



Level 1 Geotechnical Inspection, Testing and Assessment The Pocket Stage 18

11512/P/762

fgf Developments Pty Ltd

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Document History

Effective Date	Description of Revision	Prepared By	Reviewed By	Approved By
11/03/2021		Craig Wilson	Peter Gode	Peter Gode

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Introduction

Construction Sciences is the largest private provider of construction materials testing services across Australia. We have a total staff of over 600 staff in 48 permanent offices/laboratories.

We have provided QA testing services to some of the largest road and mining infrastructure projects in these states, as well as overseas.

Over the last 3 to 4 years, Construction Sciences has established more site laboratories for road, rail, mining, and other large infrastructure projects than any other company.

We benefit our clients with the following clear differentiators;

Staff Mobilisation: Construction Sciences' geographic expansion and mobility allow for teams to be available when required, and currently we have the lion's share of major projects in Australia.

Quality Management: Construction Sciences' purpose-built software, COMPLY provides our clients with confidence, by knowing project data is securely stored. COMPLY has a built-in secure audit trail and a fully tracked Quality system. We are also ISO9001 compliant and certified.

Client Relationships: We listen to your needs and respond with innovative solutions that are tailored for your business. We believe in building relationships with our staff and local community.

Safety: At Construction Sciences we embrace a 'safety' culture and it is a key consideration with every project. Currently we are over 2 years LTI (lost time injury) free.

Construction Sciences Pty Ltd was commissioned by **fgf Developments Pty Ltd** to provide Level 1 inspection and testing services for the placement of fill at the residential development:-

PROJECT: The Pocket Stage 18

ADDRESS: The Pocket – Redlynch QLD 4870

The earthworks were carried out from 23/07/2020 to 24/02/2021

Lots 1801,1802,1803,1804,1805,1806,1807,1808,1809,1810,1811,1812,1813 and 1814 had fill placed during the earthworks.

Specification Requirements

Filling was carried out in accordance with AS3798-2007 '*Guidelines on earthworks for commercial and residential developments*' and with the project specification prepared for the project.

The specification requirements were that all fill was to be placed and compacted in layers to a density ratio of not less than 95% of the maximum density as determined by AS1289.5.7.1 (standard compaction).

Site Works

The Pocket Stage 18 project was a large scale cut to fill operation with approximately 4491m³ of fill placed.

Areas to be filled were stripped and proof rolled in accordance with the specification requirements.

The fill material generally comprised of Silty CLAY.

Compaction Control Testing

Compaction control tests were carried out at regular intervals throughout the placement of fill in accordance with the minimum test frequency recommendations included in AS3798-2007 '*Guidelines on earthworks for commercial and residential developments*'. All test results are included in the Appendix A. A summary of the test results is included as Table 1. A total of 17 field density tests were carried out throughout the earthworks. The average density ratio was 101.7 % with a standard deviation of **1.84** %.

Conclusion

It is considered that the placement of fill at, The Pocket – Redlynch QLD 4870 was carried out in a controlled manner and the fill was compacted to a density ratio not less than the specified requirement. It is concluded that the fill may be deemed to be '*controlled fill*' in accordance with AS2870 – 2011 '*Residential Slabs & Footings*'.



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Table 1-1 Summary of field density test results - **The Pocket Stage 18**

Date	Lot no.	Density ratio (1)
23/07/2020	1802	100.0
5/08/2020	1802	103.5
5/08/2020	1805	104.5
5/08/2020	1807	99.0
5/08/2020	1810	100.5
5/08/2020	1811	102.0
5/08/2020	1813	104.0
7/08/2020	1814	105.0
7/08/2020	1812	103.0
8/09/2020	1801	100.0
8/09/2020	1804	100.5
8/09/2020	1809	100.5
8/09/2020	1813	99.0
24/02/2021	1806	100.5
24/02/2021	1803	102.0
24/02/2021	1808	102.5
24/02/2021	1811	103.0

No. of tests:	17	Mean:	101.7 %	Standard Dev:	1.84%
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Notes:

