m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Access Channel
0			SP	A T		Field screening at 0.25m intervals ASS and environmental sampling at 0.5m intervals	9.0	6.5	W	Loose	**Gravelly Silty Sand;** grey, fine to coarse grained, gravel is fine grained, angular, shells (Marine) MPS 20 LL NP P75 15
0.20			SC				9.0	6.4		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 10 LL 20 P75 25
0.70			CI				8.9	6.3			
1							8.7	6.2			**Sandy Clay;** grey, sand is fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine) MPS 5 LL 40 P75 65
1.40			CH				8.6	6.1			
1.80							8.6	6.0			**Clay;** grey, with fine to coarse grained sand, with fine to medium grained gravel, angular, shells (Marine) MPS 3 LL 55 P75 75
2							8.7	5.9			
2.65	PDL						8.8	5.9			**Clay;** grey, trace of fine to coarse grained sand, shells (Marine) MPS 2 LL 70 P75 90
3							8.6	5.9			
3.75							8.7	6.1			
4							8.6	5.9			
							8.5	5.8			
							8.5	5.9			
							8.5	5.7			
							8.4	5.7			**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.65m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A50
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Project: Environmental & Acid Sulfate Investigation
Site: Shute Harbour Marina

Date: 10.8.04 Job No: 21024.1/10474.3
Location: E550686386 N7754971
Surface R.L.: -3.09m Datum: AHD
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Access Channel
0			SP	A T		Field screening at 0.25m intervals	9.1	6.1	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 20 LL NP P75 10
0.25			SC			ASS and environmental sampling at 0.5m intervals	9.1	6.1		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 25 LL 20 P75 25
0.80							8.9	6.2			
			CI				8.7	6.2			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 5 LL 45 P75 65
1							8.7	6.0			
1.30			CH				8.6	6.1			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 3 LL 55 P75 75
							8.6	6.2			
2							8.6	6.2			
							8.7	6.0			**Clay;** grey, trace of fine to coarse grained sand, shells (Marine) MPS 2 LL 70 P75 95
2.60	PDL						8.6	6.0			
							8.7	6.1			
3							8.6	6.0			
							8.6	6.2			
							8.4	6.2			
3.75							8.5	6.2			
4											**Borehole complete at 3.75m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.6m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A51
Sheet 1 of 1

BOREHOLE LOG

Client: G.G. Betros & Associates Pty Ltd
Date: 10.8.04 Job No: 21024.1/10474.3
Location: E550686484 N7754935
Project: Environmental & Acid Sulfate Investigation
Surface R.L.: -3.14m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Mounting: Boat | Diameter: 50mm

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION	
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	ASS Screening Results pH_{FOX}	Moisture	Consistency	Access Channel
0.00			SP	A T		Field screening at 0.25m intervals ASS and environmental sampling at 0.5m intervals	9.2	6.1	W	Loose	**Gravelly Sand;** grey, fine to coarse grained, gravel is fine grained, angular, with silt, shells (Marine) MPS 25 LL NP P75 10
0.25			SC				9.1	6.2		Soft	**Clayey Sand;** grey, fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 25 LL 25 P75 20
0.90							8.8	6.0			
1			CI				8.8	6.0			**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, angular, shells (Marine) MPS 5 LL 40 P75 65
1.40			CH				8.6	5.9			
							8.7	5.8			**Clay;** grey, with fine to coarse grained sand, trace of fine to medium grained gravel, angular, shells (Marine) MPS 4 LL 55 P75 75
1.90							8.7	5.8			
2							8.8	5.9			**Clay;** grey, trace of fine to coarse grained sand, shells (Marine) MPS 2 LL 65 P75 90
2.50	PDL						8.7	5.8			
							8.7	5.8			
3							8.7	5.9			
							8.7	5.9			
3.50							8.8	6.0			
											Borehole complete at 3.50m
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

Note: Proposed dredge level (PDL) at -5.2m corresponds to 2.5m depth in this borehole.

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A52
Sheet 1 of 1

BOREHOLE LOG

Client:	G.G. Betros & Associates Pty Ltd	Date:	18.10.04	Job No:	21024.1/10474.3
		Location:	N7755543 E685736		
Project:	Environmental & Acid Sulphate Investigation	Surface R.L.:	3.6m	Datum:	AHD
Site:	Shute Harbour Marina	Supervisor	RC	Chkd:	AW

Drill Contractor	Ullman & Nolan Technical Services	Drill Model	Hand Auger	Mounting	Boat	Diameter 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	
0.15			ML	A T		SPOCAS	6.0 5.8	4.6 4.1	W	Very Dense	**Sandy Gravelly Silt**; pale brown, fine to coarse grained, gravel is medium to coarse grained MPS 10 LL 20 P75 50
											Hand auger refusal at 0.15m
1											
2											
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A53
Sheet 1 of 1

BOREHOLE LOG

Client:	G.G. Betros & Associates Pty Ltd	Date:	18.10.04	Job No:	21024.1/10474.3
		Location:	N7755570 E685836		
Project:	Environmental & Acid Sulphate Investigation	Surface R.L.:	2.4m	Datum:	AHD
Site:	Shute Harbour Marina	Supervisor	RC	Chkd:	AW

Drill Contractor	Ullman & Nolan Technical Services	Drill Model	Hand Auger	Mounting	Boat	Diameter 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	
0.15			GM	A T		SPOCAS	7.3 6.2	4.8 4.7	D	Dense to Very Dense	**Silty Sandy Gravel**; very pale grey, fine to coarse grained, angular, sand is fne to coarse grained (Colluvium/Marine) MPS 25 LL 10 P75 20 **Hand auger refusal at 0.15m**
1											
2											
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. A54
Sheet 1 of 1

BOREHOLE LOG

Client:	G.G. Betros & Associates Pty Ltd	Date:	18.10.04	Job No:	21024.1/10474.3
		Location:	N7755547 E685836		
Project:	Environmental & Acid Sulphate Investigation	Surface R.L.:	2.6m	Datum:	AHD
Site:	Shute Harbour Marina	Supervisor	RC	Chkd:	AW

Drill Contractor	Ullman & Nolan Technical Services	Drill Model	Hand Auger	Mounting	Boat	Diameter 50mm

STRATA				DRILLING			TESTING				VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling	ASS Screening Results pH_F	pH_{FOX}	Moisture	Consistency	
			GM	A T		SPOCAS	7.3	4.8	D	Dense to Very Dense	**Silty Sandy Gravel**; yellow-brown, fine to coarse grained, angular, sand is fine to coarse grained (Colluvium/Marine)
							6.2	4.9			MPS 25 LL 10 P75 20
0.30											**Hand auger refusal at 0.30m**
1											
2											
3											
4											

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 52
Sheet 1 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 29.3.06 Job No: 21024.1
Location: N 7755249 E 55K 0685444
Surface R.L.: 0.4m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	0.4		SC	A		D		W	Very Soft to Soft	**Clayey Sand;** grey, fine to coarse grained, trace of shells (Marine Sand)
0.20	0.2					D				MPS 5 LL 35 P75 35
										MPS 10 LL 40 P75 40
0.80	-0.4		CI			D				MPS 4 LL 50 P75 55
1										
1.40	-1.0									
1.50	-1.1		CH			D	Vane Shear = 4kPa		Very Soft	**Clay;** grey, with fine to coarse grained sand (Marine Mud) MPS 2 LL 65 P75 70
2	-1.6					D				trace of fine to coarse grained sand MPS 2 LL 65 P75 85
3							Vane Shear = 3kPa			
3.50	-3.1					D				dark grey MPS 2 LL 80 P75 95
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 52
Sheet 2 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 29.3.06 Job No: 21024.1
Location: N 7755249 E 55K 0685444
Surface R.L.: 0.4m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
4.20	-3.8		CH	A		D		W	Very Soft	**Clay:** refer sheet 1 depth 3.5m
								M	Stiff	**Clay;** brown-grey, with fine to coarse grained sand (Residual) MPS 2.0 LL 50 P75 70
5										
6										
6.50	-6.1					D			Low to Very Low Strength	**Ignimbrite;** brown, extremely weathered
6.70	-6.3									**Refusal on rock @ 6.7m**
7										
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 53
Sheet 1 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 29.3.06 Job No: 21024.1
Location: N 7755250 E 55K 0685541
Surface R.L.: -1.5m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-1.5		SC	A		D		W	Very Loose to Loose	**Clayey Sand**; grey, fine to coarse grained, with shells (Marine Sand)
0.20	-1.7					D				MPS 10 LL 20 P75 20
										MPS 10 LL 25 P75 30
0.60	-2.1					D				MPS 5 LL 30 P75 35
1										
1.20	-2.7		CI			D			Very Soft	**Sandy Clay**; grey, sand is fine to coarse grained, trace shells (Marine Mud)
1.50	-3.0						Vane Shear = 1kPa			MPS 5 LL 40 P75 60
1.65	-3.15		CH			D				**Clay**; grey, with fine to coarse grained sand (Marine Mud)
2										MPS 3 LL 55 P75 70
2.10	-3.6					D				MPS 2 LL 70 P75 85
3							Vane Shear = 3kPa			
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 53
Sheet 2 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 29.3.06 Job No: 21024.1
Location: N 7755250 E 55K 0685541
Surface R.L.: -1.5m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	A		D		W	Soft	**Clay:** refer sheet 1 depth 2.1m
4.40	-5.9					D			Soft to Firm	trace fine to coarse grained sand MPS 2 LL 80 P75 95
5										
5.50	-7.0							M	Stiff	**Clay;** grey-brown, with fine to coarse grained sand (Residual) MPS 20 LL 50 P75 70
6										
6.50	-8.0					D			Low to Very Low Strength	**Ignimbrite;** brown, extremely weathered, highly jointed
6.90	-8.4									
7										**Refusal on rock @ 6.9m**
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 54
Sheet 1 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 30.3.06 Job No: 21024.1
Location: N 7755260 E 55K 0685644
Surface R.L.: -2.7m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-2.7		SC	A		D		W	Loose to Very Loose	**Clayey Sand;** grey, fine to coarse grained, with shells (Marine Sand)
0.20	-2.9					D				MPS 10 LL 20 P75 20
										trace shells
0.60	-3.4					D				MPS 10 LL 30 P75 35
										MPS 4 LL 45 P75 40
1										
1.30	-4.0		CH			D			Very Soft	**Sandy Clay;** grey, sand is fine to coarse grained, trace shells (Marine Mud)
1.50							Vane Shear = 2kPa			MPS 4 LL 60 P75 60
1.70	-4.4					D				**Clay;** grey, with fine to coarse grained sand (Marine Mud)
2										MPS 4 LL 70 P75 70
2.30	-5.0					D				MPS 2 LL 70 P75 85
3							Vane Shear = 4kPa			
3.50	-6.2					D				trace fine to coarse grained sand
										MPS 2 LL 70 P75 95
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 54
Sheet 2 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 30.3.06 Job No: 21024.1
Location: N 7755260 E 55K 0685644
Surface R.L.: -2.7m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Diameter: 50mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	A		D		W	Very Soft	**Clay:** refer sheet 1 depth 3.5m
5										
5.40	-8.1					D		M-W	Soft to Firm	**Clay;** dark grey (Residual?) MPS 2 LL 80 P75 95
6										
6.50	-9.2					D		M	Low to Very Low Strength	**Ignimbrite;** brown, extremely weathered
6.70	-9.4									**Refusal on rock @ 6.7m**
7										
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 55
Sheet 1 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 30.3.06 Job No: 21024.1
Location: N 7755216 E 55K 0685923
Surface R.L.: -2.8m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-2.8		SC	A		D		W	Loose to Very Loose	**Sand;** grey, with silt, with shells (Marine Sand) MPS 5 LL NP P75 20
0.20	-3.0					D				**Clayey Sand;** grey, fine to coarse grained, trace shells MPS 5 LL 20 P75 20
0.70	-3.5					D				MPS 5 LL 35 P75 35
1										
1.20	-4.0					D				MPS 3 LL 45 P75 45
1.50							Vane Shear = 1kPa			
1.80	-4.6		CH			D			Very Soft	**Sandy Clay;** grey, sand is fine to coarse grained (Marine Mud) MPS 2 LL 60 P75 60
2										
2.50	-5.3					D				**Clay;** grey, with fine to coarse grained sand (Marine Mud) MPS 2 LL 65 P75 80
3							Vane Shear = 1kPa			
3.60	-6.6					D				trace fine to coarse grained sand MPS 2 LL 80 P75 95
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 55
Sheet 2 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 30.3.06 Job No: 21024.1
Location: N 7755216 E 55K 0685923
Surface R.L.: -2.8m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	A		D		W	Very Soft	**Clay;** refer sheet 1 depth 3.8m
6.40	-9.2					D			Low to Very Low Strength	**Ignimbrite;** brown, residual to extremely weathered
6.70	-9.5									**Refusal on rock @ 6.7m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 56
Sheet 1 of 1

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 30.3.06 Job No: 21024.1
Location: N 7755259 E 550685465
Surface R.L.: +0.72m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
0				A				D	Medium to High Strength	**Ignimbrite:** brown, highly weathered, highly jointed (Refusal at surface)
1										
2										
3										
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 57
Sheet 1 of 1

