DRAPERS CIVIL CONTRACTING PTY LTD

THE QUAY 2 ESTATE STAGE 10

1505-1535 SURF COAST HWY TORQUAY

Report On

LEVEL 1 SURVEILLANCE & COMPACTION CONTROL OF EARTHWORKS

Carried Out By



Project No.: 1917/041



Factory 1/8-10 Catalina Dve, Tullamarine, Vic 3043 PO Box 2693, Gladstone Park, Vic, 3043 ABN 51 102 571 077 PH (03) 9335-1225

9th November 2017 Project No.:1917/041

Drapers Civil Contracting Pty Ltd PO Box 287 Belmont, Vic 3216 Attention: - Mr. Matthew Jackman

Dear Sir,

RE: The Quay 2 Estate Stage 10 - Earthworks

Introduction & Scope

At the request of Drapers Civil Contracting Pty Ltd, Geotechnical Laboratories has carried out inspection and testing of the above-mentioned site from the 19th of January 2017 to the 16th of March 2017 where a residential development is being constructed. Inspection and testing of stripping, material quality and compaction control tests were carried out to comply with the requirements of AS 3798 Appendix B, Level 1.

The following documentation was submitted to Geotechnical Laboratories by Drapers Civil Contracting Pty Ltd and was used to determine compliance of earthworks in conjunction with the requirements of AS 3798 – 2007 (See Appendix A).

(1). Standard Faceplan Layout Drawing No. 10R2 Version H.

General site works involved the placement of fill, using on-site derived materials, to bring the fill regions to the required finished levels as indicated on the construction drawings.

Site Preparation

Site inspections were undertaken on the 19th of January 2017 confirming that areas to be filled were completely stripped of topsoil prior to filling. The brown silty topsoils had been stockpiled around the site for later removal off-site.

Proof roll inspections were performed throughout the project duration to ensure no soft areas were present prior to filling.

<u>Material</u>

It is understood that the fill material used was sourced from on-site, primarily from road boxing and service trench excavations. Additional material was also sourced from nearby Armstrong and Zeally Sands Estates.

The fill material is best described as a CLAY, slightly silty, brown, orangebrown, slightly moist to moist, with fine to course grained sand and occasional gravels.

The fill material is consistent with the naturally occurring soils for this region.

Source material was deemed a **Suitable Material** in accordance with the guidelines set out in AS 3798 - 2007 Section 4.4.

Compaction of Fill Material

A sheepsfoot compactor placed the material in horizontal loose layers of approximately 250mm–300mm. The sheepsfoot compactor also performed compaction of the fill material using a criss cross pattern where possible.

The moisture condition of the fill was closely monitored and moisture conditioning procedures were applied to bring the material closer to its Standard Optimum Moisture Content (AS 1289 5.7.1). Moisture conditioning was carried out using a water cart and mixing with the grader prior to rolling.

Compaction Testing

Compaction control testing was performed on-site using a Nuclear Densometer in accordance with AS 1289 5.8.1. Laboratory reference densities were determined from material sampled at each test site location using the Hilf Rapid Compaction Method in accordance with AS 1289 5.7.1.

A total of eighteen compaction tests were performed on the constructed allotment fill. Results are presented in Appendix A of this report.

Testing frequencies were in accordance with **AS 3798 - 2007 Table 8.1** for **Large Scale Operations.**

Acceptance of fill layers for compaction was based on the requirements of **AS** 3798 - 2007 Table 5.1 Item 1. Residential. As a result, the compliance criteria adopted by Geotechnical Laboratories was a hilf density ratio not less than 95 percent of the maximum hilf density value as determined by the Standard Hilf Rapid Compaction Method in accordance with AS 1289 5.7.1.

All test results indicate that the above-mentioned requirements have been successfully achieved.

No moisture criteria was specified.

Remarks

So far as can be determined, Drapers Civil Contracting Pty Ltd has satisfactorily complied with the compaction and construction processes required for the structural filling of this site. As such, structural filling placed on this site by Drapers Civil Contracting Pty Ltd from the 20th of January 2017 to the 16th of March 2017 can be categorised as CONTROLLED FILL in accordance with AS 2870-2011.

Note: Test results and controlled fill certification relates only to fill placed by Drapers Civil Contracting Pty Ltd and for earthworks completed at the time of testing. Any previous or subsequent earthworks will require a separate evaluation.

Yours Faithfully, GEOTECHNICAL LABORATORIES.

