

Brisbane Office
 Job No: DL17/133
 Ref No: 13195
 Author: L. McDowall

18th April 2017

CCA Winslow
 1587 Ipswich Road
 Rocklea Qld 4106

ATTENTION: MR ANTHONY ROSARIO
 Email: anthonyrosario@ccawinslow.com.au
 Cc: kieranh@ccawinslow.com.au

Dear Sir,

**RE: LEVEL ONE COMPLIANCE REPORT FOR
 BULK EARTHWORKS FILLING OPERATIONS
 EDEN'S CROSSING ESTATE, STAGE 6
 MT JUILLERAT DRIVE, REDBANK PLAINS**

Table of Contents

1.0	INTRODUCTION	2
1.1	General.....	2
1.2	Previous Earthworks	3
1.3	The Project	3
2.0	THE BRIEF	3
3.0	METHODOLOGY	4
3.1	Stripped Surface Assessment.....	4
3.2	Filling Operations	5
4.0	STATEMENT OF COMPLIANCE	9
5.0	EXCLUSIONS	9
6.0	LIMITATIONS	9
	ATTACHMENTS:	
	Appendix A – Site Plan Showing Test Locations	
	Appendix B – Laboratory Test Results Reports	
	Brochure – “Important Information About Your Geotechnical Report”	

1.0 INTRODUCTION

1.1 General

This report presents results of Level One Earthworks Inspections and associated Compaction Compliance testing carried out on Earthworks Fill constructed to form Residential Lots and embankments below subgrade at the Eden's Crossing Estate Stage 6 Development at Mount Juillerat Drive, Redbank Plains (The Site).

The work was commissioned by Mr. Anthony Rosario representing CCA Winslow (The Client), using Purchase Order 33832.

Earthworks operations were constructed by The Client.

Earthworks filling operations were carried out intermittently between 21st April 2017 and 4th April 2018.

Picture 1: Aerial View of the Site (Image Source: Nearmap.com 19th December 2017)



1.2 Previous Earthworks

As far as could be determined on site, no previous earthworks have been carried out at The Site.

1.3 The Project

The purpose for filling at The Site is to construct a Residential Subdivision which includes new pavements, residential building platforms and associated underground services.

ETS Engineering Earthworks Plan, Job Code 17BNE-0006 Drawing No. C200, Revision B, dated, 14th June 2017, indicates the extents and thickness of fill to be constructed at The Site.

This plan is a reasonable representation of the fill covered by this report with the following exceptions:

Fill was constructed on the following Lots: -

- 578 and 579
 - Materials at the design earthworks levels comprised rock of high and very high strength.
 - The rock was excavated to a depth of approximately 0.5m below the design earthworks levels and replaced by filling.
- 546 to 549 and Lot 535
 - Potentially reactive soils were exposed at the design earthworks levels. Reactive soils were excavated to approximately 1.2m below the design levels and replaced with fill of low reactivity.
- 562 to 566
 - Fill was placed on the rear boundary of these lots as part of Retaining Wall backfill

The actual thickness of fill on an individual Lot can be obtained from the Developer as a Lot Disclosure Plan.

The Site is bounded by future Residential Developments to the South and West, Eden's Crossing Stage 3 to the North and Mount Juillerat Drive to the East.

2.0 THE BRIEF

The Brief from the Client was limited to:

- Level One Inspection and Testing of the placement and compaction of fill materials in accordance with AS3798 2007 – "Guidelines on Earthworks for Commercial and Residential Developments",
- Relative Density Control Testing in accordance with AS1289 – Testing of Soils for Engineering Purposes and at frequencies required in AS3798 Table 8.1.
- Ipswich City Council Project Specifications
- Notes on ETS Earthworks Drawings.

The upper 1.2m of the fill profile was to include low reactive materials to generally conform to the following criteria: -

- Shrink Swell Index (Iss) – 1% Max.
- Particle Size Distribution:
 - Max Particle Size – 75mm
 - % passing 19mm – 80% Min.
 - % Passing 0.075mm - 10% Min.
- Plasticity:
 - Liquid Limit – 45% Max.
 - Plasticity Index – > 7% <20%
- Permeability - 5×10^{-7} m/s Max.

3.0 METHODOLOGY

Earthworks Inspection and Testing was carried out on the stripped and exposed ground surfaces and during the placement and compaction of fill materials.