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Date: 30.3.06 Job No: 21024.1
Location: N 7755344 E 55K065547
Project: Additional Geotechnical Investigation
Surface R.L.: 0.0m Datum: AHD
Site: Shute Harbour Marina
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
				A				D	Medium to High Strength	**Ignimbrite;** brown, highly weathered, highly jointed (Refusal at surface)
1										
2										
3										
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 58
Sheet 1 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 30.3.06 Job No: 21024.1
Location: N 7755287 E 55K 0685676
Surface R.L.: -2.4m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-2.4		SC	A		D		W	Loose to Very Loose	**Clayey Sand;** grey, fine to coarse grained, trace shells (Marine/Colluvial Sand)
0.20	-2.6					D				MPS 5 LL 20 P75 20
										MPS 3 LL 30 P75 35
0.70	-3.1		CI			D				**Sandy Clay;** grey, sand is fine to coarse grained, trace shells (Marine Sand)
1										MPS 3 LL 40 P75 55
1.20	-3.6		CH			D			Very Soft to Soft	**Clay;** grey, with fine to coarse grained sand (Marine Mud)
										MPS 5 LL 60 P75 70
2										
2.10	-4.5					D				MPS 3 LL 55 P75 80
3	-3.4					D			Soft	trace fine to coarse grained sand
										MPS 2 LL 70 P75 95
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 58
Sheet 2 of 2

BOREHOLE LOG

Client:	Port Binnli C/- CUN Brisbane	Date:	30.3.06	Job No:	21024.1
Project:	Additional Geotechnical Investigation	Location:	N 7755287 E 55K 0685676		
		Surface R.L.:	-2.4m	Datum:	AHD
Site:	Shute Harbour Marina	Supervisor	CG, WE	Chkd:	AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Diameter: 50mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	A		D		W	Soft	**Clay:** refer sheet 1 depth 3.0m
4.40	-6.8					D				MPS 2 LL 80 P75 95
5										
6										
6.40	-8.8					D		M	Medium to Low Strength	**Ignimbrite;** brown, extremely weathered to residual
6.90	-9.3									
7										**Refusal on rock @ 6.9m**
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 59
Sheet 1 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 31.3.06 Job No: 21024.1
Location: N 7755277 E 550685746
Surface R.L.: -2.4m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-2.4		SC	A		D		W	Loose	**Clayey Sand;** grey, fine to coarse grained, trace shells
0.20	-2.6					D				MPS 5 LL 20 P75 20
										MPS 5 LL 30 P75 30
0.80	-3.2		CI			U			Very Soft	**Sandy Clay;** grey, sand is fine to coarse grained, trace shells
1										MPS 3 LL 45 P75 55
1.40	-3.8		CH			D				MPS 3 LL 60 P75 60
2										
2.20	-4.6					D				**Clay;** grey, with fine to coarse grained sand
										MPS 3 LL 60 P75 80
3	-5.4					U			Soft	trace fine to coarse grained sand
										MPS 2 LL 65 P75 90
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 59
Sheet 2 of 2

BOREHOLE LOG

Client:	Port Binnli C/- CUN Brisbane	Date:	31.3.06	Job No:	21024.1
		Location:	N 7755277 E 550685746		
Project:	Additional Geotechnical Investigation	Surface R.L.:	-2.4m	Datum:	AHD
Site:	Shute Harbour Marina	Supervisor	CG, WE	Chkd:	AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Diameter: 50mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	A		D		W	Soft	**Clay:** refer sheet 1 depth 3.0m
4.30	-6.7					D				dark grey MPS 2 LL 70 P75 95
5										
6										
6.50	-8.9					D		M	Medium to Low Strength	**Ignimbrite;** brown, extremely weathered to residual
6.70	-9.1									**Refusal on rock @ 6.7m**
7										
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 60
Sheet 1 of 2

BOREHOLE LOG

Client:	Port Binnli C/- CUN Brisbane	Date:	31.3.06	Job No:	21024.1
		Location:	N 7755266 E 55K 685874		
Project:	Additional Geotechnical Investigation	Surface R.L.:	-2.65m	Datum:	AHD
Site:	Shute Harbour Marina	Supervisor	CG, WE	Chkd:	AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Diameter: 50mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-2.65		SC	A		D		W	Loose to Very Loose	**Clayey Sand;** grey, fine to coarse grained, with shells (Marine Sand)
0.20	-2.85					D				MPS 10 LL 15 P75 20
										trace shells
0.60	-3.25					D				MPS 5 LL 20 P75 25
1										MPS 5 LL 35 P75 35
1.20	-3.85					D				MPS 5 LL 50 P75 45
1.70	-4.35		CH			D			Very Soft	**Sandy Clay;** grey, sand is fine to coarse grained
2										MPS 2 LL 60 P75 65
2.40	-5.05					D				**Clay;** grey, with fine to coarse grained sand
3										MPS 2 LL 60 P75 80
3.50	-6.15					D			Soft	dark grey, trace fine to coarse grained sand
4										MPS 2 LL 70 P75 95

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 60
Sheet 2 of 2

BOREHOLE LOG

Client:	Port Binnli C/- CUN Brisbane	Date:	31.3.06	Job No:	21024.1
		Location:	N 7755266 E 55K 685874		
Project:	Additional Geotechnical Investigation	Surface R.L.:	-2.65m	Datum:	AHD
Site:	Shute Harbour Marina	Supervisor	CG, WE	Chkd:	AW

Drill Contractor: Ullman & Nolan Technical Services | Drill Model: Hand Auger | Diameter: 50mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
0			CH	A		D		W	Soft	**Clay:** refer sheet 1 depth 3.5m
6.20	-8.85					D			Medium to Low Strength	**Ignimbrite;** brown, extremely weathered to residual
6.50	-9.15									**Refusal on rock @ 6.5m**

5
6
7
8

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 61
Sheet 1 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 31.3.06 Job No: 21024.1
Location: N 7755322 E 550 0685842
Surface R.L.: -1.75m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-1.75		SC	A		D		W	Loose	**Clayey Gravelly Sand:** grey, fine to coarse grained, gravel is fine to medium grained, angular to subangular (Marine/Colluvial Sand) MPS 30 LL 20 P75 20
0.20	-1.95					D				**Clayey Sand;** grey, fine to coarse grained, wirh fine to medium grained gravel, angular to subangular MPS 15 LL 30 P75 35
1										
1.20	-2.95					D			Very Loose	**Clayey Sand;** grey, fine to coarse grained, trace shells (Marine Sand) MPS 5 LL 35 P75 45
1.80	-3.55					D				MPS 3 LL 45 P75 45
2										
2.40	-4.15		CH			D			Very Soft	**Sandy Clay;** grey, sand is fine to coarse grained, trace shells (Marine Mud) MPS 3 LL 55 P75 55
3										
3.30	-5.05					D			Soft	**Clay;** grey, with fine to coarse grained sand MPS 2 LL 60 P75 70
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 61
Sheet 2 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 31.3.06 Job No: 21024.1
Location: N 7755322 E 550 0685842
Surface R.L.: -1.75m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
4.60	-6.35		CH	A		D		W	Soft	**Clay:** refer sheet 1 depth 3.3m
			SC			D				**Rock;** extremely weathered excavates as **Clayey Gravelly Sand;** grey-blue mottled brown and orange, fine to coarse grained, gravel is fine to medium grained, angular to subangular (Residual) MPS 15 LL 25 P75 25
5.30	-7.05									**Refusal on rock @ 5.3m**

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 62
Sheet 1 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 30.3.06 Job No: 21024.1
Location: N 7755313 E 55K 0685795
Surface R.L.: -1.75m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-1.75		SP	A		D		W	Loose	**Gravelly Sand;** grey mottled black, medium to coarse grained, gravel is fine to coarse grained, angular to subangular (Marine/Colluvial Sand) MPS 60 LL NP P75 10
0.20	-1.95					D				**Clayey Gravelly Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular to subangular MPS 20 LL 15 P75 25
1	-2.75					D			Soft	**Clayey Sand;** grey, fine to coarse grained, with shells (Marine Sand) MPS 5 LL 30 P75 30
1.70	-3.45					D				trace shells MPS 3 LL 40 P75 40
2										
2.40	-4.15					D				MPS 4 LL 50 P75 60
3										
3.20	-4.95		CH			D			Very Soft	**Clay;** grey, with fine to coarse grained sand (Marine Mud) MPS 2 LL 60 P75 75
3.60	-5.35					D				trace fine to coarse grained sand MPS 2 LL 70 P75 90
3.90	-5.65					D				**Ignimbrite;** extremely weathered refer sheet 2
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 62
Sheet 2 of 2

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 30.3.06 Job No: 21024.1
Location: N 7755313 E 55K 0685795
Surface R.L.: -1.75m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
5				A		D			Low to Very Low Strength	**Ignimbrite;** extremely weathered excavates as **Clayey Gravelly Sand;** grey-blue mottled brown and orange, fine to coarse grained, gravel is fine to medium grained, angular to subangular (Residual) MPS 10 LL 20 P75 20
5.20	-6.95									**Refusal on rock @ 5.2m**
6										
7										
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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UNGR 103G
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Borehole No. 63
Sheet 1 of 1

BOREHOLE LOG

Client: Port Binnli C/- CUN Brisbane
Project: Additional Geotechnical Investigation
Site: Shute Harbour Marina

Date: 30.3.06 Job No: 21024.1
Location: N 7755381 E 55K 0685824
Surface R.L.: -1.5m Datum: AHD
Supervisor CG, WE Chkd: AW

Drill Contractor Ullman & Nolan Technical Services Drill Model Hand Auger Diameter 50mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
0.15	-1.5		GP	A		D		W	Loose	**Sandy Gravel;** red-brown mottled orange, yellow and grey, fine to coarse grained, angular to subangular, sand is fine to coarse grained, with silt (Colluvial/Beach Debris) MPS 60 LL NP P75 10
	-1.65		SC			D				**Clayey Gravelly Sand;** grey mottled brown and yellow, fine to coarse grained, gravel is fine to coarse grained, angular to subangular, with shells (Marine Sand) MPS 30 LL 15 P75 20
1.70	-3.2								Soft	**Clayey Sand;** grey, fine to coarse grained, trace shells MPS 20 LL 40 P75 40
3.40	-4.9							M	Dense	**Clayey Gravelly Sand;** grey-blue mottled brown and orange, fine to coarse grained, gravel is fine to medium grained, angular to subangular (Residual) MPS 10 LL 20 P75 20
3.60	-5.1									**Refusal on rock @ 3.6m**
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

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UNGR 103G
(-/1/03)

Borehole No. 6
Sheet 1 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 8.5.06 Job No: 21778.1
Location: E 550686035 N 7754920
Surface R.L.: -3.7m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-3.7		SC	W B	C	D		W	Loose	**Gravelly Clayey Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, shells (Marine Sands) MPS 2.0 LL 20 P75 20
0.20	-3.9		CI			D			Very Soft	**Sandy Clay;** grey, sand is fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine Clay) MPS 10 LL 40 P74 55
1	-4.7		CH			D				trace of fine grained gravel. angular. shells MPS 5 LL 55 P75 60
1.50	-5.2						Vane Shear = 1kPa			
2										
2.50	-6.2					D				**Sandy Clay;** grey, sand is fine to coarse grained (Marine Clay) MPS 2 LL 65 P75 65
3	-6.7						Vane Shear = 2kPa			
3.90	-7.6									**Clay;** dark grey, with fine to coarse grained sand MPS 2 LL 70 P75 80
4						D			Soft	

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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UNGR 103G
(-/1/03)

Borehole No. 6
Sheet 2 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 8.5.06 Job No: 21778.1
Location: E 550686035 N 7754920
Surface R.L.: -3.7m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D		W	Soft	**Clay:** refer sheet 1 depth 3.9m
4.50	-8.2						Vane Shear = 8kPa			
5										
5.50	-9.2									trace of fine to coarse grained sand (Marine Clay) MPS 2 LL 70 P75 95
6										
6.60	-10.3					U50				
7 7.05										
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 6
Sheet 3 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 8.5.06 Job No: 21778.1
Location: E 550686035 N 7754920
Surface R.L.: -3.7m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
8.10	-11.8		CH	W B	C	D		W	Soft Very Soft	**Clay;** refer sheet 2 depth 5.5m
						SPT1 N= 0 (Sank under own weight)				
8.55										
9										
9.60	-13.3					SPT2 N= 0 (Sank under own weight)				
10 10.05										
11										
12										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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UNGR 103G
(-/1/03)

Borehole No. 6
Sheet 4 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 8.5.06 Job No: 21778.1
Location: E 550686035 N 7754920
Surface R.L.: -3.7m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D		W	Very Soft	**Clay;** refer sheet 2 depth 5.5m
13										
13.20	-16.9		SC						Dense	**Clayey Gravelly Sand;** very dark grey-black mottled red and blue, fine to coarse grained, gravel is fine to coarse grained (Residual?) MPS 25 LL 35 P75 35
13.40	-17.1					SPT4 N= 8 (1, 4, 4)				
14										
14.60	-18.3								Low Strength	**Rock;** extremely weathered, purple mottled red, white and black, highly jointed (Ignimbrite)
15										extremely to moderately weathered with stiff residual soils lenses
15.20	-18.9					SPT5 N= 37 (21, 20, 17)				
15.65				W R						
16										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 6
Sheet 5 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 8.5.06 Job No: 21778.1
Location: E 550686035 N 7754920
Surface R.L.: -3.7m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor: Cardno Ullman & Nolan Geotechnic | Drill Model: Jacro 350 | Mounting: Truck | Diameter: 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
				W R	C	D		W	Medium to Low Strength	**Rock:** refer sheet 4 depth 14.6m
16.60	-20.3					D				moderately weathered, brown-grey mottled red and orange Appears that rock has many layers ranging from residual to moderately weathered
17										
17.20	-20.9					SPT 6 N= >50 (21,25/120mm, HB)				
18										
19										
19.72	-23.42					SPT 7 N= >50 (25/90mm)				**Borehole complete @ 19.72m**
20										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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UNGR 103G
(-/1/03)