Sam Loza.

Laboratory Manager.

DRAPERS CIVIL CONTRACTING PTY LTD

THE QUAY 2 ESTATE STAGE 10

1505-1535 SURF COAST HWY TORQUAY

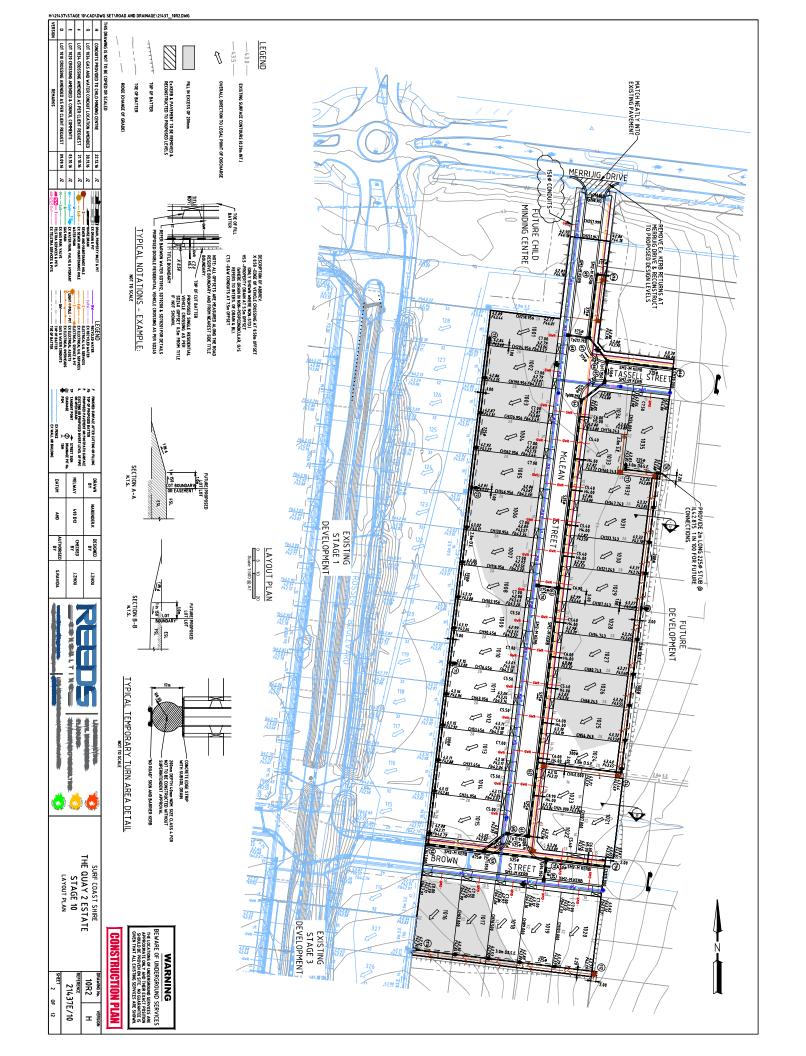
Report On

LEVEL 1 SURVEILLANCE & COMPACTION CONTROL OF EARTHWORKS

Carried Out By



APPENDIX A





REPORT NO.: # 1916/047

LOCATION: DRAPERS - Quay Estate Torquay

NOTES: Onsite Sandy Clay Fill Test sites located - Geolab Procedure 4, Part 4.3.		1	locations.	20/01/17 3 Refer to #1916/048 for	20/01/17 2	20/01/17 1	DATE TEST TEST LOCATION TESTS
re 4, Part 4.3.			1	<i>for</i> 2.06	1.99	2.06	FIELD WET DENSITY (t/m³)
		,	1	3 18.0	19.0	3 19.0	D FIELD T MOISTURE ITY CONTENT (%)
		,	1	99.5	99.5	100.0	HILF DENSITY E RATIO T STANDARD (%)
Compaction specime Start Time: 11.35am		ı		2.06	2.00	2.06	STANDARD PCWD OR APCWD (t/m³)
Compaction specimens sampled after compaction. Start Time: 11.35am Finish Time: 12.00pm	ı	ı	1	18.0	18.5	18.5	STANDARD OPTIMUM MOISTURE CONTENT (%)
s sampled Finish Ti	ı	ı	1	175	175	175	PROBE DEPTH SETTING (mm)
sampled after compac Finish Time: 12.00pm	'	ı	,	0.0 Drier 100.0	0.0 Wetter 101.5	0.5 Wetter 102.5	VARIATION FROM OPTIMUM MOISTURE CONTENT (%)
vaction.	ı	ı	1	100.0	101.5	102.5	MOISTURE RATIO (%)
	-	1	-	0	0	0	WET WET +19mm +37.5mm (%) (%)
		,	ı	0	0	0	WET +37.5mm (%)
	,	ı	1	200	400	400	APPROX. DEPTH BELOW FINISH LEVEL (mm)