1. Standard laboratory compaction used, AS1289.5.7.1.

Appendix A – Field Density Test Results



WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/28561-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/762
Project:	200702 - The Pocket Stg 18	Lot Number:	1802
Location:	Cairns	Internal Test Request:	11512/T/14612
Component:	Field Density	Client Reference/s:	MTR1605 - 23/07/2020
Area Description:	Lot 1802	Report Date / Page:	3/08/2020 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/74827			
ID / Client ID	MTR1605			
Lot Number	1802			
Date / Time Tested	23/07/2020 07:38			
Material Source	Onsite			
Material Type	Insitu Material			
Sampling Method	AS1289.1.2.1 CI 6.4b			
Depths: Test / Nom / Actual (mm)	125 / GST / 150			
Standard or Modified	Standard			
	GST			
	Lot 1802			
	Centre of Lot			
Test Fraction (mm)	< 19.0 mm			
Sample Oversize (%)	0			
Compaction Sample Number	11512/S/74827			
Sample Description	Silt Red			
Moisture Test Results:				
Field Moisture Content (%)	-			
Adjusted / Moisture Variation (%)	4.5			
Optimum Moisture Content (%)	-			
Moisture Variation from OMC	-			
Moisture Ratio (%)	-			
Density Test Results:				
Field Wet Density (t/m³)	1.89			
Adj/Peak Conv Wet Density (t/m³)	1.90			
Density Ratio Required (%)	95			
Hilf Density Ratio (%)	100.0			

Remarks

 <p>The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Accredited for compliance with ISO/IEC 17025 - Testing</p> <p>Accreditation Number: 1986 Corporate Site Number: 11512</p>	 <p>Approved Signatory: Craig Wilson Form ID: W5ASRep Rev 2</p>
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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/28749-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/762
Project:	200702 - The Pocket Stg 18	Lot Number:	Various
Location:	Cairns	Internal Test Request:	11512/T/14712
Component:	Field Densities	Client Reference/s:	MTR1606 - 5/08/2020
Area Description:	The Pocket Stage 18	Report Date / Page:	17/08/2020 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
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Sample Number	11512/S/75315	11512/S/75316	11512/S/75317	11512/S/75318
ID / Client ID	MTR1606	MTR1606	MTR1606	MTR1606
Lot Number	1802	1805	1807	1810
Date / Time Tested	5/08/2020 09:19	5/08/2020 09:34	5/08/2020 09:46	5/08/2020 10:00
Material Source	Onsite	Onsite	Onsite	Onsite
Material Type	General Fill	General Fill	General Fill	General Fill
Sampling Method	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b
Depths: Test / Nom / Actual (mm)	175 / 200 / 200	175 / 200 / 200	175 / 200 / 200	175 / 200 / 200
Standard or Modified	Standard	Standard	Standard	Standard
	GF1	GF2	GF3	GF4
	RL 28.0	RL 26.8	RL 26.1	RL 25.6
	Centre of Lot	Centre of Lot	Centre of Lot	Centre of Lot
	General Fill	General Fill	General Fill	General Fill
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	1	9	0	0
Compaction Sample Number	11512/S/75315	11512/S/75316	11512/S/75317	11512/S/75318
Sample Description	Clay	Clay	Clay	Clay
Moisture Test Results:				
Field Moisture Content (%)	12.4	12.8	17.6	17.0
Adjusted / Moisture Variation (%)	2.5	1.5	-3.0	-3.0
Optimum Moisture Content (%)	15.0	14.5	14.5	14.0
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)	(Wetter than OMC)	(Wetter than OMC)
Moisture Ratio (%)	83.0	87.0	122.0	121.5
Density Test Results:				
Field Wet Density (t/m³)	2.26	2.32	2.18	2.20
Adj/Peak Conv Wet Density (t/m³)	2.18	2.23	2.21	2.19
Density Ratio Required (%)	95	95	95	95
Hilf Density Ratio (%)	103.5	104.5	99.0	100.5

Remarks



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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/28750-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/762
Project:	200702 - The Pocket Stg 18	Lot Number:	Various
Location:	Cairns	Internal Test Request:	11512/T/14713
Component:	Field Densities	Client Reference/s:	MTR1606 - 5/08/2020
Area Description:	The pocket Stage 18	Report Date / Page:	17/08/2020 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/75319	11512/S/75320		
ID / Client ID	MTR1606	MTR1606		
Lot Number	1811	1813		
Date / Time Tested	5/08/2020 10:11	5/08/2020 10:27		
Material Source	Onsite	Onsite		
Material Type	Insitu Material	Insitu Material		
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b		
Depths: Test / Nom / Actual (mm)	125 / 150 / 150	125 / 150 / 150		
Standard or Modified	Standard	Standard		
	NS1	NS2		
	Centre of Lot	Centre of Lot		
	GST	GST		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	0	0		
Compaction Sample Number	11512/S/75319	11512/S/75320		
Sample Description	Silt Red	Gravely Clay Brow		
Moisture Test Results:				
Field Moisture Content (%)	-	-		
Adjusted / Moisture Variation (%)	2.0	2.5		
Optimum Moisture Content (%)	-	-		
Moisture Variation from OMC	-	-		
Moisture Ratio (%)	-	-		
Density Test Results:				
Field Wet Density (t/m³)	2.05	2.20		
Adj/Peak Conv Wet Density (t/m³)	2.01	2.11		
Density Ratio Required (%)	95	95		
Hilf Density Ratio (%)	102.0	104.0		