Borehole No. 7
Sheet 1 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 5.5.06 Job No: 21778.1
Location: E 55K0685729 N 7754905
Surface R.L.: -2.5m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-2.5		SC	W B	C	D		W	Loose	**Gravelly Clayey Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, shells (Marine Sands) MPS 25 LL 30 P75 30
0.20	-2.7		CI			D			Soft	**Sandy Clay;** grey, sand is fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine Clay) MPS 10 LL 40 P75 50
1	-3.5		CH			D				trace of fine to medium grained gravel MPS 10 LL 55 P75 60
1.50	-4.0						Vane Shear = 3kPa			
2										
2.50	-5.0					D				**Clay;** grey, with fine to coarse grained sand, trace of fine gravel, angular, shells MPS 5 LL 65 P75 80
3	-5.5						Vane Shear = 4kPa			
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 7
Sheet 2 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 5.5.06 Job No: 21778.1
Location: E 55K0685729 N 7754905
Surface R.L.: -2.5m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor: Cardno Ullman & Nolan Geotechnic | Drill Model: Jacro 350 | Mounting: Truck | Diameter: 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D		W	Soft	**Clay:** refer sheet 1 depth 2.5m
4.40	-6.6									
4.50	-7.0					U50 PP= too soft for reading	Vane Shear = 6kPa			
4.85										
5										
5.80										
6	-8.5					D			Very Soft	dark grey MPS 2 LL 65 P75 85
6.40	-8.9					SPT1 N= 0 (Sank under own weight)				
7										
7.90	-10.4									
8						SPT2 refer sheet 3				

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 7
Sheet 3 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 5.5.06 Job No: 21778.1
Location: E 55K0685729 N 7754905
Surface R.L.: -2.5m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor: Cardno Ullman & Nolan Geotechnic | Drill Model: Jacro 350 | Mounting: Truck | Diameter: 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
8.10	-10.6		CH	W B	C	SPT2 N= 0 (Sank under own weight)	D D	W	Very Soft	**Clay;** refer sheet 2 depth 6.0m MPS 2 LL 65 P75 90
9										
9.30	-11.8					SPT3 N= 0 (Sank under own weight)				
10										
10.80	-13.3								Soft to Firm	
11						SPT4 N= 1 (1)				
12										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 7
Sheet 4 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 5.5.06 Job No: 21778.1
Location: E 55K0685729 N 7754905
Surface R.L.: -2.5m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor: Cardno Ullman & Nolan Geotechnic | Drill Model: Jacro 350 | Mounting: Truck | Diameter: 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D		W	Soft to Firm	**Clay:** refer sheet 3 depth 8.1m
12.40	-14.9		SC			D			Dense	**Clayey Sand;** grey-brown, fine to coarse grained, trace of fine gravel, angular (Residual?) MPS 5 LL 30 P75 30
12.70	-15.2									
12.80	-15.3					SPT 5 N=8 (1, 3, 5)				very dark grey-brown (Residual) MPS 2 LL 35 P75 40
13										
						D				
13.60	-16.1					D			Low to Very Low Strength	**Rock;** extremely weathered excavates as **Sand;** grey-brown, fine to coarse grained MPS 2 LL 15 P75 10
14										
14.40	-16.9					SPT 6 N=18 (10, 9, 9)			Medium to Low Strength	**Rock;** brown, mottled orange and white, extremely to moderately weathered,
15						D				
15.60	-18.1					D			Low to Very Low Strength	residual to extremely weathered
16										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 7
Sheet 5 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 5.5.06 Job No: 21778.1
Location: E 55K0685729 N 7754905
Surface R.L.: -2.5m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor: Cardno Ullman & Nolan Geotechnic | Drill Model: Jacro 350 | Mounting: Truck | Diameter: 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
16.10	-18.6			W B	C	D SPT 7 N=32 (15, 15, 17)		W	Low to Very Low Strength Medium to Low Strength	**Rock;** refer sheet 4 depth 15.6m extremely to moderately weathered
16.60						D				
17										
17.80	-20.3					SPT 8 N=45 (22, 22, 23)				
18										
18.60										
18.70	-21.2									**Borehole complete @ 18.70m**
19										
20										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 8
Sheet 1 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 4.5.06 Job No: 21778.1
Location: E 55K0685421 N 775914
Surface R.L.: -2.3m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor: Cardno Ullman & Nolan Geotechnic | Drill Model: Jacro 350 | Mounting: Truck | Diameter: 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-2.3		SC	W B	C	D		W	Loose	**Gravelly Clayey Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, shells (Marine Sand) MPS 25 LL 20 P75 20
0.20	-2.5		CI			D			Very Soft	**Sandy Clay;** grey, sand is fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine Clay) MPS 10 LL 40 P75 50
1	-3.3		CH			D				trace of fine to medium grained gravel, angular, shells MPS 10 LL 55 P75 60
1.50	-3.8						Vane Shear = 5kPa			
2										
2.50	-4.8					D				trace of fine grained gravel, angular, shells MPS 5 LL 60 P75 60
3	-5.3						Vane Shear = 6kPa			
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 8
Sheet 2 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 4.5.06 Job No: 21778.1
Location: E 55K0685421 N 775914
Surface R.L.: -2.3m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D		W	Very Soft	**Sandy Clay:** refer sheet 1 depth 2.50m
4.50	-6.8						Vane Shear = 12kPa			
5										
5.20	-7.5					U50 PP= reading too small for gauge				
6										
6.10	-8.4					D				**Clay;** dark grey, with fine to coarse grained sand (Marine Clay) MPS 2 LL 65 P75 80
7										
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 8
Sheet 3 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 4.5.06 Job No: 21778.1
Location: E 55K0685421 N 775914
Surface R.L.: -2.3m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D		W	Very Soft	**Clay:** refer sheet 2 depth 6.10m
8.40	-10.7		CI			D				**Sandy Clay;** dark grey, sand is fine to coarse grained, decomposed organics, rootlets, organic odour (Marine Clay) MPS 2 LL 40 P75 55
8.60	-10.9									
8.70	-11.0					SPT1 N= 0 (Sank under own weight)				
9										
10										
10.35	-12.65					D			Low to Very Low Strength	**Rock;** residual to extremely weathered excavates as **Sandy Clayey Gravel;** grey, fine grained, angular, sand is fine to coarse grained, decomposed organics MPS 5 LL 20 P75 30
10.80	-13.1			C D						**Corehole begins @ 10.80m**
11										
12										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd

A.C.N 103 205 205

CORED BOREHOLE LOG

Borehole no : 8

Sheet no : 4 of 4

Client : Port Binnli
Project : Additional Over Water Investigation
Job No : 21778.1
Site: Shute Harbour
Location : Shute Harbour

Hole Commenced: 4.5.06
Hole Completed: 4.5.06
Logged by : -
Checked by : AW
Surface R.L. (m) : - 2.3m

Drill Rig: Jacro 350
Barrel type: MNLC
Bit Type: TC
Driller: Cardno UNG
Datum: AHD

Depth (m)	Geological Unit	Graphic Log	Description of Core	Weathering	Rock Mass Strength (EL / VL / L / M / H / V / H / EH)	Defect Spacing (mm) (10 / 30 / 100 / 300 / 1000 / 3000)	Description And Orientation of Rock Defects	Drilling Information: core run	TCR	SCR	RQD	Method & Bit	casing depth
10.5			continued from BH8										
10.8			**Dolerite;** grey, fine gained, with slightly discoloured feldspar phenocrysts	SW-DW			Sample highly fractured throughout, persistant joint sets at 45° and 60°	1	40	10	5		
11.3			**Ignimbrite;** yellow with brown veneer on joint surfaces	DW									
11.5			**Dolerite:** grey, fine gained, with feldspar phenocrysts	SW									
11.8								2	30	0	0		
			yellow-brown weathering on joint surfaces	DW									
12.5													
12.6								3	20	0	0		
13.2			**Ignimbrite;** red and grey, very fine grained	DW									
			Dolerite; grey, fine gained, yellow-brown weathering on joint surfaces	SW			Sample intensely fractured						
13.5			**Borehole ends at @ 13.50m**										
14.5													

Tests

E	Young Modulus (MPa)
PM	Pressure Test (MPa)
UCS	Uncon. Compres.Strength (MPa)
L	Pressure Test (Lugeons)
$I_{s(50)}$	Point load index
N	Standard Penetration Test
PI	Plasticity Index
PSD	Particle Size Distribution

Weathering

RS--	Residual soil
XW--	Extremely weathered
DW--	Destirctly Weathered
SW--	Slightly Weathered
FR--	Fresh

Rock Strength (Based on $I_{s(50)}$)

EL--Extremley Low	< 0.03
VL--Very Low	0.03 -0.10
L --Low	0.10 -0.30
M --Medium	0.30 -1.00
H -- High	1.00 -3.00
VH--Very High	3.00 -10.0
EH--Extremely High	>10.0

Defect type

J	Joint
S	Foliation
B	Bedding

Drilling Information

TCR: Total Core Recovery (%)
SCR: Solid Core Recovery (%)
RQD: Rock Quality Designation (%)

Method	Bit
C Core	T Tungsten
P Percussion	D Diamond
R Rotary air flush	
H Hammer	

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UNGR 103G
(-/1/03)

Borehole No. 9
Sheet 1 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 11.5.06 Job No: 21778.1
Location: E 55K0685862 N 7755073
Surface R.L.: -3.0m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
0.00	-3.0		SC	W B	C	U50 PP= too soft for reading		W	Loose	**Gravelly Clayey Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, shells (Marine Sands) MPS 25 LL 20 P75 25
0.20	-3.2		CI						Very Soft	**Sandy Clay;** grey, sand is fine to coarse grained, with fine to medium grained gravel, angular, shells (Marine Clays) MPS 15 LL 40 P75 55
						D				
1	-4.0		CH							trace of fine grained gravel, angular, shells MPS 5 LL 55 P75 60
1.50	-4.5						Vane Shear = 1kPa			
2										
2.50	-5.5									**Clay;** grey, with fine to coarse grained sand MPS 2 LL 65 P75 80
3	-6.0						Vane Shear = 1kPa			
3.70	-6.7									trace of fine to coarse grained sand MPS 2 LL 65 P75 95
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

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A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 9
Sheet 2 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 11.5.06 Job No: 21778.1
Location: E 55K0685862 N 7755073
Surface R.L.: -3.0m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D		W	Very Soft	**Clay:** refer sheet 1 depth 3.7m
4.50	-7.5						Vane Shear = 9kPa		Soft	
5										
5.40	-8.4					U50 PP= too soft for reading				
6										
6.80	-9.8									
6.90	-9.9					U50 PP= too soft for reading				
7										
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 9
Sheet 3 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 11.5.06 Job No: 21778.1
Location: E 55K0685862 N 7755073
Surface R.L.: -3.0m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D		W	Very Soft	**Clay;** refer sheet 1 depth 3.7m
8.40	-11.4					U50 PP= too soft for reading				
9										
9.80	-12.8								Soft to Firm	**Sandy Clay;** grey-purple, sand is fine to coarse grained, trace of fine grained gravel, angular to subangular (Marine ?) MPS 4 LL 55 P75 60
9.90	-12.9					U50 PP= too soft for reading				
10										
11										
11.20	-14.2								Medium to Very Low Strength	**Rock;** brown-purple, mottled orange and white, extremely weathered, with residual bands
12										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
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UNGR 103G
(-/1/03)

Borehole No. 9
Sheet 4 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 11.5.06 Job No: 21778.1
Location: E 55K0685862 N 7755073
Surface R.L.: -3.0m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-15			W B	C	SPT 1 N=30 (12, 18, 12)		W	Medium to Very Low Strength	**Rock;** refer sheet 3 depth 11.20m
13										
13.50	-16.5									
13.60	-16.6					SPT 2 N=>50 (25, 120mm)				pale brown
14										
14.10	-17.1			W R						
15										
16										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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UNGR 103G
(-/1/03)

Borehole No. 9
Sheet 5 of 5

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 11.5.06 Job No: 21778.1
Location: E 55K0685862 N 7755073
Surface R.L.: -3.0m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor: Cardno Ullman & Nolan Geotechnic | Drill Model: Jacro 350 | Mounting: Truck | Diameter: 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
				W R	C	D		W	Medium to Very Low Strength	**Rock:** refer sheet 3 depth 11.20m
16.50	-19.5									orange-grey, residual, with bands of fractured extremely weathered rock
17										
18										
19										
19.40	-22.4									**Borehole complete @ 19.40m**
20										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 10
Sheet 1 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 3.5.06 Job No: 21778.1
Location: E 55K0685394 N 7755055
Surface R.L.: -2.4m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-2.4		SC	W B	C	D		W	Medium Dense	**Clayey Sand;** grey, fine to coarse grained, with fine to coarse grained gravel, angular, shells MPS 20 LL 30 P75 35
0.20	-2.6		CI			D			Soft	**Sandy Clay;** grey, sand is fine to coarse grained, trace of fine to medium grained gravel, shells MPS 10 LL 40 P75 55
1										
1.50	-3.9						Vane Shear = 4kPa			
2	-4.4		CH			D			Very Soft	**Clay;** grey, with fine to coarse grained sand, trace of fine grained gravel, shells MPS 5 LL 60 P75 70
3	-5.4						Vane Shear = 3kPa			
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 10
Sheet 2 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 3.5.06 Job No: 21778.1
Location: E 55K0685394 N 7755055
Surface R.L.: -2.4m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D		W	Soft	**Clay:** refer sheet 1 depth 2.0m
4.50	-6.9						Vane Shear = 10kPa			
4.80	-7.2						Vane Shear = 11kPa			
5	-7.4					D				**Clay;** dark grey. trace of fine to coarse grained sand (Marine Clay) MPS 2 LL 75 P75 90
5.90	-8.3									
6						U50 sample not recovered				
7									Firm	
7.40	-9.4					U50 PP=500				
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 10
Sheet 3 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 3.5.06 Job No: 21778.1
Location: E 55K0685394 N 7755055
Surface R.L.: -2.4m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B		D		W	Firm	**Clay:** refer sheet 2 depth 5.0m
8.40	-10.8		SC			D			Very Loose	**Clayey Sand;** dark grey, fine to coarse grained, trace of fine to coarse grained gravels, angular, shells (Marine Sands) MPS 40 LL 35 P75 35
8.90	-11.3									
9						SPT 1 N= 0 (Sank under own weight)				
9.50	-11.9					D			Loose	**Clayey Gravelly Sand;** dark brown-grey, fine to coarse grained, gravel is fine to medium gained, angular, organics (decomposed rootlets?) (Marine Sands) MPS 10 LL 30 P75 30
10										
10.40	-12.8					SPT 2 N= 3 (1, 0, 3)			Medium Dense	**Clayey Sand;** dark grey-brown, fine to coarse grained, trace of fine to medium grained gravel, organics (decomposed rootlets?) MPS 10 LL 80 P75 25
10.60	-13.0									
11						D				
11.40	-13.8					D			Low to Very Low Strength	**Rock;** brown mottled orange and white, extremely weathered, intensely fractured, with interlayered residual soil
11.90	-14.3									
12						SPT3 refer sheet 4				

