

Bentley Crossing Level 1 Report

Bentley Crossing – Stages 1A1, 1B &
1C

11512/P/653

Prepared for fgf Developments
27/04/2017



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Document Information

Prepared for	fgf Developments
Project Name	Bentley Crossing – Stages 1A1, 1B & 1C
File Reference	11512-P-653-L1_Report
Job Reference	11512/P/653
Date	27/04/2017

Document History

Version	Effective Date	Description of Revision	Prepared by:	Reviewed by:
1	9/05/2017	Level 1 – 1	AW	PG

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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** to provide Level 1 inspection and testing services for the placement of fill at the residential development:-

PROJECT: Bentley Crossing – Stages 1A1, 1B & 1C

ADDRESS: Walker Road, Bentley Park

The earthworks were carried out from 20/09/2016 to 14/03/2017

The following sections were filled under Level 1 Supervision, Lots 101, 102, 107, 108, 109, 304, 303, 302, 301, 8000 and Walker Road Chainages 20 – 84, 240 - 700 and 800 – 850.

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 wet density as determined by AS1289.5.7.1 (Rapid compaction).

Site Works

The work undertaken consisted of a bulk fill operation. Areas outlined on the site planned were stripped and proof rolled as per AS3798. The fill material generally comprised of sandy clay and was placed in 250mm layers and rolled with a vibrating pad-foot roller.

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 B

Conclusion

It is considered that the placement of fill at, Walker Road, Bentley Park was carried out in a controlled manner and the fill was compacted to a wet 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*'.

CONSTRUCTION SCIENCES PTY LTD



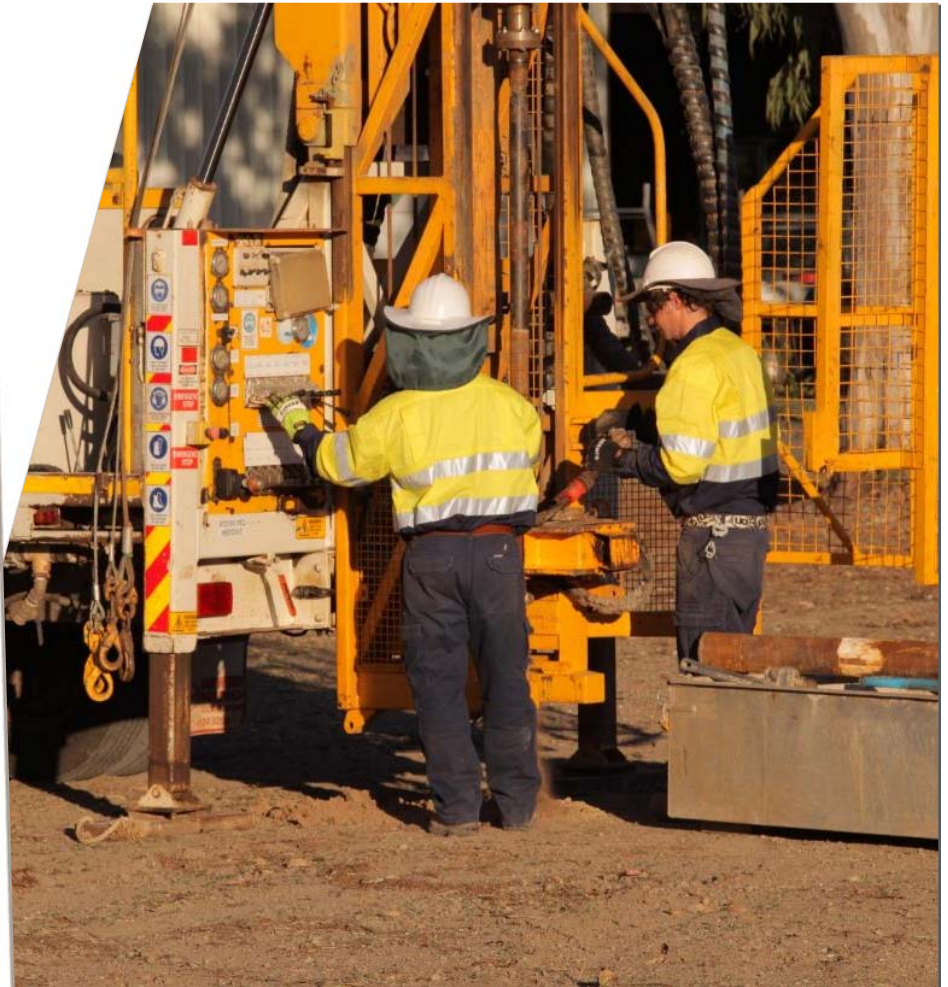
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Bentley Crossing –
Stages 1A1, 1B & 1C

APPENDIX

A

FIELD DENSITY TEST
RESULTS



WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10068-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/5808
Component:	Soiltesting	Client Reference/s:	Level 1 - 21-09-16
Area Description:	Bentley Park	Report Date / Page:	26/09/2016 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/28755			
ID / Client ID	-			
Lot Number	-			
Date / Time Tested	21/09/2016 10:00			
Material Source	Cut/Fill			
Material Type	Embankment Fill			
Sampling Method	AS1289.1.2.1 CI 6.4b			
Depths: Test / Nom / Actual (mm)	225 / 300 / 275			
Standard or Modified	Standard			
	Walker Rd			
	Ch 401			
	7.5m LHS			
	Lift 3			
Test Fraction (mm)	< 19.0 mm			
Sample Oversize (%)	8			
Density of Oversize (t/m³)	2.547			
Compaction Sample Number	11512/S/28755			
Sample Description	gravelly sandy CLAY, Red Brown			
Moisture Test Results:				
Field Moisture Content (%)	-			
Adjusted / Moisture Variation (%)	2.0			
Optimum Moisture Content (%)	-			
Moisture Variation from OMC	-			
Moisture Ratio (%)	-			
Density Test Results:				
Field Wet Density (t/m³)	2.21			
Adj/Peak Conv Wet Density (t/m³)	2.21			
Density Ratio Required (%)	95			
Hilf Density Ratio (%)	100.0			

Remarks


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 Approved Signatory: Kyle Jeffries
 Form ID: W5ASRep Rev 1

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10077-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/5799
Component:	Soil Testing	Client Reference/s:	Level 1 - 20-09-16
Area Description:	Bentley Park	Report Date / Page:	26/09/2016 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/28710			
ID / Client ID	-			
Lot Number	-			
Date / Time Tested	20/09/2016 09:45			
Material Source	Cut/Fill			
Material Type	Existing Material			
Sampling Method	AS1289.1.2.1 CI 6.4b			
Depths: Test / Nom / Actual (mm)	275 / - / 300			
Standard or Modified	Standard			
	Walker Road			
	CH: 385			
	O/S: -8.5m			
	Lift 2			
Test Fraction (mm)	< 19.0 mm			
Sample Oversize (%)	0			
Density of Oversize (t/m³)	-			
Compaction Sample Number	11512/S/28710			
Sample Description	Clayey Sandy Silt, Red			
Moisture Test Results:				
Field Moisture Content (%)	12.6			
Adjusted / Moisture Variation (%)	0.0			
Optimum Moisture Content (%)	12.5			
Moisture Variation from OMC	(Drier than OMC)			
Moisture Ratio (%)	99.0			
Density Test Results:				
Field Wet Density (t/m³)	2.25			
Adj/Peak Conv Wet Density (t/m³)	2.22			
Density Ratio Required (%)	95			
Hill Density Ratio (%)	101.5			

Remarks

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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10078-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/5799
Component:	Soil Testing	Client Reference/s:	Level 1 - 20-09-16
Area Description:	Bentley Park	Report Date / Page:	26/09/2016 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/28709	11512/S/28710		
ID / Client ID	-	-		
Lot Number	-	-		
Date / Time Tested	20/09/2016 09:45	20/09/2016 09:45		
Material Source	Cut/Fill	Cut/Fill		
Material Type	Existing Material	Existing Material		
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b		
Depths: Test / Nom / Actual (mm)	275 / - / 300	275 / - / 300		
Standard or Modified	Standard	Standard		
	Walker Road	Walker Road		
	CH: 371	CH: 385		
	O/S: -10.0m	O/S: -8.5m		
	Lift 2	Lift 2		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	0	0		
Density of Oversize (t/m³)	-	-		
Compaction Sample Number	11512/S/28709	11512/S/28710		
Sample Description	Clayey Sandy Silt, Red	Clayey Sandy Silt, Red		
Moisture Test Results:				
Field Moisture Content (%)	13.5	12.6		
Adjusted / Moisture Variation (%)	0.0	0.0		
Optimum Moisture Content (%)	13.5	12.5		
Moisture Variation from OMC	(Wetter than OMC)	(Drier than OMC)		
Moisture Ratio (%)	101.5	99.0		
Density Test Results:				
Field Wet Density (t/m³)	2.24	2.25		
Adj/Peak Conv Wet Density (t/m³)	2.23	2.22		
Density Ratio Required (%)	95	95		
Hilf Density Ratio (%)	100.0	101.5		