A Hilf Rapid Compaction test was carried out on a sample taken from each Field Density location to obtain the Compaction Parameters tabulated on this Report.

Hilf Density Ratio and Hilf Moisture Variation , Hilf Adjusted (APCWD) & Peak (PCWD) Converted Wet Density AS 1289 5.7.1

Moisture Content: AS 1289 2.1.1 Compaction Test: AS 1289 5.7.1

NATA

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(Approved Signatory)
Issue Date: 16/2/2017

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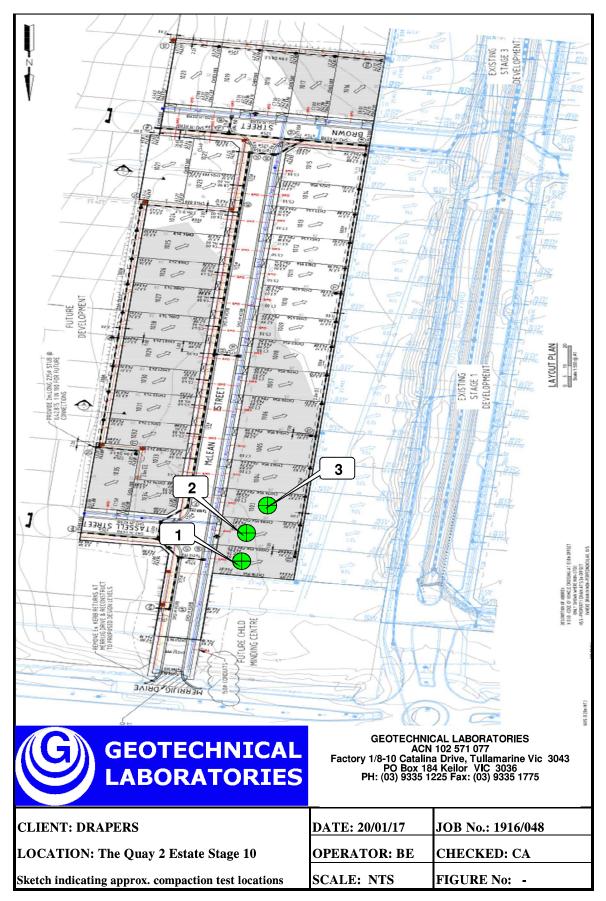
NATA Accredited Laboratory Number 14561

Rev: 12 SS3092-1 July 2016

Field Density, Nuclear Gauge: AS 1289 5.8.1

Materials Sampled: AS 1289 1.2.1 Clause 6.4(b)

Soil Layer thickness: 200mm





REPORT NO.: # 1916/049

LOCATION: DRAPERS - Quay Estate 2 Stage 10

Test	NOTES: Onsit		1		24/01/17 3	24/01/17 2	24/01/17 1	DATE TEST OF NUM.
Test sites located - Geolab Procedure 4, Part 4.4.	Onsite Clay Fill			approx. rest site locations.	Refer to #1916/050 for			TEST LOCATION
art 4.4.		-	-	-	1.94	1.91	1.99	FIELD WET DENSITY (t/m³)
		-	1	-	11.5	15.5	16.5	FIELD MOISTURE CONTENT (%)
		1		-	95.5	95.0	102.0	HILF DENSITY RATIO STANDARD (%)
Start Time: 1:15pm	Compactio	1	1	1	2.03	2.01	1.95	STANDARD PCWD OR APCWD (t/m³)
1:15pm	Compaction specimens sampled after compaction.	•	1	-	14.0	17.0	19.0	STANDARD OPTIMUM MOISTURE CONTENT (%)
Finish Tin	s sampled	1	1	-	175	175	175	PROBE DEPTH SETTING (mm)
Finish Time: 1:39pm	after comp	•	1	-	2.5 Drier	1.5 Drier	2.5 Drier	VARIATION FROM OPTIMUM MOISTURE CONTENT (%)
	action.	1	1	•	82.5	90.5	87.5	MOISTURE RATIO (%)
		ı		-	0	0	0	WET WET +19mm +37.5mm (%) (%)
		1	ı	1	0	0	0	WET +37.5mm (%)
		1	1	1	0	0	0	APPROX. DEPTH BELOW FINISH LEVEL (mm)