Field and laboratory testing included a walk over assessments of the existing ground conditions, observation of filling and compaction activities and field density testing using a nuclear soil moisture density gauge and Hilf compactions. All work was carried out in accordance with AS 3798 (Guidelines on Earthworks for Commercial and Residential Developments) and AS1289 (Testing of Soils for Engineering Purposes).

Samples of the fill materials were collected and tested for conformance with the criteria presented in Section 2.

3.1 Stripped Surface Assessment

The fill areas at The Site were observed to be stripped and cleared of visible organic matter, deleterious, loose and unsuitable materials to depths exposing suitable natural ground or existing controlled fill.

Materials exposed after stripping and clearing the site which formed the fill foundation can be broadly summarised as:

- Natural - Silty Clay (CI - CH) – At least very stiff, medium to high and high plasticity, traces of fine to medium grained sands, brown, moist.
- Natural – Sandy Clay (CI) – Very stiff, medium plasticity, traces of fine to medium grained sand, pale brown mottled orange - red, moist.
- Natural – Basalt Rock (XW) – Extremely weathered, medium strength, red – brown – grey.
- Natural – Basalt Rock (SW-FR) – slightly weathered to fresh, high and very high strength, blue grey.

Following the stripped surface assessment of the fill areas, the fill foundation was approved for filling using the following process:

- Walk over assessments confirming that the competent ground was exposed.
- Proof roll testing using large sized truck carrying out multiple passes confirming no movement of the exposed fill foundation.

Picture 2: View of the Stripped Surface Prior to Filling Operations



3.2 Filling Operations

Fill materials were sourced from onsite cuts, road box excavations and trench excavations. Materials used as fill can be broadly summarized as: -

- Capping Materials – Upper 1.2m of the fill profile.
 - Clayey Sand (SC), fine to coarse sand, medium plasticity fines, with some fine to medium gravel, yellow brown and moist.
 - Sandy Clay (CI), medium plasticity fines, fine to coarse sand, yellow brown and moist.

Samples of the capping materials were collected and testing generally conformed with the criteria presented in Section 2 and are summarised below in Table 1. Test reports are attached.

Table 1 – Summary of Capping Materials Test Results.

Particle Size % Passing			Plasticity Index %			CBR (%)	Shrink Swell (%)
75mm	19	0.075	LL	PI	LS		
100	71 ⁽¹⁾	12	40	17	8	25	0.7
Notes							
1. Criteria for % Passing 19mm Sieve was outside Capping Material Specification.							

The criteria for % passing the 19mm sieve is outside the Capping Material Specification however is not considered to affect the performance intent of the Capping Material.

It is considered likely that the specification for permeability will be met based on the achieved test results.

Placement and compaction of the fill materials was carried out using the following plant:

- Dozer
- Excavators
- Pad foot Roller
- Scrapers
- Water Truck
- Body Trucks
- Skid Steer Loader
- Grader
- Articulated Dump Trucks
- 825 Compactor

The fill materials were moisture conditioned at the fill source and during placement to moisture contents suitable for compaction. Deleterious materials such as organics, sticks, roots and over size particles were sorted and removed during placement or were rejected for use.

Placement of the fill materials was carried out in layers appropriate for the above plant and compacted using the above plant carrying out multiple passes.

Our representative observed the filling process as described above and was assessed to be consistent for the entire thickness of fill.

Field density tests and laboratory compactions were carried out on the fill materials in accordance with Table 5.1 and 8.1 of AS3798 2007 (Guidelines on Earthworks for Commercial and Residential Developments) and tested to AS1289 test methods (Testing of Soils for Engineering Purposes). Testing achieved the required specification of 95% of the Hilt Density

Fill placed and compacted at measured density ratios less than 95% were tyned, moisture conditioned and re-compacted until the required specification was achieved. Retesting was carried out using Random Stratified Location methods.

The Location of the field density tests are shown on the Site Plan contained in Appendix A. These test locations and levels were not obtained by survey and therefore should only be considered as approximate.

Picture 3: View of the Site During Construction



Picture 4: View of the Site During Construction



Picture 5: View of the Site During Construction



Picture 6: View of the Site During Construction



4.0 STATEMENT OF COMPLIANCE

Our representatives observed the relevant earthworks operations including the stripped surface, fill placement and compaction operations and carried out field density tests and laboratory compaction tests in accordance with the required standard (AS3798, AS1289) and Specification.