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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10104-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/5836
Component:	Soil Testing	Client Reference/s:	Level 1 - 27-09-16
Area Description:	Bentley Park	Report Date / Page:	30/09/2016 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/28885	11512/S/28886		
ID / Client ID	-	-		
Lot Number	-	-		
Date / Time Tested	27/09/2016 11:40	27/09/2016 11:40		
Material Source	Cut/Fill	Cut/Fill		
Material Type	Not Supplied (Not Supplied)	Not Supplied (Not Supplied)		
Sampling Method	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b		
Depths: Test / Nom / Actual (mm)	275 / - / 300	275 / - / -		
Standard or Modified	Standard	Standard		
	Lot 101	Lot 107		
	5m from Rear	5m from Front		
	6m from LHS	8m from LHS		
	Lift 1	Lift 1		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	0	0		
Density of Oversize (t/m³)	-	-		
Compaction Sample Number	11512/S/28885	11512/S/28886		
Sample Description	silt clat	silty clay red		
Moisture Test Results:				
Field Moisture Content (%)	-	-		
Adjusted / Moisture Variation (%)	2.0	2.0		
Optimum Moisture Content (%)	-	-		
Moisture Variation from OMC	-	-		
Moisture Ratio (%)	-	-		
Density Test Results:				
Field Wet Density (t/m³)	2.25	2.22		
Adj/Peak Conv Wet Density (t/m³)	2.17	2.18		
Density Ratio Required (%)	95	95		
Hilf Density Ratio (%)	104.0	102.0		

Remarks

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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10112-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/5866
Component:	Soil Testing	Client Reference/s:	Level 1 - 29-09-16 - MTR:954
Area Description:	Bentley Park	Report Date / Page:	30/09/2016 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/29029	11512/S/29030		
ID / Client ID	-	-		
Lot Number	-	-		
Date / Time Tested	29/09/2016 16:35	29/09/2016 16:35		
Material Source	Cut/Fill	Cut/Fill		
Material Type	Not Supplied (Not Supplied)	Not Supplied (Not Supplied)		
Sampling Method	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b		
Depths: Test / Nom / Actual (mm)	275 / - / 300	275 / - / 300		
Standard or Modified	Standard	Standard		
	Lot 102	Lot 302 - Future Stage		
	6m from LHS	3m from Front		
	8m from Front	5m from LHS		
	Lift 2	Lift 2		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	0	0		
Density of Oversize (t/m³)	-	-		
Compaction Sample Number	11512/S/29029	11512/S/29030		
Sample Description	sandy silt gravel brown	sandy silt gravel brown		
Moisture Test Results:				
Field Moisture Content (%)	-	-		
Adjusted / Moisture Variation (%)	2.5	2.5		
Optimum Moisture Content (%)	-	-		
Moisture Variation from OMC	-	-		
Moisture Ratio (%)	-	-		
Density Test Results:				
Field Wet Density (t/m³)	2.33	2.32		
Adj/Peak Conv Wet Density (t/m³)	2.24	2.23		
Density Ratio Required (%)	95	95		
Hiif Density Ratio (%)	103.5	104.0		

Remarks


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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10123-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/5874
Component:	Soil Testing	Client Reference/s:	Level 1 - 30-09-16
Area Description:	Bentley Park	Report Date / Page:	5/10/2016 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/29056			
ID / Client ID	-			
Lot Number	-			
Date / Time Tested	30/09/2016 11:59			
Material Source	Cut/Fill			
Material Type	Not Supplied (Not Supplied)			
Sampling Method	AS1289.1.2.1 CI 6.4b			
Depths: Test / Nom / Actual (mm)	175 / - / 200			
Standard or Modified	Standard			
	Lot 303 - Future Stage			
	2.1m from N Boundary			
	6.2m from E Boundary			
	Lift 3			
Test Fraction (mm)	< 19.0 mm			
Sample Oversize (%)	0			
Density of Oversize (t/m³)	-			
Compaction Sample Number	11512/S/29056			
Sample Description	sandy silt gravel			
Moisture Test Results:				
Field Moisture Content (%)	12.5			
Adjusted / Moisture Variation (%)	2.5			
Optimum Moisture Content (%)	15.0			
Moisture Variation from OMC	(Drier than OMC)			
Moisture Ratio (%)	84.0			
Density Test Results:				
Field Wet Density (t/m³)	2.20			
Adj/Peak Conv Wet Density (t/m³)	2.20			
Density Ratio Required (%)	95			
Hilf Density Ratio (%)	100.0			

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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10171-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	109
Location:	Bentley Park	Internal Test Request:	11512/T/5898
Component:	Soil Testing	Client Reference/s:	Level 1 - 06/10/16
Area Description:	Lot 109 - MTR 956	Report Date / Page:	8/10/2016 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/29148	11512/S/29149	11512/S/29150	
ID / Client ID	-	-	-	
Lot Number	109	109	109	
Date / Time Tested	6/10/2016 09:00	6/10/2016 09:10	6/10/2016 09:20	
Material Source	Cut/Fill	Cut/Fill	Cut/Fill	
Material Type	Allotment Fill	Allotment Fill	Allotment Fill	
Sampling Method	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)	200 / 250 / 250	200 / 250 / 250	200 / 250 / 250	
Standard or Modified	Standard	Standard	Standard	
	Lot 109	Lot 109	Lot 109	
	4m off North Bndry	12m off North Bndry	22m off North Bndry	
	3m off East Bndry	8m off East Bndry	14m off East Bndry	
	Lift 1	Lift 2	Lift 3	
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	
Sample Oversize (%)	0	0	0	
Density of Oversize (t/m³)	-	-	-	
Compaction Sample Number	11512/S/29148	11512/S/29149	11512/S/29150	
Sample Description	Sandy Silty, Red Brown	sandy CLAY, Red Brown.	sandy CLAY, Red Brown	
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	
Adjusted / Moisture Variation (%)	0.0	0.0	0.5	
Optimum Moisture Content (%)	-	-	-	
Moisture Variation from OMC	-	-	-	
Moisture Ratio (%)	-	-	-	
Density Test Results:				
Field Wet Density (t/m³)	2.11	2.03	2.08	
Adj/Peak Conv Wet Density (t/m³)	2.08	2.06	2.11	
Density Ratio Required (%)	95	95	95	
Hiif Density Ratio (%)	101.0	98.5	99.0	

Remarks


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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10273-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/5941
Component:	Soil Testing	Client Reference/s:	MTR: 957 - Walker Rd + Lot 8000 fill
Area Description:	Bentley Park	Report Date / Page:	18/10/2016 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/29358	11512/S/29359	11512/S/29360	
ID / Client ID	-	-	-	
Lot Number	-	-	-	
Date / Time Tested	12/10/2016 15:40	12/10/2016 15:40	12/10/2016 15:40	
Material Source	Cut/Fill	Cut/Fill	Cut/Fill	
Material Type	General Fill	General Fill	General Fill	
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	
Depths: Test / Nom / Actual (mm)	175 / - / 200	175 / - / 200	175 / - / 200	
Standard or Modified	Standard	Standard	Standard	
	Walker Rd	Lot: 8000	Lot: 8000	
	CH: 261	2.5m from N Boundary	4m from N Corner	
	O/S: +1.1m	4m from S Corner	6.1m from S Corner	
	Lift 3	Lift 3	Lift 3	
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	
Sample Oversize (%)	0	0	0	
Density of Oversize (t/m³)	-	-	-	
Compaction Sample Number	11512/S/29358	11512/S/29359	11512/S/29360	
Sample Description	clay gravel silt red	clay gravel silt red	clay gravel silt red	
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	
Adjusted / Moisture Variation (%)	2.5	2.5	2.0	
Optimum Moisture Content (%)	-	-	-	
Moisture Variation from OMC	-	-	-	
Moisture Ratio (%)	-	-	-	
Density Test Results:				
Field Wet Density (t/m³)	2.23	2.22	2.24	
Adj/Peak Conv Wet Density (t/m³)	2.17	2.15	2.16	
Density Ratio Required (%)	95	95	95	
Hiif Density Ratio (%)	103.0	103.0	103.5	

Remarks

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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10421-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	8000
Location:	Bentley Park	Internal Test Request:	11512/T/6063
Component:	Soiltesting	Client Reference/s:	MTR 961
Area Description:	Lot 8000 - Allotment Fill	Report Date / Page:	25/10/2016 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/29860	11512/S/29861	11512/S/29862	11512/S/29863
ID / Client ID	-	-	-	-
Lot Number	8000	8000	8000	8000
Date / Time Tested	24/10/2016 12:45	24/10/2016 12:55	24/10/2016 13:10	24/10/2016 13:20
Material Source	Cut/Fill	Cut/Fill	Cut/Fill	Cut/Fill
Material Type	Allotment Fill	Allotment Fill	Allotment Fill	Allotment Fill
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b
Depths: Test / Nom / Actual (mm)	150 / 200 / 200	150 / 200 / 200	150 / 200 / 200	150 / 200 / 200
Standard or Modified	Standard	Standard	Standard	Standard
	South	South	East	East
	5m off Sth Batter	12m off Sth Batter	36m off Nth Batter	58m off Nth Batter
	38m off East Batter	12mm off East Batter	39m off East Batter	14m off East Batter
	Lift 6	Finished Level	Lift 4	Lift 5
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	0	0	0	0
Density of Oversize (t/m³)	-	-	-	-
Compaction Sample Number	11512/S/29860	11512/S/29861	11512/S/29862	11512/S/29863
Sample Description	Sandy Clay, Red Brown.	silty CLAY, Red Brown.	silty CLAY, Red Brown.	silty CLAY, Red Brown.
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	-
Adjusted / Moisture Variation (%)	2.5	2.0	0.0	0.0
Optimum Moisture Content (%)	-	-	-	-
Moisture Variation from OMC	-	-	-	-
Moisture Ratio (%)	-	-	-	-
Density Test Results:				
Field Wet Density (t/m³)	2.13	2.06	2.04	2.10
Adj/Peak Conv Wet Density (t/m³)	2.16	2.12	2.11	2.12
Density Ratio Required (%)	-	-	-	-
Hilf Density Ratio (%)	98.5	97.0	97.0	99.5

