

REPORT on GEOTECHNICAL INVESTIGATION

PROPOSED SYDNEY SUPER YACHT MARINA REDEVELOPMENT JAMES CRAIG ROAD, ROZELLE BAY

Prepared for SYDNEY SUPER YACHT MARINA PTY LTD AND NSW MARITIME

Project 71816.01 September 2010

# **Douglas Partners** Geotechnics · Environment · Groundwater

REPORT on GEOTECHNICAL INVESTIGATION

PROPOSED SYDNEY SUPER YACHT MARINA REDEVELOPMENT JAMES CRAIG ROAD, ROZELLE BAY

Prepared for SYDNEY SUPER YACHT MARINA PTY LTD AND NSW MARITIME

Project 71816.01 September 2010

Douglas Partners Pty Ltd ABN 75 053 980 117

96 Hermitage Road West Ryde NSW 2114 Australia PO Box 472 West Ryde NSW 1685

 Phone
 (02) 9809 0666

 Fax
 (02) 9809 4095

 sydney@douglaspartners.com.au





### TABLE OF CONTENTS

#### Page

1.	INTRO	DUCTION1	
2.	BACK	GROUND	2
3.	SITE D	ESCRIPTION AND GEOLOGY	3
4.	FIELD	WORK	3
	4.1	Methods	3
	4.2	Results	5
5.	LABOF	RATORY TESTING	7
6.	PROP	OSED DEVELOPMENT	3
7.	COMM	ENTS	3
	7.1	Geotechnical Model	3
	7.2	Geotechnical Issues	)
	7.3	Site Preparation Measures	)
	7.4	Excavation Conditions	I
	7.5	Foundations12	2
	7.6	Seismic Design14	1
	7.7	Pavement Design Parameters14	ł
	7.8	Drainage	5
8.	LIMITA	TIONS	5

DRAFT

APPENDIX A - Drawing 1

- APPENDIX B Notes Relating to this Report Results of DP Field Work
- APPENDIX C Results of relevant CPI, PB and SKM Field Work
- APPENDIX D Pavement Photographs
- APPENDIX E Results of Laboratory Tests





Page 1 of 16

GRB:III Project 71816.01 3 September 2010

### REPORT ON GEOTECHNICAL INVESTIGATION PROPOSED SYDNEY SUPER YACHT MARINA REDEVELOPMENT JAMES CRAIG ROAD, ROZELLE BAY

#### 1. INTRODUCTION

This report details the results of a geotechnical investigation carried out by Douglas Partners Pty Ltd (DP) for the proposed Sydney Super Yacht Marina Redevelopment at James Criag Road, Rozelle Bay. The work was requested by Mr Tony Ellis of the Sydney Super Yacht Marina Pty Ltd.

The proposed development involves the construction of two new double storey mixed-use buildings together with the upgrading of the existing pavements. Site investigation was carried out to provide information on subsurface conditions for the design of earthworks, foundations and pavements.

The investigation included the drilling of twenty bores, the installation of five groundwater wells followed by laboratory testing of soil samples recovered from the bores. Details of the field and laboratory work are given in this report together with comments relating to design and construction practice.

The field work was carried out concurrently with a baseline contamination investigation by DP. The results of DP's baseline contamination investigation have been reported separately in a report dated 12 August 2010.



#### 2. BACKGROUND

It is understood that the site was originally reclaimed in 1891 but remained unused until the early twentieth century. After further reclamations were carried out, the site was used as timber yards and became one of the largest timber handling wharves in the Sydney region. The area was also used for ship building and maintenance in the past. The timber handling operation was gradually phased out and container storage and transportation activities were introduced in the 1960s. The site has been owned by the Maritime Services Board since the site was first used and has been leased to various operators.

It s understood that the site has been investigated for geotechnical and environmental purposes in the past. These previous investigations carried out on the site include:

- Sinclair Knight Merz (SKM), May 1998. Rozelle Bay Maritime Precincts Inspection Report No 4, James Craig Road, Rozelle Bay, Stage 2 Environmental Assessment, Final; and
- Parsons Brinckerhoff (PB), February 2009. Assessment of soil and Groundwater Conditions adjacent to Maritime Underground Storage, Rozelle Bay, NSW, Letter Report prepared for NSW Maritime.
- Coffey Partners International (CPI), January 1991. *Mareng Workshops, Rozelle Bay,* Geotechnical Investigation prepared for Maritime Services Board of NSW
- CPI, March 1991, *Mareng Workshops, Rozelle Bay,* Additional Geotechnical Investigation prepared for Maritime Services Board of NSW

Relevant geotechnical findings of these investigations include:

- The general geological profile comprises filling overlying residual sands and clays overlying sandstone bedrock. The sandstone bedrock was encountered from near surface levels to RL -20 m AHD.
- An underground storage tank farm on the eastern side of the site that is understood to still be present on-site.

Test bore locations from these previous investigations within the subject site are indicated on Drawing 1, Appendix A. Test Bore Logs have been referenced in Section 4.2.



#### 3. SITE DESCRIPTION AND GEOLOGY

The site is an irregular shaped area with maximum dimensions in both a north–south and east– west direction of 100 m. The ground surface is a relatively level area (RL 1.8 to 3.0 m AHD).

The site is currently utilised as a marina, parking lot, offices and café (Liquidity Café). The surface of the site is covered by a building (Liquidity Café), demountables, an asphalt and concrete covered carpark and driveways, shipping containers, refuelling area, sewerage holding tank, some garden areas and numerous medium sized trees. It is understood that a few USTs are also present on site. On the northern boundary there is evidence of a disused railway line. The strip of land along the southern shoreline is a suspended concrete deck directly over the waters of Rozelle Bay, supported by a number of piers that are understood to include tie-back anchors.

The site is bounded by an access road to the north with vacant land and James Craig Road further to the north, NSW Maritime offices to the east, Rozelle Bay to the south and an asphalt covered area occupied as a carpark and container storage to the west.

Reference to the Sydney 1:100 000 Geological Series Sheet shows that the site is located in an area underlain by man-made fill overlying alluvial/estuarine sediments. The site is located near an area mapped as Hawkesbury Sandstone to the north-east. Field investigation confirmed the presence of man-made fill overlying alluvial/estuarine sediments overlying Hawkesbury Sandstone on site.

#### 4. FIELD WORK

#### 4.1 Methods

The field work involved the following:



- Twenty bores (Bores 1, 2, 2A, 3 to 15 and 101 to 104) drilled with either a truck or bobcat mounted auger/rotary drilling and sampling rig. The boreholes were typically drilled to depths of 0.5 4.5 m with 110 mm spiral flight augers, being either practical refusal depth or the limit of investigation. Diacoring of concrete of slabs encountered in Bores 11 and 13 was required. Disturbed soil samples retrieved from the cuttings returned by the auger blade were used for identification and classification purposes.
- Three bores (Bores 2, 11 and 13) were extended to final depths of 4.8 31.0 m. All bores were advanced for a depth of 2.9 3.4 m into the underlying rock using NMLC (52 mm diameter) sized diamond drilling equipment to obtain core samples for classification and laboratory testing purposes. Bore 2 was drilled to a depth of 27.9 m by rotary drilling techniques. Standard Penetration Tests (SPTs) were carried out at 1.5 m depth intervals within the soils to obtain samples for identification and classification purposes and for estimation of the consistency/density of the soils. An undisturbed sample was collected in a U50 tube in the natural clays in Bore 2 for subsequent laboratory testing.
- Piezometers were installed in Bores 2A, 6, 9, 14 and 103 to depths of 2.0 4.5 m for subsequent monitoring of the ground water level and sampling of the ground water for contamination testing. These piezometers were purged of water and allowed to recharge over a period of 7 days and groundwater levels re-measured by means of an electronic interface probe.
- Inspection of the condition of existing pavements was carried out by a senior geotechnical engineer.

All field work was carried out under the direction of an experienced geo-environmental engineer.

The locations of the current and previous bores are given in Drawing 1, Appendix A. The collar levels relative to Australian Height Datum (AHD), shown on the borehole logs, were estimated from the survey plan dated 12 February 2010 by StrataSurv Surveyors (Drawing No. 2398DA Rev C).





#### 4.2 Results

Details of the conditions encountered in the test bores are presented in Appendix B. Notes defining classification methods and descriptive terms used in logging the bores are also given in the appendix.

The material strata encountered are described below:

- **PAVEMENT**Asphaltic Concrete (AC) to 0.1 m depth generally overlying roadbase(Unit 1)materials to depths of 0.1 0.4 m in all bores except Bore 9. The AC was<br/>placed directly over timber planks in Bore 7 and sand in Bores 8, 14, 15 and<br/>103; overlying,
- FILLING Poorly and moderately compacted, brown and grey, sand, crushed (Unit 2) sandstone, sandstone cobbles and boulders, gravel, timber and concrete filling with some charcoal, clayey sand, sandy clay, building rubble to depths of 0.6 3.1 m in Bores 4 to 7, 9, 11 and 14 and 9.7 m in Bore 2. Concrete was encountered at depths of 0.2 0.5 m in Bores 8, 10 to 15, 102 and 104. Practical refusal on sandstone boulders or concrete was encountered at depths of 0.4 2.2 m in Bores 1, 10, 15, 101 and 102,
- **RESIDUAL SOILS** Interbedded silty clay and clay, organic and sandy clay and clayey sand (Unit 3) layers to 26.8 m in Bore 2. Silty clays and clays were typically firm to very stiff, orange, brown and black clays with some ironstone gravel. Organic and sandy clays were typically very soft to firm and grey and black. The clayey sand was medium dense and fine to medium grained; overlying,
- WEATHEREDextremely low to very low strength, brown, red brown and light greySANDSTONEsandstone at depths of 0.6 3.1 m in Bores 4 to 7, 9 and 11 to 13. The(Unit 4)sandstone encountered in Bores 4 and 5 was possibly a boulder. Practical<br/>refusal on sandstone of at least low strength was encountered at depths of<br/>1.3 4.5 m in Bores 6, 7, 9, 14, 103 and 104; overlying,



**SANDSTONE** medium strength and high strength layers, moderately weathered to fresh, (Unit 5) fractured to slightly fractured, brown, grey brown and red brown, medium and coarse grained sandstone with some very high strength ironstone bands at depths of 1.9 - 3.3 m In Bores 11 and 13 and 27.9 m in Bore 2.

The results of the CPI and SKM investigations generally correspond to DP's investigation. However, some of the results from the PB investigation are slightly different to the results of DP, CPI and SKM investigations in terms of the presence of natural materials on site and the depth of bedrock. DP, CPI and SKM do not record any natural materials on the eastern side of the site. DP's cored bores are considered the most reliable method of confirming the bedrock levels. The CPI, SKM and PB results are included in Appendix C.

Groundwater was observed at depths of 1.5 - 2.8 m (RL -0.8 to +0.9 m) during auger drilling in Bores 2, 2A, 3 to 6, 9, 13, 14 and 103. No free groundwater was observed in other test bores during auger drilling. The use of water as a drilling fluid during diamond coring, and the immediate backfilling of the test bore, precluded measurement of the groundwater level in Bore 11.

The water levels measured in the piezometers are shown in Table 1

Bore No.	Ground measured dr	water level during auger illing	Pre-deve standing w	elopment vater levels	Standii levels a devel	ng water after well opment
	Depth (m bgl)	RL (m AHD)	Depth (m bgl)	RL (m AHD)	Depth (m bgl)	RL (m AHD)
Bore 2A	2.3	-0.4	1.7	0.5	1.7	0.5
Bore 6	2.2	0.7	Dry	<0.2	Dry	<0.2
Bore 9	1.6	0.9	1.9	0.6	1.9	0.6
Bore 14	2.5	0.1	2.1	0.1	2.1	0.1
Bore 103	2.1	0.3	2.1	0.3	2.4	0.0

Table 1 – Well Development Details

Photographs of the pavements are included in Appendix D. Inspection of the pavements indicated the following:

• Pavements are generally in a fair condition (Photos 1 and 2).



- Some minor cracking is present (Photo 3).
- They appear to have been constructed in sections (Photo 4).
- There is a mixture of concrete and asphaltic concrete pavements (Photos 1, 6 and 8).

- Patching has been carried out at a few locations (Photo 5) and where service trenches have been installed (Photo 6).
- Differential settlement has occurred across the site (Photos 9 and 10).
- Some areas of pavement to do not grade to a drainage point (Photos 7 and 8).
- Ponding of water is occurring where poorly graded pavements and differential settlement is occurring (Photos 7 to 10).
- Drainage of surface water is poor to fair.

#### 5. LABORATORY TESTING

Samples recovered from the field investigation were tested in the laboratory to determine compaction properties, California bearing ratio (CBR) values, moisture contents, and aggressivity values (pH, resistivity, chloride and sulphate content). The detailed results are given in Appendix E and are summarised in Table 2.

Test Bore	Depth (m)	Material Description	W (%)	OMC (%)	MDD (t/m3)	CBR (%)	рН	CI (ppm)	SO₄ (ppm)	Resistivity (ohm.m)
2	2.0 – 2.5	Filling	-	-	-	-	8.1	4100	740	3.3
6	0.4 – 1.5	Filling	9.2	11.0	1.99	30	-	-	-	-
7	0.2-0.5	Filling	9.4	11.5	1.93	20	-	-	-	-
7	0.7-1.2	Sandstone	8.3	11.5	1.94	30	-	-	-	-
9	0.5-1.5	Filling	12.2	12.5	1.94	45	-	-	-	-
13	3.0 – 3.5	Sandstone	-	-	-	_	7.5	4100	1100	3.2

Table 2 – Summary of CBR and Aggressivity Test Results

w = Moisture Content MDD = Maximum Dry Density  $W_L - Liquid Limit$ PI = Plasticity Index OMC = Optimum Moisture Content CBR = California Bearing Ratio $W_P = Plastic Limit$ 

Where:



The results of aggressivity testing, and comparison with Table 6.4.2(C) and Table 6.5.2 (C) in AS2159-2009 "Piling: Design and Installation" indicate that an exposure classification of 'Mildly Aggressive' is appropriate for subsurface concrete elements and "Moderately Aggressive" for subsurface steel elements.

Point Load Strength Index ( $Is_{50}$ ) testing was carried out on selected rock core specimens. The results of the tests are given on the test borehole logs at the appropriate depth, indicating values mainly in the range of 0.4 MPa and 1.0 MPa within medium strength sandstone, 1.1 MPa and 1.9 MPa in the high strength sandstone and 5 MPa for the very high strength ironstone band.

#### 6. PROPOSED DEVELOPMENT

The proposed development is to include two double storey buildings with associated driveways and car parks. The eastern building is to be semi - circular in shape with maximum north – south and east – west dimensions of about 100 m by 60m, respectively. The western building is to be a near rectangular shape with maximum north-south and east-west dimensions of about 50 m by 75 m, respectively. It is understood that up to 0.5 m of excavation is proposed for the buildings to create the building platforms.

Existing pavements are understood to be retained, where possible.

#### 7. COMMENTS

#### 7.1 Geotechnical Model

The site can be split up into two separate areas. The eastern side, which covers the footprint on the eastern building, and the western side, which covers the footprint of the western building. The geology of these two areas varies significantly and is described separately below.





#### Eastern Side

The eastern side of the site is underlain by the following subsurface conditions:

- Unit 1 Pavement Materials to depths of 0.1 0.4 m at most locations.
- Unit 2 Filling to depths of 0.6 3.1 m. A layer of concrete was encountered at depths of 0.2 0.5 m across the footprint of the proposed eastern building.
- Unit 4 Weathered Sandstone beneath the filling. The depth of sandstone appears to increase with proximity to Rozelle Bay. Natural soils (Unit 3) were not encountered above the sandstone on this side of the site.
- Unit 5 Sandstone of medium to high strength at depths of 1.9 3.3 m.

#### Western Side

The western side of the site is underlain by the following subsurface conditions:

- Unit 1 Pavement Materials to 0.2 m depth.
- Unit 2 Filling to depths of 2.5 2.6 m on the eastern side and 9.7 m depth on the western side. The filling includes sandstone cobbles and boulders.
- Unit 3 interbedded sands and clays of variable strength to 26.8 m on the western side of the site.
- Unit 4 Weathered Sandstone beneath the filling. The sandstone encountered in Bores 4 and 5 was possibly sandstone boulder filling.
- Unit 5 Sandstone of medium to high strength at 27.9 m in Bore 2.

Bedrock levels appear to fall at least 24 m across the western side of the site. It is recommended that once the Liquidity Café building is demolished, that further core drilling be carried out across the building footprint to accurately determine the bedrock level on the western and central sections of the site so as to be confident as to founding depths for piling purposes.



#### Groundwater Levels

Groundwater levels were recorded between RL -0.4 m AHD and RL 0.9 m AHD. Variations in water levels are expected with tidal fluctuations.

#### 7.2 Geotechnical Issues

The presence of deep, uncontrolled filling with an associated high groundwater level presents some geotechnical issues that will need to be carefully considered when designing the building.

The filling is unsuitable to support any foundation or floor slab loads. Therefore, all foundation loads will need to be supported on footings founded on bedrock. A combination of shallow and deep foundations will be required to support the eastern building. Deep foundations, capable of penetrating sandstone boulders, will be required to support the western building.

Floor slabs will need to be fully suspended on footings founded on bedrock.