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 10
Sheet 4 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 3.5.06 Job No: 21778.1
Location: E 55K0685394 N 7755055
Surface R.L.: -2.4m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
12.35	-14.75			W B		SPT 3 N=27 (11, 11, 16)		W	Low to Very Low Strength	**Rock:** refer sheet 3 depth 11.4m
				C D		D				
13										
14										
15	-17.4									
										Borehole terminated @ 15.0m
16										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 11
Sheet 1 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 4.5.06 Job No: 21778.1
Location: E 5500685435 N 7755180
Surface R.L.: -1.2m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-1.2		SC	W	C	D		W	Loose	**Gravelly Clayey Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, shells
0.20	-1.4			B						MPS 20 LL 20 P75 25
			CI			D			Soft	**Sandy Clay;** grey, sand is fine to coarse grained, with fine to medium grained, shells
										MPS 10 LL 40 P75 55
1	-2.2									
			CH			D				trace of fine grained gravel, shells
										MPS 5 LL 55 P75 60
2										
2.50	-3.7					D				**Clay;** grey, with fine to coarse grained sand
										MPS 2 LL 65 P75 80
3										
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 11
Sheet 2 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 4.5.06 Job No: 21778.1
Location: E 5500685435 N 7755180
Surface R.L.: -1.2m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D		W	Soft	**Clay:** refer to sheet 1 depth 2.5m
5										
5.80	-7.0					U50 PP= too soft for reading				
6										
6.25										
6.60	-7.8					D			Firm	**Sandy Clay;** grey, sand is fine to coarse grained (Residual?) MPS 2 LL 65 P75 65
7	-8.2					D			Low to Very Low Strength	**Rock;** brown-purple mottled orange and white, extremely weathered, intensely fractured, bands of residual throughout
7.30	-8.5					SPT 1 N=10 (6, 7, 3)				
7.75										
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

Technical Services Pty Ltd
A.C.N. 103 205 205

UNGR 103G
(-/1/03)

Borehole No. 11
Sheet 3 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 4.5.06 Job No: 21778.1
Location: E 5500685435 N 7755180
Surface R.L.: -1.2m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor: Cardno Ullman & Nolan Geotechnic | Drill Model: Jacro 350 | Mounting: Truck | Diameter: 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
				W B	C	D			Low to Very Low Strength	**Rock:** refer sheet 2 depth 7.0m
8.90	-10.1									
9						SPT 2 N=24 (8, 11, 13)				
9.35										
10										
10.80	-12.0								Medium to Low Strength	**Rock;** excavates as **Sandy Clayey Gravel;** purple mottled yellow, orange and white, fine to coarse grained, angular, sand is fine to coarse grained MPS 25 LL 30 P75 20
11						SPT 3 N=>50 (15,16, 25/110mm)				
11.25										
12										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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Borehole No. 11
Sheet 4 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 4.5.06 Job No: 21778.1
Location: E 5500685435 N 7755180
Surface R.L.: -1.2m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
				W B				W	Medium to Low Strength	**Rock;** moderate to extremely weathered, very pale red-white mottled orange, white and brown, intensely fractured, with residual bands
13										
13.30	-14.5					SPT 4 N=>50 (25/125mm, 38/150mm)				
13.50										slightly fractured
13.80	-15.0									highly fractured
14										
15										
15.10	-16.3					SPT 5 N=>50 (25/50mm, HB)				
15.20	-16.4			W R						**Rock;** residual excavates as **Sandy Clayey Gravel;** purple mottled orange, white and brown, fine to coarse grained, angular, sand is fine to coarse grained, with bands of extremely weathered rock MPS 25 LL 30 P75 20
15.40	-16.6									**Borehole complete @ 16.0m**
16										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ULLMAN & NOLAN

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UNGR 103G
(-/1/03)

Borehole No. 12
Sheet 1 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 10.5.06 Job No: 21778.1
Location: E 55K0685489 N 7755280
Surface R.L.: 0.3m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	0.3		SC	W B	C	D		W	Loose	**Gravelly Clayey Sand;** grey, fine to coarse grained, gravel is fine to coarse grained, angular, shells MPS 25 LL 20 P75 25
0.30	0.0		CI						Very Soft	**Sandy Clay;** grey, sand is fine to coarse grained, with fine to medium grained gravel, angular, shells MPS 10 LL 40 P75 55
1	-0.7		CH							trace of fine to medium grained gravel, shells MPS 5 LL 40 P75 60
1.50	-1.2						Vane Shear = 3kPa			
2										
2.20	-1.9									**Sandy Clay;** grey, sand is fine to coarse grained MPS 2 LL 55 P75 65
2.90	-2.6									
3	-2.7					U50 PP= too soft for reading	Vane Shear = 4kPa			
3.80	-3.5								Soft to Firm	grey mottled red and white, trace of fine gravel, subangular MPS 5 LL 40 P75 55
4										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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(-/1/03)

Borehole No. 12
Sheet 2 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 10.5.06 Job No: 21778.1
Location: E 55K0685489 N 7755280
Surface R.L.: 0.3m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING			VISUAL SOIL DESCRIPTION
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
			CH	W B	C	D	Vane Shear = 5kPa	W	Soft to Firm	**Sandy Clay:** refer sheet 1 depth 3.8m
4.40	-4.1					U50 PP= too soft for reading				**Rock;** all colours, residual to extremely weathered, intensely fractured (Boulder?)
5.70										
5										
5.50										
5.70	-5.4									pale colours
5.90	-5.6									
6	-5.7		SC			SPT 1 N=>50 (25, 130mm/ HB)			Very Dense	**Clayey Sand;** blue-orange-grey, fine to coarse grained, trace of fine to medium grained gravel, angular (Residual) MPS 15 LL 30 P75 30
7										
7.60	-7.3									orange-white, trace of fine grained gravel, subangular MPS 4 LL 30 P75 40
8										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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Borehole No. 12
Sheet 3 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 10.5.06 Job No: 21778.1
Location: E 55K0685489 N 7755280
Surface R.L.: 0.3m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
	-7.7		SC	W B		SPT 2 N=>50 (14, 25, 140mm)		W	Very Dense	**Clayey Sand;** orange-white, fine to coarse grained, trace of fine grained gravel, subangular (Residual) MPS 4 LL 30 P75 40
9										
9.80	-9.5					SPT 3 N=>50 (25, 110mm)	HB)			**Clayey Sand;** orange, fine to coarse grained, with bands of fractured, purple, extremely weathered rock MPS 2 LL 30 P75 40
10										
10.20	-11.9								Low to Very Low Strength	**Rock;** grey-brown, extremely weathered, intensely fractured, with bands of residual
10.60										orange
11										
11.70										
11.74	-11.44			W R		SPT 3 N=>50 (25, 40mm)				
12										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

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Borehole No. 12
Sheet 4 of 4

BOREHOLE LOG

Client: Port Binnili
Project: Additional Over Water Investigation
Site: Shute Harbour

Date: 10.5.06 Job No: 21778.1
Location: E 55K0685489 N 7755280
Surface R.L.: 0.3m Datum: AHD (From nearest known spot height)
Supervisor CG, TAB, WS Chkd: AW

Drill Contractor Cardno Ullman & Nolan Geotechnic Drill Model Jacro 350 Mounting Truck Diameter 75mm Auger

STRATA				DRILLING			TESTING	VISUAL SOIL DESCRIPTION		
Depth (m)	R.L	Log	Classification	Method & Bit	Support	Sampling		Moisture	Consistency	
				W B		D		W	Low to Very Low Strength	**Rock;** refer sheet 4 depth 10.60m
12.50	-12.3								Very Dense	**Clayey Sand:** orange, fine to coarse grained, residual with bands of intensely fractured extremely weathered rock MPS 2 LL 30 P75 40
13										
13.40	-13.1									**Borehole complete @ 13.40m**
14										
15										
16										

METHOD
A auger
W washbore
P percussion
H hammer
C core
R rotary air flush

BIT
R roller
B blank
V V bit
T TC bit
D diamond

SUPPORT
C casing
M mud

SAMPLING
U undisturbed sample & size in mm
D disturbed sample
N Standard Penetration Test & Result
PP Pocket Penetrometer Value

MOISTURE
D dry
M moist
W wet

VISUAL DESCRIPTION
MPS maximum particle size
LL Liquid Limit
P75 % passing 75um sieve

ATTACHMENT B

Dynamic Cone Penetrometer Results

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UNGR 92 G
(-/12/05)

DYNAMIC CONE PENETROMETER

Mackay Laboratory

CLIENT: Port Binnli **JOB NO:** 21778.1 **LAB REF NO:** 06-1833A

PROJECT: Additional Over Water Investigation **TESTED BY:** CG **DATE:** 3.5.06

LOCATION: Shute Harbour Marina **CHECKED BY:** AW **DATE:** 8.5.06

TEST PROCEDURES : **AS 1289.6.3.2** **CLIENT REF:** -

Test No.: A
Test Location/Chainage : BH10
Ground Surface R.L. (m) : -1.8m
Depth Below Ground
Surface at start of Test (mm): 4000
Soil Description : Refer Logs

Soil Moisture Condition: Very Wet
Depth to Groundwater (m) : -1.8m

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
	4000	
1	4100	100
2	4200	100
4	4300	50
6	4400	50
8	4500	50
10	4600	50
12	4700	50
14	4800	50
16	4900	50
18	5000	50
20	5100	50
22	5200	50
24	5300	50
26	5400	50
28	5500	50
30	5600	50
32	5700	50
34	5800	50
40	5900	17
46	6000	17
50	6100	25
54	6200	25
59	6300	20
64	6400	20
68	6500	25
73	6600	20
78	6700	20
83	6800	20
88	6900	20

Test No.: A (cont'd)
Test Location/Chainage : BH10
Ground Surface R.L. (m) : -1.8m
Depth Below Ground
Surface at start of Test (mm): 4000
Soil Description : Refer Logs

Soil Moisture Condition: Very Wet
Depth to Groundwater (m) : -1.8m

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
93	7000	20
99	7100	17
105	7200	17
110	7300	20
115	7400	20
122	7500	14

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DYNAMIC CONE PENETROMETER

UNGR 92 G
(-/12/05)

Mackay Laboratory

CLIENT: Port Binnli **JOB NO:** 21778.1 **LAB REF NO:** 06-1833B

PROJECT: Additional Over Water Investigation **TESTED BY:** CG **DATE:** 4.5.06

LOCATION: Shute Harbour Marina **CHECKED BY:** AW **DATE:** 8.5.06

TEST PROCEDURES : **AS 1289.6.3.2** **CLIENT REF:** -

Test No.: B
Test Location/Chainage : BH8
Ground Surface R.L. (m) : -1.7m
Depth Below Ground
Surface at start of Test (mm): 3300
Soil Description : Refer Logs

Soil Moisture Condition: Wet
Depth to Groundwater (m) : +1.7m

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
	3300	
2	3400	50
3	3500	100
5	3600	50
7	3700	50
9	3800	50
10	3900	100
12	4000	50
15	4100	33
18	4200	33
21	4300	33
24	4400	33
27	4500	33
30	4600	33
33	4700	33
36	4800	33
39	4900	33
42	5000	33
45	5100	33
49	5200	25
52	5300	33
56	5400	25
60	5500	25
64	5600	25
68	5700	25
72	5800	25
76	5900	25
80	6000	25
84	6100	25
88	6200	25

Test No.: B (cont'd)
Test Location/Chainage : BH8
Ground Surface R.L. (m) : -1.7m
Depth Below Ground
Surface at start of Test (mm): 3300
Soil Description : Refer Logs

Soil Moisture Condition: Wet
Depth to Groundwater (m) : +1.7m

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
93	6300	20
97	6400	25
102	6500	20
109	6600	14
116	6700	14
122	6800	17
129	6900	14
135	7000	17
142	7100	14
148	7200	17
154	7300	17
161	7400	14
167	7500	17

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DYNAMIC CONE PENETROMETER

Mackay Laboratory

CLIENT: Port Binnli **JOB NO:** 21778.1 **LAB REF NO:** 06-1833C

PROJECT: Additional Over Water Investigation **TESTED BY:** CG **DATE:** 4.5.06

LOCATION: Shute Harbour Marina **CHECKED BY:** AW **DATE:** 8.5.06

TEST PROCEDURES : **AS 1289.6.3.2** **CLIENT REF:** -

Test No.: C
Test Location/Chainage : BH7
Ground Surface R.L. (m) : 0
Depth Below Ground
Surface at start of Test (mm): 4400
Soil Description : Refer Logs