It is confirmed that Level One Inspection and Testing has been carried out on the earthworks fill to form the residential Lots. Based on the observations made by our Geotechnicians and the results of the field and laboratory tests, the placed and compacted fill at the above project has, as far as we have been able to assess, been constructed in general accordance with the intent of AS3798 and the Specifications.

The fill can be deemed to be “controlled” in accordance with AS2870.

It can be confirmed that the upper 1.2m of the fill profile has been constructed using low reactive materials as described in Section 2.

5.0 EXCLUSIONS

This statement does not include any top soil, which may be placed for use as dressing, trench backfill or any other subsequent earthworks after 4th April 2018.

Assessments of material quality such as soaked CBR and site classifications are excluded from this commission.

Our on-site attendance specifically excludes assessments of fill material quality and engineering properties that are outside the requirements of AS3798 – 2007.

Footings and ground slabs for any structures constructed over natural soils or controlled fill should be designed to accommodate the characteristic ground surface movements and settlement potential.

Assessments of these design parameters are beyond the scope of this Report.

6.0 LIMITATIONS

This Report has been prepared by Morrison Geotechnic Pty Ltd (**Morrison Geotechnic**), and may include contributions from Morrison Geotechnic’s officers and employees, sub-contractors, sub-consultants or agents (**Contributors**).

This Report is for the sole benefit and use of CCA Winslow (**Client**), its designers, clients and relevant statutory authorities for the sole purpose of providing geotechnical advice and recommendations in respect of the Eden’s Crossing Estate, Stage 6, Mount Juillerat Drive, Redbank Plains (**Project**). The Report is only intended to address those issues expressly described in the Brief/ Work Instructions in this Report.

This Report should not be used or relied upon for any other purpose without Morrison Geotechnic’s prior written consent. Morrison Geotechnic and the Contributors do not accept any responsibility or liability in any way whatsoever for the use or reliance of this Report by anyone other than CCA Winslow (**Client**), its designers, its clients and relevant statutory authorities or by anyone else for any purpose other than that for which it has been prepared.

Except with Morrison Geotechnic’s prior written consent, this Report may not be:

- (a) released to any other party, whether in whole or in part (other than to the Client’s officers, employees, advisers, designers, clients and relevant statutory authorities);
- (b) used or relied upon by any other party.

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The information (including technical information and information obtained through discussions) on which this report is based has been provided by the Client and third parties. Morrison Geotechnic and the Contributors:

- (a) have relied upon and presumed the accuracy of this information;
- (b) have not verified the accuracy or reliability of this information (other than as expressly stated in this Report);
- (c) have not made any independent investigations or enquiries in respect of those matters of which it has no actual knowledge at the time of giving this Report to the Client; and
- (d) make no warranty or guarantee, expressed or implied, as to the accuracy or reliability of this information.

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- (a) is not an environmental, contamination or hazardous materials assessment; may be invalid, incomplete or inaccurate (including errors in the scope of work, investigation methodology, observations, opinions and advice) where the information provided to Morrison Geotechnic was invalid, incomplete or inaccurate;
- (b) is limited to observations of those parts of the site described in Section 1.0.

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If further information becomes available, or additional assumptions need to be made, Morrison Geotechnic reserves its right to amend this Report.

If you have any queries regarding the above, please contact our Brisbane office.

Yours faithfully



LIAM McDOWALL



M.D. RILEY (RPEQ 5641)