Existing pavements have shown some signs of differential settlement. Regardless of the treatment, pavements are anticipated to continue to settle with time and require ongoing repair and maintenance. Therefore, where possible it is recommended to retain the existing pavements and place asphaltic concrete overlays over the top of the existing pavements to attain design levels. Overlays should be designed to allow all surface water to efficiently flow to drainage points.

Underground services may also be subjected to large differential settlements. Design should allow for potential differential settlements across short distances.

#### 7.3 Site Preparation Measures

At the locations where a new pavement is to be constructed or UST excavations are to be backfilled, the following site preparation measures for a subgrade platform are recommended:



- Excavate to the design level.
- Proof roll the exposed surface using a minimum 10 tonne smooth drum roller in nonvibration mode. The subgrade should be rolled a minimum of six times with the last two passes observed by an experienced geotechnical engineer to detect any 'soft spots'.

- Any heaving materials identified during proof rolling should be removed as directed by the geotechnical engineer. Heaving materials may be to a depth and extent that excavation is not feasible. In such a scenario, the geotechnical engineer may recommend the placement of a geogrid, or similar, to reduce the amount of deflection occurring across "soft spots".
- Replacement filling, which is expected to be required only within 0.5 m of the subgrade level, should then be placed in layers of 250 mm maximum loose thickness and compacted to a minimum dry density ratio (DDR) of 100% (Standard) with moisture contents maintained within 2% of Standard optimum moisture content (SOMC). The select fill should be free of oversize particles (>100 mm) and deleterious material and should have a CBR of at least 20%.
- The existing fill material on site is considered suitable for re-use provided all vegetation, oversize pieces (>100 mm) and other deleterious materials are removed.
- Density testing of the filling should be carried out at Level 1 or Level 2 responsibility, as defined in AS3798 "Guidelines for earthworks for commercial and residential developments."

For the proposed piling platforms, it is recommended that the existing pavements be retained as a piling platform subject to testing immediately prior to trafficking.

#### 7.4 Excavation Conditions

Bulk excavation will probably encounter Units 1, 2 and 4 (Pavement materials, filling, and weathered rock) when excavating to 0.5 m depth with the possibility of minor amounts of Unit 5 (medium and high strength sandstone) within some footing excavations for the eastern building.



Page 12 of 16

Excavation within Units 1, 2 and 4 should be readily achievable by bulldozer blade or hydraulic excavator. Some light to medium ripping assistance or the use of rock hammers may be required for layers of any stronger rock that are interbedded within Unit 4.

Any excavation within medium and high strength sandstone (Unit 5) will require medium to heavy rock breaking equipment. Some bands of the high strength sandstone is expected to have an unconfined compressive strength (UCS) of 30 – 40 MPa. Rock breaking equipment will generally cause noise and vibrations that could be disturbing to surrounding personnel. Vibration levels should therefore be kept below a peak particle velocity of 5 mm/s. Monitoring of vibration levels may be required to manage vibration levels when excavating Unit 5 sandstone.

All excavated materials will need to be disposed in accordance with current Department of Environment Climate Change and Water policies namely the *Waste Classification Guidelines* (2008) revised July 2009. Further, under the Waste Avoidance and Resource Recovery Act (NSW EPA, 2001) a waste/fill receiving site must be satisfied that materials received meet the environmental criteria for proposed land use. This includes filling and virgin excavated natural materials (VENM), such as the material which may be removed from site. In this regard it is noted that a preliminary waste classification assessment was undertaken as part of the DP baseline contamination assessment (dated 12 August, 2010). Therefore, for waste disposal purposes, the results of the preliminary waste classification assessment should be referred to. Further, for materials not classified in the DP preliminary waste classification assessment, testing will need to be carried out to classify spoil prior to disposal. The type and extent of the treceiving site.

#### 7.5 Foundations

It is anticipated that differing foundations column loads for the proposed structures will be up to 1000 kN.

Due to the variable rock levels across the two building footprints, the foundation options for the two areas are different and have been addressed in separate sections below.





Prior to any footing construction, the location of any anchors supporting the adjacent wharf piers should be determined so that piling/footings do not intersect these tensioned anchors.

#### Eastern Building

Foundations for the eastern building are generally anticipated to be piles bearing on medium or high strength sandstone. However, shallow footings on the northern side of the building (e.g. near Bore 12) may be appropriate.

Due to the presence of filling and a high groundwater table either continuous flight auger (CFA) or driven piles (e.g. concrete, steel or timber piles) would be appropriate. Driven piles have the advantage of not producing spoil, however, more noise and vibration occurs than with the CFA piling method. Both methods would require any concrete slabs to be broken, cored or penetrated prior to commencing piling.

A maximum allowable bearing pressure of 3.5 MPa is suggested for design of shallow footings and CFA piles founded on medium strength (or stronger) sandstone. An allowable shaft adhesion of 350 kPa is recommended for piles socketed into medium strength sandstone. Reference to the comments below for driven piles for the western building should be made for the foundation design of driven piles. Settlements are not expected to exceed 1% of the footing width for footings loaded to the above recommended maximum values.

The foundation design parameters assume that the foundation excavations (e.g. pads or piles) are clean and free of loose debris, with pile sockets free of smear and adequately roughened immediately prior to the placement of concrete.

#### Western Building

Due to the depth and type of filling together with the depth of bedrock, driven steel displacement piles are considered the only effective method of penetrating the filling and founding on sandstone bedrock to support all loads. Driven piles do create some noise and vibrations which will need to be considered during construction.



The ultimate compression capacity of driven piles is normally determined from the pile driving records using the Hiley or Janbu formulae. However, it is common practice for driven piles to be driven to virtual refusal and then to adopt the structural capacity of the pile shaft as the ultimate geotechnical strength. For preliminary design purposes, it is recommended that the structural capacity of the piles with a 50 mm load eccentricity be adopted for H piles driven to rock. For example, 2500C 89 piles with adequate corrosion protection are estimated to have an allowable load capacity of 1100 kN.

The level and strength of bedrock across the site would need to be confirmed prior to pile construction so that the overall length of pile driving can be estimated. The investigation indicates the possibility of sandstone boulders above bedrock level at some of the bore locations. If steel piles refuse above the bedrock, it will be necessary to drive replacement 'H' piles or to chop through the boulders with a drop hammer so that there is a low risk of unacceptable foundation movement.

While the results of laboratory testing indicate "mildly" and "moderately" aggressive conditions, it is considered prudent to allow for "severe" aggressive conditions due to the close proximity to seawater. Reference should be made to Tables 6.4.2 and 6.5.2 of AS2159-2009 for the aggresivity design.

#### 7.6 Seismic Design

In accordance with the Earthquake Loading Standard, AS1170.4 - 2007 the site is assessed to have a Site Sub-Soil Class of "Ce". This assumes that all loads are transferred to at least medium strength sandstone.

#### 7.7 Pavement Design Parameters

Based on the results of the field assessment and experience within the local area, a soaked CBR value of 5 % is considered appropriate for the design of pavements constructed on the filling. While laboratory test results were significantly higher, this value was predominately for crushed sandstone filling. The lower design value is considered more appropriate to include the



presence of sand and clay filling also at the subgrade level. Subgrade preparation should be undertaken in accordance with the recommendations outlined in Section 7.3.

DRAFT

#### 7.8 Drainage

Surface and subsurface drainage for the buildings and pavement structures should be incorporated into the design.

#### 8. LIMITATIONS

Douglas Partners (DP) has prepared this report for the proposed Sydney Super Yacht Marina redevelopment (the site), located at James Craig Road, Rozelle. The work was performed in accordance with DP's proposal dated 17 June 2010 and acceptance received from the Sydney Super Yacht Marina (SSYM), under DP's Conditions of Engagement. This report is provided for the exclusive use of the SSYM (Client) and NSW Maritime for the specific project and purpose as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other sites or by a third party.

The results provided in the report are considered to be indicative of the sub-surface conditions on the site only to the depths investigated at the specific sampling and/or testing locations, and only at the time the work was carried out. DP's advice is based on observations, measurements, tests or derived interpretations. The accuracy of the advice provided by DP in this report may be limited by unobserved features and variations in ground conditions across the site in areas between test locations and beyond the site boundaries or by variations with time. The advice may also be limited by restrictions in the sampling and testing which was able to be carried out, as well as by the amount of data that could be collected given the project and site constraints. Actual ground conditions and materials behaviour observed or inferred at the test locations may differ from those which may be encountered elsewhere on the site. Should variations in subsurface conditions be encountered, then additional advice should be sought from DP and, if required, amendments made.





Page 16 of 16

This report must be read in conjunction with the attached "Notes Relating to This Report" and any other attached explanatory notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion in this report. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

#### DOUGLAS PARTNERS PTY LTD

Reviewed by

**Gavin Boyd** Geotechnical Engineer Michael J Thom Principal

## APPENDIX A Drawing 1



RASFI INF

BAY ROZELLE



LOCALITY PLAN

### LEGEND

- **\*** TEST BORE LOCATION
- COFFEY TEST BORE LOCATION (1991)
- \* SKM 1998 SAMPLING LOCATION
- △ PB 2009 SAMPLING LOCATION

	PROJECT No:	71816
oment	DRAWING No:	1
	REVISION:	А

APPENDIX B Notes Relating to this Report Results of Field Work

Sydney Super Yacht Marina Pty Ltd

LOCATION: James Craig Road, Rozelle Bay

Sydney Super Yacht Marina Redevelopment

CLIENT:

PROJECT:

SURFACE LEVEL: 2.0 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

BORE No: 1 PROJECT No: 71816 DATE: 22/6/2010 SHEET 1 OF 1

Γ			Description	jc.		Sam	ipling 8	k In Situ Testing	بر	Well
씸	De   (n	pth 1)	of	Log	be.	pt	nple	Results &	Wate	Construction
		_	Strata	U	Ty	å	San	Comments	-	Details
-		0.1	ASPHALTIC CONCRETE							
ŀ	ŀ	0.2	ROADBASE			0.2				-
-	•		FILLING - brown, coarse grained sand filling with some gravel and trace amounts of charcoal, damp	$\otimes$	A/F=*			PID<1nnm		
ŀ	ŀ		3	$\bigotimes$	/ ***			t in a them		-
	İ			$\otimes$		0.5				
	ļ			$\bigotimes$						-
ŀ	ŀ			$\otimes$						-
ŀ	ŀ	0.9	- sandstone cobbles and boulders from U.8m	$\bigotimes$						
	-1		sandstone fragments, damp	$\otimes$		1.0				-1
ŀ	ŀ			$\otimes$						
[	[			$\otimes$	A/E			PID<1ppm		
ŀ	ŀ			$\mathbb{X}$						-
ŀ	ŀ			$\otimes$		1.5				
ŀ	ŀ			$\mathbb{X}$						
ţ	t			$\mathbb{X}$						•
	[			$\mathbb{X}$						
-	-2			$\bigotimes$		2.0				-2
	ŀ			Ŵ	AVE			PID<1ppm		
ŀ	ŀ	2.2	Bore discontinued at 2.2m			-2.2-				
ĺ	[		<ul> <li>practical refusal on sandstone boulder</li> </ul>							
	ŀ						1			
ŀ	ŀ									~
ŀ	ŀ									-
ĺ	[									
	-3									-3
ŀ	ŀ									-
ł	ł									-
ĺ	ľ									
	ļ									
ŀ	ŀ									
ŀ										
ŀ	-									
	-4									
ŀ	ŀ									
ŀ	ŀ									-
ŀ	-									-
ľ	Ĩ									
ŀ	ŀ									
ŀ	ŀ									
ł	ŀ									
Ĺ	<u> </u>									
RI	IG: I	Roh	nat DRILLER:Salib					24	CAS	SING: Uncased

TYPE OF BORING: 110mm diameter spiral flight auger to 2.2m

WATER OBSERVATIONS: No free groundwater observed

**REMARKS:** \*Denotes field replicate samples BD2/220610 and BD2A/220610 collected

E = Environmental sample SAMPLING & IN SITU TESTING LEGEND

Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

ADBU,¥C

 PD
 Pocket penetrometer (kPa)

 PiD
 Photo ionisation detector

 S
 Standard penetration test

 PL
 Point load strength Is(50) MPa

 V
 Shear Vane (kPa)

 D
 Water seep

 ¥
 Water seep







Sydney Super Yacht Marina Pty Ltd CLIENT: PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 1.9 AHD EASTING: NORTHING:

DIP/AZIMUTH: 90°/--

BORE No: 2 PROJECT No: 71816.01 DATE: 24 - 26/6/2010 SHEET 1 OF 4

Γ		Description	Degree of Weathering	Rock Strength	Fracture	Discontinuities	Samplii	ng &	n Situ Testing
	Depth (m)	of	raph		Spacing (m)	8 - Bedding J - Joint	ype ore c. %	00%	Test Results &
		Strata	₩¥₹%%£€		0.0	S - Shear D - Drill Break	F O B	R	Comments
****	0.1	ROADBASE					A		
	- - -	FILLING - poorly compacted, light grey brown clay and crushed							
ļ.	- - - 1	sanostone ning, damp		$\left\{ \begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $					Piokippiii
-	1.3	FILLING - poorly compacted,	-				s		4,6,2 N = 8
È		brown, crushed sandstone cobbles and boulders (medium to high							D1D -0
	-2	strength) filling with some clayey sand, damp							PID<2ppm
	2 	- saturated from 2.3m					A/E		PID<2ppm
	-						s		8,4,1 N = 5
	- 3						A		
							w		
	-4						s		2,3,1 N = 4
-									
	-5						w		
	5,5	FILLING - poorly to moderately							258
	-6	compacted, grey brown, crushed sandstone and sandstone cobbles and boulder filling with some sandy					S		2,5,6 N = 13
Junior Control		clay bands, saturated					w		
	-7 [						s		4,5,4 N = 9
F									
	-8						w		
5	-								
	5						s		8,5,1 N = 6
-	-9 -								
							A A A		
ŀ	⊧ 9.7 የ-	SILTY CLAY - firm, grey, silty clay, saturated					w		

#### RIG: Scout 4

#### DRILLER:KE

LOGGED: SI

CASING: HW to 8.5m; HQ to 28.0m

TYPE OF BORING: Solid flight auger to 3.5m; Rotary (mud) to 27.9m; NMLC-Coring to 31.0m WATER OBSERVATIONS: Free groundwater observed at 2.3m whilst augering E = Environmental sample \*Dentoes field replicate samples BD3/240610 and BD3A/240610 collected **REMARKS:** 



Sydney Super Yacht Marina Pty Ltd

LOCATION: James Craig Road, Rozelle Bay

Sydney Super Yacht Marina Redevelopment

CLIENT:

PROJECT:

SURFACE LEVEL: 1.9 AHD EASTING: NORTHING:

DIP/AZIMUTH: 90°/--

BORE No: 2 PROJECT No: 71816.01 DATE: 24 - 26/6/2010 SHEET 2 OF 4

Γ		Description	Degree of Weathering	د	Rock Strength	Fracture	Discontinuities	Sa	mplir	ıg &	n Situ Testing
æ	(m)	of Strata	EW MW SSW FFR Grant	u apro Log	Very Low Very Low Medium Very High Ex High	Spacing (m)	B - Bedding J - Joint S - Shear D - Drill Break	Type	Core Rec. %	RQD %	Test Results & Comments
-		SILTY CLAY - firm, grey, silty clay, saturated (continued)						U <sub>so</sub>			pp = 50kPa
· · · · · · · · · · · · · · · · · · ·	- - - - - - - - - - - - - - - - - - -							w			
								S			2,2,4 N = 6
	-12 12.0	CLAY - very stiff, mottled orange and light grey, clay with a trace of ironstone gravel, saturated						w			
	-13							s			5,12,17 N = 29
6. F	- 14							w			
	2							s			4,7,10 N = 17
	- 15							w			
	-16 16.0	CLAY - stiff, dark grey to black clay, saturated		//				s	-		3,4,6 N = 10
	-17 17.0	SANDY CLAY - very soft to soft, dark grey, fine to medium grained sandy clay, saturated		//////////////////////////////////////				w			
عدم من المحمد المحم المحمد المحمد	- 18			.   .   .				s	-		1/600mm refusal
······································				////				w			
	- 19 19.0	SANDY CLAY - stiff to very stiff, dark grey, fine to medium grained, sandy clay, saturated		<i>[</i> ].				s			5,3,13 N = 16
				/./.				w			

 RIG: Scout 4
 DRILLER:KE
 LOGGED: SI

 TYPE OF BORING: Solid flight auger to 3.5m;
 Rotary (mud) to 27.9m;
 NMLC-Coring to 31.0m

 WATER OBSERVATIONS: Free groundwater observed at 2.3m whilst augering
 REMARKS:
 E = Environmental sample

CASING: HW to 8.5m; HQ to 28.0m

\*Dentoes field replicate samples BD3/240610 and BD3A/240610 collected

 Deritoes inerd replicate samples BD3/240610 and BD3/240610 collected

 SAMPLING & IN SITU TESTING LEGEND

 A Auger sample
 pp
 Pock penetrometer (kPa)

 D bisturbed sample
 PID
 Photo ionisation detector

 B Bulk sample
 S
 Standard penetration test

 U, Tube sample (k mm dia.)
 PL
 Point load strength 1s(50) MPa

 W Water sample
 V
 Shear Vane (kPa)