Remarks


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 Accreditation Number: 1986
 Corporate Site Number: 11512



Approved Signatory: Peter Gode

Form ID: W5ASRep Rev 1

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10719-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	Various
Location:	Bentley Park	Internal Test Request:	11512/T/6248
Component:	Soiltesting	Client Reference/s:	MTR 963
Area Description:	Lot 8000 & Bentley Dr	Report Date / Page:	10/11/2016 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/30733	11512/S/30734	11512/S/30735	11512/S/30736
ID / Client ID	-	-	-	-
Lot Number	8000	8000	8000	Bentley Dr
Date / Time Tested	7/11/2016 13:20	7/11/2016 13:30	7/11/2016 13:40	7/11/2016 13:50
Material Source	Cut/Fill	Cut/Fill	Cut/Fill	Cut/Fill
Material Type	Allotment Fill	Allotment Fill	Allotment Fill	Allotment 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)	150 / 200 / 200	150 / 200 / 200	150 / 200 / 200	150 / 200 / 200
Standard or Modified	Standard	Standard	Standard	Standard
	Lot 8000 East	Lot 8000 East	Lot 8000	Bentley Dr
	5m off East Edge	19m off East Edge	5m off South Edge	Ch 15.1
	12m off South Edge	34m off South Edge	8m off East Edge	5m LHS of cL of Road
	Lift 8	Finished Level	Lift 3	Lift 3
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	3	2	1	3
Density of Oversize (t/m³)	2.454	2.446	2.490	2.487
Compaction Sample Number	11512/S/30733	11512/S/30734	11512/S/30735	11512/S/30736
Sample Description	gravelly sandy CLAY, Red Brown.	gravelly silty CLAY, Red Brown.	sandy CLAY, Dark Brown	gravelly sandy CLAY, Red Brown.
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	-
Adjusted / Moisture Variation (%)	2.0	0.5	2.0	2.5
Optimum Moisture Content (%)	-	-	-	-
Moisture Variation from OMC	-	-	-	-
Moisture Ratio (%)	-	-	-	-
Density Test Results:				
Field Wet Density (t/m³)	2.26	2.20	2.19	2.25
Adj/Peak Conv Wet Density (t/m³)	2.20	2.23	2.23	2.20
Density Ratio Required (%)	95	95	95	95
Hiif Density Ratio (%)	102.5	99.0	98.5	102.0

Remarks

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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10720-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/6193
Component:	Soil Testing	Client Reference/s:	MTR: 962
Area Description:	Bentley Park	Report Date / Page:	10/11/2016 Page 1 of 2

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/30474	11512/S/30475	11512/S/30476	11512/S/30477
ID / Client ID	-	-	-	-
Lot Number	-	-	-	-
Date / Time Tested	1/11/2016 08:00	1/11/2016 08:10	1/11/2016 08:30	1/11/2016 08:35
Material Source	Cut/Fill	Cut/Fill	Cut/Fill	Cut/Fill
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	175 / - / 200	175 / - / 200	175 / - / 200
Standard or Modified	Standard	Standard	Standard	Standard
	Lot 8000 E	Lot 8000 E	Lot 109	Line: MH1/15 to 1/17
	10m from N Boundary	7m from S Boundary	4m from E Boundary	CH: 284
	8m from W Boundary	11m from E Boundary	6m from S Boundary	Sewer Backfill
	Lift 6	Lift 7	F/L	
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	7	3	4	2
Density of Oversize (t/m³)	2.400	2.401	2.400	2.500
Compaction Sample Number	11512/S/30474	11512/S/30475	11512/S/30476	11512/S/30477
Sample Description	Brown, Sandie clay	Brown sandie clay	Sandie clay, brown	Sandie clay, brown
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	-
Adjusted / Moisture Variation (%)	2.0	2.0	2.0	2.0
Optimum Moisture Content (%)	-	-	-	-
Moisture Variation from OMC	-	-	-	-
Moisture Ratio (%)	-	-	-	-
Density Test Results:				
Field Wet Density (t/m³)	2.12	2.11	2.11	2.12
Adj/Peak Conv Wet Density (t/m³)	2.09	2.13	2.13	2.12
Density Ratio Required (%)	95	95	95	95
Hilf Density Ratio (%)	101.5	99.0	99.0	100.0

Remarks


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 Corporate Site Number: 11512



 Approved Signatory: Kyle Jeffries
 Form ID: W5ASRep Rev 1

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/10847-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	Walker Rd
Location:	Bentley Park	Internal Test Request:	11512/T/6315
Component:	Soiltesting	Client Reference/s:	MTR 964
Area Description:	Embankment Fill	Report Date / Page:	18/11/2016 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/31087	11512/S/31088	11512/S/31089	
ID / Client ID	-	-	-	
Lot Number	Walker Rd	Walker Rd	Walker Rd	
Date / Time Tested	15/11/2016 12:15	15/11/2016 12:25	15/11/2016 12:35	
Material Source	Cut/Fill	Cut/Fill	Cut/Fill	
Material Type	Embankment Fill	Embankment Fill	Embankment Fill	
Sampling Method	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)	200 / 250 / 250	200 / 250 / 250	200 / 250 / 250	
Standard or Modified	Standard	Standard	Standard	
	Walker Rd	Walker Rd	Walker Rd	
	Ch 21	Ch 46	Ch 393	
	3.8m RHS of cL	2.5m LHS of cL	1.5m LHS of cL	
	Lift 2	Lift 3	Lift 3	
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	
Sample Oversize (%)	0	0	0	
Density of Oversize (t/m³)	-	-	-	
Compaction Sample Number	11512/S/31087	11512/S/31088	11512/S/31089	
Sample Description	gravelly Silty CLAY, Brown.	gravelly silty CLAY, Brown.	silty CLAY, Brown.	
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	
Adjusted / Moisture Variation (%)	2.0	2.0	0.0	
Optimum Moisture Content (%)	-	-	-	
Moisture Variation from OMC	-	-	-	
Moisture Ratio (%)	-	-	-	
Density Test Results:				
Field Wet Density (t/m³)	2.05	2.05	1.93	
Adj/Peak Conv Wet Density (t/m³)	2.07	1.99	1.97	
Density Ratio Required (%)	95	95	95	
Hilf Density Ratio (%)	99.0	103.0	97.5	

Remarks


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WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/11047-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	8000
Location:	Bentley Park	Internal Test Request:	11512/T/6047
Component:	Soil Testing	Client Reference/s:	MTR - 960
Area Description:	Lot 8000 East & South	Report Date / Page:	30/11/2016 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/29805	11512/S/29806	11512/S/29807	11512/S/29808
ID / Client ID	-	-	-	-
Lot Number	8000	8000	8000	8000
Date / Time Tested	20/10/2016 14:00	20/10/2016 14:28	20/10/2016 14:45	20/10/2016 15:15
Material Source	Existing Material	Existing Material	Existing Material	Existing Material
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 / 300mm / 300	275 / 300mm / 300	275 / 300mm / 300	275 / 300mm / 300
Standard or Modified	Standard	Standard	Standard	Standard
Allotment No	8000 East	8000 East	8000 South	8000 South
Chainage	12m From East	26m From East	11m From East	14m From East
Offset	8m From South	13m From South	15m From South	28m From South
Level	2	3	2	3
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	0	0	0	0
Density of Oversize (t/m³)	-	-	-	-
Compaction Sample Number	11512/S/29805	11512/S/29806	11512/S/29807	11512/S/29808
Sample Description	sandy silty CLAY.	sandy CLAY.	Sandy CLAY	Sandy CLAY.
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	-
Adjusted / Moisture Variation (%)	1.5	0.0	0.5	2.0
Optimum Moisture Content (%)	-	-	-	-
Moisture Variation from OMC	-	-	-	-
Moisture Ratio (%)	-	-	-	-
Density Test Results:				
Field Wet Density (t/m³)	2.18	2.19	2.20	2.18
Adj/Peak Conv Wet Density (t/m³)	2.25	2.25	2.24	2.24
Density Ratio Required (%)	-	-	-	-
Hilf Density Ratio (%)	97.0	97.5	98.0	97.5

Remarks

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	Corporate Site Number:	11512	
	Approved Signatory: Peter Gode		Form ID: W5ASRep Rev 1