A Hilf Rapid Compaction test was carried out on a sample taken from each Field Density location to obtain the Compaction Parameters tabulated on this Report. Moisture Content: AS 1289 2.1.1

Hilf Density Ratio and Hilf Moisture Variation , Hilf Adjusted (APCWD) & Peak (PCWD) Converted Wet Density AS 1289 5.7.1 Soil Layer thickness: 200mm Compaction Test: AS 1289 5.7.1

Field Density, Nuclear Gauge: AS 1289 5.8.1

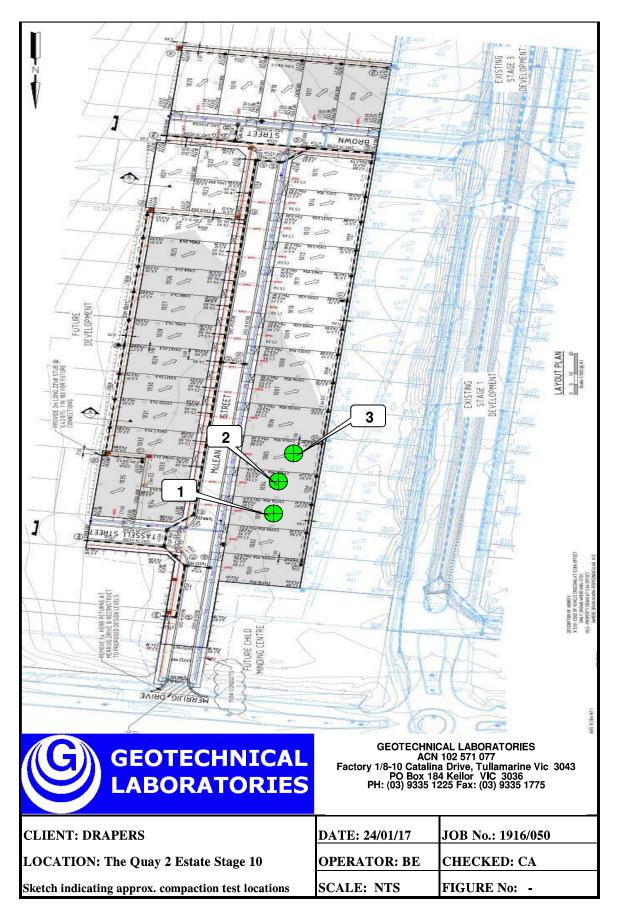
Materials Sampled: AS 1289 1.2.1 Clause 6.4(b)

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Issue Date: 20/2/2017





REPORT NO.: # 1916/051

LOCATION: DRAPERS - Quay Estate 2 Stage 10

	NOTES: Onsite Clay Fill		,	,	25/01/17	25/01/17	25/01/17	DATE OF TESTS
Test s	Onsit	ı	1	ı	3	2	_	TEST NUM.
Test sites located - Geolab Procedure 4, Part 4.4.	e Clay Fill			locations.	Refer to #1916/052 for			TEST LOCATION
art 4.4.		-	1	1	2.11	1.90	1.96	FIELD WET DENSITY (t/m³)
		-	1	•	12.0	19.0	16.0	FIELD MOISTURE CONTENT (%)
		-	1	-	102.0	97.0	100.0	HILF DENSITY RATIO STANDARD (%)
Start Time: 11:22am	Compaction	ī	1	ı	2.07	1.95	1.96	STANDARD PCWD OR APCWD (t/m³)
11:22am	Compaction specimens	-	1	-	14.0	21.0	17.5	STANDARD OPTIMUM MOISTURE CONTENT (%)
Finish T	s sampled	1	1	1	175	175	175	PROBE DEPTH SETTING (mm)
Finish Time: 11:46am	sampled after compaction.	1	'	•	2.0 Drier	1.5 Drier	1.5 Drier	VARIATION FROM OPTIMUM MOISTURE CONTENT (%)
m	action.		,	,	87.0	92.0	92.0	MOISTURE RATIO (%)
		,	1	'	0	0	0	WET +19mm (%)
		ı	ı	ı	0	0	0	WET +37.5mm (%)
		1	1	ı	0	0	400	APPROX. DEPTH BELOW FINISH LEVEL (mm)

A Hilf Rapid Compaction test was carried out on a sample taken from each Field Density location to obtain the Compaction Parameters tabulated on this Report.