 C Core drilling
 D
 Water seep 💿 Water seep
 Water seep



CLIENT:Sydney Super Yacht Marina Pty LtdPROJECT:Sydney Super Yacht Marina RedevelopmentLOCATION:James Craig Road, Rozelle Bay

SURFACE LEVEL: 1.9 AHD EASTING: NORTHING:

DIP/AZIMUTH: 90°/--

BORE No: 2 PROJECT No: 71816.01 DATE: 24 - 26/6/2010 SHEET 3 OF 4

		Description	Degree of	C	Rock Strength	Fracture	Discontinuities	Sar	nplin	g & I	n Situ Testing
R	Depth (m)	of	, reactioning ,	raph Log		(m)	B - Bedding J - Joint	be	see %	d S	Test Results
		Strata	N H M N N H M	9	Exto Very Extin	0.10	S - Shear D - Drill Break	Ŷ	ပိမ္ဆို	ж °`	Comments
		SANDY CLAY - stiff to very stiff, dark grey, fine to medium grained, sandy clay, saturated (continued)						w			
	20,6 	ORGANIC CLAY - soft to firm, dark grey to black, organic clay, saturated						s			5,1,2 N = 3
-20								w			
	- 22							s			2,2,2 N = 4
· · · · · · · · · · · · · · · · · · ·	-23							w			
								S			2,2,3 N = 5
-23	-24 24.0	CLAYEY SAND - medium dense, dark grey, fine to medium grained, clayey sand, saturated						w			
-								s			7,6,12 N = 18
	-26 26,0	SANDY CLAY - stiff to very stiff.						w			
		dark grey to black, organic rich, fine to medium grained sandy clay, saturated									18,25/150mm
	26.8	SANDSTONE - very low strength,					Note: Unless otherwise	3			refusal
		grained sandstone					stated, rock is fractured atong rough planar bedding dipping at 0°- 10° or joints	w			
90- } <u>1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1</u>	27.9 28	SANDSTONE - medium strength, fresh, fractured and slightly fractured, light grey, medium grained sandstone. Some extremely low strength bands					27.95m: B0°, clay band 28.1m: B5°, clay smear 28.18m: J45°, clay smear, rough 28.61m: B0°, 10mm clay				PL(A) = 0.4MPa
L L L L L L L L L L L L L L L L L L L	28.82 29 [	SANDSTONE - high strength, fresh, slightly fractured, light grey, medium to coarse grained sandstone 29.22 & 29.62m: 40mm to 70mm thick siltstone bands					28.75m: J70°, clay smear, rough 28.82 & 29.04m: (x2) B0°, clay veneer 29.15m: J90°, clay smear, rough 29.62m: J45°- 60°, concave, smooth	c	100	89	PL(A) = 1.9MPa

RIG: Scout 4

DRILLER:KE

LOGGED: SI

CASING: HW to 8.5m; HQ to 28.0m

 TYPE OF BORING: Solid flight auger to 3.5m; Rotary (mud) to 27.9m; NMLC-Coring to 31.0m

 WATER OBSERVATIONS: Free groundwater observed at 2.3m whilst augering

 REMARKS:
 E = Environmental sample

 \*Dentoes field replicate samples BD3/240610 and BD3A/240610 collected



Sydney Super Yacht Marina Pty Ltd

LOCATION: James Craig Road, Rozelle Bay

Sydney Super Yacht Marina Redevelopment

CLIENT:

PROJECT:

SURFACE LEVEL: 1.9 AHD EASTING: **NORTHING:** 

DIP/AZIMUTH: 90°/--

BORE No: 2 PROJECT No: 71816.01 DATE: 24 - 26/6/2010 SHEET 4 OF 4

		Description	Degree of	Rock	Fracture	Discontinuities	Sa	mplir	ng & I	In Situ Testing
R	Depth (m)	of	weamening E		Spacing (m)	B - Bedding J - Joint	,pe	ore c. %	g.*	Test Results
		Strata	₩¥¥%°°°°°, ₩¥¥%°°°°,		0.00	S - Shear D - Drill Break	÷	ပိမ္ဆိ	<u>ي</u> ي	Comments
-29		SANDSTONE - high strength, fresh, slightly fractured, light grey, medium to coarse grained sandstone 29.22 & 29.62m: 40mm to 70mm thick siltstone bands (continued)				29.7m: J40°, smooth 30.56-30.87m: (x3) B0°- 5°, clay smear	с	100	89	PL(A) = 1.1MPa
	-31 31.0	Bore discontinued at 31.0m								
	- 32									
	-34								and the second se	
	- 35								n mar an	
	- 36									
	37									
	- 38 									
	- 39 - - -									
₽ R					GED: SI	CAS		<u> </u>	to 8.	5m: HQ to 28.0

TYPE OF BORING: Solid flight auger to 3.5m; Rotary (mud) to 27.9m; NMLC-Coring to 31.0m WATER OBSERVATIONS: Free groundwater observed at 2.3m whilst augering **REMARKS:** 

E = Environmental sample \*Dentoes field replicate samples BD3/240610 and BD3A/240610 collected

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) e PID Phote ionisation detector S Standard penetration test mm dia.) PL Point load strength Is(50) MPa V Shear Vane (kPa) P Water seep ¥ Water level CHECKED SAMPI Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling ADBU,¥C Initials: 688 Date: 4/8/10

ASING: HW to 8.5m; HQ to 28.0m



CLIENT: Sydney Super Yacht Marina Pty Ltd Sydney Super Yacht Marina Redevelopment PROJECT: LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 1.9 AHD EASTING: NORTHING: DIP/AZIMUTH 90°/--

BORE No: 2A **PROJECT No: 71816** DATE: 26/6/2010 SHEET 1 OF 1

ſ				Description	. <u>0</u>		San	pling 8	& In Situ Testi⊓g		Well	
l	ᆋ	Dep (m	) )	of	Log	be	Lt	aple	Results &	Vate	Constructio	n
			,	Strata	Ō	ļ	Del	San	Comments		Details	
	-		0.1	ASPHALTIC CONCRETE							Gatic cover - Backfill -	
ł	ŀ		0.2	ROADBASE	0							
ŀ	ł			FILLING - light grey brown clay and crushed sandstone, damp	$\otimes$	1					Bentonite -	
ŀ	ł				$\bigotimes$	1						
Ì	ĺ				$\otimes$							
ŀ	-				$\otimes$						-	
ł	ł				$\otimes$						r	0,0
ł	-				$\mathbb{X}$						-	0000
t	-1				$\bigotimes$						-1	
ľ	[				$\mathbb{X}$	1						
ł	ł		1.3	FILLING - brown enveloed condutions calibles and	$\bigotimes$							0-0
ł	ŀ			boulder filling with some clayey sand, damp	$\otimes$							0-0
ŀ	ł				$\otimes$						Backfilled with -	
l	Ĩ				$\otimes$							
ŀ					$\mathbb{X}$						}	0
ŀ	╺┝				$\otimes$						-	
ł	-2	2			$\mathbb{X}$	*					-2	0000
Ì	ľ				$\otimes$	ļ						00110
ļ	ŀ				$\otimes$					Ţ		
ł	ł			- saturated from 2.3m	$\otimes$							
ł	ł				$\otimes$							
t	Į				$\otimes$						Machine slotted -	
ļ	ļ				$\otimes$							
$\left  \right $	<b>7</b>				$\otimes$						-	
ł	-3	}			$\otimes$						-3	
ŀ	ŀ				$\mathbb{X}$						-	
Į	[				$\otimes$							
ŀ	ł				$\otimes$						r	
ł	ł				$\otimes$	2						
ł	ł				$\otimes$						*****	ŎŢŎ
Ì	Į				$\otimes$							
ļ	Ņ-				$\otimes$	1						
ł	-4	ł			$\bigotimes$		1				-4	
ł	ł				$\otimes$	, X					-	
Į	ţ	4	1.25	Bore discontinued at 4.25m	$\times$	1			· · · · · · · · · · · · · · · · · · ·		End cap -	
	ŀ										-	
ł	ł					****					-	
	ł											
	ţ											
ļ	~[											
Т						1	1	1	1	1	1	1

**RIG:** Bobcat DRILLER: Salib TYPE OF BORING: 110mm diameter spiral flight auger to 4.25m WATER OBSERVATIONS: Free groundwater observed at 2.3m **REMARKS:** 

LOGGED: NSA

CASING: Uncased

SAMPLING & IN SITU TESTING LEGEND Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling ADœu∛c

 I LS I ING LEGEND

 pp
 Pocket penetrometer (kPa)

 PID Photo ionisation detector

 S
 Standard penetration test

 PL
 Point load strength Is(50) MPa

 V
 Shear Vane (kPa)

 D
 Water seep

 ¥
 Water level





CLIENT: Sydney Super Yacht Marina Pty Ltd PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.0 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

BORE No: 3 **PROJECT No: 71816** DATE: 22/6/2010 SHEET 1 OF 1

[			Description	<u>.</u>		Sam	pling 8	& In Situ Testing	<b>.</b>	Well
물	De	pth	of	aph-	a	Ę	ple	Decuite 2	Vater	Construction
	`"	,	Strata	5	Typ	Dep	Sam	Comments	5	Details
-	<b></b>		ASPHALTIC CONCRETE							
ſ	[	0.1	ROADBASE		]	0.2				
ļ		0.2	FILLING - black sand filling with some gravel, moist	$\otimes$		U.2				-
-	ŀ			$\otimes$	AVE			PID<1ppm		-
	ŀ			$\otimes$		0.5				-
ŀ	ŀ	0.6	FILLING - grey gravel filling, moist	ŔX						
l	t	• •		$\bigotimes$						
Ĺ	[	0.6	FILLING - brown, coarse grained sand filling with some	$\mathbb{X}$	<u> </u>	0.9				
	-1		fragments, moist	$\otimes$						-1
ŀ	ŀ			$\otimes$				BID classes		
ŀ	ŀ			$\otimes$	AVE			PiD<2ppm		
ŀ	ł			$\otimes$						-
Į	ĺ	1.5		$\mathbb{X}$	, ,	1.4				
	ļ	1.5	FILLING - black with a tinge of green discoloration,	$\otimes$		1,5				
ŀ	ŀ		medium to coarse grained sand ming and some graver, moist	$\otimes$	AVE			PID<1ppm		-
ŀ	ŀ	1.8	FILLING , brown sandstone cobble and boulder filling	$\bigotimes$		1.8				-
ŀ	ŀ		moist	$\otimes$	<b> </b>					-
۲°	-2			$\otimes$	<u>}</u>	2.0				-2
[	[			$\otimes$	X					
ŀ	ļ			$\otimes$	AVE			PID<1ppm		
ŀ	-			$\otimes$	X					
ŀ	ŀ			$\otimes$	]	2.5				
ŀ	ŀ			$\otimes$	}		1			
t	ĺ	70		$\otimes$					W	
		2.0	FILLING - grey, medium to coarse grained sand filling	$\boxtimes$	]					
<u> </u>	-3		with trace amounts of sandstone ragments, saturated	$\otimes$	1	3.0				-3
ł				$\bigotimes$						-
ł				$\otimes$	A/E			PID<1npm		
ŀ	2			$\otimes$						
[		35		$\mathbb{X}$		L3 5-				
ŀ			Bore discontinued at 3.5m							-
ŀ			- target depth achieved							-
ł										
ŀ.										•
Ľ	4									-4
	-									
ŀ	-									
ŀ	-									
ŀ	ŀ									
ŀ	ľ									
[	Ĺ									
ŀ	ŀ									
L									1	

**RIG:** Bobcat DRILLER: Salib TYPE OF BORING: 110mm diameter spiral flight auger to 3.5m WATER OBSERVATIONS: Free groundwater observed at 2.8m **REMARKS:** E = Environmental sample

ADBUWC

LOGGED: NSA

CASING: Uncased

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) PiD Photo ionisation detector S Standard penetration test mm dia.) PL Point load strength 1s(50) MPa V Shear Vane (kPa) P Water seep T Water level SAMPI Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling





SURFACE LEVEL: 2.2 AHD EASTING: NORTHING: DIP/AZIMUTH90°/---

BORE No: 4 PROJECT No: 71816 DATE: 23/6/2010 SHEET 1 OF 1

Best     Description     State     State     State     State     State       0.1     ASPHALTC CONCRETE     0.2     ASPHALTC CONCRETE     0.2     0.2     Construction       0.2     ASPHALTC CONCRETE     0.2     0.2     PID-3ppm     0.2     0.2       1.1     ASPHALTC CONCRETE     0.2     0.2     PID-3ppm     0.2       1.2     FILLING - brown to black, first to medium grained, sity and filling with some gravel and timber pieces, most     0.2     PID-3ppm     1       1.1     some gravel and timber pieces, most     0.3     PID-3ppm     1       1.1     some gravel and timber pieces, most     0.3     PID-3ppm     1       1.1     some gravel and timber pieces, most     0.4     PID-1ppm     1       1.1     some gravel and timber pieces, most     0.4     PID-1ppm     1       1.1     some gravel and timber pieces, most     0.4     PID-1ppm     1       1.3     saturated from 2.0m     Are     PID-1ppm     1       1.4     saturated from 2.0m     Are     3.0     PID-1ppm     2       2.5     SANDSTONE - extremely low to very low strength, grey and store boulder filing)	П				1	I	0		) I. Oliv. T			
arr     of Strata     is for Strata		De	pth	Description	ghic		San	npung ð	k in Situ Testing	ter	Well	
Strata     P     A     B     Commission     Details       ASPHALTIC CONCRETE     PADBASE     PID-3ppm     0.2     PID-3ppm     PID-3ppm       PID-1     PID-3ppm     PID-3ppm     PID-3ppm     PID-3ppm     PID-3ppm		(n	'n)	of	Log	ype	bt	mple	Results &	Wat	Construction	
ord     ASPHALTIC CONCRETE       PROADBASE       PILLING - brown to black, fine to medium grained, silly       sand filling with some gravel and timber pieces, moist       0.6       FILLING - dark grey, coarse grained sand filling with some gravel and timber pieces, moist       0.6       FILLING - dark grey, coarse grained sand filling with some gravel and timber pieces, moist       0.6       FILLING - grey, coarse grained sand filling with some gravel, moist       1       1.8       910-tippm       1.8       1.8       910-tippm       2.8       SANDSTONE - extremely low to very low strength, grey       3.0       2.8       SANDSTONE - extremely low to very low strength, grey       3.0       3.1       3.2       3.3       3.4       910-tippn       3.5				Strata	0	É.	ď	Sai	Comments		Details	
n1     0.2     FOLLING - travel and timber pieces, moist     0.2       0.4     FULLING - dark prev, coarse grained sand filling with some gravel and trace amounts of asphaltic concrete and stag, moist     0.9       -1     FULLING - dark prev, coarse grained sand filling with some gravel, moist     0.9       -1     FULLING - grey, medium grained sand filling with some gravel, moist     0.9       -1     FULLING - grey, medium grained sand filling with some gravel, moist     1.4       -2     - saturated from 2.0m     A/E       -2.6     SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling)     3.0       -3     Bore discontinued at 3.5m     - target depth achieved			0.1	ASPHALTIC CONCRETE								
Image: set of the set of th	-~		0.2	ROADBASE	p		0.2					
sand filling with some gravel and timber pieces, moist     A/E     PiD <sppm< td="">       0.8     FILLING - dark gray, coarse grained sand filling with some gravel and trace amounts of asphaltic concrete and slag, moist     0.9       -1     A/E     PiD<sppm< td="">       -1     FILLING - gray, medium grained sand filling with some gravel, moist     0.9       -1     A/E     PiD<sppm< td="">       -1     FILLING - gray, medium grained sand filling with some gravel, moist     1.4       -2     - saturated from 2.0m     A/E       -3     - saturated from 2.0m     A/E       -4     PiD<sppm< td=""></sppm<></sppm<></sppm<></sppm<>		-		FILLING - brown to black, fine to medium grained, silty	$\bigotimes$		0.1.					
0.8     FILLING - dark grey, coarse grained sand filling with some gravel and trace amounts of asphaltic concrete and slag, molet     0.5     0.8       1.0     FILLING - grey, medium grained sand filling with some gravel, molst     1.4     PID<1ppm				sand filling with some gravel and timber pieces, moist	$\bigotimes$	A/E			PID<3ppm			
0.8     FILLING - dark grey, coarse grained sand filling with some gravel and trace amounts of asphalic concrete and slag, molet     0.9     0.9       1     A/E     PID<1ppm					$\bigotimes$		0.5				-	
O.8     FILLING - dark grey, coarse grained sand filling with some gravel and blag, moist     and slag, moist     A/E     O.9					$\otimes$						-	
0.8     FILLING - dark grey, coarse gravined sand filling with some gravel and trace amounts of asphaltic concrete and slag, moist     0.9     0.9       1.6     FILLING - grey, medium grained sand filling with some gravel, moist     1.4     PID <tpm< td="">       -2     - saturated from 2.0m     A/E     2.3       -3     - saturated from 2.0m     A/E     PID<tppm< td="">       -3     - saturated from 2.0m     - a       -3     - saturated from 2.0m     - a       -4     - a     - a</tppm<></tpm<>	$\left  \cdot \right $	-			$\bigotimes$						-	
Pitches - cark gley, coalse grained and ming with and sleg, molst     0.9     0.9       1.0     Fitches - grey, medium grained sand filling with some gravel, molst     1.4       1.0     Fitches - grey, medium grained sand filling with some gravel, molst     1.4       2.1     - saturated from 2.0m     A/E       2.0     SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling)       3.0     A/E       3.0     -3       4     -4		_	0.8		<del>XX</del>						-	
A/E PID<1ppm -1 1.8 FILLING - grey, medium grained sand filling with some gravel, moist -2 - saturated from 2.0m -3 SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling) -3 SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling) -4 Solution - Sol				some gravel and trace amounts of asphaltic concrete	$\otimes$		0.9				-	
A/E PID<1ppm - 2 - saturated from 2.0m - sa	ŀ	-1		and stag, moist	$\otimes$	{					-1	
1.6     FILLING - grey, medium grained sand filling with some gravel, moist     1.4     1.4       -2     - saturated from 2.0m     1.8     PID<1ppm		-			$\mathbb{X}$	A/F			PID<1nom			
Image: Second secon		-			$\otimes$	1			1 10 - 1PM			
1.6 FilLLING - grey, medium grained sand filling with some gravel, moist   -2 - saturated from 2.0m   -2 - saturated from 2.0m   -2 - saturated from 2.0m   2.6 SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling)   -3 -3   -4 -4		•			$\boxtimes$						-	
1.6     FILLING - grey, medium grained sand filling with some gravel, moist     1.8     1.8       -2     - saturated from 2.0m     A/E     PID<1ppm	t I	-			$\mathbb{X}$		1.4				-	
Image: status     FILLING - grey, medium grained sand filling with some gravel, moist     1.8     1.8       -2     - saturated from 2.0m     VE     2.3       -3     - saturated from 2.0m     VE     2.3       2.6     SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling)     3.0       -3     -3       -4     -4	T I	•			$\otimes$						-	
gravel, moist     1.8     PID<1ppm			1.6	FILLING - grey, medium grained sand filling with some	$ \rangle$						-	
I - 2 - saturated from 2.0m A/E 2.3 PID<1ppm I - 2 3ANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling) - 3 - 4 - 4 - 4		[		gravel, moist	$\otimes$		10				-	
- 2 - saturated from 2.0m - saturated from 2.0m - 2.3 PID<1ppm - 2 - 2 - 2 - 3 - 3 - 3 - 4 - 4		_			$\otimes$		1.0					
- saturated from 2.0m - saturated from 2.0m - saturated from 2.0m - A/E 2.3 PID<1ppm - 2.6 SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling) - 3.0 - 3.0 - 3.0 - 3.0 - 3.0 - 3.0 3		-2			$\bigotimes$					V	-2	
2.6 SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling) 				- saturated from 2.0m	$\mathbb{X}$	A/E			PID<1ppm			
2.6 SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling) 3.0 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3	-0	-			$\otimes$							
2.6 SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling) 		-			$\bigotimes$		2.3					
2.6 SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling) -3 3.0 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3	$\left  \right $	-			$\mathbb{X}$	j						
2.8 SANDSTONE - extremely low to very low strength, grey sandstone (possible sandstone boulder filling) -3	$\left  \right $	-			$\otimes$	2					-	
-3 -3 -3 -3 -3 -3 -3 -3 -3 -3		ŀ	2.6	SANDSTONE - extremely low to very low strength grey	×						- I	
A/E 3.0 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3		-		sandstone (possible sandstone boulder filling)							·	
-3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -3 -		ſ										
A/E PID<1ppm -3 Bore discontinued at 3.5m - target depth achieved -4											-	
A/E PID<1ppm		-3					3.0				-3	
3.5     Bore discontinued at 3.5m       -4	-	1									ct <b>F</b>	
3.5     Bore discontinued at 3.5m       -4						AVE			PID<1ppm			
3.5 Bore discontinued at 3.5m - target depth achieved4444444	[ ]	[										
Bore discontinued at 3.5m - target depth achieved 4 4 4			3.5	· · · · · · · · · · · · · · · · · · ·								
- target depth achieved		-	0.0	Bore discontinued at 3.5m			0.0				-	
		-		- target depth achieved							-	
	-											
	$ \cdot $	$\mathbf{F}$									}	
-9-	$\left  \right $	-4									-4	
	$\mathbf{F}$	-										
	Ļ٩	ŀ										
		ŀ										
		ŀ										
		r										
		ſ										
	[										[	
										1	<u> </u>	