Soil Moisture Condition: Wet
Depth to Groundwater (m) : 0

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
	4400	
4	4500	25
7	4600	33
9	4700	50
10	4800	100
12	4900	50
14	5000	50
16	5100	50
19	5200	33
21	5300	50
25	5400	25
29	5500	25
32	5600	33
35	5700	33
38	5800	33
42	5900	25
45	6000	33
49	6100	25
53	6200	25
57	6300	25
60	6400	33
64	6500	25
69	6600	20
73	6700	25
78	6800	20
84	6900	17
88	7000	25
93	7100	20
97	7200	25
103	7300	17

Test No.: N/A
Test Location/Chainage : N/A
Ground Surface R.L. (m) : N/A
Depth Below Ground
Surface at start of Test (mm): N/A
Soil Description : N/A

Soil Moisture Condition: N/A
Depth to Groundwater (m) : N/A

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
N/A	N/A	

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DYNAMIC CONE PENETROMETER

Mackay Laboratory

CLIENT: Port Binnli **JOB NO:** 21778.1 **LAB REF NO:** 06-1847A

PROJECT: Additional Over Water Investigation **TESTED BY:** CG **DATE:** 8.5.06

LOCATION: Shute Harbour Marina **CHECKED BY:** AW **DATE:** 10.5.06

TEST PROCEDURES : **AS 1289.6.3.2** **CLIENT REF:** -

Test No.: A
Test Location/Chainage : BH6
Ground Surface R.L. (m) : -3600
Depth Below Ground Surface at start of Test (mm): 3600
Soil Description : Refer Logs

Soil Moisture Condition: Wet
Depth to Groundwater (m) : -3600

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
	3600	
2	3700	50
4	3800	50
6	3900	50
8	4000	50
10	4100	50
12	4200	50
14	4300	50
17	4400	33
19	4500	50
22	4600	33
25	4700	33
28	4800	33
31	4900	33
34	5000	33
37	5100	33
40	5200	33
45	5300	20
49	5400	25
53	5500	25
57	5600	25
62	5700	20
67	5800	20
72	5900	20
78	6000	17
83	6100	20
89	6200	17
95	6300	17
102	6400	14
108	6500	17

Test No.: A (cont'd)
Test Location/Chainage : BH6
Ground Surface R.L. (m) : -3600
Depth Below Ground Surface at start of Test (mm): 3600
Soil Description : Refer Logs

Soil Moisture Condition: Wet
Depth to Groundwater (m) : -3600

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
114	6600	17
120	6700	17
127	6800	14
133	6900	17

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(-/12/05)

DYNAMIC CONE PENETROMETER

Mackay Laboratory

CLIENT: Port Binnli **JOB NO:** 21778.1 **LAB REF NO:** 06-1848A

PROJECT: Additional Over Water Investigation **TESTED BY:** CG **DATE:** 9.5.06

LOCATION: Shute Harbour Marina **CHECKED BY:** AW **DATE:** 10.5.06

TEST PROCEDURES : **AS 1289.6.3.2** **CLIENT REF:** -

Test No.: A
Test Location/Chainage : BH11
Ground Surface R.L. (m) : -4900
Depth Below Ground Surface at start of Test (mm): 4900
Soil Description : Refer Logs

Soil Moisture Condition: Wet
Depth to Groundwater (m) : -4900

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
	4900	
2	5000	50
4	5100	50
5	5200	100
7	5300	50
9	5400	50
10	5500	100
12	5600	50
14	5700	50
16	5800	50
18	5900	50
20	6000	50
22	6100	50
24	6200	50
26	6300	50
29	6400	33
32	6500	33
34	6600	50
37	6700	33
40	6800	33
43	6900	33
47	7000	25
54	7100	14
57	7200	33
61	7300	25
65	7400	25
73	7500	13
79	7600	17
84	7700	20
90	7800	17

Test No.: A (cont'd)
Test Location/Chainage : BH11
Ground Surface R.L. (m) : -4900
Depth Below Ground Surface at start of Test (mm): 4900
Soil Description : Refer Logs

Soil Moisture Condition: Wet
Depth to Groundwater (m) : -4900

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
95	7900	20
99	8000	25
105	8100	17
112	8200	14
117	8300	20
122	8400	20
127	8500	20
132	8600	20
137	8700	20
144	8800	14
151	8900	14
158	9000	14

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Date of Issue 10.5.06

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DYNAMIC CONE PENETROMETER

Mackay Laboratory

CLIENT: Port Binnli **JOB NO:** 21778.1 **LAB REF NO:** 06-1896A

PROJECT: Additional Over Water Investigation **TESTED BY:** CG **DATE:** 10.5.06

LOCATION: Shute Harbour Marina **CHECKED BY:** AW **DATE:** 12.05.06

TEST PROCEDURES : **AS 1289.6.3.2** **CLIENT REF:** -

Test No.: A
Test Location/Chainage : BH12
Ground Surface R.L. (m) : -3800
Depth Below Ground
Surface at start of Test (mm): 3800
Soil Description : Refer Logs

Soil Moisture Condition: Wet
Depth to Groundwater (m) : -3800

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
	3800	
2	3900	50
4	4000	50
6	4100	50
7	4200	100
9	4300	50
11	4400	50
15	4500	25
21	4600	17
31	4700	10
38	4800	14
58	4900	5
68	5000	10
84	5100	6
103	5200	5
128	5300	4
156	5400	4
181	5460	2
217	5500	1

Test No.: N/A
Test Location/Chainage : N/A
Ground Surface R.L. (m) : N/A
Depth Below Ground
Surface at start of Test (mm): N/A
Soil Description : N/A

Soil Moisture Condition: N/A
Depth to Groundwater (m) : N/A

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
N/A	N/A	

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DYNAMIC CONE PENETROMETER

Mackay Laboratory

CLIENT: Port Binnli **JOB NO:** 21778.1 **LAB REF NO:** 06-1897A

PROJECT: Additional Over Water Investigation **TESTED BY:** CG **DATE:** 11.5.06

LOCATION: Shute Harbour Marina **CHECKED BY:** AW **DATE:** 12.5.06

TEST PROCEDURES : **AS 1289.6.3.2** **CLIENT REF:** -

Test No.:	A
Test Location/Chainage :	BH9
Ground Surface R.L. (m) :	-3700
Depth Below Ground Surface at start of Test (mm):	3700
Soil Description :	Refer Logs
Soil Moisture Condition:	Wet
Depth to Groundwater (m) :	-3700

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
	3700	
2	3800	50
4	3900	50
6	4000	50
7	4100	100
9	4200	50
11	4300	50
14	4400	33
17	4500	33
20	4600	33
23	4700	33
26	4800	33
29	4900	33
32	5000	33
35	5100	33
38	5200	33
41	5300	33
44	5400	33

Test No.:	N/A
Test Location/Chainage :	N/A
Ground Surface R.L. (m) :	N/A
Depth Below Ground Surface at start of Test (mm):	N/A
Soil Description :	N/A
Soil Moisture Condition:	N/A
Depth to Groundwater (m) :	N/A

Cumulative No. of Blows	Depth Below Starting Level (mm)	Penetration Rate (mm/blow)
N/A	N/A	

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Date of Issue 12.5.06

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Authorised Signatory .....
A. J. Williams

ATTACHMENT C

Laboratory Test Results

ULLMAN & NOLAN GEOTECHNIC

A.C.N. 010 026 418

REPORT ON SOIL CLASSIFICATION

UNGR 1
Issue: 1 Rev 4
(-/11/97)
Mackay Laboratory

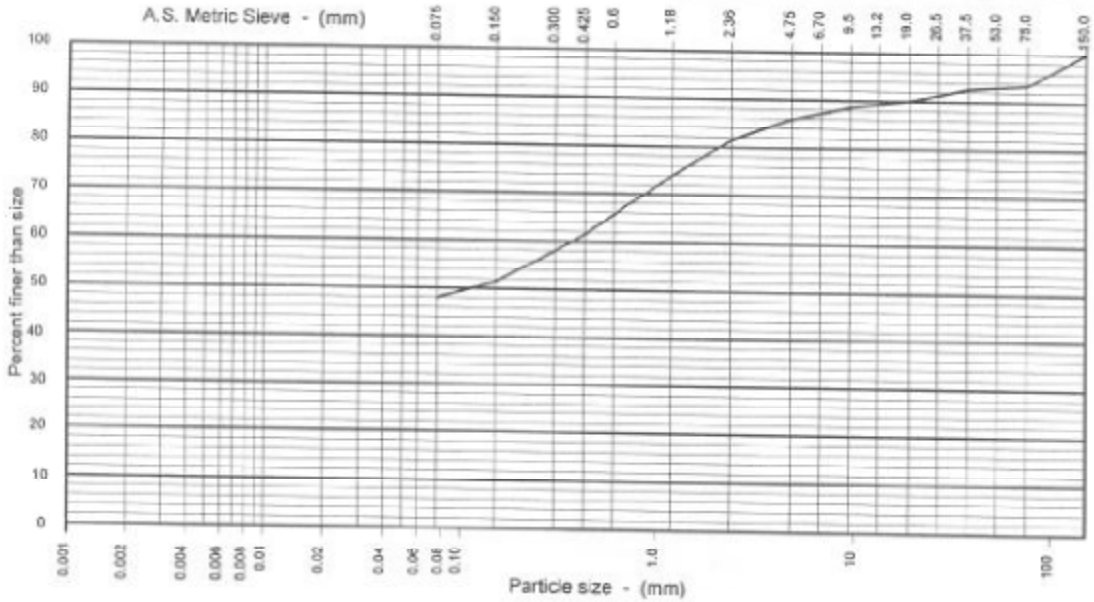
CLIENT: Kinsmen Pty Ltd **JOB NO:** 10474.1 **LAB REF NO:** 01-0512A

PROJECT: Shute Harbour Marina Development **SAMPLED BY:** Client **DATE:** 9.4.01

LOCATION: Test Pit 6, Depth 3.50-4.00m **TESTED BY:** DM **DATE:** 12,18.4.01

MATERIAL USE: Investigation **CHECKED BY:** DG **DATE:** 24.4.01

TEST PROCEDURES: AS 1289.3.6.1 **CLIENT REF:** -



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
48				6	12	15	6	3	3	7

Particle Size (mm)	Percent Passing (%)	Particle Size (mm)	Percent Passing (%)
150.0	100		
75.0	93		
37.5	93		
19.0	90		
9.5	89		
4.75	86		
2.36	81		
1.18	74		
0.600	66		
0.425	61		
0.300	58		
0.150	51		
0.075	48		

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Specific Gravity (g/cm^3)
-	-	-	-	-

Classification: light grey, moderately plastic, gravelly (corals and angular volcanoclaste rock) sandy silty CLAY

Preparation History of Atterberg Limits

Sample : -

Sieved: -

Linear Shrinkage Data

Length of Mould (mm) : -

Sample: -

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Certificate No. 01-0512A

Date of Issue 27.4.01

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Authorised Signatory: Richard

ULLMAN & NOLAN GEOTECHNIC

A.C.N. 010 026 418

REPORT ON SOIL CLASSIFICATION

UNGR 1
Issue: 1 Rev 4
(-/11/97)
Mackay Laboratory

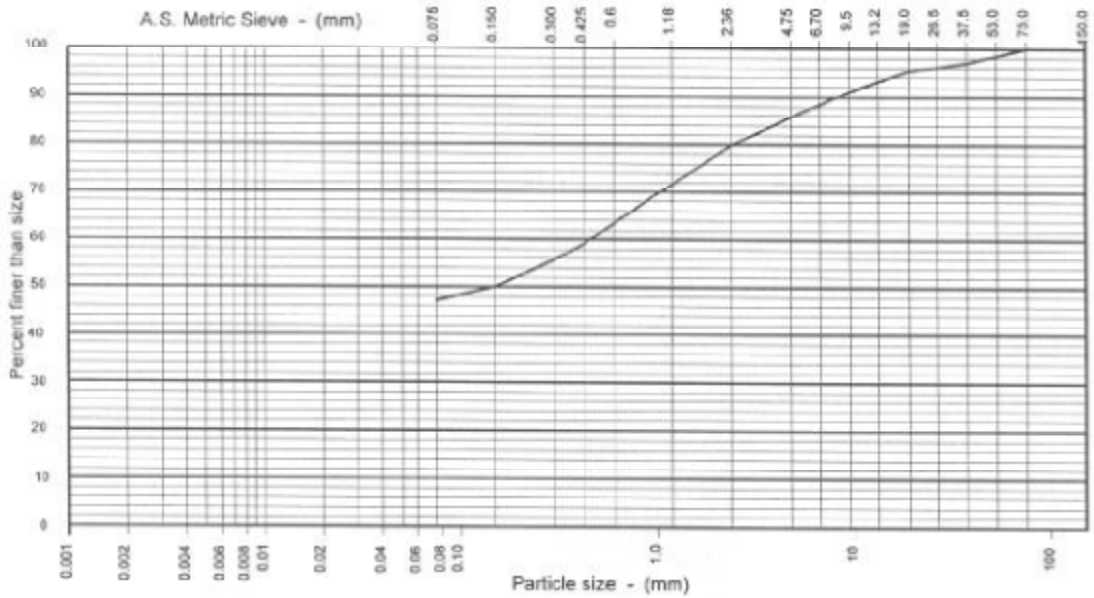
CLIENT: Kinsmen Pty Ltd **JOB NO:** 10474.1 **LAB REF NO:** 01-0513A

PROJECT: Shute Harbour Marina Development **SAMPLED BY:** Client **DATE:** 9.4.01

LOCATION: Test Pit 7, Depth 3.50-4.00m **TESTED BY:** DM **DATE:** 12,18.4.01

MATERIAL USE: Investigation **CHECKED BY:** DG **DATE:** 24.4.01

TEST PROCEDURES: AS 1289.3.6.1 **CLIENT REF:** -



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
47				5	11	17	8	8	3	1

Particle Size (mm)	Percent Passing (%)	Particle Size (mm)	Percent Passing (%)
150.0	100		
75.0	100		
37.5	97		
19.0	95		
9.5	91		
4.75	86		
2.36	80		
1.18	72		
0.600	63		
0.425	59		
0.300	56		
0.150	50		
0.075	47		

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Specific Gravity (g/cm^3)
-	-	-	-	-

Classification: grey, moderately plastic, gravelly (shells and coral fragments) sandy clayey SILT

Preparation History of Atterberg Limits

Sample: -

Sieved: -

Linear Shrinkage Data

Length of Mould (mm): -

Sample: -

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Certificate No. 01-0513.