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/11048-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	Walker Road
Location:	Bentley Park	Internal Test Request:	11512/T/6343
Component:	Soiltesting	Client Reference/s:	MTR 965
Area Description:	Embankment Fill - Walker Road	Report Date / Page:	30/11/2016 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/31235	11512/S/31236	11512/S/31237	11512/S/31238
ID / Client ID	-	-	-	-
Lot Number	Walker Road	Walker Road	Walker Road	Walker Road
Date / Time Tested	18/11/2016 11:30	18/11/2016 11:40	18/11/2016 11:50	18/11/2016 12:00
Material Source	Cut/Fill	Cut/Fill	Cut/Fill	Cut/Fill
Material Type	Embankment Fill	Embankment Fill	Embankment Fill	Embankment 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)	150 / 200 / 200	150 / 200 / 200	150 / 200 / 200	150 / 200 / 200
Standard or Modified	Standard	Standard	Standard	Standard
	Walker Road	Walker Road	Walker Road	Walker Road
	Ch 305	Ch 315	CH 61	Ch 73
	2.0m RHS of cL	1.0m LHS of cL	1.5m RHS of cL	0.5m LHS of cL
	Lift 1	Lift 2	Lift 4	Lift 5
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	0	0	0	0
Density of Oversize (t/m³)	-	-	-	-
Compaction Sample Number	11512/S/31235	11512/S/31236	11512/S/31237	11512/S/31238
Sample Description	gravelly silty CLAY, Red Brown	silty CLAY, Red Brown	silty CLAY, Red Brown	gravelly silty CLAY, Red Brown
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	-
Adjusted / Moisture Variation (%)	2.5	2.0	0.0	0.0
Optimum Moisture Content (%)	-	-	-	-
Moisture Variation from OMC	-	-	-	-
Moisture Ratio (%)	-	-	-	-
Density Test Results:				
Field Wet Density (t/m³)	2.15	2.15	2.15	2.14
Adj/Peak Conv Wet Density (t/m³)	2.13	2.14	2.13	2.12
Density Ratio Required (%)	-	-	-	-
Hill Density Ratio (%)	101.0	100.5	101.0	101.0

Remarks


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 Corporate Site Number: 11512



 Approved Signatory: Peter Gode
 Form ID: W5ASRep Rev 1

LOT REPORT - WET DENSITY RATIO

Client:	fgf Developments	Report Number:	11512/R/11182-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/6436
Component:	Soil Testing	Client Reference/s:	MTR: 966 Level 1 24-11-16
Area Description:	Bentley Park	Report Date / Page:	7/12/2016 Page 1 of 2

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
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Sample Number	11512/S/31772	11512/S/31773	11512/S/31774	11512/S/31775
ID / Client ID	-	-	-	-
Lot Number	-	-	-	-
Date / Time Tested	24/11/2016 15:11	24/11/2016 15:16	24/11/2016 15:28	24/11/2016 15:40
Material Source	Cut/Fill	Cut/Fill	Cut/Fill	Cut/Fill
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	175 / - / 200	175 / - / 200	175 / - / 200
Standard or Modified	Standard	Standard	Standard	Standard
	Walker Road	Walker Road	Walker Road	Walker Road
	CH: 285	CH: 311	CH: 54	CH: 37
	O/S: -1.1m	O/S: +0.8m	O/S: -1.0m	O/S: +1.6m
	Lift 4	Lift 4	F/L	F/L
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	0	0	0	0
Density of Oversize (t/m³)	-	-	-	-
Compaction Sample Number	11512/S/31772	11512/S/31773	11512/S/31774	11512/S/31775
Sample Description	Silty Clay Pale Brown	Silty Clay Pale Brown	Silty Clay Pale Brown	Silty Clay Pale Brown
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	-
Adjusted / Moisture Variation (%)	3.0	3.0	2.5	2.5
Optimum Moisture Content (%)	-	-	-	-
Moisture Variation from OMC	-	-	-	-
Moisture Ratio (%)	-	-	-	-
Density Test Results:				
Field Wet Density (t/m³)	2.13	2.12	2.13	2.13
Adj/Peak Conv Wet Density (t/m³)	2.10	2.10	2.11	2.13
Density Ratio Required (%)	-	-	-	-
Hilf Density Ratio (%)	101.0	101.0	101.0	100.0

Remarks

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	Accreditation Number:	1986	
	Corporate Site Number:	11512	
	Approved Signatory: Nathan Lyne		Form ID: W5ASRepSum Rev 2

LOT REPORT - WET DENSITY RATIO

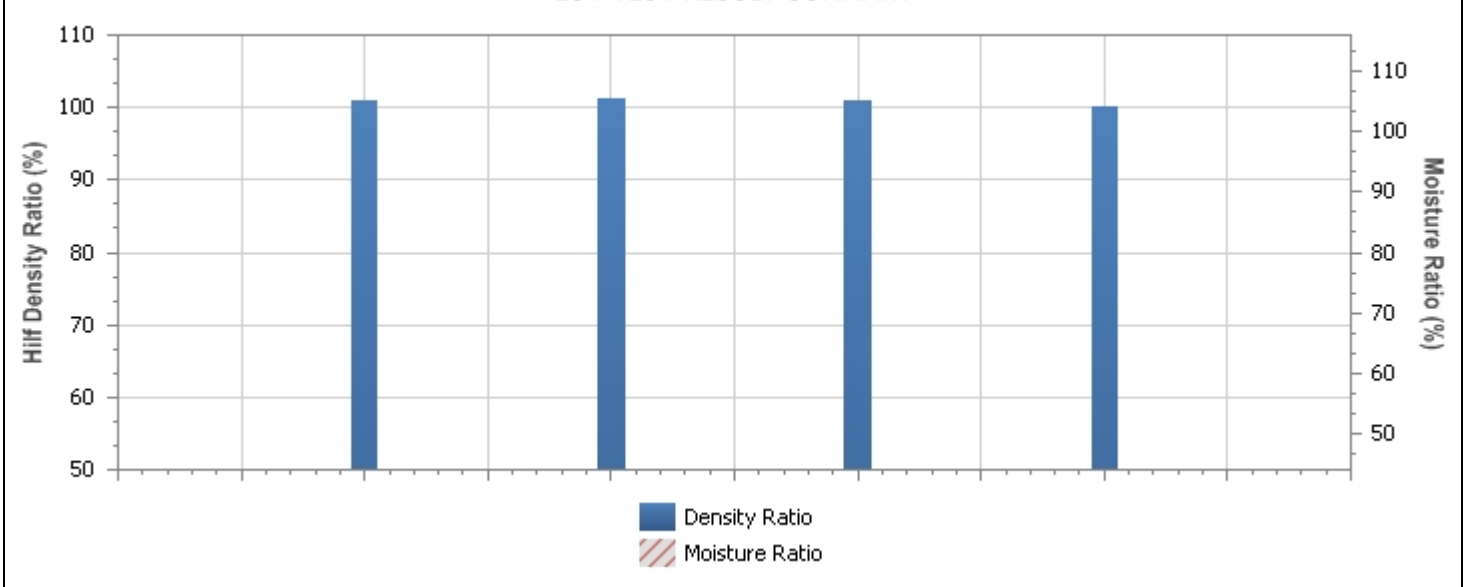
Client:	fgf Developments	Report Number:	11512/R/11182-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/6436
Component:	Soil Testing	Client Reference/s:	MTR: 966 Level 1 24-11-16
Area Description:	Bentley Park	Report Date / Page:	7/12/2016 Page 2 of 2

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
Statistical Analysis Test Method:	Lot Average (Lot average calculations are not covered by NATA endorsement)

Nuclear Gauge Calibration Details

Calibration Number	-	Material Source	-
Calibration Last Updated	-	Material Type	-
Nominated Calibration Layer Depth (mm)	-		

LOT TEST RESULT SUMMARY



Tests in Lot = 4	Lot Minimum	Lot Maximum	Lot Mean	Standard Deviation
Moisture Ratio (%)	-	-	-	-
Half Density Ratio (%)	100.0	101.1	100.8	0.520

Lot Number: -
Mean Density Ratio (%): 100.8
Mean Moisture Ratio (%): -

Remarks



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Accreditation Number: 1986
 Corporate Site Number: 11512



Approved Signatory: Nathan Lyne
 Form ID: W5ASRepSum Rev 2

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/11260-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/6554
Component:	Soil Testing	Client Reference/s:	MTR: 969 Job number: 160705
Area Description:		Report Date / Page:	12/12/2016 Page 1 of 2