**RIG:** Bobcat DRILLER:Salib TYPE OF BORING: 110mm diameter spiral flight auger to 3.5m WATER OBSERVATIONS: Free groundwater observed at 2.0m **REMARKS:** E = Environmental sample

LOGGED: NSA

**CASING:** Uncased

Sydney Super Yacht Marina Pty Ltd

LOCATION: James Craig Road, Rozelle Bay

Sydney Super Yacht Marina Redevelopment

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) le PID Photo ionisation detector S Standard penetration test mm dia.) PL Point load strength Is(50) MPa V Shear Vane (kPa) D Water seep ¥ Water level SAMPI Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling ADBU. VVC

CLIENT:

PROJECT:

CHECKED Initials: CRB Date: 4/8/10





CLIENT: Sydney Super Yacht Marina Pty Ltd PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.2 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

BORE No: 5 PROJECT No: 71816 DATE: 22/6/2010 SHEET 1 OF 1

	Description				San	npling 8	k In Situ Testing		Well		
R	Depth (m)	of	aph og	e	Ê	ре В	Recuite 9	Vater	Construction		
	(0.07	Strata	õ	ŢŢ	De D	Sam	Comments	5	Details		
	1	ASPHALTIC CONCRETE									
-	0.1	ROADBASE						*******			
	- 0.3	FILLING - grey gravel filling, moist	$\bigotimes$						-		
	-	FILLING - brown timber plank filling	$\bigotimes$	<b> </b>	0,4				-		
-	• 0.5	FILLING - brown sandstone cobble and boulder filling	$\bigotimes$						-		
	-	with trace amount of sand, moist	$\bigotimes$	A/E			PID<1ppm				
			$\bigotimes$		0.0						
	-		$\bigotimes$		0.0						
	- 1		$\mathbb{X}$	1					-1		
	- 1.1	FILLING - brown, coarse grained sand filling with trace	$\bigotimes$		1,1						
-	-	amounts of sandstone fragments, moist	$\bigotimes$								
	-		$\otimes$	A/E			PID<1ppm				
	_		$\otimes$		1.5						
ļ	-		$\bigotimes$	1	1.5						
ŀ	-		$\otimes$								
	•	- saturated from 1.8m	$\bigotimes$					Ţ	-		
	-		$\otimes$	1					-		
ł	-2		$\bigotimes$						-2		
6	_		$\bigotimes$								
	•		$\bigotimes$								
$\left  \right $	-		$\bigotimes$								
ŀ	- 2.5	Bare discontinued at 2 5m	$\mathbb{K}$		<u> </u>			_			
ŀ	-	- refusal on sandstone (possible boulder)									
	-										
Ĺ											
-	-3								-3		
Ļ	•								-		
+-	-								-		
	•										
				]							
	-										
	-										
	•										
	-4								-4		
Ĺ.	-										
	-										
ŀ	-								-		
$\left  \right $	-										
ł	<u>_</u>										
ľ						ļ					
RI	G: Bob	cat DRILLER:Salib		LC	OGGE	D: NS	SA .	CA	SING: Uncased		
TΥ	PE OF	BORING: 110mm diameter spiral flight auger to 2.5m									
W	NATER OBSERVATIONS: Free groundwater observed at 1.8m										

CHECKED

Initials: GRB Date: 4/8/10 **Douglas Partners** Geotechnics • Environment • Groundwater

**REMARKS:** E = Environmental sample

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) PID Photo ionisation detector S Standard penetration test mm dia.) PL Point load strength Is(50) MPa V Shear Vane (kPa) b Water seep ¥ Water level Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling ADBU,₩C

CLIENT:Sydney Super Yacht Marina Pty LtdPROJECT:Sydney Super Yacht Marina RedevelopmentLOCATION:James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.2 AHD EASTING: NORTHING: DIP/AZIMUTH90°/-- BORE No: 6 PROJECT No: 71816 DATE: 23/6/2010 SHEET 1 OF 1

Γ		Description	. <u>e</u>		San	npling 8	& In Situ Testing		Well
	Depth (m)	of	Log	be		nple	Results &	Wate	Construction
		Strata	0	L L	ă	Sar	Comments		Details
ł	0.05		$\times$		0.1				Backfill
ſ	-	FILLING - black to brown, medium to coarse grained,	$\otimes$				PID<100m		Bentonite
ŀ		sand filling with some gravel, damp to moist	$\otimes$				r to < typin		
	*****		$\otimes$	}	0.5				
Ì			$\otimes$						
-	-		$\otimes$						Backfilled with
ŀ			$\otimes$						gravel price
ļ			$\mathbb{X}$		1.0				
+-	-		$\bigotimes$				BIDetanm		
·			$\otimes$				PIO~ (ppin		PVC screen
ļ			$\times$	<u>}</u>	1.5			<b>X</b>	
ŀ			$\bigotimes$						
t	1.7	SANDSTONE - extremely low to very low strength,	- <b>F X X</b>		*****				
-	*****	brown sandstone							
ł	-2 2.0	Bore discontinued at 2.0m	<u></u>						2 End cap
Ļ	×	- practical refusal on at least low strength sandstone							
ŀ									
ŀ									
ļ									
ŀ									-
ŀ	ĺ								
	-3								-3
ŀ	ŀ								-
ŀ									
ŀ	ŀ					:			
	-								
-									
ł									
ļ	4								
- -	4								-
ŀ	[								
ŀ	ŀ								
ŀ	ŀ								
ţ	[								
-	-								
-				ـــــــــــــــــــــــــــــــــــــ		) D			
T	YPE OF	BORING: 110mm diameter spiral flight auger to 2.0m		LÇ	JGGE	D: N	5A	CA	SING: Uncased
N	ATER C	DESERVATIONS: Free groundwater observed at 1.5m							
R	EMARK	S: E = Environmental sample							

 SAMPLING & IN SITU TESTING LEGEND

 A
 Auger sample
 pp
 Pocket penetrometer (kPa)

 D
 Disturbed sample
 PID
 Photo ionisation detector

 B
 Bulk sample
 S
 Standard penetration test

 U
 Tube sample (x mm dia.)
 PL
 Point load stempting hs(50) MPa

 W
 Water sample
 V
 Shear Vane (kPa)

 C
 Core drilling
 P
 Water seep

Sydney Super Yacht Marina Pty Ltd CLIENT: Sydney Super Yacht Marina Redevelopment PROJECT: LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.2 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

BORE No: 7 **PROJECT No: 71816** DATE: 24/6/2010 SHEET 1 OF 1

			Description	.0		Sam	ipling 8	k In Situ Testing		Well
RL	Dep (m	th )	of	raph Log	g	oth	ble	Results &	Vater	Construction
		'	Strata	õ	Ţ	Der	Sam	Comments	>	Details
	ļ	0.1	ASPHALTIC CONCRETE							
-~	-	0.2	FILLING - timber plank filling			0.2				
-			FILLING - brown, silty sand filling with some timber fragments, moist		A/E*	0.5		PID<1ppm		
	*****	0.6	SANDSTONE - extremely low to very low strength sandstone			0.7				-
-	1				AVE	1.2		PID<1ppm		-1
ł	-	1.3	Bore discontinued at 1 3m	<u> </u>					<u> </u>	
-			- practical refusal on at least low strength sandstone							
-	-2									-2
-0	anna a san anna anna anna									
-										-
	-3									-3
-										
ماسسینڈ ، ا	-4									-4
	-									
	-									
-										

RIG: Bobcat TYPE OF BORING: 110mm diameter spiral flight auger to 1.3m

Core drilling

DRILLER: Salib

LOGGED: NSA

CASING: Uncased

WATER OBSERVATIONS: No free groundwater observed

REMARKS: E = Environmental sample. \*Denotes field replicate samples BD2/240610 and BD2A/240610 collected

SAMPLING & IN SITU TESTING LEGEND Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Case déline ADBJ.VO

- pp
   Pocket penetrometer (kPa)

   pD
   Pocket penetrometer (kPa)

   PID
   Photo ionisation detector

   S
   Standard penetration test

   PL
   Point load strength (s(50) MPa

   V
   Shear Vane (kPa)

   D
   Water seep

   ¥
   Water level

CHECKED Initials: GRB Date: 4/8/10





CLIENT: Sydney Super Yacht Marina Pty Ltd PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.7 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

BORE No: 8 **PROJECT No: 71816** DATE: 24/6/2010 SHEET 1 OF 1

[		Description 9			San	pling &	& In Situ Testing	Well		
님	Depth (m)	of	l cog	,pe	pth	nple	Results &	Wate	Constructio	n
		Strata	U	1	Å	Sar	Comments	ļ	Details	
•	0.1	ASPHALTIC CONCRETE FILLING - brown, fine to medium grained, silty sand filling with some gravel, humid		A/E	0.1		PID<1ppm			
ŀ	0.5		$\times$		_0.5_			<u> </u>		
-~		Bore discontinued at 0.52m - practical refusal on concrete							-	
	-1 -								- 1 - 1	
-	• • •									
	-2								-2	
-										
-0									-	
	-3								-3	
	-									
	-4								4	
	-								- -	
-7	-									
ŀ	•									
RI T\ W	G: Bob PE OF	cat DRILLER: Salib BORING: 110mm diameter spiral flight auger to 0.52m BSERVATIONS: No free groundwater observed		LC	GGE	D: NS	SA	CA	SING: Uncased	

**REMARKS:** E = Environmental sample

SAMPI Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample ADBU,VC Core drilling

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) le PID Photo ionisation detector S Standard penetration test mm dia.) PL Point load strength Is(50) MPa V Shear Vane (RPa) b Water seep ₹ Water level

CHECKED Initials: 6RB Date: 4/8/10



Sydney Super Yacht Marina Pty Ltd CLIENT: PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.5 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

BORE No: 9 **PROJECT No: 71816** DATE: 24/6/2010 SHEET 1 OF 1

	_		Description	<u>.</u>	<u> </u>	San	ipling 8	& In Situ Testing	<u>_</u>	Well
RL	D(	epth (m)	of Strata	Graph Log	Type	Depth	Sample	Results & Comments	Wate	Construction Details
	-		FILLING - dark brown, fine to medium grained, silty sand filling with some organic matter and gravel, moist		A/E	0.0		PID<1ppm		Gatic cover Backfill Bentonite
-	- - -	0.6	FILLING - brown, medium grained, sand filling with some sandstone fragments and trace amounts of gravel		A/E	0.6		PID<2ppm		Backfilled with
-	•	1. <b>1</b> 1.5	FILLING - brown gravel and coarse grained sand filling with some metal, wire and brick fragments		A/E	1.1		PID<1ppm		Machine slotted
-	2								<u>₹</u>	
		2.1	Bore discontinued at 2.1m - practical refusal on at least low strength sandstone							End cap

TYPE OF BORING: 110mm diameter spiral flight auger to 2.1m WATER OBSERVATIONS: Free groundwater observed at 1.6m REMARKS: E = Environmental sample

SAMPLING & IN SITU TESTING LEGEND SAMPI Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling ADBU,WC

 PICSTING LEGEND

 pp
 Pocket penetrometer (kPa)

 PID Photo ionisation detector

 S
 Standard penetration test

 PL
 Point load strength Is(50) MPa

 V
 Shear Vane (kPa)

 D
 Water seep

 I
 Water level

CHECKED Initials: GRB [[ Date: 4/8/00

SASING: UI



BORE	HOLE	LOG
------	------	-----

Sydney Super Yacht Marina Pty Ltd CLIENT: PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.7 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

**BORE No: 10 PROJECT No: 71816** DATE: 24/6/2010 SHEET 1 OF 1

Γ		Description of	raphic Log		Sampling & In Situ Testing				Well	
R	Depth (m)			be	Ę	uple	Results &	Natei	Construction	
		Strata	G	Ţ	å	San	Comments		Details	
ŀ	0.1	ASPHALTIC CONCRETE	م.ب.(.						-	
ł		ROADBASE	۶Ģζ						-	
ļ	0,4		60.0. 60.0						-	
	-	Bore discontinued at 0.4m - refusal on concrete								
	-									
Ē	-									
$\left  \right $	ŗ									
~	-1								- 1	
ŀ										
}	-									
Ĺ	t									
	-									
ł	-									
t	-									
[	- 2								-2	
ŀ										
ŀ									-	
Ì	Ĺ									
l	-								-	
	ŀ								-	
t									-	
ļ	-3								-3	
ŀ										
ŀ										
[									-	
ŀ									-	
ł_									~	
ļ	[								-	
	-								-	
ŀ	-4							****	- 4	
ľ	ļ							1		
ŀ	ŀ									
ŀ										
t										
-9										
ŀ										
ŀ										

**RIG:** Bobcat DRILLER: Salib TYPE OF BORING: 110mm diameter spiral flight auger to 0.4m WATER OBSERVATIONS: No free groundwater observed **REMARKS:** 

LOGGED: NSA

CASING: Uncased

SAMPLING & IN SITU TESTING LEGEND 

SAMPI Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

 PICS LING LEGENU

 pp
 Pocket penetrometer (kPa)