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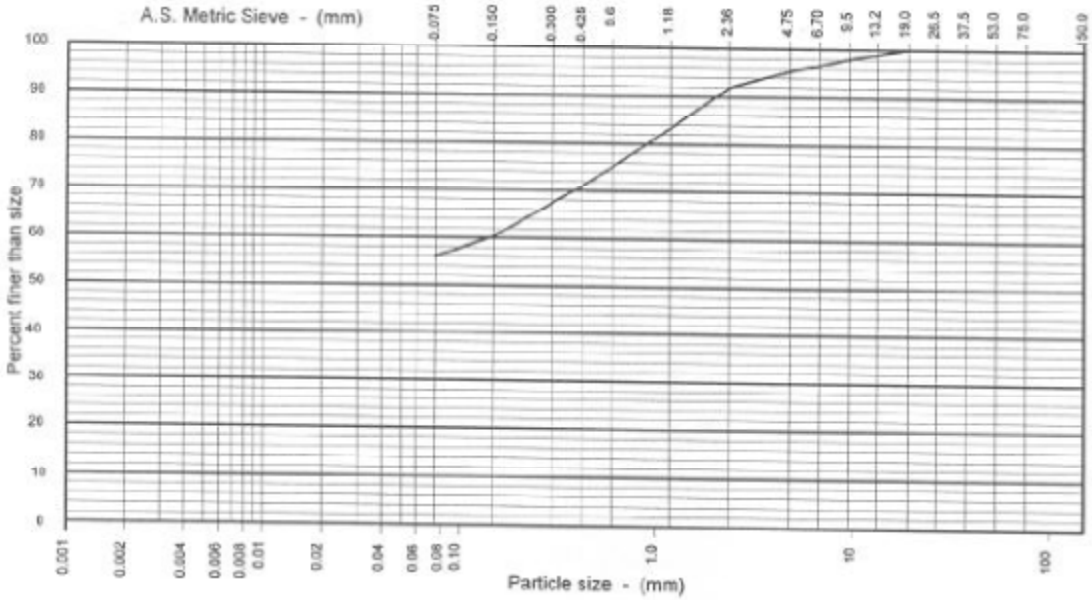
REPORT ON SOIL CLASSIFICATION

UNGR
Issue: 1 Rev
(-/11/97
Mackay Laboratory

CLIENT:	Kinsmen Pty Ltd	**JOB NO:**	10474.1	**LAB REF NO:**	01-0514A
PROJECT:	Shute Harbour Marina Development	**SAMPLED BY:**	Client	**DATE:**	9.4.01
LOCATION:	Test Pit 8, Depth 1.50-2.00m	**TESTED BY:**	DM	**DATE:**	12,18.4.01
MATERIAL USE:	Investigation	**CHECKED BY:**	DG	**DATE:**	20.4.01
TEST PROCEDURES:	AS 1289.3.6.1	**CLIENT REF:**	-		



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
56				8	11	17	4	4	0	0

Particle Size (mm)	Percent Passing (%)	Particle Size (mm)	Percent Passing (%)
150.0			
75.0			
37.5			
19.0	100		
9.5	98		
4.75	95		
2.36	92		
1.18	83		
0.600	75		
0.425	71		
0.300	67		
0.150	60		
0.075	56		

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Specific Gravity (g/cm^3)
-	-	-	-	-

Classification: grey, highly plastic, slightly gravelly (shells), sandy silty CLAY

Preparation History of Atterberg Limits

Sample : -

Sieved: -

Linear Shrinkage Data

Length of Mould (mm) : -

Sample: -

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REPORT ON SOIL CLASSIFICATION

UNGR 1
Issue: 1 Rev 5
(-/8/00)

Sheet 1 of 1

Mackay Laboratory

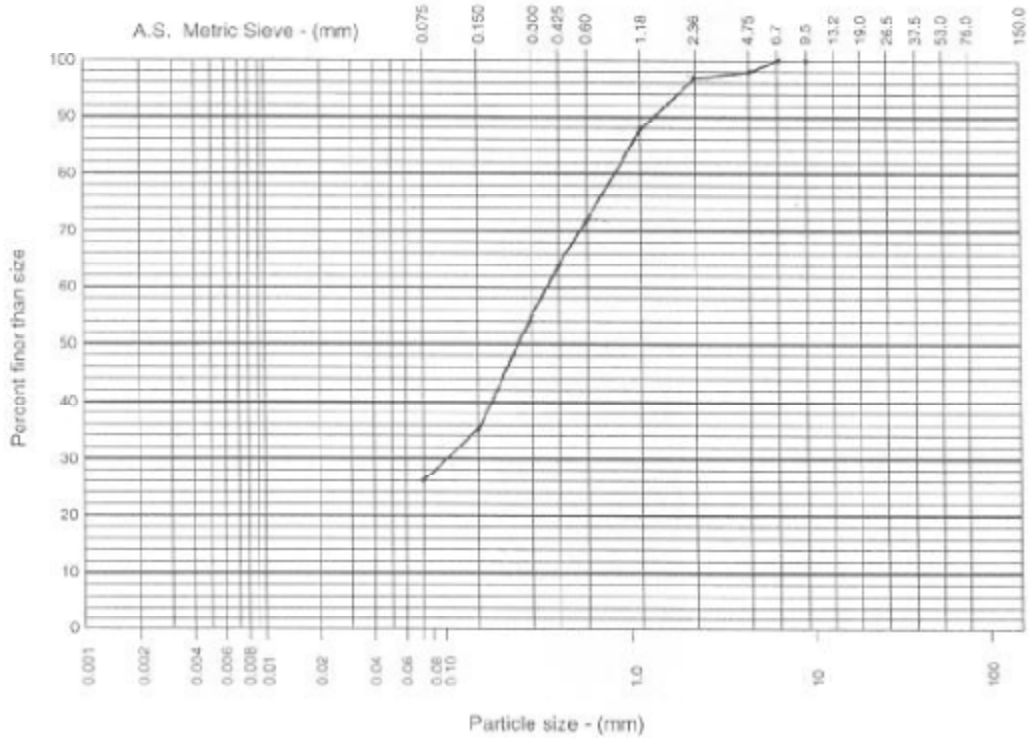
CLIENT: Kinsmen Pty Ltd JOB NO.: 10474.1 LAB REF NO.: 01-0973A

PROJECT: Shute Harbour Marina SAMPLED BY: U&N DATE: 22,23.5.01

LOCATION: Borehole 1, Depth 1.50m TESTED BY: NJR DATE: 22.6.01

MATERIAL: Investigation CHECKED BY: VJ DATE: 25.6.01

TEST PROCEDURES: AS 1289.3.6.1 CLIENT REF: -



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
26				16	30	25	3			

Particle Size (mm)	Percent Passing (%)	Particle Size (mm)	Percent Passing (%)
150.0			
75.0			
37.5			
19.0			
9.5	100		
4.75	98		
2.36	97		
1.18	88		
0.60	72		
0.425	64		
0.300	55		
0.150	35		
0.075	26		

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Soil Particle Density (g/cm^3)
-	-	-	-	-

Classification: Silty Sand

Preparation History of Atterberg Limits

~~Natural Sieved/Air Dried/Oven Dried~~ (delete two)

~~Wet Sieved/Dry Sieved~~ (delete one)

Linear Shrinkage Data

Length of Mould mm: -

Sample: ~~Crumbled/Curled/Crumbled &~~ ~~Curled~~ (delete as required)

NATA

Accredited No.: 910

Certificate No.: 01-0973A

Date of Issue: 25.6.01

Authorised Signatory: N. J. Richards

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REPORT ON SOIL CLASSIFICATION

UNGR 1
Issue: 1 Rev 5
(-/8/00)

Sheet 1 of 1

Mackay Laboratory

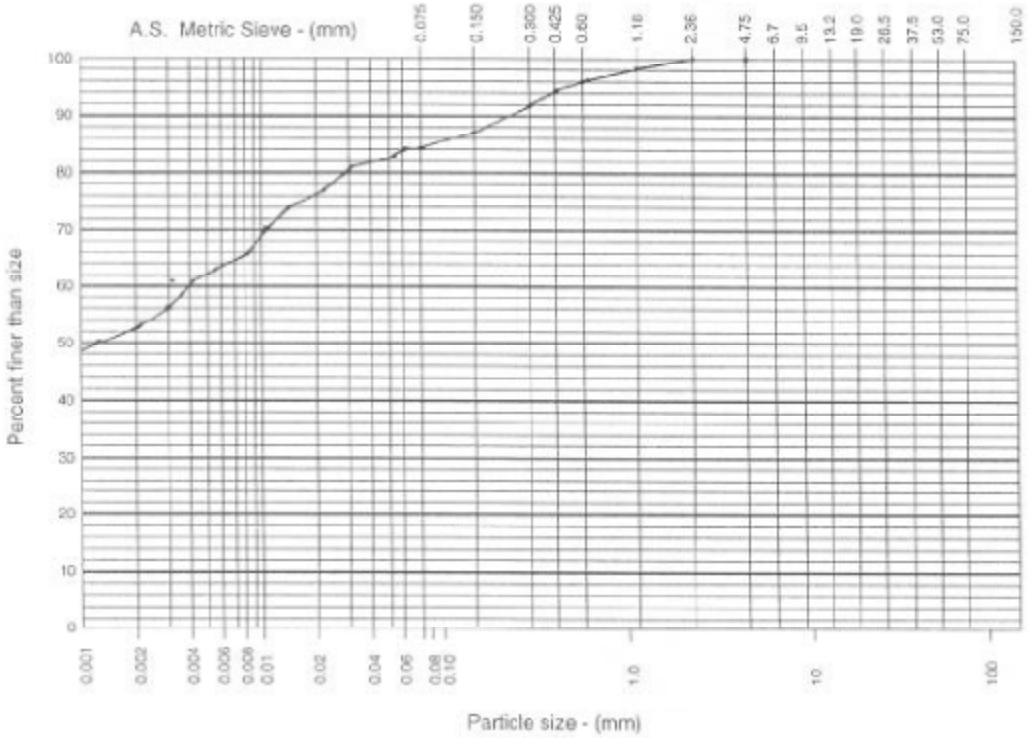
CLIENT: Kinsmen Pty Ltd JOB NO.: 10474.1 LAB REF NO.: 01-0974A

PROJECT: Shute Harbour Marina SAMPLED BY: U&N DATE: 22,23.5.01

LOCATION: Borehole 2, Depth 1.50m TESTED BY: NR,MS DATE: 19-22.6.01

MATERIAL: Investigation CHECKED BY: VJ DATE: 25.6.01

TEST PROCEDURES: AS 1289.3.6.1,3.6.3 CLIENT REF: -



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
53	10	13	8	4	3	4				

Particle Size (mm)	Percent Passing (%)	Particle Size (~~XXX~~ um)	Percent Passing (%)
150.0		61.6	85
75.0		44.0	83
37.5		31.3	81
19.0		22.5	77
9.5		15.3	74
4.75		11.3	70
2.36	100	8.2	66
1.18	98	5.9	63
0.60	96	4.2	61
0.425	94	3.0	56
0.300	92	2.1	53
0.150	87	1.2	50
0.075	84	0.9	48

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Soil Particle Density (g/cm^3)
-	-	-	-	-

Classification: Silty Clay

Preparation History of Atterberg Limits

~~Natural State/Air Dried/Oven Dried~~ (delete two)

~~Wet Sieved/Dry Sieved~~ (delete one)

Linear Shrinkage Data

Length of Mould mm ---

Sample: ~~Crumbled/Curled/Crumbled &~~ ~~Curled~~ (delete as required)

NATA

Accredited No.: 910

Certificate No.: 01-0974A

Date of Issue: 25.6.01

Authorised Signatory: M.J. Richardson

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REPORT ON SOIL CLASSIFICATION

UNGR 1
Issue: 1 Rev 5
(-/8/00)