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
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Sample Number	11512/S/32293	11512/S/32294	11512/S/32295	11512/S/32296
ID / Client ID	-	-	-	-
Lot Number	-	-	-	-
Date / Time Tested	6/12/2016	6/12/2016	6/12/2016	6/12/2016
Material Source	Imported Material	Imported Material	Imported Material	Imported Material
Material Type	-75mm Crushed Rock	-75mm Crushed Rock	-75mm Crushed Rock	-75mm Crushed Rock
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b
Depths: Test / Nom / Actual (mm)	300 / 300 / 300	300 / 300 / 300	300 / 300 / 300	300 / 300 / 300
Standard or Modified	Standard	Standard	Standard	Standard
Road	Gabion Replacement	Gabion Replacement	Gabion Replacement	Gabion Replacement
Chainage	3	16	25	41
Offset				
Level	Lift: 1	Lift: 1	Lift: 1	Lift: 1
Test Fraction (mm)	< 37.5mm	< 37.5mm	< 37.5mm	< 37.5mm
Sample Oversize (%)	5	4	5	5
Density of Oversize (t/m³)	2.477	2.482	2.476	2.505
Compaction Sample Number	11512/S/32293	11512/S/32294	11512/S/32295	11512/S/32296
Sample Description	-75	-75	-75	-75
Moisture Test Results:				
Field Moisture Content (%)	5.5	5.8	4.9	4.9
Adjusted / Moisture Variation (%)	4.5	5.0	4.5	4.5
Optimum Moisture Content (%)	10.0	11.0	9.5	9.5
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)	(Drier than OMC)	(Drier than OMC)
Moisture Ratio (%)	54.0	53.0	51.0	51.0
Density Test Results:				
Field Wet Density (t/m³)	2.31	2.20	2.35	2.20
Adj/Peak Conv Wet Density (t/m³)	2.34	2.38	2.38	2.36
Density Ratio Required (%)	-	-	-	-
Hilf Density Ratio (%)	98.5	93.0	99.0	93.5

Remarks


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 Approved Signatory: Kyle Jeffries
 Form ID: W5ASRep Rev 1

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/11260-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/6554
Component:	Soil Testing	Client Reference/s:	MTR: 969 Job number: 160705
Area Description:		Report Date / Page:	12/12/2016 Page 2 of 2

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
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Sample Number	11512/S/32297	11512/S/32298		
ID / Client ID	-	-		
Lot Number	-	-		
Date / Time Tested	6/12/2016	6/12/2016		
Material Source	Insitu Material	Insitu Material		
Material Type	Insitu Material	Insitu Material		
Sampling Method	AS1289.1.2.1 CI 6.4b	AS1289.1.2.1 CI 6.4b		
Depths: Test / Nom / Actual (mm)	300 / 300 / 300	300 / 300 / 300		
Standard or Modified	Standard	Standard		
Road	Walker Road	Walker Road		
Chainage	762	397		
Offset				
Level	FL	Lift: 1		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	0	0		
Density of Oversize (t/m³)	-	-		
Compaction Sample Number	11512/S/32297	11512/S/32298		
Sample Description	Insitu	Insitu		
Moisture Test Results:				
Field Moisture Content (%)	8.8	12.0		
Adjusted / Moisture Variation (%)	4.5	2.5		
Optimum Moisture Content (%)	13.0	15.0		
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)		
Moisture Ratio (%)	66.5	81.0		
Density Test Results:				
Field Wet Density (t/m³)	2.10	2.13		
Adj/Peak Conv Wet Density (t/m³)	2.19	2.20		
Density Ratio Required (%)	-	-		
Hilf Density Ratio (%)	96.0	97.0		

Remarks

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	Accreditation Number:	1986	
	Corporate Site Number:	11512	
	Approved Signatory: Kyle Jeffries		
	Form ID: W5ASRep Rev 1		

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/11355-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/6666
Component:	Soil Testing	Client Reference/s:	MTR:968 Subgrade Replacement
Area Description:	Bentley Park	Report Date / Page:	15/12/2016 Page 1 of 2

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
------------------	----------------------------

Sample Number	11512/S/32792	11512/S/32793	11512/S/32794	11512/S/32795
ID / Client ID	-	-	-	-
Lot Number	-	-	-	-
Date / Time Tested	1/12/2016 07:05	1/12/2016 07:10	1/12/2016 07:15	1/12/2016 07:20
Material Source	PNQ - Edmonton	PNQ - Edmonton	PNQ - Edmonton	PNQ - Edmonton
Material Type	-75mm Crushed Rock	-75mm Crushed Rock	-75mm Crushed Rock	-75mm Crushed Rock
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b
Depths: Test / Nom / Actual (mm)	175 / - / 200	175 / - / 200	175 / - / 200	175 / - / 200
Standard or Modified	Standard	Standard	Standard	Standard
	Section 1	Section 1	Section 1	Section 2
	CH: 6	CH: 21	CH: 27	CH: 34
	O/S: +1.5m	O/S: -1.0m	O/S: -0.5m	O/S: +0.5m
	Lift 1	Lift 2	Lift 3	Lift 1
Test Fraction (mm)	< 37.5mm	< 37.5mm	< 37.5mm	< 37.5mm
Sample Oversize (%)	0	0	0	0
Density of Oversize (t/m³)	-	-	-	-
Compaction Sample Number	11512/S/32792	11512/S/32793	11512/S/32794	11512/S/32795
Sample Description	-75	-75	-75	-75
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	-
Adjusted / Moisture Variation (%)	4.5	4.5	4.5	4.0
Optimum Moisture Content (%)	-	-	-	-
Moisture Variation from OMC	-	-	-	-
Moisture Ratio (%)	-	-	-	-
Density Test Results:				
Field Wet Density (t/m³)	2.28	2.30	2.31	2.33
Adj/Peak Conv Wet Density (t/m³)	2.28	2.32	2.31	2.33
Density Ratio Required (%)	98	98	98	98
Hiif Density Ratio (%)	100.0	99.0	99.5	99.5

Remarks

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---	---

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/11355-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/6666
Component:	Soil Testing	Client Reference/s:	MTR:968 Subgrade Replacement
Area Description:	Bentley Park	Report Date / Page:	15/12/2016 Page 2 of 2

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
------------------	----------------------------

Sample Number	11512/S/32796	11512/S/32797		
ID / Client ID	-	-		
Lot Number	-	-		
Date / Time Tested	1/12/2016 07:25	1/12/2016 07:30		
Material Source	PNQ - Edmonton	PNQ - Edmonton		
Material Type	-75mm Crushed Rock	-75mm Crushed Rock		
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b		
Depths: Test / Nom / Actual (mm)	175 / - / 200	175 / - / 200		
Standard or Modified	Standard	Standard		
	Section 2	Section 2		
	CH: 49	CH: 57		
	O/S: +2.0m	O/S: +2.0m		
	Lift 2	Lift 3		
Test Fraction (mm)	< 37.5mm	< 37.5mm		
Sample Oversize (%)	0	0		
Density of Oversize (t/m³)	-	-		
Compaction Sample Number	11512/S/32796	11512/S/32797		
Sample Description	-75	-75		
Moisture Test Results:				
Field Moisture Content (%)	-	-		
Adjusted / Moisture Variation (%)	4.5	4.5		
Optimum Moisture Content (%)	-	-		
Moisture Variation from OMC	-	-		
Moisture Ratio (%)	-	-		
Density Test Results:				
Field Wet Density (t/m³)	2.42	2.31		
Adj/Peak Conv Wet Density (t/m³)	2.34	2.30		
Density Ratio Required (%)	98	98		
Hilf Density Ratio (%)	103.5	101.0		

Remarks

 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 Accreditation Number: 1986 Corporate Site Number: 11512	 Approved Signatory: Kyle Jeffries Form ID: W5ASRep Rev 1
--	---

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/11560-2
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/6466
Component:	Soil Testing	Client Reference/s:	MTR: 967 Level 1 29-11-2016
Area Description:	Bentley Park	Report Date / Page:	11/01/2017 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1
------------------	----------------------------

Sample Number	11512/S/31866	11512/S/31867	11512/S/31868	11512/S/31869
ID / Client ID	-	-	-	-
Lot Number	-	-	-	-
Date / Time Tested	29/11/2016	29/11/2016	29/11/2016	29/11/2016
Material Source	Cut/Fill	Cut/Fill	Cut/Fill	Cut/Fill
Material Type	-	-	-	-
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b
Depths: Test / Nom / Actual (mm)	300 / 300 / 300	300 / 300 / 300	300 / 300 / 300	300 / 300 / 300
Standard or Modified	Standard	Standard	Standard	Standard
	Walker Road	Walker Road	Walker Road	Bentley Lane
	CH: 279	CH: 363	CH: 492	CH: 11
	O/S: +1.0m	O/S: -3.5m	O/S: -2.0m	O/S: +1.5m
	Lift 5	Lift 5	Lift 5	Lift 5
Test Fraction (mm)	< 19.0 mm	< 19.0 mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	0	0	0	0
Density of Oversize (t/m³)	-	-	-	-
Compaction Sample Number	11512/S/31866	11512/S/31867	11512/S/31868	11512/S/31869
Sample Description	Brown Silty Gravel	Brown Silty Gravel	Brown Silty Gravel	Brown Silty Gravel
Moisture Test Results:				
Field Moisture Content (%)	-	-	-	-
Adjusted / Moisture Variation (%)	2.5	3.0	0.0	0.0
Optimum Moisture Content (%)	-	-	-	-
Moisture Variation from OMC	-	-	-	-
Moisture Ratio (%)	-	-	-	-
Density Test Results:				
Field Wet Density (t/m³)	1.94	1.82	1.76	1.93
Adj/Peak Conv Wet Density (t/m³)	1.94	1.90	1.84	1.86
Density Ratio Required (%)	95	95	95	95
Hilf Density Ratio (%)	100.0	96.0	95.5	103.5