Moisture Content: AS 1289 2.1.1

Compaction Test: AS 1289 5.7.1

Hilf Density Ratio and Hilf Moisture Variation , Hilf Adjusted (APCWD) & Peak (PCWD) Converted Wet Density AS 1289 5.7.1

Field Density, Nuclear Gauge: AS 1289 5.8.1

Soil Layer thickness: 200mm

Materials Sampled: AS 1289 1.2.1 Clause 6.4(b)

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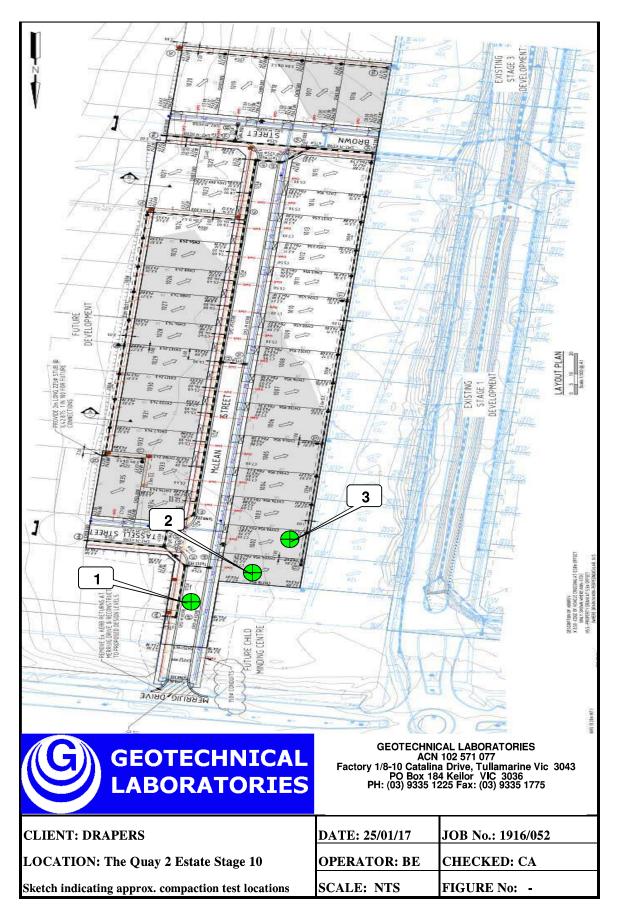
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REPORT NO: # 1916/053

LOCATION: DRAPERS - Quay 2 Estate Stage 10

			paction. om	sampled after compac Finish Time: 12:15pm	s sample Finish T	Compaction specimens sampled after compaction. Start Time: 11:45am Finish Time: 12:15pm	Compaction specimes Start Time: 11:45am			oart 4.4.	Onsite Clay Fill Test sites located - Geolab Procedure 4, Part 4.4.	Onsite Test sit	NOTES: Onsite Clay Fill Test sites located
1	-	1	1	1	1	1	ı	1	ı	1		,	ı
ı	1	ı	ı	ı	ı	ı	ı	ı	ı	ı		'	ı
-	-	1	1	-	1	1	ı	1	ı	ı	locations.	ı	-
0	0	0	101.5	0.0 Wetter	175	19.0	2.03	98.0	19.0	1.98	Refer to #1916/054 for	3	1/02/17
0	0	0	90.5	2.5 Drier	175	26.5	1.82	103.5	24.0	1.89		2	1/02/17
0	0	0	89.0	2.0 Drier	175	17.0	2.01	97.5	15.0	1.96			1/02/17
APPROX. DEPTH BELOW FINISH LEVEL (mm)	WET +37.5mm (%)	WET +19mm (%)	MOISTURE RATIO (%)	VARIATION FROM OPTIMUM MOISTURE CONTENT (%)	PROBE DEPTH SETTING (mm)	STANDARD OPTIMUM MOISTURE CONTENT (%)	STANDARD PCWD OR APCWD (t/m³)	HILF DENSITY RATIO STANDARD (%)	FIELD MOISTURE CONTENT (%)	FIELD WET DENSITY (t/m³)	TEST LOCATION	TEST NUM.	DATE OF TESTS

A Hilf Rapid Compaction test was carried out on a sample taken from each Field Density location to obtain the Compaction Parameters tabulated on this Report.