Sheet 1 of 1

Mackay Laboratory

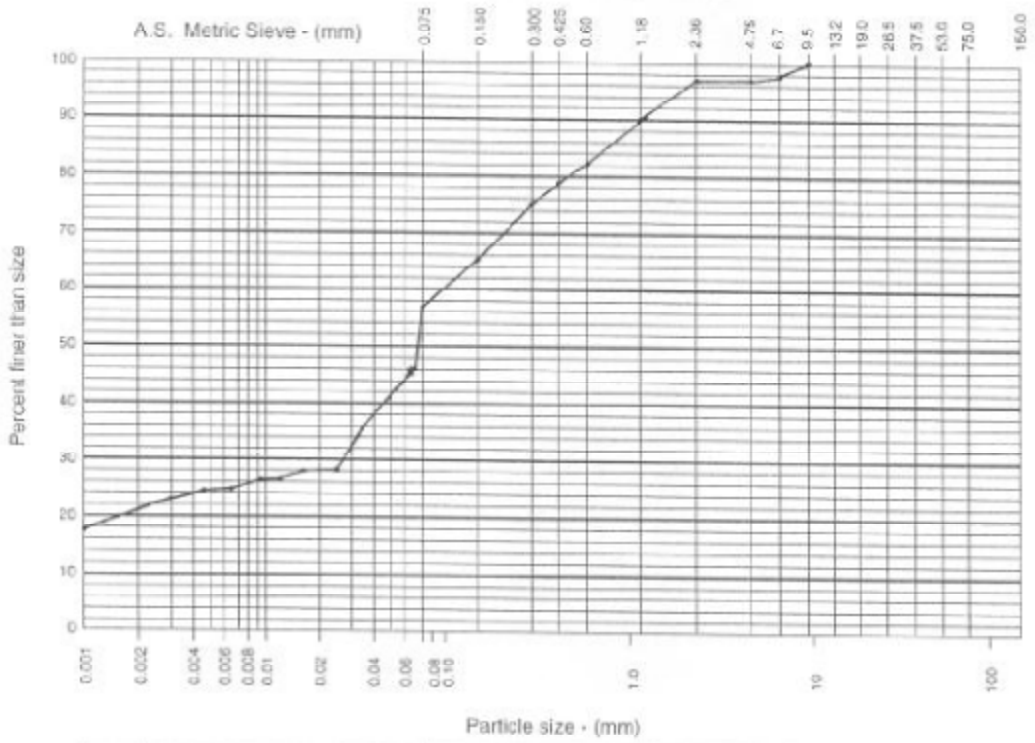
CLIENT: Kinsmen Pty Ltd JOB NO.: 10474.1 LAB REF NO.: 01-0975A

PROJECT: Shute Harbour Marina SAMPLED BY: U&N DATE: 22,23.5.01

LOCATION: Borehole 3, Depth 0.50-1.00m TESTED BY: MS DATE: 18-22.6.01

MATERIAL: Investigation CHECKED BY: VJ DATE: 25.6.01

TEST PROCEDURES: AS 1289.3.6.1,3.6.3 CLIENT REF: -



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
21	4	3	29	11	14	15	0	3		

Particle Size (mm)	Percent Passing (%)	Particle Size (~~mm~~ um)	Percent Passing (%)
150.0		69.1	46
75.0		49.8	41
37.5		35.8	36
19.0		25.8	28
9.5	100	17.7	28
4.75	97	13.0	27
2.36	97	9.2	27
1.18	90	6.5	25
0.60	82	4.6	25
0.425	79	3.1	23
0.300	75	2.3	22
0.150	66	1.3	19
0.075	57	0.9	18

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Soil Particle Density (g/cm^3)
-	-	-	-	-

Classification: Silty Clayey Sand

Preparation History of Atterberg Limits

~~Natural State/Air Dried/Oven Dried~~ (delete two)

~~Wet Sieved/Dry Sieved~~ (delete one)

Linear Shrinkage Data

Length of Mould mm "

Sample: ~~Crumbled/Curled/Crumbled &~~ ~~Curled~~ (delete as required)

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Certificate No.: 01-0975A

Date of Issue: 25.6.01

N. J. Richard

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REPORT ON SOIL CLASSIFICATION

UNGR 1
Issue: 1 Rev 5
(-/8/00)

Sheet 1 of 1

Mackay Laboratory

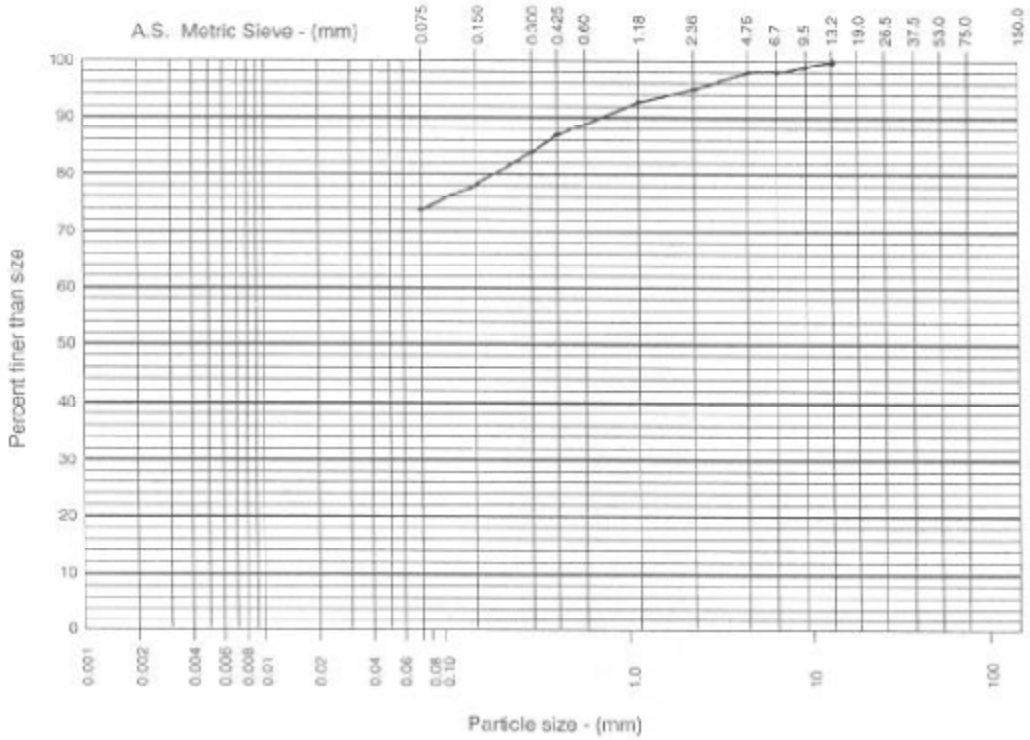
CLIENT: Kinsmen Pty Ltd JOB NO.: 10474.1 LAB REF NO.: 01-0976A

PROJECT: Shute Harbour Marina SAMPLED BY: U&N DATE: 22,23.5.01

LOCATION: Borehole 4, Depth 1.00-2.00m TESTED BY: NJR DATE: 22.6.01

MATERIAL: Investigation CHECKED BY: VJ DATE: 25.6.01

TEST PROCEDURES: AS 1289.3.6.1 CLIENT REF: -



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
74				6	9	6	3	2		

Particle Size (mm)	Percent Passing (%)	Particle Size (mm)	Percent Passing (%)
150.0			
75.0			
37.5			
19.0			
9.5	99		
4.75	98		
2.36	95		
1.18	93		
0.60	89		
0.425	87		
0.300	84		
0.150	78		
0.075	74		

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Soil Particle Density (g/cm³)
-	-	-	-	-

Classification: Silt

Preparation History of Atterberg Limits

~~Natural State/Air Dried/Oven Dried~~ (delete two)

~~Wet Sieved/Dry Sieved~~ (delete one)

Linear Shrinkage Data

Length of Mould mm -

Sample: ~~Crumbled/Curled/Crumbled &~~ Curled (delete as required)

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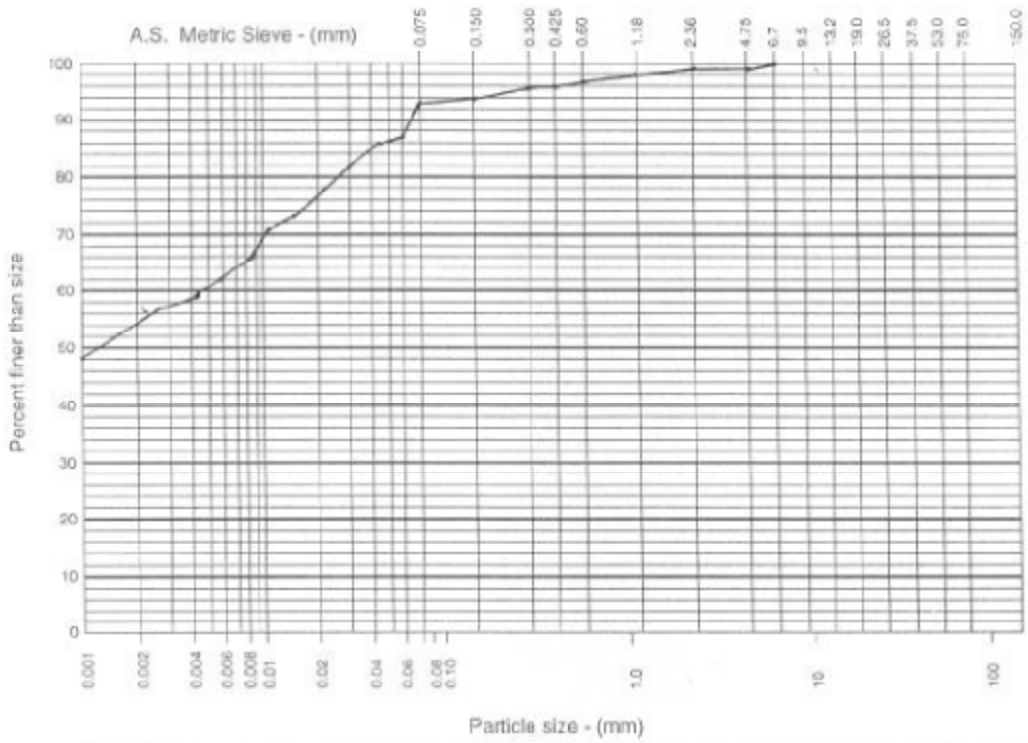
REPORT ON SOIL CLASSIFICATION

UNGR 1
Issue: 1 Rev 5
(-/8/00)

Sheet 1 of 1 — Mackay Laboratory

CLIENT:	Kinsmen Pty Ltd	JOB NO.:	10474.1	LAB REF NO.:	01-0977A
PROJECT:	Shute Harbour Marina	SAMPLED BY:	U&N	DATE:	22,23.5.01
LOCATION:	Borehole 5, Depth 0.5m	TESTED BY:	MS	DATE:	18,19.6.01
MATERIAL:	Investigation	CHECKED BY:	VJ	DATE:	25.6.01
TEST PROCEDURES:	AS 1289.3.6.1,3.6.3	CLIENT REF:	-		



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
54	8	13	18	1	3	2	1			

Particle Size (mm)	Percent Passing (%)	Particle Size (~~XX~~ um)	Percent Passing (%)
150.0		60.4	87
75.0		42.9	86
37.5		30.7	82
19.0		22.3	78
9.5	100	15.6	73
4.75	99	11.4	71
2.36	99	8.3	66
1.18	98	5.9	62
0.60	97	4.2	59
0.425	96	2.8	57
0.300	96	2.1	53
0.150	94	1.3	50
0.075	93	0.9	48

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Soil Particle Density (g/cm^3)
-	-	-	-	-

Classification: Silty Clay

Preparation History of Atterberg Limits

~~Natural State/Air Dried/Oven Dried~~ (delete two)

~~Wet Sieved/Dry Sieved~~ (delete one)

Linear Shrinkage Data

Length of Mould mm -

Sample: ~~Crumbled/Curled/Crumbled~~ & ~~Curled~~ (delete as required)

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Certificate No. 01-0977A

Date of Issue: 25.6.01

Authorised Signatory: M. J. Richardson

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A.C.N. 010 026 418

REPORT ON MOISTURE CONTENT

UNGR 41
Issue: 1 Rev 1
(-/2/00)

Mackay Laboratory

CLIENT:	Kinsmen Pty Ltd	**JOB NO:**	10474.1	**LAB REF NO:**	01-1038A-F
PROJECT:	Shute Harbour Marina	**SAMPLED BY:**	U&N	**DATE:**	7,20,21.5.01
LOCATION:	Refer Below	**TESTED BY:**	DG	**DATE:**	14.6.01
MATERIAL USE:	Fill	**CHECKED BY:**	AW	**DATE:**	22.6.01
TEST PROCEDURES:	AS 1289.2.1.1			**CLIENT REF:**	-

Sample Identification Number	Sampling Location	Moisture Content (%)	For Subsidiary Methods	
			Original Value	Amended Value
01-1038A	BH3, Depth 1.00m	86.5		
01-1038B	BH3, Depth 2.00m	51.5		
01-1038C	BH4, Depth 1.50m	71.5		
01-1038D	BH5, Depth 1.50m	78.0		
01-1038E	TP 1, Depth 1.20-1.50m	38.0		
01-1038F	TP2, Depth 1.20-1.50m	54.5		

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Certificate No 01-1038A

Date of Issue 22.6.01

Authorised Signatory: [illegible]

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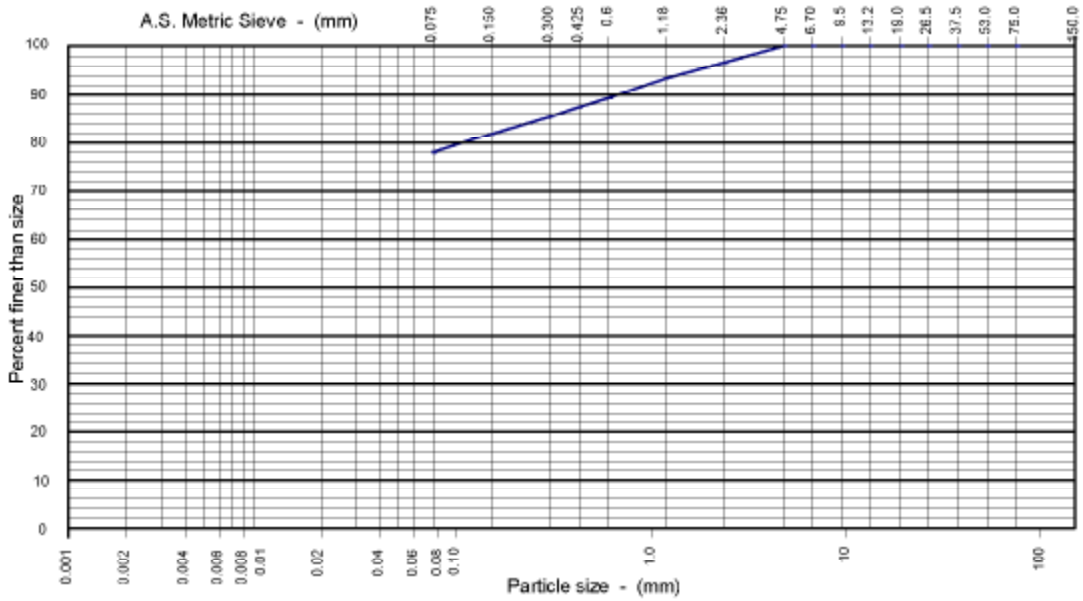
Technical Services Pty Ltd
A.C.N. 103 205 205