Remarks	Re-Issued Report Replaces Report No 11512/R/11560-1.
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	Accreditation Number: 1986 Corporate Site Number: 11512	 Approved Signatory: Kyle Jeffries Form ID: W5ASRep Rev 1

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/11561-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/6705
Component:	Soil Testing	Client Reference/s:	MTR-970
Area Description:	Backfill Gabion Basket & Stormwater Bakfill	Report Date / Page:	10/01/2017 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
------------------	--

Sample Number	11512/S/33026	11512/S/33027		
ID / Client ID	-	-		
Lot Number	-	-		
Date / Time Tested	20/12/2016 09:15	20/12/2016 09:31		
Material Source	Existing Material	Existing Material		
Material Type	Backfill	Backfill		
Sampling Method	AS1289.1.2.1 Cl 6.4b	AS1289.1.2.1 Cl 6.4b		
Depths: Test / Nom / Actual (mm)	275 / 300mm / 300	275 / 300mm / 300		
Standard or Modified	Standard	Standard		
	CH:23	Line 3/1 to 2/1		
	2.8m From Gabion Wall	10.2m From 3/1		
	Lift 5	F/L		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	0	0		
Density of Oversize (t/m³)	-	-		
Compaction Sample Number	11512/S/33026	11512/S/33027		
Sample Description	clay silt orange	silty sand clay brown orange		
Moisture Test Results:				
Field Moisture Content (%)	7.2	6.9		
Adjusted / Moisture Variation (%)	4.5	2.5		
Optimum Moisture Content (%)	12.0	9.5		
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)		
Moisture Ratio (%)	60.5	73.5		
Density Test Results:				
Field Wet Density (t/m³)	2.14	2.21		
Adj/Peak Conv Wet Density (t/m³)	2.17	2.21		
Density Ratio Required (%)	95	95		
Hilf Density Ratio (%)	99.0	100.0		

Remarks

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	Accreditation Number:	1986	
	Corporate Site Number:	11512	
	Approved Signatory: Kyle Jeffries		
	Form ID: W5ASRep Rev 1		

LOT REPORT - WET DENSITY RATIO

Client:	fgf Developments	Report Number:	11512/R/12001-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	Walker Road
Location:	Bentley Park	Internal Test Request:	11512/T/6925
Component:	Soil Testing	Client Reference/s:	MTR-972
Area Description:	Walker Road	Report Date / Page:	21/02/2017 Page 1 of 2

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
------------------	--

Sample Number	11512/S/34081	11512/S/34082		
ID / Client ID	160705	160705		
Lot Number	Walker Road	Walker Road		
Date / Time Tested	9/02/2017 08:10	9/02/2017 08:14		
Material Source	Existing Material	Existing Material		
Material Type	Backfill	Backfill		
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		
Road	Gabion Wall	Gabion Wall		
Chainage	15	45		
Offset	-1.5	2.0		
Level	Backfill	Backfill		
Test Fraction (mm)	< 19.0 mm	< 19.0 mm		
Sample Oversize (%)	0	0		
Density of Oversize (t/m³)	-	-		
Compaction Sample Number	11512/S/34081	11512/S/34082		
Sample Description	Silty Clay Red Brown	Silty Clay Red Brown		
Moisture Test Results:				
Field Moisture Content (%)	13.7	15.0		
Adjusted / Moisture Variation (%)	0.0	0.0		
Optimum Moisture Content (%)	13.5	15.0		
Moisture Variation from OMC	(at OMC)	(Drier than OMC)		
Moisture Ratio (%)	100.0	99.5		
Density Test Results:				
Field Wet Density (t/m³)	2.12	2.14		
Adj/Peak Conv Wet Density (t/m³)	2.12	2.14		
Density Ratio Required (%)	95	95		
Hilf Density Ratio (%)	100.5	100.0		

Remarks


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 Accreditation Number: 1986
 Corporate Site Number: 11512



 Approved Signatory: Anton Wespe
 Form ID: W5ASRepSum Rev 2

LOT REPORT - WET DENSITY RATIO

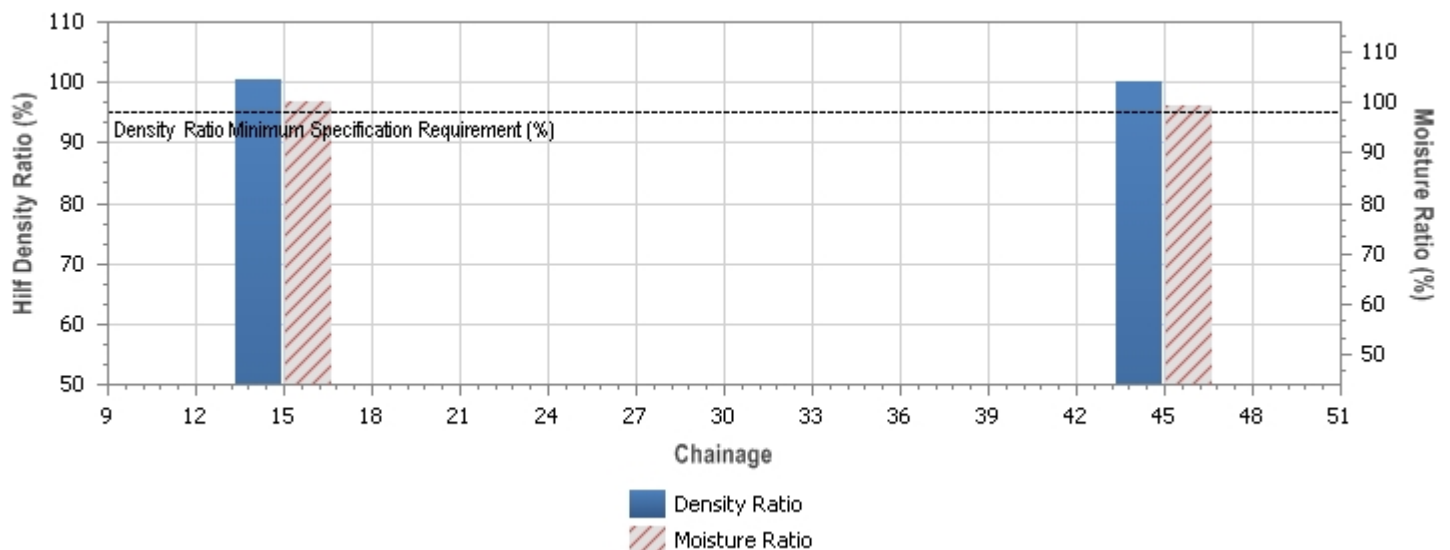
Client:	fgf Developments	Report Number:	11512/R/12001-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	Walker Road
Location:	Bentley Park	Internal Test Request:	11512/T/6925
Component:	Soil Testing	Client Reference/s:	MTR-972
Area Description:	Walker Road	Report Date / Page:	21/02/2017 Page 2 of 2

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
Statistical Analysis Test Method:	Lot Average (Lot average calculations are not covered by NATA endorsement)

Nuclear Gauge Calibration Details

Calibration Number	-	Material Source	-
Calibration Last Updated	-	Material Type	-
Nominated Calibration Layer Depth (mm)	-		-

LOT TEST RESULT SUMMARY



Tests in Lot = 2	Lot Minimum	Lot Maximum	Lot Mean	Standard Deviation
Moisture Ratio (%)	99.3	100.0	99.6	0.500
Half Density Ratio (%)	100.0	100.4	100.2	0.283

Lot Number: Walker Road
Mean Density Ratio (%): 100.2
Mean Moisture Ratio (%): 99.6

Remarks



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 Accredited for compliance with ISO/IEC 17025

Accreditation Number: 1986
 Corporate Site Number: 11512



Approved Signatory: Anton Wespe
 Form ID: W5ASRepSum Rev 2

WET DENSITY RATIO REPORT

Client:	fgf Developments	Report Number:	11512/R/12265-1
Client Address:	PO Box 6665, Cairns	Project Number:	11512/P/653
Project:	160705 - Bentley Crossing Stage 1A1	Lot Number:	
Location:	Bentley Park	Internal Test Request:	11512/T/7175
Component:	Density Testing	Client Reference/s:	MTR-974
Area Description:	Walker Road	Report Date / Page:	15/03/2017 Page 1 of 1