 PID
 Photo lonisation detector

 S
 Standard penetration test

 PL
 Point load strength (s/50) MPa

 V
 Shear Vane (kPa)

 D
 Water seep

 T
 Water level




CLIENT:Sydney Super Yacht Marina Pty LtdPROJECT:Sydney Super Yacht Marina RedevelopmentLOCATION:James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.9 AHD EASTING: NORTHING:

DIP/AZIMUTH: 90°/--

BORE No: 11 PROJECT No: 71816.01 DATE: 25/6/2010 SHEET 1 OF 1

$\left[ \right]$	[		Description	De	gree of	<u>o</u>	5	Ro	ock	_	Fracture	Discontinuities	S	amp	ling &	In Situ Testing
R	Dep (m	oth	of	110	uatoring	Laph Log	- - 			Vate	Spacing (m)	B - Bedding J - Joint	De	ore	្លំក្នុ	Test Results
		7	Strata	M E	M S S S	Q	Vervi	١ <u>ة</u>		N N	0.00 0.10 1.00 1.00	S - Shear D - Drill Br	ak ≧	·  ŭ	al x .	Comments
-		0,1	ASPHALTIC CONCRETE	1		έÇ.		T T 					A			
Ē		0.3 0.5				4.4										
ŧ	ŀ	0.0	FILLING - grey, fine to medium	ļį		$\bigotimes$	ļ	ij							ĺ	DID claam
Ę∾	- - 1		grained, sand filling with some crushed sandstone and gravel,			$\bigotimes$						Note: Unless otherwis	9 AVE			PID<2ppm
	È.	1.1				XX						along rough planar	d A S			5,19,20
	Ē		light grey brown, medium to coarse			[	l i	ii				bedding dipping 0°- 10 or joints	°	_		N = 39
ŀ	ŀ		grained sandstone										A	=		PID<1ppm
<u>-</u> +-	[ -2	1.85	SANDSTONE - medium then	-i-			┝┤┺									PL(A) = 5MPa
:	ŀ		medium to high strength, slightly weathered, slightly fractured, light													
Ē			grey brown, medium to coarse grained sandstone. Some very low													PL(A) = 0.8MPa
-			strength bands	ļ	i ili i		i	ii	İİ.	i						
Ē	1											2.75m: B10°, 10mm c	ay			
ŧ	ţ				╤╣╵╵	[::::	וו		4!			3.05m: B5°, clay band			_	
Ē	Ē	<u>о с</u>		l				ii	Li			3.32-4.64m: (x5) B0°-	5°, C	10	0 94	PL(A) = 1MPa
E	E	3.5	SANDSTONE - high strength, moderately weathered, slightly					11				clay veneer/smear				
Ļ.,	Ė,		fractured, brown, medium to coarse	ļį			ļ	ļļ	i i							
ŀ	[*		graned sandstone													
ŀ							]									PL(A) = 1.2MPa
Ē				1	ili i i		ļį	įį	ij.	i	i i <b>r</b> ii					
Ļώ	È,	4.73	Bore discontinued at 4.75m													
E	5															
F	ŀ			į				ij								
Ę	[															
Ł.,	ŧ,						ļ			i						
	-6 [															
ŧ				1												
Ē	لاستقسا			ļ	i i i i		İ	ij	11	i						
-4																
È	F7							ļļ								
-							¦									
F	F															
[ 	£			li	<u>iii</u>		į	ij	ij	i	i ii ii					
ł	-8 -															
E																
ŧ	ŀ						¦									
Ľ	Ĵ.															
ţ.	-9			ļ	İİİ		i	ii	ii	i					1	
E	Ē									1						
-	ţ							11								
Ę	ļ							ii	11					Ì		
Ľ	1		1	11		ļ	11	Į		1	!   ⊈	.1			!	
R	IG: 1	Bob	cat DRIL		ISS			<b>C</b> -	्रील देव	LO abt a	GGED: SI	(		9: H	W to 1	.8m
L. M		OF R C	DURING: Solid flight auger to 0.3h BSERVATIONS: No free proundw	i; L ater	natube 1 observe	io U.5 id wh	m; ilst :	ວດ ອຍຕ	ла III Ierina	gnt a	uger to 1.85	III, NWLC-Coring to	4.79M			
R	EMA	RK	S: *Denotes field replicate sam	les	BD1/25	0610	and	i Bl	D1A/	2506	10 collected					

RKS: \*Denotes field replicate samples BD1/250610 and BD1A/250610 collected E = Environmental sample



CLIENT: Sydney Super Yacht Marina Pty Ltd PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.7 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

BORE No: 12 PROJECT No: 71816 DATE: 24/6/2010 SHEET 1 OF 1

	_		Description	<u>.</u>		San	npling &	& In Situ Testing	L	Well	
Ъ	Dept   (m)	n	of	Log	be	pth	nple	Results &	Wate	Constructio	n
			Strata	U U	♪	å	San	Comments	-	Details	
ŀ	- (	).1	ASPHALTIC CONCRETE		*	0.1				-	
ţ			with some gravel, moist	$\otimes$	AVE	0.2		PID<1ppm			
ŀ	- (	).4	201025T5	$ \times\rangle$		0.5					
-			CUNCRETE	4.4						-	
-~~		0.6	SANDSTONE - very low to low strength, yellow brown								
ŀ	+ (	).8	Bore discontinued at 0.8m								
ŀ	- -										
ŀ	-										
ŀ	-										
ļ											
ŀ	-										
-											
	-										
ŀ										-	
ļ	-2									-2	
	-									-	
ŀ	_									-	
	-									[	
ŀ	-									-	
	-										
~	-										
ŀ	-3									-3	
[	ļ									- -	
ŀ	ſ									-	
ŀ											
ŀ										r	
┝᠇										r.	
[											
ŀ	-4									-4	
ľ											
ŀ	-									-	
ŀ										-	
ļ											
-ņ	1										
ţ											
L											
RI	G: Bo	bc	at DRILLER:Salib		LC	GGE	D: N	SA	CA	SING: Uncased	
T) W	'PE O ATER	F E O	BORING: 110mm diameter spiral flight auger to 0.8m BSERVATIONS: No free groundwater observed								

**REMARKS:** E = Environmental sample

Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling ADBU.℃C

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) PiD Photo ionisation detector S Standard penetration test mm dia.) PL Point load strength 15(50) MPa V Shear Vane (kPa) D Water seep T Water level



**Douglas Partners** Geotechnics · Environment · Groundwater

Sydney Super Yacht Marina Pty Ltd CLIENT: PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.5 AHD EASTING: NORTHING: DIP/AZIMUTH: 90°/--

BORE No: 13 PROJECT No: 71816.01 DATE: 24/6/2010 SHEET 1 OF 1

		Т	Description	Degree of	0		Roc	:k		Frac	ture	Discontinuities	Sar	mplin	g & I	n Situ Testing
뉟	Depti (m)	h	of	veamening	Log			드립	Vate	Spa (r	cing n)	B - Bedding J - Joint	ē	se X%	<b>B</b> %	Test Results
	1.17		Strata	M M M M M M M M M M M M M M M M M M M	Ū	Very	Ned U			0.05 10.10	0.50	S - Shear D - Drill Break	1	ပိမ္ဆို	<u>کي</u>	Comments
1	- 0 0 0 - 0	).1 ).2 ).4	ASPHALTIC CONCRETE ROADBASE CONCRETE FILLING - poorly compacted, dark grey to black, fine to medium grained sand and slag filling with some ash and charcoal, moist										A/E A.			PID<1ppm 2,2,2 N = 4 PID<2ppm
	-2	2.6	- saturated from 2.1m FILLING - moderately compacted, grey brown, gravelly sand filling with crushed sandstone, saturated						¥			Note: Unless otherwise stated, rock is fractured along rough planar bedding dipping at 0°- 10° or joints	A/E A S			PID<1ppm 3,1,9 N = 10
		3.1 3.3	SANDSTONE - very low strength, light grey brown, medium grained						-			3.3-4.28m: (x6) B5°- 10°,	A/E			PID<1ppm
			SANDSTONE - medium strength, moderately weathered, fractured and slightly fractured, light brown to					       			<b>L</b> +1     	clay veneer	С	100	100	FL(A) = 0.500Fa
			red brown, medium to coarse grained sandstone with some very high strength ironstone bands									4.28m: J70°, clay smear 4.45-4.65m: (x4) B5°, clay veneer 4.7m: J60°, clay smear 4.8-5.3m: (x3) B0°- 5°, clay veneer, ironstained	Ċ	100	86	PL(A) = 0.7MPa
· [- · · · · · · · · · · · · · · · · · ·	6	5.6	SANDSTONE - high strength, moderately weathered, unbroken, brown, medium to coarse grained sandstone										5			PL(A) = 0.9MPa PL(A) = 1.2MPa
-	6	.75	Bore discontinued at 6.75m	<del>╎╷╷╹╹╵╵╵</del>	_ <u></u>		+-+ 	╬╹┼╶┼ ╿╹╿╵╿		<u>}</u>  [	┠╍╍╍┠═╂╇ ┠ ╸ ┠		-			
	۲ ۲ ۳ ۳ ۳ ۳ ۳ ۳ 9															

**RIG:** Bobcat

A D B U W

DRILLER:SS

LOGGED: SI

CASING: HW to 3.3m

TYPE OF BORING: Solid flight auger to 0.2m; Diatube to 0.4m; Solid flight auger to 3.3m; NMLC-Coring to 6.75m WATER OBSERVATIONS: Free groundwater observed at 2.1m whilst augering

Water loss from 3.4m. E = Environmental sample **REMARKS:** 

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) le PID Photo ionisation detector Standard penetration test mm dia.) PL Point load strength Is(50) MPa V Shear Vane (kPa) V Water seep ¥ Water level SAMP: Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

Initials: GRB 4/8/10 Date:





CLIENT:

Sydney Super Yacht Marina Pty Ltd

PROJECT: Sydney Super Yacht Marina Redevelopment

LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.6 AHD EASTING: NORTHING: DIP/AZIMUTH:90°/-- BORE No: 14 PROJECT No: 71816 DATE: 24/6/2010 SHEET 1 OF 1

			Description	. <u>0</u>	1	Sarr	ipling &	& In Situ Testing	Τ.	Well	
뭑	Dej (n	pth ר)	of	iraph Log	be	pth	nple	Results &	Water	Construction	
			Strata	U	⊢ ×	De	San	Comments	_	Details	A COMPANY
$\left  \right $		0.1	ASPHALTIC CONCRETE		A/F*	0.1		PID<10pm		Backfill	
		0.2	some gravel, humid			0,2		1.15 - 1951		-	
	-	0.4	CONCRETE	0.0						8entonite	
	-		and crushed sandstone filling with some charcoal,	$\bigotimes$	}	0.5				-	
2	-		gravel, ironstone gravel and trace amounts of brick fragments, damp	$\bigotimes$	*						000
$\left  \right $	-			$\bigotimes$	A/E			PID<2ppm		-	000
È	-			$\bigotimes$							00
$\left  \right $	-			$\bigotimes$		1.0			*****		000
$\left  \right $	-			$\bigotimes$	*						
		1.3	FILLING - brown, coarse grained, sand filling with some	1 XX		14				-	
				$\otimes$						Backfilled with	
-				$\bigotimes$						gravel	
				$\bigotimes$	AVE			PID<1ppm		Machine slotted	
-	•			$\bigotimes$						PVC screen	
	-2			$\otimes$	}	2.0				-2	0-0
				$\bigotimes$	*					-	
				$\bigotimes$	*					-	
				$\bigotimes$					Ţ		
		2.6	- saturated at 2.5m SANDSTONE - very low strength, white and vellow	$\sum_{i=1}^{i}$	1					End cap	
		2.7	brown sandstone	L							
$\left  \right $			- refusal on at least low strength sandstone								
	-3									-3	
										-	
ŀ										-	
										-	
										-	
	- 4									-4	
		:									
-											
										-	
RI	G: E	Sobe	DRILLER:Salib		LC	GGE	D: NS	SA	CA	SING: Uncased	
۱Y W/	VE ATE	or R C	BSERVATIONS: Free groundwater observed at 2.5m								

REMARKS: E = Environmental sample. \*Denotes field replicate samples BD1A/240610 and BD1B/240610 collected

 SAMPLING & IN SITU TESTING LEGEND

 A Auger sample
 pp
 Pocket penetrometer (kPa)

 D Disturbed sample
 PID
 Photo ionisation detector

 B Bulk sample
 S
 Standard penetration test

 U, Tube sample
 S
 Standard penetration test

 W Water sample
 V
 Shear Vane (kPa)

 C Core drilling
 D
 Water seep ¥

Sydney Super Yacht Marina Pty Ltd CLIENT: PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.6 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

**BORE No: 15 PROJECT No: 71816** DATE: 24/6/2010 SHEET 1 OF 1

		Description	<u>.</u> 0		Sam	ipling &	& In Situ Testing		Well	
RL	Depth (m)	of Strata	Graph Log	Type	Depth	ample	Results & Comments	Water	Constructio Details	'n
ŀ	- 01	ASPHALTIC CONCRETE								
	- 0.1 0.15 - 0.2	FILLING - black, medium grained, sand filling with some gravel, humid CONCRETE Bore discontinued at 0.2m - refusal on concrete								
· · · · · · · · · · · · · · · · · · ·	2								-2	
-0	-									
-1	-									
	4								-4	

RIG: Bobcat DRILLER:Salib TYPE OF BORING: 110mm diameter spiral flight auger to 0.2m WATER OBSERVATIONS: No free groundwater observed **REMARKS:** 

A D 8 U, W C

LOGGED: NSA

CASING: Uncased

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) PiD Photo ionisation detector S Standard penetration test mm dia.) PL Point load strength Is(50) MPa V Shear Vane (kPa) P Water seep ¥ Water level SAMPI Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

Initials: GRB Date: 4/8/10

CHECKED





Sydney Super Yacht Marina Pty Ltd CLIENT: PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 1.8 AHD EASTING: **NORTHING:** DIP/AZIMUTH90°/--

BORE No: 101 PROJECT No: 71816 DATE: 25/6/2010 SHEET 1 OF 1

Γ			Description	. <u>0</u>		San	pling &	& In Situ Testing		Well	
R	i Dej (n	pth า)	of	Sraph Log	ype	spth	mple	Results &	Wate	Construction	
	ļ					ă	Sa	Comments		Details	
	ŀ	0.1	ROADBASE	<u>ەبى ر</u>							
	[	0.3									
	ŀ		FILLING - dark grey, medium grained sandstone filling with some gravel and sandstone cobbles and boulders,	$\mathbb{X}$							
i.	Ì.		humid	$\otimes$		0,5					
	ŀ			$\bigotimes$				PID<1nom		-	
	t			$\bigotimes$				Papa Ibbu			
	-1	1.0		$\bigotimes$	<b>]</b>	-1.0-				1	
	ŀ		- refusal on sandstone boulder								
ļ	[									-	
ł	ł									-	
ļ	ļ									- -	
ŀ	-										
f	<u>}</u>										
ŀ	-2									-2	
ł										n	
ļ	-										
ł	-									-	
ŀ	ŀ									-	
ŀ	-									r l	
-											
ŀ	-3									-3	
ł	ŀ										
Į											
[	ŀ										
	ļ.									- -	
	ŀ									-	
ł٩	<sup>9</sup> -									-	
	-4									-4	
-	}										
ļ											
-										-	
ŀ						1					
ŀ	ŀ									-	
- "	?										
[	[					<u> </u>	<u> </u>		1	<u>}</u>	•••••
R	IG: E	Bobi	cat DRILLER: Salib		LC	GGE	D: NS	SA	CA	SING: Uncased	

DRILLER: Salib TYPE OF BORING: 110mm diameter spiral flight auger to 1.0m WATER OBSERVATIONS: No free groundwater observed **REMARKS:** E = Environmental sample

SAMPI Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling

ADBU,₩C

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) le PID Photo ionisation detector S Standard penetration test mm dia.) PL Point load strength Is(50) MPa V Shear Vane (kPa) b Water seep ¥ Water level

CHECKED

Initials: GRA

Date: 4/8/10



**Douglas Partners** Geotechnics · Environment · Groundwater

Sydney Super Yacht Marina Pty Ltd CLIENT: Sydney Super Yacht Marina Redevelopment PROJECT: LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.2 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

**BORE No: 102** PROJECT No: 71816 DATE: 23/6/2010 SHEET 1 OF 1

		Description	ic.		Sam	pling 8	k In Situ Testing	<u>ب</u>	Well	
RL	Depth   (m)	of	Log	be	pth	nple	Results &	Wate	Constructio	n
		Strata	U	Γ	Ğ	San	Comments		Details	
	0.05	ASPHALTIC CONCRETE			0.1					
-~	-	ROADBASE	$\otimes$						-	
ŀ	-	FILLING - black, fine to medium grained, silty sand with some gravel	$\bigotimes$	AVE			PID<1ppm		-	
Ĺ	ŀ		$\otimes$		0.5					
	0.6		$\bigotimes$		0.6					
ŀ	0.7	CONCRETE Boro discontinued at 0.7m	4.4	A/E	-0.7-		PID<1ppm	<b> </b>		
ł	,	- refusal on concrete							-	
ŀ	t_								- 1	
ſ	['								-	
ł	ŀ								-	
ľ									-	
									-	
ŀ	-									
ł	ŀ									
	Ĺ,								- 2	
ŀ	-									
-e	ŀ									
ŀ									ng k	
ľ										
	[								-	
	ŀ								r	
ł	ŀ								-	
ŀ	Ľ,									
	[				1					
				1					-	
ł									-	
ŀ	t								Į	
ſ	[									
-	-								r.	
ŀ	-								ŀ	
t	ţ,				ĺ					
ſ	[*			1						
-	2									
ł	ŀ								La contra contra contra contra contra contra contra contra contra contra contra contra contra contra contra con	
ł	İ								į	
Ĩ	[									
$\left  \right $									-	
	ŀ									
ſ	Ì								•	