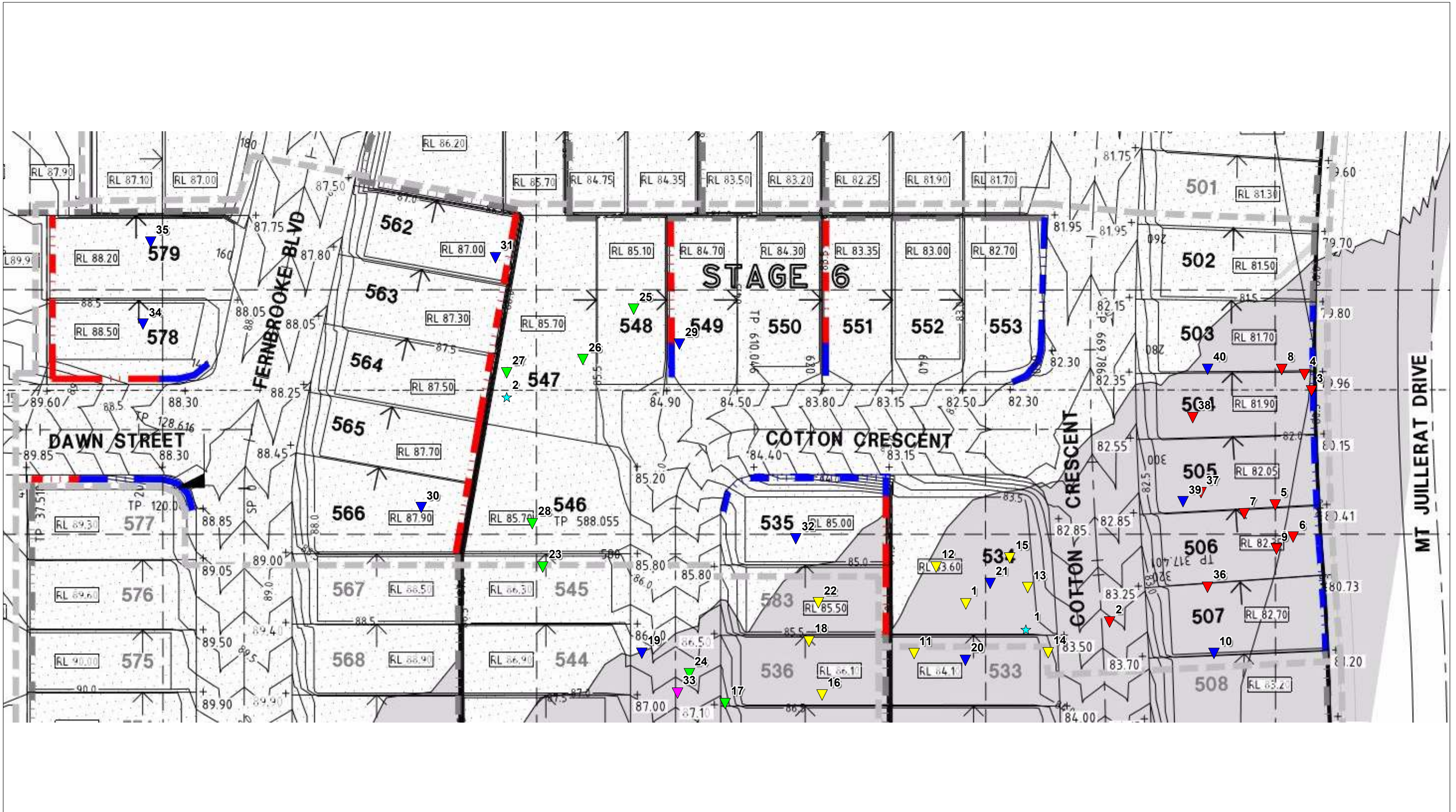
For and on behalf of
MORRISON GEOTECHNIC PTY LIMITED

ATTACHMENTS:

- Appendix A – Site Plan Showing Test Locations
- Appendix B – Laboratory Test Results Reports
- Brochure – “Important Information About Your Geotechnical Report”

APPENDIX A

**Site Plan
Test Locations**



MORRISON GEOTECHNIC PTY LTD
 ABN: 51 009 878 899

Unit 1/ 35 Limestone St, Darra 4076 Ph: 3279 0900
 Email: brisbanelab@morrisongeo.com.au Fax: 3279 0955

Engineers: D.Riley, J. Daly
 D.Dragun, & S.Wynne
 Geologists: L.Bexley & R.Howchin
 Laboratory: M.Morrison

LEGEND

- ▼ R.L 80.0 - 82.0
- ▼ R.L 82.0 - 84.0
- ▼ R.L 84.0 - 86.0
- ▼ R.L 86.0 - 88.0
- ★ CBR/QUALITY OF FILL
- ▼ Final Level

Map Description :	EARTHWORKS FIELD DENSITY TESTING - Level 1 Inspection		
Client :	CCA WINSLOW,		
Project :	STAGE 6, EDENS CROSSING		
Project No :	DL17/133	Drawing No :	DL17/133 - 01
		Scale :	Not to Scale