REPORT ON SOIL CLASSIFICATION

UNGR 1 G
(-/12/05)

Sheet 1 of 1 — Mackay Laboratory

CLIENT:	Port Binnli	**JOB NO:**	21024.1	**LAB REF NO:**	06-1465A
PROJECT:	Additional Geotechnical Investigation	**SAMPLED BY:**	U&N	**DATE:**	29-31.3.06
LOCATION:	Shute Harbour Marina, Borehole 54, Depth 0.60-1.30m	**TESTED BY:**	DN	**DATE:**	13.4.06
MATERIAL:	Sandy Clay; grey	**CHECKED BY:**	NJR	**DATE:**	20.4.06
TEST PROCEDURES:	AS 1289.3.6.1, 3.8.1	**CLIENT REF:**	12276.1		



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
78				5	6	8	3	0	0	0

Particle Size (mm)	Percent Passing (%)	Particle Size (mm)	Percent Passing (%)
150.0			
75.0			
37.5			
19.0			
9.5			
4.75	100		
2.36	97		
1.18	93		
0.600	89		
0.425	88		
0.300	86		
0.150	82		
0.075	78		

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Soil Particle Density (g/cm^3)
-	-	-	-	-

Classification: **Sandy Clay**; grey, sand is fine to coarse grained.

(CH)

Preparation History of Atterberg Limits

Sample : ~~Natural~~/Air Dried~~/Oven~~

Sieved: ~~Wet~~/dry

Linear Shrinkage Data

Length of Mould (mm) :

Sample: -

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Certificate No. 06-1465A

Date of Issue 20.4.06

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Authorised Signatory ..... N. J. Richardson

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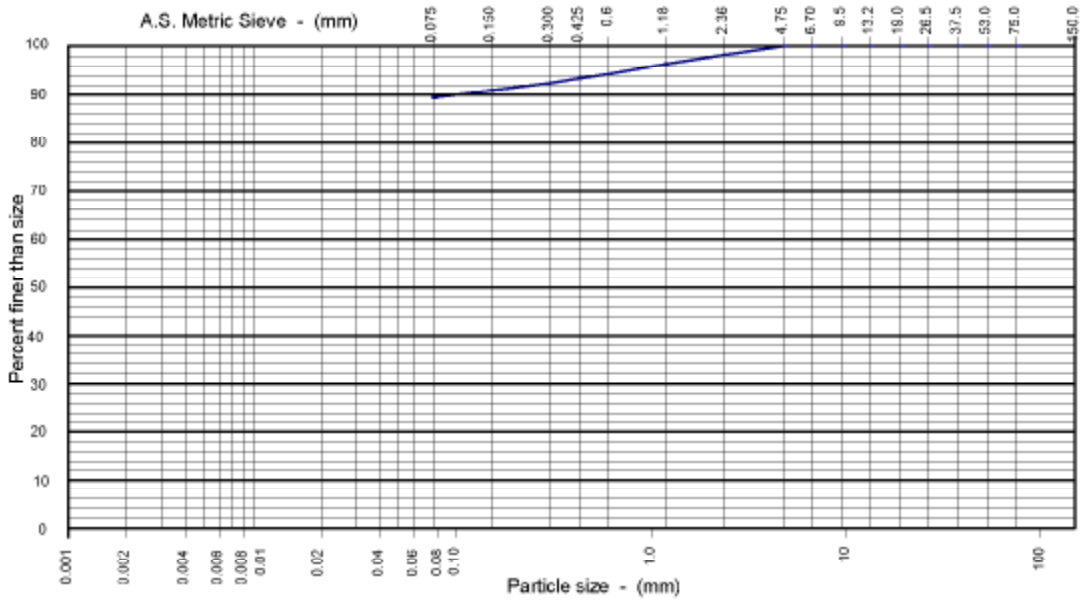
REPORT ON SOIL CLASSIFICATION

UNGR 1 G
(-/12/05)

Sheet 1 of 1 — Mackay Laboratory

CLIENT:	Port Binnli	**JOB NO:** 21024.1	**LAB REF NO:**		06-1466A
PROJECT:	Additional Geotechnical Investigation	**SAMPLED BY:**	U&N	**DATE:**	29-31.3.06
LOCATION:	Shute Harbour Marina, Borehole 54, Depth 1.70-2.30m	**TESTED BY:**	DN	**DATE:**	13.4.06
MATERIAL:	Clay; grey	**CHECKED BY:**	NJR	**DATE:**	19.4.06
TEST PROCEDURES:	AS 1289.3.6.1, 3.8.1	**CLIENT REF:**	12276.1		



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
89				2	3	4	2	0	0	0

Particle Size (mm)	Percent Passing (%)	Particle Size (mm)	Percent Passing (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Soil Particle Density (g/cm^3)
150.0				-	-	-	-	-
75.0				Classification:	**Clay**; grey, with fine to coarse grained sand.			
37.5								(CH)
19.0								
9.5								
4.75	100							
2.36	98							
1.18	96							
0.600	94							
0.425	93							
0.300	92							
0.150	91							
0.075	89							

Preparation History of Atterberg Limits

Sample : ~~Natural~~/Air Dried~~/Oven~~

Sieved: ~~Wet~~/dry

Linear Shrinkage Data

Length of Mould (mm) :

Sample: -

NATA

Accredited No. 910

Certificate No. 06-1465A

Date of Issue 19.4.06

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Authorised Signatory ..... N. J. Richardson

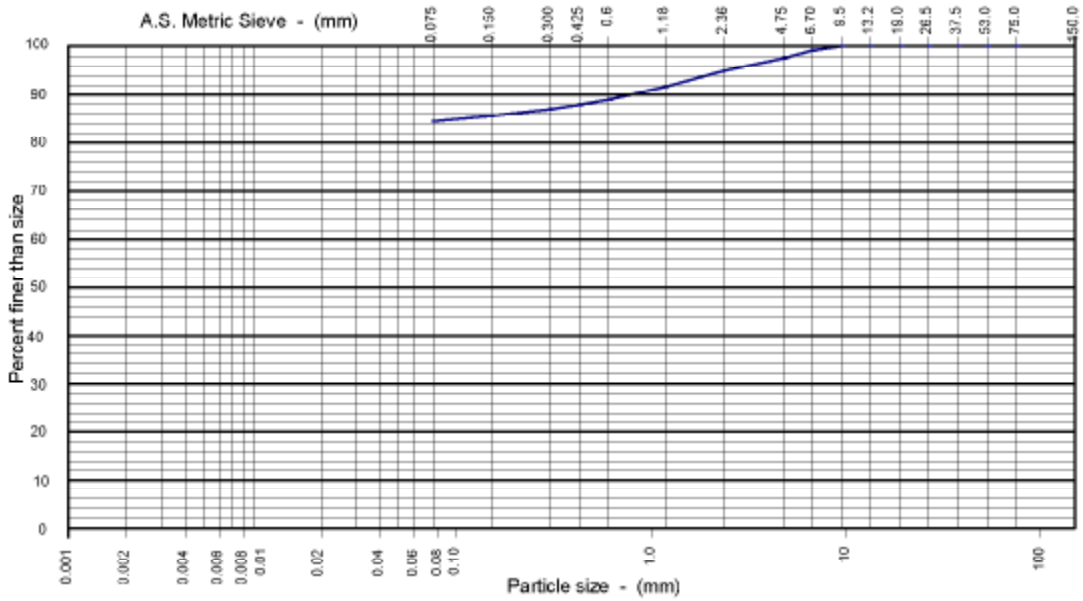
ULLMAN & NOLAN
Technical Services Pty Ltd
A.C.N. 103 205 205

REPORT ON SOIL CLASSIFICATION

UNGR 1 G
(-/12/05)

Sheet 1 of 1 — Mackay Laboratory

CLIENT:	Port Binnli	**JOB NO:** 21024.1	**LAB REF NO:**		06-1467A
PROJECT:	Additional Geotechnical Investigation	**SAMPLED BY:**	U&N	**DATE:**	29-31.3.06
LOCATION:	Shute Harbour Marina, Borehole 54, Depth 2.30-3.50m	**TESTED BY:**	CD	**DATE:**	26.4.06
MATERIAL:	Clay; grey	**CHECKED BY:**	NJR	**DATE:**	26.4.06
TEST PROCEDURES:	AS 1289.3.6.1	**CLIENT REF:**	12276.1		



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
85				1	3	6	3	2	0	0

Particle Size (mm)	Percent Passing (%)	Particle Size (mm)	Percent Passing (%)
150.0			
75.0			
37.5			
19.0			
9.5	100		
4.75	98		
2.36	95		
1.18	92		
0.600	89		
0.425	88		
0.300	87		
0.150	86		
0.075	85		

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Soil Particle Density (g/cm^3)
-	-	-	-	-

Classification: **Clay; grey**

Preparation History of Atterberg Limits

Sample : ~~Natural/Air Dried/Oven~~

Sieved: ~~Wet/dry~~

Linear Shrinkage Data

Length of Mould (mm) :

Sample: -

NATA

Accredited No. 910

Certificate No. 06-1467A

Date of Issue 26.4.06

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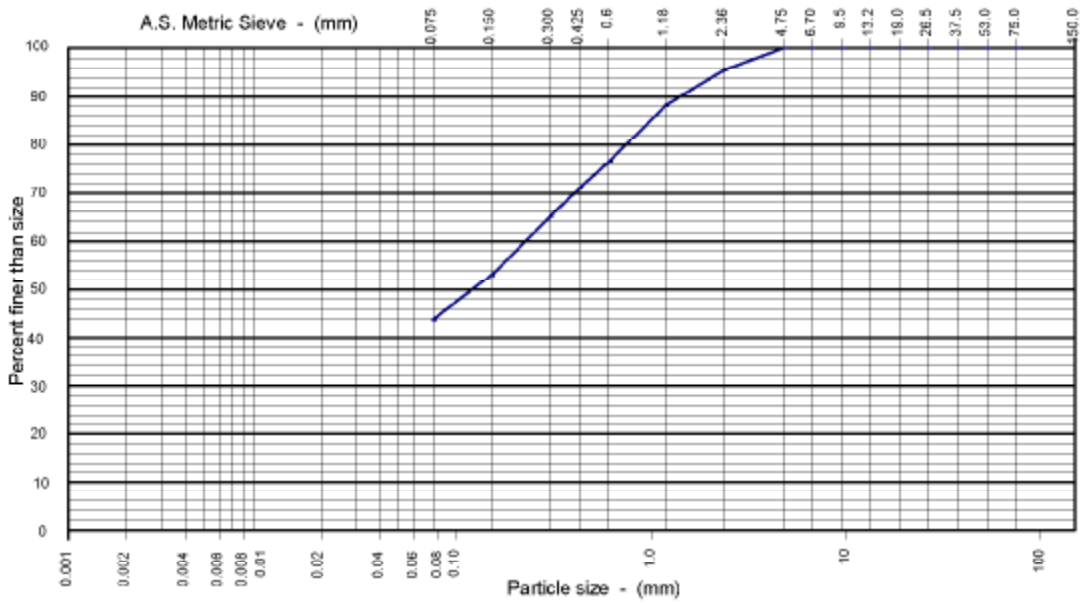
REPORT ON SOIL CLASSIFICATION

UNGR 1 G
(-/12/05)

Sheet 1 of 1 — Mackay Laboratory

CLIENT:	Port Binnli	**JOB NO:** 21024.1	**LAB REF NO:**		06-1468A
PROJECT:	Additional Geotechnical Investigation	**SAMPLED BY:**	U&N	**DATE:**	29-31.3.06
LOCATION:	Shute Harbour Marina, Borehole 54, Depth 1.70-2.30m	**TESTED BY:**	DN,SS	**DATE:**	13-18.4.06
MATERIAL:	Clayey Sand; grey	**CHECKED BY:**	NJR	**DATE:**	19.4.06
TEST PROCEDURES:	AS 1289.3.6.1, 3.8.1	**CLIENT REF:**	12276.1		



clay	silt			sand			gravel			cobbles
	fine	medium	coarse	fine	medium	coarse	fine	medium	coarse	
44				14	18	20	4	0	0	0

Particle Size (mm)	Percent Passing (%)	Particle Size (mm)	Percent Passing (%)
150.0			
75.0			
37.5			
19.0			
9.5			
4.75	100		
2.36	96		
1.18	88		
0.600	76		
0.425	71		
0.300	65		
0.150	53		
0.075	44		

Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)	Soil Particle Density (g/cm^3)
-	-	-	-	-

Classification: **Clayey Sand;** grey, fine to coarse grained.

(SC)

Emerson Class No.: 4

Preparation History of Atterberg Limits

Sample : ~~Natural~~/Air Dried~~/Oven~~

Sieved: ~~Wet~~/dry

Linear Shrinkage Data

Length of Mould (mm) :

Sample: -

NATA

Accredited No. 910

Certificate No. 06-1468A

Date of Issue 19.4.06

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