Test Procedures:	AS1289.5.7.1, AS1289.5.8.1, AS1289.2.1.1
------------------	--

Sample Number	11512/S/35095	11512/S/35096	11512/S/35097	11512/S/35098
ID / Client ID	-	-	-	-
Lot Number	-	-	-	-
Date / Time Tested	14/03/2017 09:22	14/03/2017 09:31	14/03/2017 09:40	14/03/2017 09:52
Material Source	Existing Material	Existing Material	Existing Material	Existing Material
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 / 300mm / 300	275 / 300mm / 300	275 / 300mm / 300	275 / 300mm / 300
Standard or Modified	Standard	Standard	Standard	Standard
	Gabion Wall Batter East	Gabion Wall Batter East	Gabion Wall Batter West	Gabion Wall Batter West
	3.5m From South Wall	8.2m From South Wall	4.8m From South Wall	6.5m From South Wall
	13.4m East of Gabion Basket	28.6m East of Gabion Basket	3.5m West of Gabion Basket	14.2m West of Gabion Basket
	Lift 3	FL	Lift 3	FL
Test Fraction (mm)	< 37.5mm	< 37.5mm	< 19.0 mm	< 19.0 mm
Sample Oversize (%)	0	0	0	0
Density of Oversize (t/m³)	-	-	-	-
Compaction Sample Number	11512/S/35095	11512/S/35096	11512/S/35097	11512/S/35098
Sample Description	Red/yellow rocky soil	Red Rocky Clay	Red Rocky Clay	Red Clay
Moisture Test Results:				
Field Moisture Content (%)	6.8	6.6	7.3	7.4
Adjusted / Moisture Variation (%)	3.5	4.0	3.5	4.0
Optimum Moisture Content (%)	10.5	11.0	11.0	11.5
Moisture Variation from OMC	(Drier than OMC)	(Drier than OMC)	(Drier than OMC)	(Drier than OMC)
Moisture Ratio (%)	66.0	61.0	67.0	65.0
Density Test Results:				
Field Wet Density (t/m³)	2.15	2.17	2.19	2.17
Adj/Peak Conv Wet Density (t/m³)	2.06	2.08	2.09	2.07
Density Ratio Required (%)	95	95	95	95
Hiif Density Ratio (%)	104.5	104.0	105.0	105.0

Remarks

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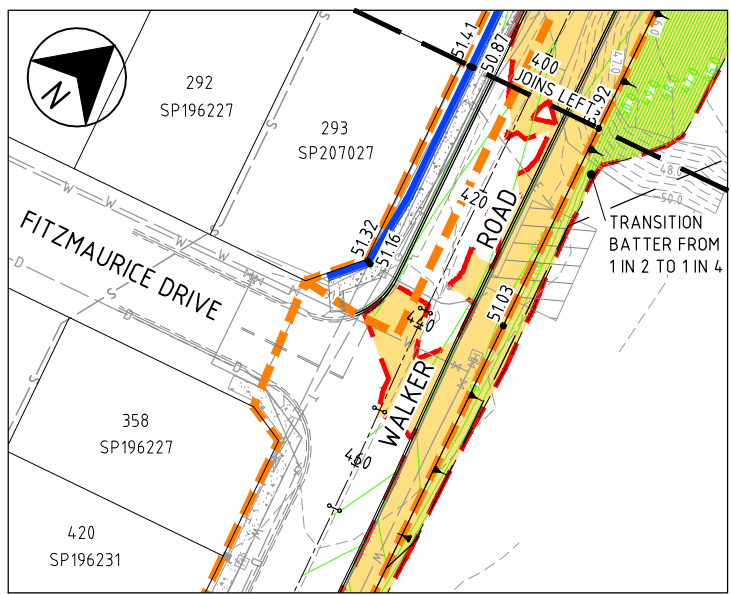
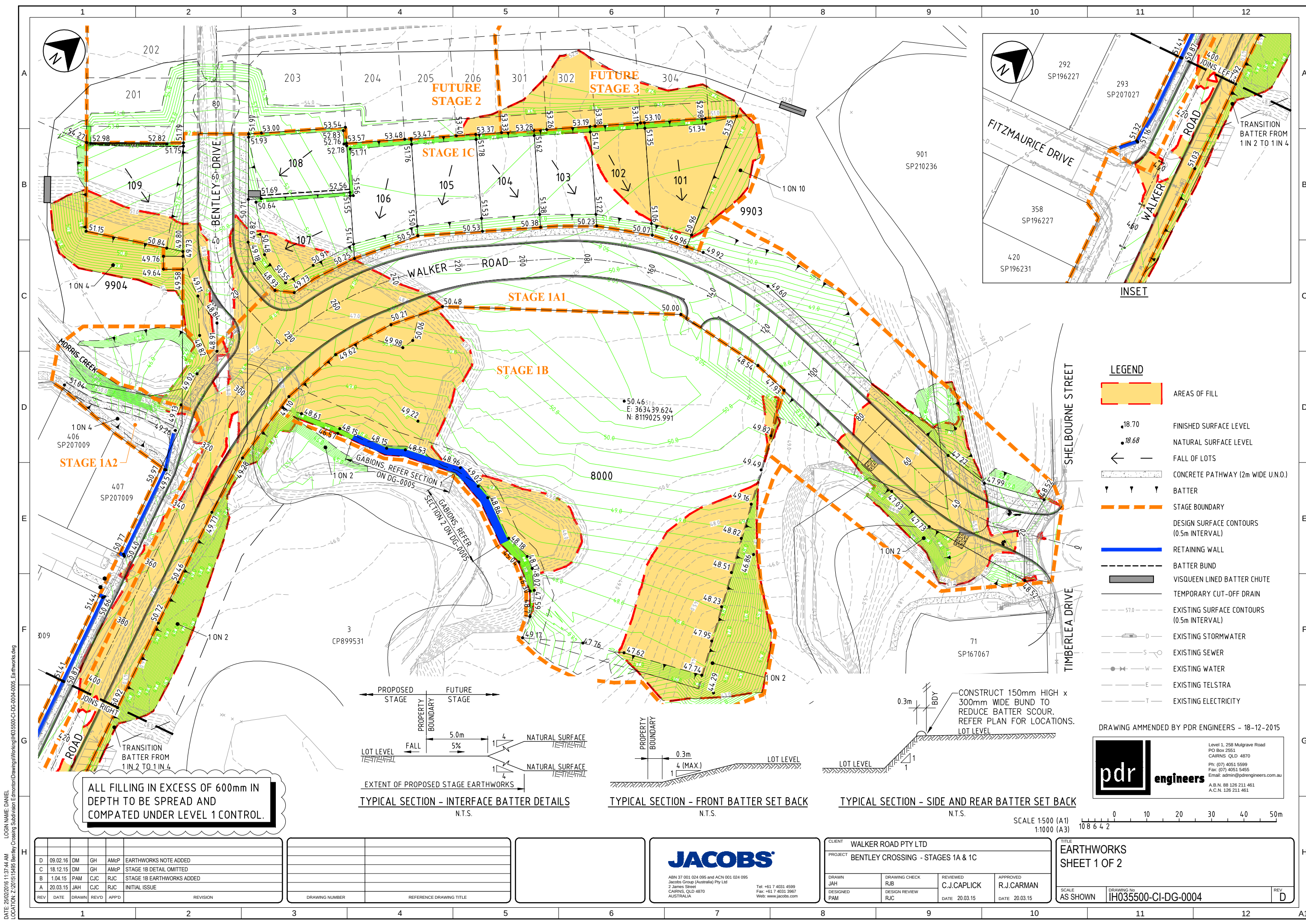
Bentley Crossing –
Stages 1A1, 1B & 1C

APPENDIX

B

ALLOTMENT FILL
MAP





LEGEND

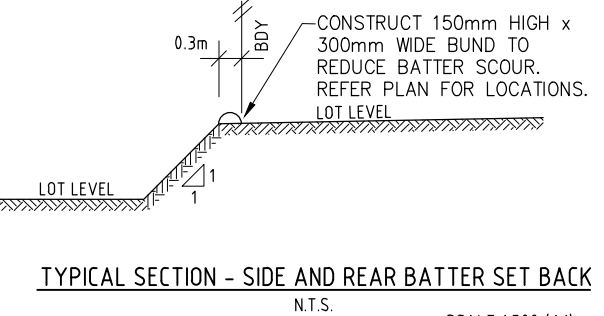
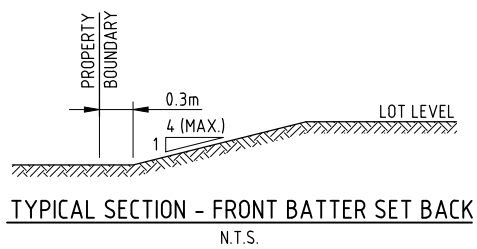
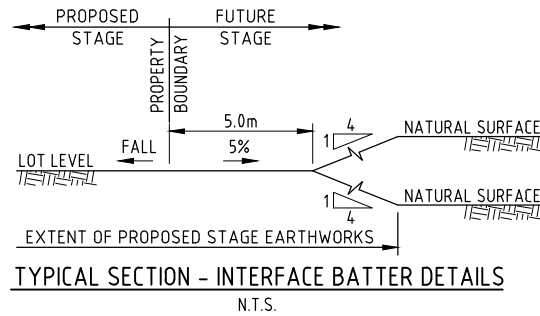
- AREAS OF FILL
- FINISHED SURFACE LEVEL
- NATURAL SURFACE LEVEL
- FALL OF LOTS
- CONCRETE PATHWAY (2m WIDE U.N.O.)
- BATTER
- STAGE BOUNDARY
- DESIGN SURFACE CONTOURS (0.5m INTERVAL)
- RETAINING WALL
- BATTER BUND
- VISQUEEN LINED BATTER CHUTE
- TEMPORARY CUT-OFF DRAIN
- EXISTING SURFACE CONTOURS (0.5m INTERVAL)
- EXISTING STORMWATER
- EXISTING SEWER
- EXISTING WATER
- EXISTING TELSTRA
- EXISTING ELECTRICITY

DRAWING AMENDED BY PDR ENGINEERS - 18-12-2015

pdr engineers

Level 1, 258 Mulgrave Road
PO Box 2551
CAIRNS QLD 4870
Ph: (07) 4051 5599
Fax: (07) 4051 5455
Email: admin@pdrengineers.com.au
A.B.N. 88 126 211 461
A.C.N. 126 211 461

ALL FILLING IN EXCESS OF 600mm IN DEPTH TO BE SPREAD AND COMPATED UNDER LEVEL 1 CONTROL.