APPENDIX B

Test Certificates

Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 1
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	08/05/2017
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	228082		
Test Number :	1		
Sampling Method :	-		
Date Sampled :	21/04/2017		
Date Tested :	21/04/2017		
Material Type :	Bulk Fill		
Material Source :	On Site Cut		
Lot Number :	-		
Sample Location :	E 484506 N 6939734 RL 82.500		
Test Depth (mm) :	150		
Layer Depth (mm) :	-		
Maximum Size (mm) :	19		
Oversize Wet (%) :	-		
Oversize Dry (%) :	-		
Oversize Density (t/m ³) :	-		
Field Moisture Content (%) :	31.7		
Hilf MDR Number :	228082		
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1		
Compactive Effort :	Standard		
Field Density Method :	AS1289.5.8.1 & 5.7.1		
Moisture Method :	AS1289.2.1.1		
Moisture Ratio (%) :	98.5		
Field Wet Density (t/m ³) :	1.862		
Optimum Moisture Content (%) :	32.1		
Moisture Variation :	0.4		
Peak Converted Wet Density (t/m ³) :	1.761		
Hilf Density Ratio (%) :	105.5		
Minimum Specification :	95		
Moisture Specification :	+ or - 2%		
Site Selection :	-		
Soil Description :	-		
Remarks :	-		

 <p align="center">Accredited for compliance with ISO/IEC 17025.</p>	<p align="center">APPROVED SIGNATORY</p> <p align="center"><i>Liam A Mcdowall</i></p> <p align="center">Liam Mcdowall (Brisbane) - Branch Manager NATA Accreditation Number 1162 / 1169</p>
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MORRISON
GEOTECHNIC

Brisbane | Gold Coast | Maroochydore
Unit 1, 35 Limestone Street (PO Box 3063), Darra Q 4076 P (07) 3279 0900 F (07) 3279 0955

ABN: 51 009 878 899

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Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 2
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	12/05/2017
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	228398		
Test Number :	2		
Sampling Method :	-		
Date Sampled :	04/05/2017		
Date Tested :	04/05/2017		
Material Type :	Bulk Fill		
Material Source :	On Site		
Lot Number :	-		
Sample Location :	E 484530.734 N 6939727.200 RL 81.333		
Test Depth (mm) :	150		
Layer Depth (mm) :	-		
Maximum Size (mm) :	19		
Oversize Wet (%) :	-		
Oversize Dry (%) :	-		
Oversize Density (t/m ³) :	-		
Field Moisture Content (%) :	28.0		
Hilf MDR Number :	228398		
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1		
Compactive Effort :	Standard		
Field Density Method :	AS1289.5.8.1 & 5.7.1		
Moisture Method :	AS1289.2.1.1		
Moisture Ratio (%) :	100.5		
Field Wet Density (t/m ³) :	1.924		
Optimum Moisture Content (%) :	27.8		
Moisture Variation :	-0.1		
Peak Converted Wet Density (t/m ³) :	1.895		
Hilf Density Ratio (%) :	101.5		
Minimum Specification :	95		
Moisture Specification :	+ or - 2%		
Site Selection :	-		
Soil Description :	-		
Remarks :	-		



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Liam A Mcdowall

Liam Mcdowall (Brisbane) - Branch Manager
NATA Accreditation Number
1162 / 1169

Document Code RF89-11



Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 3
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	19/01/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	240296		
Test Number :	3		
Sampling Method :	-		
Date Sampled :	15/01/2018		
Date Tested :	15/01/2018		
Material Type :	Allotment Fill		
Material Source :	On Site		
Lot Number :	-		
Sample Location :	E 484575 N 6939757 2.2m Below Final Level		
Test Depth (mm) :	150		
Layer Depth (mm) :	-		
Maximum Size (mm) :	19		
Oversize Wet (%) :	-		
Oversize Dry (%) :	-		
Oversize Density (t/m ³) :	-		
Field Moisture Content (%) :	20.9		
Hilf MDR Number :	240296		
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1		
Compactive Effort :	Standard		
Field Density Method :	AS1289.5.8.1 & 5.7.1		
Moisture Method :	AS1289.2.1.1		
Moisture Ratio (%) :	100.5		
Field Wet Density (t/m ³) :	1.970		
Optimum Moisture Content (%) :	20.8		
Moisture Variation :	-0.1		
Peak Converted Wet Density (t/m ³) :	2.050		
Hilf Density Ratio (%) :	96.0		
Minimum Specification :	95		
Moisture Specification :	-		
Site Selection :	-		
Soil Description :	-		
Remarks :	-		