DRILLER:Salib **RIG:** Bobcat TYPE OF BORING: 110mm diameter spiral flight auger to 0.70m WATER OBSERVATIONS: No free groundwater observed REMARKS: E = Environmental sample

LOGGED: NSA

CASING: Uncased

SAMPLING & IN SITU TESTING LEGEND Auger sample Disturbed sample Buik sample Tube sample (x mm dia.) Water sample Core drilling

A D B U, W C

DILESTING LEGEND pp Pocket penetrometer (kPa) PiD Photo ionisation detector S Standard penetration test PL Point load strength Is(50) MPa V Shear Vane (kPa) D Water seep ₹ Water level

Initials: GKB Date: 4/8/0

CHECKED



CLIENT:

PROJECT:

Sydney Super Yacht Marina Pty Ltd

LOCATION: James Craig Road, Rozelle Bay

Sydney Super Yacht Marina Redevelopment

SURFACE LEVEL: 2.4 AHD EASTING: NORTHING: DIP/AZIMUTH90°/-- BORE No: 103 PROJECT No: 71816 DATE: 23/6/2010 SHEET 1 OF 1

	\IL	Description	hic -		Sarr	npling &	In Situ Testing		Well
ᆐ	/epin (m)	of Strata	Grapl Log	Lype	Jepth	ample	Results & Comments	Wate	Construction
		ASPHALTIC CONCRETE	li kirety site. Nevez alek			Ś			Gatic cover
	0.1	FILLING - brown, course grained, sand filling with some gravel, humid		A/E*	0.1		PID<1ppm		Backfilled with
	0.5	FILLING - yellow brown, sandstone cobbles and boulder filling, moist			0,5				Bentonite
	0.6	FILLING - brown, coarse grained, sand filling with some crushed sandstone fragments, moist		A/E	0.9		PID<1ppm		-1
	1.6	FILLING - brown grey, sandstone cobble and boulder filling with some sand, moist			1.4				11111111111111111111111111111111111111
2				A/E	1.8		PID<3ppm	Ţ	-2 Backfilled with
		- saturated from 2.1m - faint hydrocarbon odour at 2.1m		···	2.4				
-3				A/E	3.0		PID<2ppm		-3 Machine slotted
4					3.5				-4 End cap
	4.5	Bore discontinued at 4.5m - refusal on at least low strength sandstone							
RIG: TYP	Bob E OF	cat DRILLER:Salib BORING: 110mm diameter spiral flight auger to 4.5m		LC	GGE	D: NS	SA	CA	SING: Uncased

REMARKS: E = Environmental sample. \*Denotes field replicate samples BD1/230610 and BD1A/230610 collected



CLIENT: Sydney Super Yacht Marina Pty Ltd PROJECT: Sydney Super Yacht Marina Redevelopment LOCATION: James Craig Road, Rozelle Bay

SURFACE LEVEL: 2.6 AHD EASTING: NORTHING: DIP/AZIMUTH90°/--

**BORE No: 104 PROJECT No: 71816** DATE: 23/6/2010 SHEET 1 OF 1

		Description	<u>.</u>		San	npling &	& In Situ Testing		Well	
문 De	epth m)	of	Log	ø	oth	ple	Results &	Vate	Constructio	n
		Strata	อี	T <sub>yF</sub>	Der	Sam	Comments	>	Details	
	0 1	ASPHALTIC CONCRETE	and a second second					1		
$\left  \right $	0.2	ROADBASE							-	
		CONCRETE - reinforced	4 4 A A							
- ~	0.4	FILLING - dark grey, fine to medium grained, sand filling with some gravel		A/E	U.4		PID<1ppm			
	0.8	CANDOTONE	$\bigotimes$		0.8				The second s	
	0.85	ANDSIONE - extremely low to very low strength, grey- and yellow brown sandstone	· <b>· · · · ·</b>							
		Bore discontinued at 0.85m - refusal on at least low strength sandstone								
┝╼┝										
									•	
									-2	
									-~ -	
[ ]									-	
								***	Ļ	
									[	
				*****					}   	
									ŀ	
									ł	
									-4	
				****					ŀ	
-9-										
RIG:	Bobo	cat DRILLER:Salih		<u>.</u> ור	GGF	D: N.S	5A	CA	SING: Uncased	1
TYPE		BORING: 110mm diameter spiral flight auger to 0.85m								

**REMARKS:** E = Environmental sample

SAMPI Auger sample Disturbed sample Bulk sample Tube sample (x mm dia.) Water sample Core drilling 

SAMPLING & IN SITU TESTING LEGEND pp Pocket penetrometer (kPa) PiD Photo ionisation detector S Standard penetration test mm dia.} PL Point load strength Is(50) MPa V Shear Vane (kPa) D Water seep ¥ Water level

CHECKED initials: GRB Date: 4/8/10



### APPENDIX C Results of Relevant CPI, PB and SKM Field Work

ļ l.

÷

i. . . .

{

L

Ł.

ł . l.,

ł Ĺ

έ...

ł.

i

ţ

inc	orooro	ted in	NSW													$\mathbb{N}$		b	orenole r	10.	-
~	nc	in	orin		100	4								600	702				BH3		
b	or	eh	ole	g	10 <u>C</u>									office in	7 <u>0</u> 2	1 504	30/1	st	eel 1	ìo	1
clî pri	ent. ncipal			EJE AR MARITI	CHITECT	UPE	BOARD	}			<b>.</b>			hole cor	nmence npleted:	d:	13/ 13/	12790 12790		<u> </u>	
pro DO	ojeci: rehole	local	ion:	MAREN SEE DR	G WOR	KSHOP No S9	'S 439-1-	•1						logged checked	by: by:		SR) JGI	M L			
dri ho	li mod Ie diai	el ana netor:	mounting:	84 10	40 - TR 0mm	UCK M	OUNTEI	D ORILL	RIG			slope: pearinci,	-	90 DEG		R.L.	Surfo	oce:			
method	c perstration	support	notės samples, tesi.etc	8.L	dap <i>t</i> h metres	ցութիւն ինց։	classification symbol	soil colo	type:p	me blasticity condary (	ateriol or porti and mino	cle charact	terislics ents	moislure condition	consistency density indexc	w kand w Annetro-	of meler	ada	struc ditiona	ture c obser	and vation
IQV		NIL			-			CONC FILL: 1	CRETE. Grovell	y sand, I	ight gre	y brown		м				FILL s	andstone	gravel	103 JUN
A CALL AND A CALL AND			N=R		- - - - - - - - - - - - - 			SAND Jtey Pigi n Jinbo hil Do	STONE: orange of jum the ther oulder	: fine to ping, see efore pro	mecium ms very n viacada	grainea. líg v even <u>k</u> iol a	อูก์					SPT re Double SAND	efusal en STONE B	sonds I EDROCI	one 
MBB	THOC	ander	screwing <sup>-</sup>	SUPF	M C O a S	cand		i Borel	NO U50	BH3 TES s undistur diamete	ampies : bed safr	ond tests	CLAS SYMB DESC	2.05			U > s	- ONSIST S	ENCY/C very so	DENSIT h	····
AD R W CT HA DI Tbit 8 V	I show	auger roller/ washb cable hand d diatub m by blank V bit	drilling Iricone ore tool nuger e sutfix bu		M m TRATIC 2 3 ER not n water	N N I no I ran I e fi I e v e fi I e v e fi	resista ging to usat ed	ince D	D N NC V P Bs R	diamete disturbe standart SPT + SPT wi vane sh pressure bulk sai refusat	a sampli d penetr somple r In solid lear imeter mple	e alion test: lecovered cone	DESC based clossif MOIS D M	RIPTION on unifie ication s TURE dry moist wet	:d ystem		S F Sti V: FB V! L M	i Si L Đ	soft film stiff very st hara friosle very lo loose medium	oze iff	
i e.g		IC bit ADI		ΤÅ	woter	inflow							Wp	plasti	c limil		D 1	D	dense very de	ense	

.

ŧ

; **.**....

1

| | |------167-230 102-230 ş

**L** .....

ł

# endineering log

ł	וכ הכ	າບ ວາ	Ч С	h	ole	ii rç	3	Νų	3									72	7L	7.0	4			she	eet	I of	1
	lier	nt:				EJ	E AR	CHITEC	TURE				••					offic hole	e jo com	b no:	59	439	/1 1/12/2	····			
	nin	çipa	1:			M		AE SER	VICE	S BOARD								hole	con	pletec	;	1	3/12) 3/12)	90 90		•	
	oro) oroj	ect: shol	e ic	cati	on:	SE	E DR.	∌ wui Awing	NO I	59439-1-	1							logg chec	eđ t keđ	by: by:		S L	RM GL				
	irill ole	m¢ dic	del	ond	mount	ing:	84 10	0 - TF	RUCK	MOUNTE	D DRILL RIG				510	ope: `		-90	DEG	- 1.	R	L.Su	lioce:	:			• <u></u> ,
method	1	c penelration	1.000	writer	not samp test,t	es es	i'a	depli. melres	graphic log	classification symbol	soil typ colour, s	pe:p sect	r Iosticit ondaty	nateri y or pr and m	al article c hinor col	haracte mponer	eristics	moisture	condiléon	consistency/ density indexc	di puou	Denetro- meter united		addi	stru tional	cture obse	and rvations
	5		Ī				†		X	8	FILL: Bilur	men	and ç	gravel				M					R	000 8	k road	pase	
				¥	4 . N*	3 , 2 = 5 2 , 2 = 4		1			Fill: Sand sandston		ne bo atrix	uiders i	n crushe	đ				٨D			W	ater i Ih fid	evel m es	ay fiuc	1ual e
											Borehole	≥ B	9	-	Terr	ninate	əd at	4	.10	m							
M A A R W C H J I B V I e (	ETH S D	shov	aug aug roll wa: cor han dial wa t blan V t TC	ger ger/ti shbo d on lube by s bit bit	acrewin dritting icone re ool uger uffix il	9- 9- 9- 9- 9- 9- 9- 9- 9- 9- 9- 9- 9- 9		n I DRT C c M n RATIC 2 3 R not n water water water	asing nud N N ra ra re neasu level inflo	o resiston nging to fusat rea ow	NU U N N N N N N N N N N N N N N N N N	C C C	ES undistu diarnel disturb standa SPT + SPT v vane s pressu bulk sa refusat	sample inbed som and som ind pend somple with sol shear remeter ample	s and le ample 5 ple etration B recove id cone	asts 0 mm Jest: sred	CLAS SYMB DESCI bosed clossifi D MOIS <sup>1</sup> D W W W P	SIFIC/ OLS RIPTIC on ur ication TURE dry mc we pla	ATIC ANE DN iffied iffied iffied iffied	limit	· · ·	L I I I I I I I I I I I I I I I I I I I	CONS SST VST T VST T VST T VST T VST T VST T VST VS	SISTER I I I I I I I I I I I I I I I I I I I	NCY/E very so soft lim very st very lo cose medium dense very de	DENSIT' SII jil ose dense anse	Y INDE>

,

borehole no:

÷

··.,

. . BH4

DD

187-230 JCJ Copyright Cottey Partners International Pty. Ltd. 1989

0

i

:

.

ı.

1

	Col Inco	ley Ipo	Por	neia Véia	lnter NS₩	natior	od Plv	y, Lte	d.														RN			2/1	7			por	ehole	no:	
	e	ກູ ເ	ji م	ר∈ הי		rin 2	g	lc	g	-	-												67 72						ļ	B	el	1 c	of 1
	clie prin pro bor	nt: cipc ject		catio	<u></u>	5 F N S	JE AR MARITI MAREN EE DR	CHIT ME S IG W	TECT SERV VORI	URE ICES (SHO No S	BOA PS			<b>~</b>						-			office hole c hole c logged checke	job omn omp d by ed b	no: hence letec v:	5 əd: J:	943	1971 137 137 SRI 16	12/9 12/9 12/9 M	0			<u>\</u>
	driļ	mo	dei	ong	mour	nting:	В	40 -	- TRL	ICK I	MOUN	ITED	DRILL	RIG					sic	ope:		- 0	Û DE	G G		-	R L.S	Surfe	oce:				
	method	v cenetration	licitis	water	nC son lesi	tes nples. Laic	RL	depth	melres	ցարին և ց	classification	io ante	20	ii lyp	secc	astici	mati ty or y and	erial part mine	icle cl	haracti mponei	eris ha nts	сs	moisture condition		consistency density indexc		an aberetro-	meter 3		addil	stri Hond	ucture I obs	e ana serva
	ADI		Ī						-				CON FILL:	Sond	IE: Dalo	ne bo	sulde	rs in	ciushe	ad			м	1			Î		FIL	L - 1	ci ge	bould	8/3
			•										SAN strer	ĒŠTŌ Igih	NE:	medi	um g	rained	j, meć	dium									Riç Sm	V SA g grin oothi	NDST naing ly for	ONE sands 1.4m	tone
-								:	2				Bore Virtu SANI	bole JAL 1 OSTO	D E IC I NE	3H5 SIT RE	FUSA	L IN	ler	minat	ed	at	1.9	γq	m								
								:	2 														74 <sup>-</sup>										,
								5	4 4 5 5																				•		`	<i>*</i> *•	
								6														~											
_							and a first state of the state	7							-								-			1				-			
	MET AS AD R W CT HA DT Tbit B V ī	sho	oug toll was cat han dia vn t bloi V t tC	ier s er/tri hboi le to d au ube by si hk bi it bit	crewi Irilling icone icone iger uffix t	ing-				sing Ja N 	o fesis nging fusal red	slanc Io	e	NU DNN NV PB R	01 50 - c	S undis diama distur stand SPT SPT vane press bulk refuse	som turber aler bed bed tord p tord p tord p tord som som of	aples d som sampl penetr nole i solid rr eter le	and linple 5 e ation ecov cone	ests 10 mm 1est: ered	C S D c t C S C S C S C S C S C S C S C S C S C	LASS YMBC ESCR Dsed Dssific	IFICA DLS A IPTIOI con unit cation URE dry moi well plax	TIOI ND Niec syst	sol em			C V S F St V H Fb VI L M D	ONS S SI		NCY very soft linm stiff very nord riable very cose nediu sense	(DENS soft stift loose m der	15e

1

, , , \_\_\_,

> : L.,

، ا

**.**...

.

:

: L.,

ί.

; 1...

: : :

		Inc	orpor	bled	in NSV	W													P	NF		sΜ	1	Γ	orehole	101	
		0	nc	un	<u>م</u>	arin.	a		۹	_									60	7 <i>0</i> 20					BH6		
		b	or	eł	nol	e	9	100	2	-									<i>V</i> 2	70	7/7/	1			heel	t of	1
		cli	ent:			E.	JE AR	CHITEC	TURE			<u>-</u>	·· <u> </u>					<b></b>	hole	e job com	no: nence	SÇ əd:	/ <u>439/</u> 13	1 /12/90			-,
		pro	ncipai: bject:			M	AREN	AE SER G WOR	VICES KSHO	BOARD									hole logg:	comp ed by	oleted /:	i:	13 Sr	/12/90 M			••
		dri	l woq	el an	a moi	unting:	B4	AWING 10 - TR	NO S UCK I	943971 MOUNTEE	D DRII	L RIG	· <u> </u>			slop	e:		chec	ked b DEG	у <b>у:</b>		J.G L.Surf			<u></u>	····
فعبد		ho	e diar	neter	:		10	0000	<u>,                                     </u>	[	l					bea	ring:					d	ຕາມຫ:				· ·
27-		method	ы с peneticlion	support	eler 10 10 10	otes mples, si,eic	B.L.	depth metres	graphic log	classification symbol	2	oil typ plour, s	e:plast econd	ma licity d lary ai	lpiteti or part nd bin	icle cho or comp	aracte ponen	eristics Its	moisțure	condition	consistency/ density indexe	hand *	banetro-	ad	stru ditional	ciure a observ	nd ations
		ADT		NIL					$\otimes$		FILI	Biturr	ien plu	is 200	mm th	ick grav	vel		м				8.E	Road	& road	base	
<b>*</b> 66				7	J7			-			fill sor	.: Sand Idstone	sione	bould	ers in	crushed								FiLL - penei	boulder rated	s easily	
<del></del>				-	16	N. 11. N. ≖R		_ ۱ _ +											w					n I92 bluod	etusai or ers	san¢sic	ne
\. قدمة								2					-						· ·								
4r-4								u XXHentredus			SAF higr	IDSTON streng	ië BED Jih	ROCK	? med	ium to								Rig c 2.óm.	ulling sn Probably	noothiy L r not in I	elow elow
تعديد العديد العديد العديد العديد											Bor NEA BED	ehole R REFU ROCK	BH6 SAL №	4 SAN	DSTON	Termi	inate	d at	3.	oc	m						
	ional Ply. Lld. 1989							· · · · · · · · · · · · · · · · · · ·	-			-															-
187-230	(C) Copytiahl Coffey Partners Internal	MET AS AD R W CI HA DT DT DT bill B V T e.g.	HOD an an cc w cc ha di shown bl V tC Al	uger uger blier/ blier/ bable bable bable bable bit bit bit bit Di J J J	screw drilling tricone ore tool buger e suffix bit	ying g g P		ATION ATION ATION ATION ATION A A A A A A A A A A A A A	sing d t tan tan tan tan tan tan tan tan tan t	résislanc ging Jo Isal d	¢e	NC USC N NC V P Bs R	)TES undi dian distu ston SPT SPT vone pres bulk refu	san isturbe neter urbed indard + san with e shea san san san	npies c id sam sample penelic mple ii solid or eter sie	ind test ple 50 i a dition te acovere cone	ist: ed	CLAS SYMB DESCI based classifi D MOIST D M W W W P	SIFICA OLS A RIPTIO on uni ication TURE dry moi wet plas	TION AND N fied syste	i SOIL am		C S S F S S S S S S S S S S S S S S S S		ENCY/D very so soft firm stiff very sli hard friable very loc loose medium dense very de	ENSITY (I (i) DSB dense nse	INDEX

,

2

. .