Moisture Content: AS 1289 2.1.1

Compaction Test: AS 1289 5.7.1

Hilf Density Ratio and Hilf Moisture Variation ,Hilf Adjusted (APCWD) & Peak (PCWD) Converted Wet Density AS 1289 5.7.1

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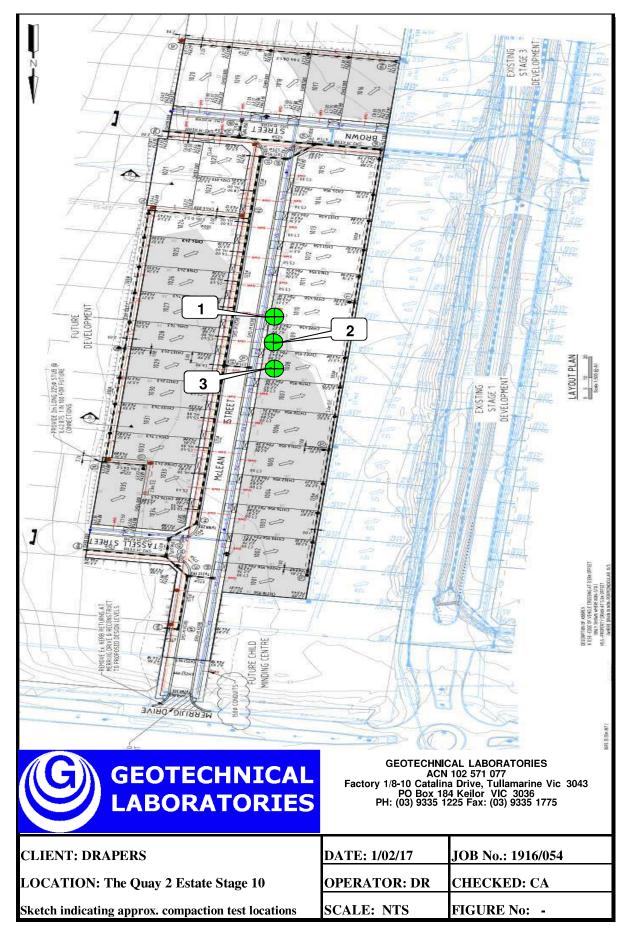
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Materials Sampled: AS 1289 1.2.1 Clause 6.4(b) Field Density, Nuclear Gauge: AS 1289 5.8.1 Soil Layer thickness: 200mm





REPORT NO: # 1916/073

LOCATION: DRAPERS - Quay 2 Estate Stage 10

2am	:02am	Finish Time: 11:02am	Finish 7	10:40am	Start Time: 10:40am			Part 4.4	Test sites located - Geolab Procedure 4, Part 4.4.	Test sit	
after cc	after (ă	s sample	n specimer	Compaction specimens sampled after compaction.				NOTES: Onsite Clay Fill	Onsite)TES:
		ı	ı	-	ı	1	ı	ı		i	-
ı	ı		1	-	1	ı	I	ı		ı	1
ı	ı	-	1	-	1	1	ı	-	locations.	i	Ī
2.5 Drier	2.5 [175	27.0	1.89	99.0	24.0	1.87	Refer to #1916/074 for	ω	10/03/17
3.0 Drier	3.0 [175	19.5	1.95	0.66	16.5	1.93		2	10/03/17
0.5 Drier	0.5 [175	25.5	1.93	98.5	25.0	1.90		_	10/03/17
VARIATION FROM OPTIMUM MOISTURE CONTENT (%)		21/	PROBE DEPTH SETTING (mm)	STANDARD OPTIMUM MOISTURE CONTENT (%)	STANDARD PCWD OR APCWD (t/m³)	HILF DENSITY RATIO STANDARD (%)	FIELD MOISTURE CONTENT (%)	FIELD WET DENSITY (t/m³)	TEST LOCATION	TEST NUM.	DATE OF TESTS

A Hilf Rapid Compaction test was carried out on a sample taken from each Field Density location to obtain the Compaction Parameters tabulated on this Report.