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NATA Accreditation Number
1162 / 1169



MORRISON
GEOTECHNIC

Brisbane | Gold Coast | Maroochydore
Unit 1, 35 Limestone Street (PO Box 3063), Darra Q 4076 P (07) 3279 0900 F (07) 3279 0955

ABN: 51 009 878 899

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Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 4
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	23/01/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	240402	240403	
Test Number :	4	5	
Sampling Method :	-	-	
Date Sampled :	16/01/2018	16/01/2018	
Date Tested :	16/01/2018	16/01/2018	
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	
Material Source :	On Site (Crushed Basalt)	On Site (Crushed Basalt)	
Lot Number :	504	505	
Sample Location :	Lot 504 E 484571.857 N 6939760.531 RL 80.647	Lot 504 E 484563.098 N 6939740.954 RL 80.622	
Test Depth (mm) :	150	150	
Layer Depth (mm) :	-	-	
Maximum Size (mm) :	19	19	
Oversize Wet (%) :	-	-	
Oversize Dry (%) :	-	-	
Oversize Density (t/m ³) :	-	-	
Field Moisture Content (%) :	16.1	16.6	
Hilf MDR Number :	240402	240403	
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	
Compactive Effort :	Standard	Standard	
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	
Moisture Ratio (%) :	89.5	87	
Field Wet Density (t/m ³) :	2.091	2.076	
Optimum Moisture Content (%) :	18.0	19.1	
Moisture Variation :	1.8	2.3	
Peak Converted Wet Density (t/m ³) :	2.092	2.054	
Hilf Density Ratio (%) :	100.0	101.0	
Minimum Specification :	95	95	
Moisture Specification :	-	-	
Site Selection :	-	-	
Soil Description :	-	-	
Remarks :	-		



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Document Code RF89-11



Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 5
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	23/01/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	240404	240405	
Test Number :	6	7	
Sampling Method :	-	-	
Date Sampled :	16/01/2018	16/01/2018	
Date Tested :	16/01/2018	16/01/2018	
Material Type :	Allotment Fill	Allotment Fill	
Material Source :	On Site	On Site	
Lot Number :	-	-	
Sample Location :	E 484565.350 N 6939735.450 RL 80.460	E 484557.390 N 6939740.420 RL 80.400	
Test Depth (mm) :	150	150	
Layer Depth (mm) :	-	-	
Maximum Size (mm) :	19	19	
Oversize Wet (%) :	-	-	
Oversize Dry (%) :	-	-	
Oversize Density (t/m ³) :	-	-	
Field Moisture Content (%) :	17.1	23.6	
Hilf MDR Number :	240404	240405	
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	
Compactive Effort :	Standard	Standard	
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	
Moisture Ratio (%) :	90	100	
Field Wet Density (t/m ³) :	2.087	1.827	
Optimum Moisture Content (%) :	19.0	23.6	
Moisture Variation :	1.8	0.0	
Peak Converted Wet Density (t/m ³) :	2.036	1.869	
Hilf Density Ratio (%) :	102.5	98.0	
Minimum Specification :	95	95	
Moisture Specification :	-	-	
Site Selection :	-	-	
Soil Description :	-	-	
Remarks :	-		



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Brisbane | Gold Coast | Maroochydore
Unit 1, 35 Limestone Street (PO Box 3063), Darra Q 4076 P (07) 3279 0900 F (07) 3279 0955
ABN: 51 009 878 899
www.morrisongeotech.com.au

Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 6
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	25/01/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6		Page 1 of 1