Remarks



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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/28751-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/762
Project:	200702 - The Pocket Stg 18	Lot Number:	Various
Location:	Cairns	Internal Test Request:	11512/T/14741
Component:	Field Density	Client Reference/s:	MTR1608 - 7/08/2020
Area Description:	The Pocket Stage 18	Report Date / Page:	17/08/2020 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
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Sample Number	11512/S/75441	11512/S/75442		
ID / Client ID	MTR1608	MTR1608		
Lot Number	1814	1812		
Date / Time Tested	7/08/2020 12:04	7/08/2020 12:22		
Material Source	Onsite	Onsite		
Material Type	General Fill	General Fill		
Sampling Method	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b		
Depths: Test / Nom / Actual (mm)	175 / 200 / 200	175 / 200 / 200		
Standard or Modified	Standard	Standard		
	GF5	GF6		
	RL 27.8	RL 29.0		
	Centre of Lot	Centre of Lot		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	4	3		
Compaction Sample Number	11512/S/75441	11512/S/75442		
Sample Description	Silt Red	Silt Red		
Moisture Test Results:				
Field Moisture Content (%)	18.6	18.9		
Adjusted / Moisture Variation (%)	0.0	0.0		
Optimum Moisture Content (%)	19.0	19.0		
Moisture Variation from OMC	(Drier than OMC)	(Wetter than OMC)		
Moisture Ratio (%)	99.0	100.5		
Density Test Results:				
Field Wet Density (t/m³)	2.23	2.15		
Adj/Peak Conv Wet Density (t/m³)	2.12	2.09		
Density Ratio Required (%)	95	95		
Hilf Density Ratio (%)	105.0	103.0		

Remarks



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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/29452-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/762
Project:	200702 - The Pocket Stg 18	Lot Number:	Various
Location:	Cairns	Internal Test Request:	11512/T/15106
Component:	Field Densities	Client Reference/s:	MTR 1610 - 8/09/2020
Area Description:	The Pocket Stage 18	Report Date / Page:	23/09/2020 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
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Sample Number	11512/S/77149	11512/S/77150	11512/S/77151	11512/S/77152
ID / Client ID	MTR 1610	MTR 1610	MTR 1610	MTR 1610
Lot Number	1801	1804	1809	1813
Date / Time Tested	8/09/2020	8/09/2020	8/09/2020	8/09/2020
Material Source	Onsite	Onsite	Onsite	Onsite
Material Type	General Fill	General Fill	General Fill	General Fill
Sampling Method	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b
Depths: Test / Nom / Actual (mm)	275 / 300 / 300	275 / 300 / 300	275 / 300 / 300	275 / 300 / 300
Standard or Modified	Standard	Standard	Standard	Standard
Lot No.	1801	1804	1809	1813
Location	Centre of Lots	Centre of Lots	Centre of Lots	Centre of Lots
RL	28.5	27.3	26.1	28.8
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	6	14	4	2
Compaction Sample Number	11512/S/77149	11512/S/77150	11512/S/77151	11512/S/77152
Sample Description	Silty gravel Red	Silty sandy gravelly Clay, brown	Silty Gravelly Clay, red	Silty Gravelly Clay Red
Moisture Test Results:				
Field Moisture Content (%)	9.9	6.9	10.9	10.1
Adjusted / Moisture Variation (%)	3.5	3.5	3.5	4.5
Optimum Moisture Content (%)	13.5	11.0	15.0	14.5
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)	(Drier than OMC)	(Drier than OMC)
Moisture Ratio (%)	72.5	62.0	73.0	69.0
Density Test Results:				
Field Wet Density (t/m ³)	2.07	2.22	2.30	2.04
Adj/Peak Conv Wet Density (t/m ³)	2.07	2.20	2.29	2.06
Density Ratio Required (%)	95	95	95	95
Hilf Density Ratio (%)	100.0	100.5	100.5	99.0