ί...

Bore Hole Inclination: 90*	Bore Hole VERT	<u></u> Г	Surface	 	Bo	re Hole			OFICE I	
Drill type:	Drilling method:		Elevation: Di	: ote: 30/	Lo: 3/98	cation:		.lah	No: ENO	06.07
AUGER	ROTARY	· ·····	Lo	ogged by	RG				IN ENU	0027
Soil descri	PTION	GROUND WATER	CONSISTENCY VELATIVE DENSITY	MOISTURE COND.	DEPTH (M)	GRAPHIC LOG	CLASSIFICATION SYMBOL	CONT	AMINA TION IMMARY	Sample Interval
Ashpolt							L			<u> </u>
FiLL: sandy fill gravel brown slight cla weathered sond:	iy stone				- 0.5		SP			S60
TERMINATED of 1.1m	<b></b>				• 1.0					
Sandstone bedrock										
				ر <u>اور و را اور دو اور دو اور در اور د</u> ر د	1.5					
				يريح ليريم المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد ا						
				المحتيد والمحتول المحتول والمحتول والمحتول والمحتول والمحتول والمحتول والمحتول والمحتول والمحتول والمحتول والم						
CONTA ASSE	MINATION SSMENT		·		 E1	UGIN T	LEEI EST	RIN P	G LO( IT	3
SINCLAIR KNIGHT MERZ				SIGNA	TURE					

; , ,,

:

Ë.

	PROJECT: ROZELL	NMENTAL A	SSESSI TTI F	MENT	вс	RE H	OLE: F		QUEFT	and a second second
;	Bore Hole Inclination: 90* (from horizontal)	Bore Hole VE	RT	Surface	 G5	Bo	re Hole		SHEET	1 of 1
	Drilf type:	Drilling method	<u>j:</u>	Do	ile: 30/	Loc /3/98	ation:		Job No: ENI	0627
3	AUGER	ROTARY		Lo	gged by	: 8G				00027
	SOIL DESCRIP	TION	GROUND WATER	CONSISTENCY RELATIVE DENSITY	MOISTURE COND.	DEPTH. (W)	GRAPHIC LOG	CLASSIFICATION SYMBOL	CONTÁMINATION SUMMARY	SAMPLE INTERVAL
	FiLL: brown sandy slig some building ru weathered sandst	ht clay bble cone			· · · ·	0,5		SP		\$58 \$59
					والموارية والمرابعة والمربية المربية المربية والمربية والمحمول معروان والمرابعة والمربعة والمربعة والمربية والمرب	1.0				
	CONTAN	INATION SMENT	1			EN		EER		G

. 

۵. بر

Bore Hole Inclination; 90*	Bore Hole VER	Γ	Surface	. G5	80	re Hole				
Drill type: ALIGER	Drilling method:	<u>.</u>	Di	ote: 30/	/3/98			đoL	No: ENO	0627
NOOLK		~	Lo 	xgged by:	RG	1	[			
soil descri	- -	GROUND WATE	CONSISTENCY Relative Densi	MOISTURE CON	DEPTH (M)	GRAPHIC LOG	CLASSIFICA TION SYMBOL	.Conta Sui	amination Umary	SAMPLI INTERVA
Ashpalt FILL: brown sand, gro TERMINATED at 0.4m	ivel						SP			S61
	· .				- 0.5					
					- 1.0					
					- 1.5					
	·			· · · · · · ·	.				•	
				ي م الم م الم	· ·					
				ل بنا ا			•			
· · ·									1	
				يد بد						
				ي بي تاريخ						
				لديب						-
				و ل م م م						
				ىر لەر رىلىر						
									4	
CONTA ASSE	MINATION SSMENT				E	NGI	NEE TES	rin T P	G LO IT	G
SINCLAIR KNIGHT MERZ				SIGNA	TURE					<u> </u>
					5 - 10 - <b>1</b> - 1			1. A	a an an an an an an an an an an an an an	

i

,

. .

:

.

.

.

•. •



BOREHOLE NO.

MW1

		YE/	uta G										
Clie	ent:			NSW M	laritime					PB Borehole No .:	Dat	te Comm	enced: 10.02.2009
Pro	ject	:   _		Rozelle	Bay Gro	oundwate	er S	ampli	ng		Dat	te Comple	eted: 10.02.2009
Bor	eno iect		nber:	COZEIIE	e Bay, NS 9A	W					Ree	corded By	/: UV d Due MNM
	Jeor	1-1-14		211030	04			Drille	er:	Macquaria Surface RI		J Checker	
Drill	I MO	del/	Mounting:	Hydrap	ower			Drille	er Li	c No: Co-ords:	•		
	eno		Deer!					100	; (R	L): Local Co-o	rds:		
1	2	3	Boren	iole imor	mation 5	6	7	8	9				13
	-	-	(1) (1)			-			-		<u> </u>	RELATIVE	
			SING	WELL				ğ	g		ш	/CONSISTENCY	
ĝ	ŐR	E.	S SCON	STRUCTION	-		Ш	0H	SYM	SOIL/ROCK MATERIAL FIELD DESCRIPTION	TUR	ᇤᅿᄀᇢᇰ	ADDITIONAL OBSERVATIONS
METI	I'	WAT	25mr 50mr		LL LL		SAMI	BRAI	Sc		MOIS	Santa	
TC			Fiu	sh Galic and					-	BITUMEN	D		
			888	mentSeal	0.10 ~~	PID=0.0	J	XXX		FILL; Silty Sand, fine grained, some	м		MW1_0.1-0.2
					0.30	ppm	1	$\bigotimes$		gravels, dark brown/dark grey, moist.			
						-		0,0	50	brown/brown white, moist			
						PID=0.0	J					11111	MW1_0.5-0.6
						- ppm		Ċ.	[				
						-		<u>ှ</u> င့်					
								6					
						PID=0.0	J	١ <u></u>	ļ				MW1_1.0-1.1
						_ ppm		₿Ç0					
		▼	Be	ntonite Seal			l	b					
		1/2/0				-		0.	Į				
								þ°o	1				
						1			{				
			. 50 . Ca	mm uPVC sing				۰D					
1		ļ						þ_o					
5			k ⊟el		2		.1	ĽD.	1				MW1_2.0-2.1
3						ppm	ř	6	ļ				
5					2.20					SANDSTONE; brown, moderate			
2						_			ł	weathering, moist			
		972/0							ł				
ž						-			ŧ				
į.						•			ł				
					280				Γ-	as above, red	1		
									ł				MW1 3.0-3.1
R						ppm	1						
						-							
	1						.		1				
5					3.50						4		
2		ļ		reen		-				SANDSTONE; weathered, fine grained, sandstone gravels up to 30mm			
										diameter, light brown/yellow, moist			
						1			ł				
						I			Į		ł		
2						PID=0.5	J		ŧ				IVIVV I_4.0-4.1
						-	-[		ł				
5									1				
200						1							
2		l				1							
i i									1				
						-				ļ			
					}				ł				
						PID=0.0	J						
			Er	rd Cap	210	- ppm	1		<b>_</b>	END OF BOREHOLE AT 5.10 m			
	i												
		1				-							
S R	-		<u> </u>	TL'- 1	rah-l- !-	مامور الک			1 		1	<u>, , , , , , , , , , , , , , , , , , , </u>	1
۶L					nenole loĝ	Should De	read	in conj	unct	ion with Parsons Brinckemoff's accompan	ying s	standard no	185.



BOREHOLE NO.

														MW2
Cli Pro Bo	ent: oject reho	ie Lo	ocation	NSW M Rozelle Rozelle 211698	aritime Bay Grou Bay, NSV	indwate V	er Sa	ampli	ng	PB Borehole No.:	Dat Dat Rec	te Comme te Comple corded By	SHEI nced: 10.0 ied: 10.0 DV	ET 1 OF 1 02.2009 02.2009
Dri	ill Mo	del/	Mounti	ng: Hydrap	ower			Drille	er:	Macquarie Surface RL	: :	J Checkeu	<u>Бу.</u> (МИ)	
Bo	reho	le D	iamete	r: 100 mn	n			TOC	(R	L): Local Co-olds.	ds:			
	2	3	BO		mation 5	6	7	8	9	10	Jesc 11	12	13	
METHOD	SUPPORT	WATER	25mm CASING 50mm CASING	WELL CONSTRUCTION	RL(m) DEPTH(m)	FIELD	SAMPLE	GRAPHIC LOG	USC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	MOISTURE		STRUCTUR ADDITIONAL OBS	RE AND SERVATIONS
тс				Flush Gatic and Lockable Cap Cement Seal		PID=0.0	J			BITUMEN; with underlying Roadbase (old) FILL; Silty Sand; fine grained, dark brown, organic, moist	D		<u>MW2_0.5-0.8</u> -	
				Bentonite Seal	a 70	PID=13.0	J	***		SANDSTONE; weathered, fine grained, light grey becoming white/yellow, slight odour (possibly organic)				
03		1/2/0		50mm uPVC Casing	- - 200 ~2									
				يت شرك به يه يكر بنه يه يكر بنه						grained, light yellow				
הטרבווטרביאומיר גיטס אטברור				50mm uPVC Screen	-	PID=0.4	J			as above, becoming light orange			MW2_3.0-3.1	
<b>BENIAL</b>		N			3.90					as above, weathered red sandstone				
		F 10/2/0		End Cap	4-	PID=5.2	J			END OF BOREHOLE AT 4 10 m				
DIS BRINCKERTION AUSTRAIRA FLY LIV. VERSION 2.1 ELVI		E		· · ·	-									
		•••••		This bo	prehole log sl	nould be i	ead	in con	junct	ion with Parsons Brinckerhoff's accompany	ying :	standard not	es.	



BOREHOLE NO.

MW3

		YE.	ARŞ @														SHEET 1 OF 1
Clia Pro	ent: oject	:		N F	NSW M Rozelle	lariti Bay	me / Grou	Indwate	er S	PB Borehole No.: r Sampling				te C te C	Comm Comple	enced: eted:	10.02.2009 10.02.2009
Bo	reho	le L	ocatio	n: F	Rozelle	Bay	, NSV	V					Re	core	ded B	/:	DV
	ject	- INU		2	211698	8A				Drille	ər:	Macquaria Surface Ri		3 CI	necke	а ву:	MVV
Bo	i ivio reho	iaei/ le D	iviount liamet	ing: F er: 1	iyarap 100 mn	n n	ſ			Drille	er L C (R	c No: Co-ords: L): Local Co-o	rds:				
			Bo	orehole	e Infor	mati	on				,	Field Material	Desc	crip	tion		
₽ <sup>1</sup>	2	3		4			5	6	7	8	9	10	11	R	12 ELATIVE		13
AETHOD	UPPORT	VATER	5mm CASING 0mm CASING	WE CONSTR	ELL RUCTION	(m)	)EPTH(m)	IELD EST	AMPLE	SRAPHIC LOG	ISC SYMBOL	SOIL/ROCK MATERIAL FIELD DESCRIPTION	IOISTURE	S FB			RUCTURE AND INAL OBSERVATIONS
TC	00	>		Flush G	atic and		0.05		0			BITUMEN					
					te Cap t Seal		_	PID=0.0	J			FILL; Silty Sand, fine grained, dark brown, some sandstone gravels up to	м			MW3_	0.1-0.2
				4				PiD≂0.0	<u> </u>			40mm diameter, moist				— мwз_	0.3-0.5
							-	ррт						ļį			÷
							-										
				A X			0.80			××		SAND: medium grained brown white	_	Ľ			
				Ž.						0°0		and orange, some sandstone gravels					
							_	PiD=0.0 ppm	J	þ° o		up to somm diameter, moist				MW3	1.0-1.1
				Bentoni	ite Seal		-			p° o							
		1/2/0					-						ļ				
		.								Ċ,	}						
				50mm I	uPVC		-			P 0							
				Casing			1.80			စ္ဲဝ	SP	as above, but medium to coarse	-	H-	╧┝┙╧	<u> </u> -	
8							2-	00-00	<u> </u>			grained and more consistent, light brown, moist				MW3	20-21
232	ŀ			3			2 10	ppm		۴Ċ,	SC	Clayey SAND; fine to medium grained,	w				
1.GDT							-					wet					
힕		L		9			-			(÷./.	1						
E E		<i>•</i> 972/0					_			./				ļ			
E.										: :/:							
							-			:/:::							
202							-	PID=0.0	J	[::/						MW3_	,3.0-3.1
							3 10	ppm	/	1	SC	as above, but higher clay content,	1	H.	†n†	<u>+</u>	
Į.										[://		moderate plastory, dark brown					
E O					-		-			:/:`;							
픲				Screen	upvc		-			/.							
AL AL							_	Į		[/ · · ;							
										:./·							
Ž.	ļ						4-	PID=0.0	J	/						MW3_	4.0-4.1
EN							-	ppn	1	l∶,⁄.							
5.1	1									[/ · · ;				ļ			
ersion		<u> </u>		End Cau	<b>q</b>					<u> /</u>	1		+	ļ			
Ē					-		-					END OF BOREHOLE AT 4.50 m					
A La							-										
ustralı																	
10ff At							_	1									
ickert							-	l									
is Bri							-	ł		1							
Parso	1	I	<u> </u>	<u> </u>	Thie bo	rehol	e  07 et	l ould be i		in con		on with Parsons Brinskerboffa according			<u>       </u>	L.	
	This borehole log should be read in conjunction with Parsons Brinckerhoff's accompanying standard notes.																



BOREHOLE NO.