Moisture Content: AS 1289 2.1.1

Compaction Test: AS 1289 5.7.1

Hilf Density Ratio and Hilf Moisture Variation ,Hilf Adjusted (APCWD) & Peak (PCWD) Converted Wet Density AS 1289 5.7.1 NATA Accredited for compliance with ISO/IEC 17025. The results of the tests, calibrations and/or measurements included in standards. This document may not be reproduced except in

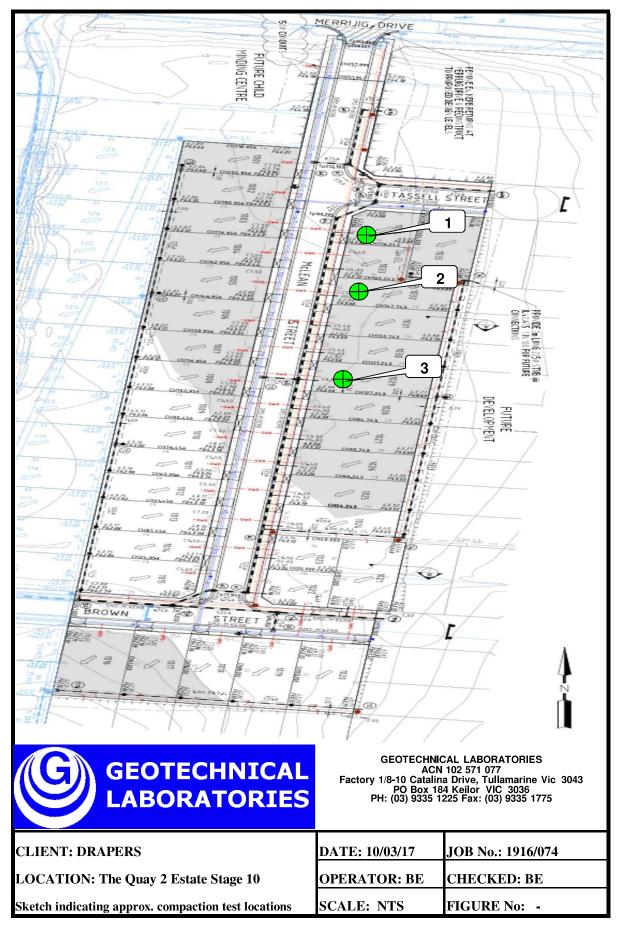
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Materials Sampled: AS 1289 1.2.1 Clause 6.4(b) Field Density, Nuclear Gauge: AS 1289 5.8.1 Soil Layer thickness: 200mm





REPORT NO: # 1916/077

LOCATION: DRAPERS - Quay2 Estate Stage 10

)m	- 5	Finish Time: 12:34pm	Finish Tim	12:10pm	Start Time: 12:10pm			Part 4.4.	Test sites located - Geolab Procedure 4, Part 4.4.	Test sit	()
pled after com	Compaction specimens sampled after compaction.	pled :	s sam	n specimen	Compaction				NOTES: Onsite Clay Fill	Onsite)TES:
1	1		_	ı	ı	1	ı	ı		ı	ı
ı	1		ı	1	I	-	ı	I		ı	ı
-	-			-	ı	-	-	ı	approx. test site locations.	ı	-
175 4.5 Drier			1	25.0	1.87	101.0	21.0	1.89	Refer to #1916/078 for	ω	16/03/17
175 4.0 Drier				27.5	1.84	100.5	23.5	1.85		2	16/03/17
175 6.0 Drier				30.5	№ 1.89	98.0	24.0	1.85		1	16/03/17
PROBE FROM DEPTH OPTIMUM SETTING MOISTURE (mm) (%)			S L F	STANDARD OPTIMUM MOISTURE CONTENT (%)	STANDARD PCWD OR APCWD (t/m³)	HILF DENSITY RATIO STANDARD (%)	FIELD MOISTURE CONTENT (%)	FIELD WET DENSITY (t/m³)	TEST LOCATION	TEST NUM.	DATE OF TESTS

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Moisture Content: AS 1289 2.1.1

Compaction Test: AS 1289 5.7.1

Hilf Density Ratio and Hilf Moisture Variation ,Hilf Adjusted (APCWD) & Peak (PCWD) Converted Wet Density AS 1289 5.7.1

Field Density, Nuclear Gauge: AS 1289 5.8.1

Soil Layer thickness: 200mm

Materials Sampled: AS 1289 1.2.1 Clause 6.4(b)

I Indicates APCWD



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