Remarks



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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/32754-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/762
Project:	200702 - The Pocket Stg 18	Lot Number:	Various
Location:	Cairns	Internal Test Request:	11512/T/16753
Component:	Field Density	Client Reference/s:	TR-1702
Area Description:	Pocket Subdivision Lots	Report Date / Page:	1/03/2021 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
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Sample Number	11512/S/85252	11512/S/85253	11512/S/85254	11512/S/85255
ID / Client ID	TR-1702	TR-1702	TR-1702	TR-1702
Lot Number	EX1-Lot - 1806	EX1-Lot - 1803	EX1-Lot - 1808	EX1-Lot - 1811
Date / Time Tested	24/02/2021 11:00	24/02/2021 11:00	24/02/2021 11:00	24/02/2021 11:00
Material Source	Existing Material	Existing Material	Existing Material	Existing Material
Material Type	Insitu Material	Insitu Material	Insitu Material	Insitu Material
Sampling Method	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b
Depths: Test / Nom / Actual (mm)	125 / 150 / 150	125 / 150 / 150	125 / 150 / 150	125 / 150 / 150
Standard or Modified	Standard	Standard	Standard	Standard
	Centre of Lot	Centre of Lot	Centre of Lot	Centre of Lot
	4.2m Left	6.5m Right	5.8m Left	3.2m Right
	Finished	Finished	Finished	Finished
	Level	Level	Level	Level
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	2	1	4	1
Compaction Sample Number	11512/S/85252	11512/S/85253	11512/S/85254	11512/S/85255
Sample Description	Silty Sandy Brown	Silty Sandy Brown	Silty Sandy Brown	Silty Sandy Brown
Moisture Test Results:				
Field Moisture Content (%)	13.4	14.2	13.0	14.6
Adjusted / Moisture Variation (%)	0.5	-0.5	0.0	0.0
Optimum Moisture Content (%)	13.5	14.0	13.0	14.5
Moisture Variation from OMC	(Drier than OMC)	(Wetter than OMC)	(Drier than OMC)	(Drier than OMC)
Moisture Ratio (%)	98.0	102.0	98.5	99.5
Density Test Results:				
Field Wet Density (t/m³)	2.16	2.18	2.20	2.20
Adj/Peak Conv Wet Density (t/m³)	2.15	2.15	2.15	2.14
Density Ratio Required (%)	95	95	95	95
Hilf Density Ratio (%)	100.5	102.0	102.5	103.0

Remarks

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Appendix B – Allotment Fill Map



NOTE

FOR NOTES REFER DRG-0102.

LEGEND

- AREAS OF FILL
- FINISHED SURFACE LEVEL
- NATURAL SURFACE LEVEL
- TOP OF RETAINING WALL LEVEL
- FALL OF LOTS
- BATTER
- STAGE BOUNDARY
- DESIGN SURFACE CONTOURS (0.2m INTERVAL)
- EXISTING SURFACE CONTOURS (0.5m INTERVAL)
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING WATER
- TIMBER FENCE
- RETAINING WALL
- EASEMENT BOUNDARY
- MINIMUM LEVEL OF LOT ABLE TO BE SERVICED BY SEWER



NOTE A: COMPACTION BY VIBRATING ROLLER TO BE OUTSIDE ZONE OF INFLUENCE OF EXISTING RETAINING WALL.

SCALE 1:250 (A1)
1:500 (A3)

REV	DATE	DRAWN	REV'D	APP'D	REVISION	DRAWING NUMBER	REFERENCE DRAWING TITLE
D	31.07.20	PAM	NLL	RJC	LOT 1814 REVISED, LOTS RAISED		
C	11.02.20	PAM	NLL	RJC	KERB ADDED TO ACCESS DRIVEWAY		
B	06.01.20	PAM	NLL	RJC	FENCING AMENDED		
A	15.10.19	PAM	NLL	RJC	INITIAL ISSUE		



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CLIENT	EASTERLY PROJECTS PTY LTD	TITLE	EARTHWORKS
PROJECT	THE POCKET - STAGE 18	SCALE	AS SHOWN
DRAWN	PAM	DRAWING CHECK	RJB
DESIGNED	PAM	DESIGN REVIEW	RJC
REVIEWED	N.LEE LONG	APPROVED	R.CARMAN
DATE		DATE	
DRAWING No.	IH035800-18-CI-DRG-0201	REV	D