MW4

	SHEET 1 OF 1																		
Client: NSW Maritime											PB Borehole No.: Sampling				ite	Сс	nm	enced:	10.02.2009
P	roj	ect:				Rozelle	Ba	iy Grou	indwate	er S	ampli	ng		Da	te	Co	omple	eted:	10.02.2009
B	ore	əho	le Lo	ocatio	n:	Rozelle	Ba	ay, NSV	V					Re	co	rde	ed By	/:	DV
P	roj	ect	Nur	nber:		211698	8A				· <u>··</u> ·····			Log	g (	Che	ecke	d By:	
D	Prill	Мо	del/	Moun	ling	g: Hydrap	wo	er			Drille	er: er Li	c No: Macquarie Surface RL						
В	ore	ehoi	le D	iamet	er:	100 mn	n				TOC	(R	L): Local Co-or	ds:					
Γ		_		B	ore	hole Infor	mai	tion					Field Material	)es(	cri	pti	on		····
	1	2	3			4		5	6	7	8	9	10	11		1	2		13
				y g	2						g	님			, n	DE	ASITY		
	Q	RT	~	CASI	co	WELL INSTRUCTION		Ē		ш	ц Ц	MB	SOIL/ROCK MATERIAL FIELD DESCRIPTION	盟			<u> </u>	ADDITIC	RUCTURE AND
	Ĕ	PPO	TER	Ē	Í		Ē	РТН	ST C	MPL	НΗ	C S		IST		₹_	צסצי	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Ľ	Ä	ŝU	/M	55	ŝ		R	DE	ËË	Ś	ß	S		β	Ş	மை	т <u>қ</u> ят		
Т	С					Flush Gatic and Lockable Seal		0.05			$\times$		BITUMEN FILL: silty sand: fine grained light grey	1 <sup>D</sup>	$\vdash$				
				S (	Ň.	Certeri Sea		-	PID=0.6	J	$\otimes$		loose, dry					—_мw4_	0.2-0.3
				¥2. `					ppm PID=0.0	<u>F</u>	i XXX							MW4	0.3-0.5
								-	ppm	J	$\bigotimes$					ļ	Цİ.		
	-					nentonne Seal		0.60			×			1	$\vdash$	  +	111 日十	<u> </u>	
				5. I 8							×		with some shale gravel and cobbles			ļį			
					· .]	50mm uPVC Casing		0.80			颷		FILL; sand; medium grained, brown,	м	╓┼╴				
					;]	*			<u> </u>	<u> </u>	×		white and orange, some sandstone gravels up to 30mm diameter.	1		ļ			1 0-1 1
			▼	٩Ē				Pi	D=insuffici	enţ	鱁		becoming moist					101004	
			1/2/01					-			$\bigotimes$			1		1	ļļį		
											×			1					
				三日				1.50			XX			]	L	<u>i i</u>	Ľί		
			18/2/0						PID=0.0	J	Ѭ		FILL; sand, as above but slightly more clay, with larger sandstone					101004	1.0-1.0
Т				目									gravels/cobbles			11	ίij.		
Т			:					-			×								
g				三	2			2.00 - ?			XXX				L				<u> </u>
12122				Î		50mm uPVC Screen			PiD=0.0 ppm	J	Ѭ		FILL; clayey sand; fine grained, grey to dark grey, sandstone gravels present					1414 44_	2.0-2.1
5								-								11			
В. Н											XXX								
Ĕ								-			$\otimes$					İİ	<u>iii</u>		
B								-			×								
GD											XX					ļĮ	İİİ		
Ë				目				-		ĺ									
NZ								_			×					ii			20.21 (041
ğ				<u>99</u>	2	End Cap		<del>- 210</del>	PID=0.0	J	×××				+				-0.0-0.1, (GPC1,
Ĭ						Ŧ		-					LIG OF BOMEROLE AT 3. WIII			í I		1	
ξ																			
<u>ole</u>								-	]		1					ii			
뛴								-	Į		1								
8											1					11			
NTAL								-	1		1								
ΨĮ			ļ					4-			1								
<u>ě</u>								4-			1					ļļ			
EN								-	-		1				1			1	
5.7																			
lsion								-	1	ł									
ŝ								-	ļ			ĺ				ļļ			
Ĭ																			
lia P								-	{		1					ÌÌ	111	ļ	
ustra											1								
βĮ								-	]		1								
Ē								-	-		1								
Binc											1								
suo								-											
Pars						This by	oreh	ole log sh	nould be	rear	in coni	uncf	on with Parsons Brinckerhoff's accompany	ina	ste	inde	ard no	tes.	
٥L												~	and a second printerior of a doornpan		0.0				

# APPENDIX D Pavement Photographs



Plate

Sydney Super Yacht Marina Development	July-10
James Craig Road, Rozelle Bay	





Sydney Super Yacht Marina Development	July-10
James Craig Road, Rozelle Bay	





Plate

Sydney Super Yacht Marina Development	July-10
James Craig Road, Rozelle Bay	





Plate

Sydney Super Yacht Marina Development	July-10
James Craig Road, Rozelle Bay	





Sydney Super Yacht Marina Development	July-10
James Craig Road, Rozelle Bay	-



# APPENDIX E Results of Laboratory Tests



Envirolab Services Pty Ltd ABN 37 112 535 645 12 Ashley St Chatswood NSW 2067 ph 02 9910 6200 fax 02 9910 6201 enquiries@envirolabservices.com.au www.envirolabservices.com.au

### CERTIFICATE OF ANALYSIS 42914-A

<u>Client:</u> Douglas Partners 96 Hermitage Rd West Ryde NSW 2114

Attention: Nizam Ahamed

#### Sample log in details:

Your Reference: No. of samples: Date samples received: Date completed instructions received:

#### 71816, Rozelle Baseline

Additional Testing on 2 Soils 01/07/10 02/07/10

#### Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data. Samples were analysed as received from the client. Results relate specifically to the samples as received. Results are reported on a dry weight basis for solids and on an as received basis for other matrices. *Please refer to the last page of this report for any comments relating to the results.* 

#### **Report Details:**

 Date results requested by:
 9/07/10

 Date of Preliminary Report:
 Not Issued

 Issue Date:
 9/07/10

 NATA accreditation number 2901. This document shall not be reproduced except in full.

 This document is issued in accordance with NATA's accreditation requirements.

 Accredited for compliance with ISO/IEC 17025.

 Tests not covered by NATA are denoted with \*.

Results Approved By:

Jacinta/Hurst Laboratory Manager

Envirolab Reference:

42914-A R 00



Page 1 of 5

Miscellaneous Inorg - soil			
Our Reference:	UNITS	42914-A-8	42914-A-25
Your Reference		BH2/2-2.5	BH13/3-3.5
Date Sampled		22/06/2010	22/06/2010
Type of sample		Soil	Soil
Date prepared	-	7/7/2010	7/7/2010
Date analysed	-	7/7/2010	7/7/2010
pH 1:5 soil:water	pH Units	8.1	7.5
Chloride, CI 1:5 soil:water	mg/kg	4,100	4,100
Sulphate, SO4 1:5 soil:water	mg/kg	740	1,100
Resistivity in soil*	ohm m	3.3	3.2

ACCREDITED FOR TECHNICAL COMPETENCE

#### **Client Reference:** 71816, Rozelle Baseline

Method ID	Methodology Summary
LAB.1	pH - Measured using pH meter and electrode in accordance with APHA 20th ED, 4500-H+.
LAB.81	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA 21st ED, 4110-B.
LAB.2	Conductivity and Salinity - measured using a conductivity cell and dedicated meter, in accordance with APHA2510 20th ED and Rayment & Higginson.

42914-A R 00



### Client Reference: 71816, Rozelle Baseline

			1		the state of the s			
QUALITY CONTROL	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results	Spike Sm#	Spike %
Miscellaneous Inorg - soil						Base II Duplicate II %RPD		Recovery
Date prepared	-			7/7/201 0	[NT]	[NT]	LCS-1	7/7/2010
Date analysed	-			7/7/201 0	[NT]	[דא]	LCS-1	7/7/2010
pH 1:5 soil:water	pH Units		LAB.1	[NT]	[NT]	[NT]	LCS-1	100%
Chloride, Cl 1:5 soil:water	mg/kg	2	LAB.81	<2.0	[NT]	[TM]	LCS-1	104%
Sulphate, SO4 1:5 soil:water	mg/kg	2	LAB.81	<2.0	[NT]	[NT]	LCS-1	106%
Resistivity in soil*	ohm m	1	LAB.2	<1.0	[NT]	[NT]	LCS-1	98%

Envirolab Reference: 42914-A Revision No: R 00



#### Report Comments:

 Asbestos was analysed by Approved Identifier:
 Not applicable for this job

 Asbestos was authorised by Approved Signatory:
 Not applicable for this job

 INS: Insufficient sample for this test
 NT: Not tested
 PQL: Practical Quantitation Limit
 <: Less than</td>
 >: Greater than

 RPD: Relative Percent Difference
 NA: Test not required
 LCS: Laboratory Control Sample
 NR: Not requested

#### **Quality Control Definitions**

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples. **Duplicate:** This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist. LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank

sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

### Laboratory Acceptance Criteria:

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the sample batch were within laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for

SVOC and speciated phenols is acceptable. Surrogates: 60-140% is acceptable for general organics and 10-140% for

Envirolab Reference: 42914-A Revision No: R 00 

Douglas Partners Pty Ltd ABN 75 053 980 117 PO Box 472 West Rvde NSW 1685 Australia

96 Hermitage Road West Ryde NSW 2114 Phone (02) 9809 0666 (02) 9809 4095 Fax: sydney@douglaspartners.com.au

# **RESULT OF CALIFORNIA BEARING RATIO TEST**

Client :	SYDNEY SUPERYACHT MARINA PTY LTD	Project No. :	71816.01
		Report No. :	S10-135 A
Project :	SYD SUPERYACHT MARINA REDEVELOPMENT	Report Date :	12/07/10
		Date Sampled :	-
Location :	JAMES CRAIG ROAD, ROZELLE BAY	Date of Test:	02/07/10
Test Location :	BH 6		
Depth / Layer :	0.4-1.5m	Page:	1 of 1



**Description:** GRAVEL AND SAND - Grey fine to medium gravel and sand with some clay Test Method(s): AS 1289.6.1.1, AS 1289.2.1.1 Sampling Method(s): Sampled by Engineering Department Percentage > 19mm:

> LEVEL OF COMPACTION: 100% of STD MDD MOISTURE RATIO: 104% of STD OMC

SURCHARGE: 4.5 kg SOAKING PERIOD: 4 days

(Exclue	aea)
SWELL:	-0.1%

1.0%

CONDITION		MOISTURE CONTENT %	DRY DENSITY t/m <sup>3</sup>
At compaction		11.3	1.99
After soaking		12.8	1.99
After test	Top 30mm of sample	11.8	-
	Remainder of sample	11.9	-
Field values		9.2	-
Standard Compa	action	10.9	2.00

RESULTS			
TYPE	PENETRATION	CBR (%)	
тор	2.5 mm	25	
IOF	5.0 mm	30	



NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025

### **Approved Signatory:**

M ermann Norman Weimann

Laboratory Manager

© 2006Douglas Partners Pty Ltd

Form R019 Rev6 July 2006



Douglas Partners Pty Ltd ABN 75 053 980 117 PO Box 472 West Ryde NSW 1685 Australia 96 Hermitage Road West Ryde NSW 2114 Phone (02) 9809 0666 Fax: (02) 9809 4095 sydney@douglaspartners.com.au

# **RESULTS OF COMPACTION TEST**

Client :	SYDNEY SUPERYACHT MARINA PTY LTD	Project No. :	71816.01
Project :	SYD SUPERYACHT MARINA REDEVELOPMENT	Report No. : Report Date :	S10-135 A2 05/07/2010
Location :	JAMES CRAIG ROAD, ROZELLE BAY	Date of Test: Page:	02/07/2010 1 of 1





Test Methods:

AS 1289.2.1.1, AS 1289.5.1.1

Sampling Methods:

Sampled by Engineering Department



NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025 Approved Signatory:

AY

NW

Tested:

Checked:

Moimon

Norman Weimann Laboratory Manager



Douglas Partners Pty Ltd ABN 75 053 980 117 PO Box 472 West Ryde NSW 1685 Australia 96 Hermitage Road West Ryde NSW 2114 Phone (02) 9809 0666 Fax: (02) 9809 4095 sydney@douglaspartners.com.au

# **RESULT OF CALIFORNIA BEARING RATIO TEST**

Client :	SYDNEY SUPERYACHT MARINA PTY LTD	Project No. :	71816.01
		Report No. :	S10-135 B
Project :	SYD SUPERYACHT MARINA REDEVELOPMENT	Report Date :	12/07/10
		Date Sampled :	-
Location :	JAMES CRAIG ROAD, ROZELLE BAY	Date of Test:	02/07/10
Test Location :	BH 7		
Depth / Layer :	0.2-0.5m	Page:	1 of 1



Description:GRAVELLY SAND - Dark grey gravelly sand with some clayTest Method(s):AS 1289.6.1.1, AS 1289.2.1.1

Sampling Method(s): Sampled by Engineering Department

Percentage > 19mm: 6.0% (Excluded)

LEVEL OF COMPACTION: 101% of STD MDD MOISTURE RATIO: 98% of STD OMC

SURCHARGE: 4.5 kg SOAKING PERIOD: 4 days SWELL: -0.1%

CONDITION		MOISTURE CONTENT %	DRY DENSITY t/m <sup>3</sup>
At compaction		11.2	1.95
After soaking		12.6	1.95
After test	Top 30mm of sample	12.4	-
	Remainder of sample	11.9	-
Field values		9.4	-
Standard Compaction		11.5	1.93

RESULTS				
TYPE	PENETRATION	CBR (%)		
тор	2.5 mm	17		
106	5.0 mm	20		



NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025 Approved Signatory:

Mainan


96 Hermitage Road West Ryde NSW 2114 Phone (02) 9809 0666 Fax: (02) 9809 4095 sydney@douglaspartners.com.au

### **RESULTS OF COMPACTION TEST**

Client :	SYDNEY SUPERYACHT MARINA PTY LTD	Project No. : Report No. :	71816.01 \$10-135 B2
Project :	SYD SUPERYACHT MARINA REDEVELOPMENT	Report Date :	05/07/2010
Location :	JAMES CRAIG ROAD, ROZELLE BAY	Date of Test: Page:	02/07/2010 1 of 1





AS 1289.2.1.1, AS 1289.5.1.1

Sampling Methods:

Sampled by Engineering Department



NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025

**Approved Signatory:** 

AY

NW

Tested:

Checked:

Maimann

Norman Weimann Laboratory Manager



96 Hermitage Road West Ryde NSW 2114 Phone (02) 9809 0666 Fax: (02) 9809 4095 sydney@douglaspartners.com.au

## **RESULT OF CALIFORNIA BEARING RATIO TEST**

Client :	SYDNEY SUPERYACHT MARINA PTY LTD	Project No. :	71816.01
		Report No. :	S10-135 C
Project :	SYD SUPERYACHT MARINA REDEVELOPMENT	Report Date :	12/07/2010
		Date Sampled :	-
Location :	JAMES CRAIG ROAD, ROZELLE BAY	Date of Test:	02/07/2010
Test Location :	BH 7		
Depth / Layer :	0.7-1.2m	Page:	1 of 1



Description:SANDY SILT - Light brown sandy siltTest Method(s):AS 1289.6.1.1, AS 1289.2.1.1Sampling Method(s):Sampled by Engineering Department

Percentage > 19mm: 0.0%

LEVEL OF COMPACTION: 101% of STD MDD MOISTURE RATIO: 92% of STD OMC SURCHARGE: 4.5 kg SOAKING PERIOD: 4 days SWELL: 0.1%

C	CONDITION	MOISTURE CONTENT %	DRY DENSITY t/m <sup>3</sup>
At compaction		10.5	1.95
After soaking		12.8	1.95
After test	Top 30mm of sample	14.9	-
	Remainder of sample	12.5	-
Field values		8.3	-
Standard Compaction		11.4	1.94

RESULTS			
TYPE PENETRATION		CBR (%)	
TOP	2.5 mm	30	
	5.0 mm	30	



NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/TEC 17025

#### Approved Signatory:

Meimann

Tested: AY Checked: NW

Norman Weimann Laboratory Manager



96 Hermitage Road West Ryde NSW 2114 Phone (02) 9809 0666 Fax: (02) 9809 4095 sydney@douglaspartners.com.au

## **RESULTS OF COMPACTION TEST**

Client :	SYDNEY SUPERYACHT MARINA PTY LTD	Project No. :	71816.01
Project :	SYD SUPERYACHT MARINA REDEVELOPMENT	Report Date :	05/07/2010
Location :	JAMES CRAIG ROAD, ROZELLE BAY	Date of Test: Page:	02/07/2010 1 of 1





Sampling Methods:

Sampled by Engineering Department



NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements Accredited for compliance with ISO/IEC 17025

**Approved Signatory:** 

AY

NW

Tested:

Checked:

Milleimann

Norman Weimann Laboratory Manager



96 Hermitage Road West Ryde NSW 2114 Phone (02) 9809 0666 Fax: (02) 9809 4095 sydney@douglaspartners.com.au

# **RESULT OF CALIFORNIA BEARING RATIO TEST**

Client :	SYDNEY SUPERYACHT MARINA PTY LTD	Project No. : Report No. :	71816.01 S10-135 D
Project :	SYD SUPERYACHT MARINA REDEVELOPMENT	Report Date : Date Sampled :	12/07/2010
Location : Test Location :	JAMES CRAIG ROAD, ROZELLE BAY BH 9	Date of Test:	02/07/2010
Depth / Layer :	0.5-1.5m	Page:	1 of 1



Description:CLAYEY SAND - Brown clayey sand with some gravelTest Method(s):AS 1289.6.1.1, AS 1289.2.1.1Sampling Method(s):Sampled by Engineering Department

LEVEL OF COMPACTION: 100% of STD MDD MOISTURE RATIO: 99% of STD OMC SURCHARGE: 4.5 kg SOAKING PERIOD: 4 days

4.5 kg 4 davs

Percentage > 19mm: 3.1%

(Exclue	ded)
SWELL:	-0.2%

С	ONDITION	MOISTURE CONTENT %	DRY DENSITY t/m <sup>3</sup>
At compaction		12.4	1.95
After soaking		13.2	1.95
After test	Top 30mm of sample	13.4	-
	Remainder of sample	12.6	-
Field values		12.2	-
Standard Compaction		12.5	1.94

RESULTS			
TYPE	PENETRATION	CBR (%)	
TOP	2.5 mm	35	
IOF	5.0 mm	45	



NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's secreditation requirements. Accredited for compliance with ISO/IEC 17025

#### Approved Signatory:

AY

NW

Tested:

Checked:

Mllemann. Norman Weimann Laboratory Manager



96 Hermitage Road West Ryde NSW 2114 Phone (02) 9809 0666 Fax: (02) 9809 4095 sydney@douglaspartners.com.au

## **RESULTS OF COMPACTION TEST**

Client :	SYDNEY SUPERYACHT MARINA PTY LTD	Project No. : Report No. :	71816.01 S10-135 D2
Project :	SYD SUPERYACHT MARINA REDEVELOPMENT	Report Date :	05/07/2010
Location :	JAMES CRAIG ROAD, ROZELLE BAY	Date of Test: Page:	02/07/2010 1 of 1





Test Methods:

AS 1289.2.1.1, AS 1289.5.1.1

Sampling Methods:

Sampled by Engineering Department



Form R016 Rev 6 July 2006 @ 2006 Douglas Partners Pty Ltd

NATA Accredited Laboratory Number: 828 This Document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/TEC 17025 Approved Signatory:

AY

NW

Tested:

Checked:

ermann Norman Weimann

Laboratory Manager