SCALE 1:500 (A1)
1:1000 (A3)

REV	DATE	DRAWN	REV'D	APP'D	REVISION
D	09.02.16	DM	GH	AMcP	EARTHWORKS NOTE ADDED
C	18.12.15	DM	GH	AMcP	STAGE 1B DETAIL OMITTED
B	1.04.15	PAM	CJC	RJC	STAGE 1B EARTHWORKS ADDED
A	20.03.15	JAH	CJC	RJC	INITIAL ISSUE

DRAWING NUMBER	REFERENCE DRAWING TITLE

JACOBS

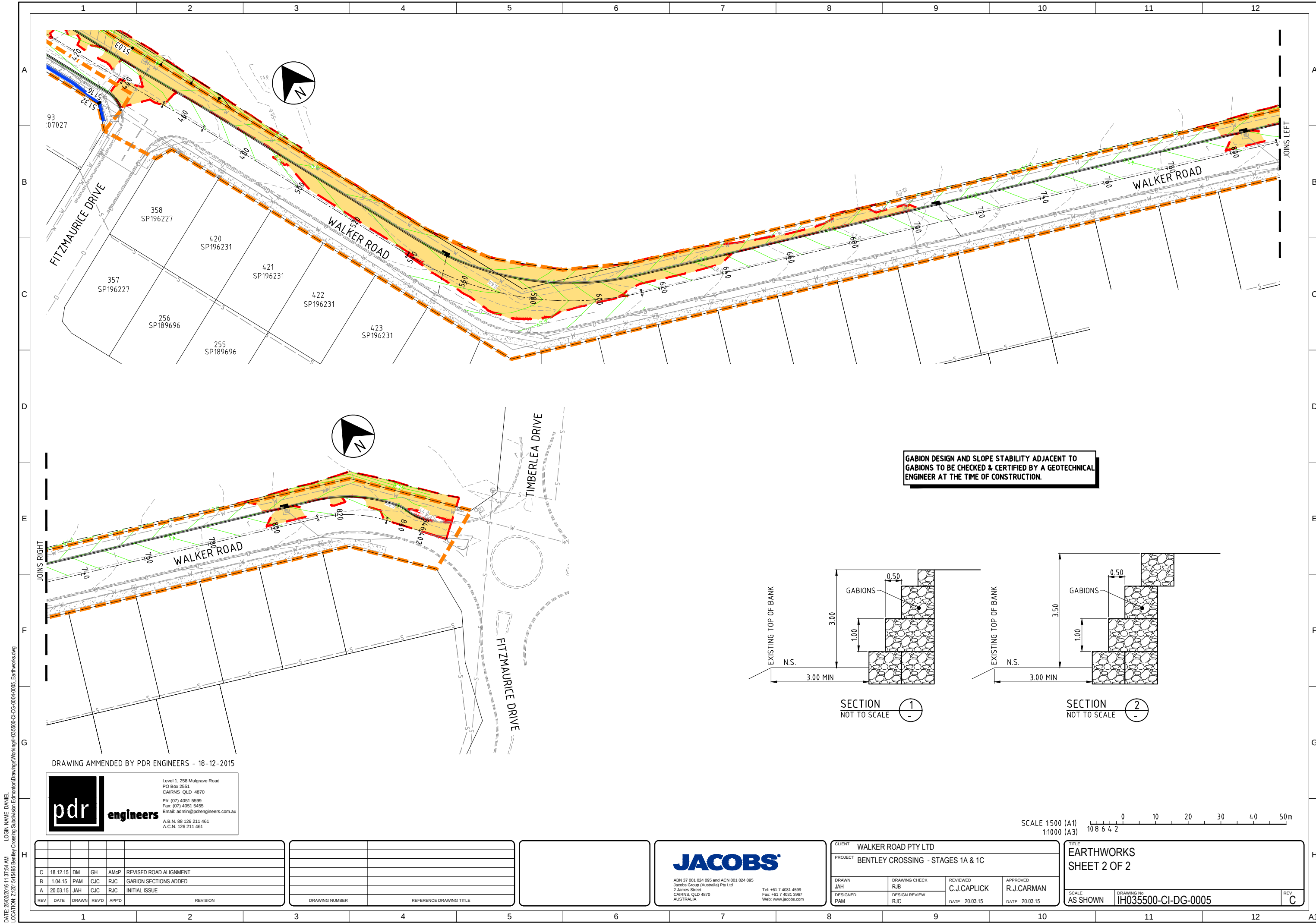
ABN 37 001 024 095 and ACN 001 024 095
Jacobs Group (Australia) Pty Ltd
2 James Street
CAIRNS, QLD 4870
AUSTRALIA

Tel: +61 7 4031 4599
Fax: +61 7 4031 3967
Web: www.jacobs.com

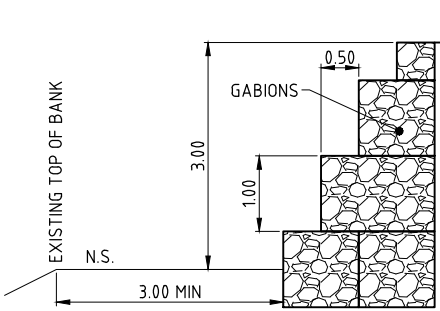
CLIENT	WALKER ROAD PTY LTD
PROJECT	BENTLEY CROSSING - STAGES 1A & 1C
DRAWN	JAH
DRAWING CHECK	RJB
DESIGNED	PAM
DESIGN REVIEW	RJC
REVIEWED	C.J.CAPLICK
DATE	20.03.15
APPROVED	R.J.CARMAN
DATE	20.03.15

TITLE	
EARTHWORKS	
SHEET 1 OF 2	
SCALE	DRAWING No
AS SHOWN	IH035500-CI-DG-0004
REV	D

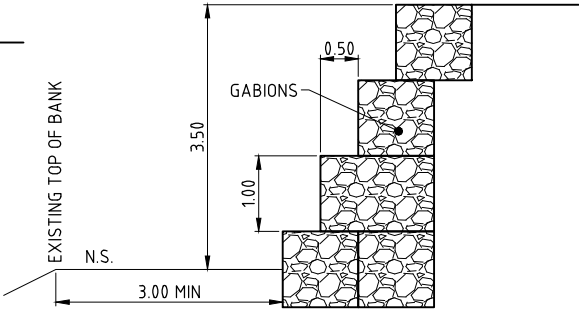
DATE: 25/02/2016 11:37:44 AM
LOCATION: 2:201515495 Bentley Crossing Subdivision
LOGIN NAME: DANIEL
Drawing: Drawing\Working\IH035500-CI-DG-0004-0005 Earthworks.dwg



GABION DESIGN AND SLOPE STABILITY ADJACENT TO GABIONS TO BE CHECKED & CERTIFIED BY A GEOTECHNICAL ENGINEER AT THE TIME OF CONSTRUCTION.



SECTION 1
NOT TO SCALE



SECTION 2
NOT TO SCALE

DRAWING AMENDED BY PDR ENGINEERS - 18-12-2015

Level 1, 258 Mulgrave Road
PO Box 2551
CAIRNS QLD 4870
Ph: (07) 4051 5599
Fax: (07) 4051 5455
Email: admin@pdrengineers.com.au
A.B.N. 88 126 211 461
A.C.N. 126 211 461

REV	DATE	DRAWN	REV'D	APP'D	REVISION
C	18.12.15	DM	GH	AMcP	REVISED ROAD ALIGNMENT
B	1.04.15	PAM	CJC	RJC	GABION SECTIONS ADDED
A	20.03.15	JAH	CJC	RJC	INITIAL ISSUE

DRAWING NUMBER	REFERENCE DRAWING TITLE

JACOBS

ABN 37 001 024 095 and ACN 001 024 095
Jacobs Group (Australia) Pty Ltd
2 James Street
CAIRNS, QLD 4870
AUSTRALIA
Tel: +61 7 4031 4599
Fax: +61 7 4031 3967
Web: www.jacobs.com

CLIENT WALKER ROAD PTY LTD			
PROJECT BENTLEY CROSSING - STAGES 1A & 1C			
DRAWN JAH	DRAWING CHECK RJB	REVIEWED C.J.CAPLICK	APPROVED R.J.CARMAN
DESIGNED PAM	DESIGN REVIEW RJC	DATE 20.03.15	DATE 20.03.15

TITLE EARTHWORKS SHEET 2 OF 2		
SCALE AS SHOWN	DRAWING No IH035500-CI-DG-0005	REV C

Contact

3/5 Commercial Place, Earlville QLD 4870

Telephone: 07 40337815

Facsimile: 07 47288023

cairns@constructoinsciences.net

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