Sample Number :	240513	240514	240515	
Test Number :	8	9	10	
Sampling Method :	-	-	-	
Date Sampled :	17/01/2018	17/01/2018	17/01/2018	
Date Tested :	17/01/2018	17/01/2018	17/01/2018	
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	
Material Source :	On Site (Crushed Basalt) CBR 15+	On Site (Crushed Basalt) CBR 15+	On Site (Crushed Basalt) CBR 15+	
Lot Number :	-	-	-	
Sample Location :	E 484568.001 N 6939761.943 RL 81.367	E 484562.080 N 6939734.125 RL 81.402	E 484548.204 N 6939719.430 Final Level	
Test Depth (mm) :	150	150	150	
Layer Depth (mm) :	-	-	-	
Maximum Size (mm) :	19	19	19	
Oversize Wet (%) :	-	-	-	
Oversize Dry (%) :	-	-	-	
Oversize Density (t/m ³) :	-	-	-	
Field Moisture Content (%) :	17.3	17.4	11.0	
Hilf MDR Number :	240513	240514	240515	
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	
Compactive Effort :	Standard	Standard	Standard	
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	
Moisture Ratio (%) :	100	95.5	78	
Field Wet Density (t/m ³) :	2.090	2.039	2.075	
Optimum Moisture Content (%) :	17.3	18.2	14.1	
Moisture Variation :	0.0	0.8	3.2	
Peak Converted Wet Density (t/m ³) :	2.136	2.099	1.978	
Hilf Density Ratio (%) :	98.0	97.0	105.0	
Minimum Specification :	95	95	95	
Moisture Specification :	-	-	-	
Site Selection :	-	-	-	
Soil Description :	-	-	-	
Remarks :	-			



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Sam Woodley (Brisbane) - Laboratory Manager
NATA Accreditation Number
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Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 7
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	02/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242074	242075	242076	242077
Test Number :	11	12	13	14
Sampling Method :	-	-	-	-
Date Sampled :	19/02/2018	19/02/2018	19/02/2018	19/02/2018
Date Tested :	19/02/2018	19/02/2018	19/02/2018	19/02/2018
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)
Material Source :	On Site (Crushed Basalt)	On Site (Crushed Basalt)	On Site (Crushed Basalt)	On Site (Crushed Basalt)
Lot Number :	-	-	-	-
Sample Location :	E 484495.231 N 6939725.994 RL 82.710	E 484501.799 N 6939740.560 RL 82.519	E 484517.306 N 6939734.847 RL 82.229	E 484519.105 N 6939724.082 RL 82.739
Test Depth (mm) :	150	150	150	150
Layer Depth (mm) :	-	-	-	-
Maximum Size (mm) :	19	19	19	19
Oversize Wet (%) :	14	-	-	-
Oversize Dry (%) :	-	-	-	-
Oversize Density (t/m ³) :	2.665	-	-	-
Field Moisture Content (%) :	14.6	18.9	17.4	10.6
Hilf MDR Number :	242074	242075	242076	242077
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1
Compactive Effort :	Standard	Standard	Standard	Standard
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Moisture Ratio (%) :	87.5	100.5	90.5	81
Field Wet Density (t/m ³) :	2.190	2.137	2.162	2.124
Optimum Moisture Content (%) :	16.7	18.8	19.2	13.1
Moisture Variation :	2.0	-0.1	1.8	2.6
Peak Converted Wet Density (t/m ³) :	2.168*	2.100	2.115	2.064
Hilf Density Ratio (%) :	101.0	102.0	102.0	103.0
Minimum Specification :	95	95	95	95
Moisture Specification :	-	-	-	-
Site Selection :	-	-	-	-
Soil Description :	-	-	-	-
Remarks :	-			

* - denotes adjusted for oversize

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Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 8
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	02/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242078		
Test Number :	15		
Sampling Method :	-		
Date Sampled :	19/02/2018		
Date Tested :	19/02/2018		
Material Type :	Allotment Fill (Capping Layer)		
Material Source :	On Site (Crushed Basalt)		
Lot Number :	-		
Sample Location :	E 484514.985 N 6939739.954 RL 82.584		
Test Depth (mm) :	150		
Layer Depth (mm) :	-		
Maximum Size (mm) :	19		
Oversize Wet (%) :	-		
Oversize Dry (%) :	-		
Oversize Density (t/m ³) :	-		
Field Moisture Content (%) :	16.6		
Hilf MDR Number :	242078		
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1		
Compactive Effort :	Standard		
Field Density Method :	AS1289.5.8.1 & 5.7.1		
Moisture Method :	AS1289.2.1.1		
Moisture Ratio (%) :	99		
Field Wet Density (t/m ³) :	2.223		
Optimum Moisture Content (%) :	16.7		
Moisture Variation :	0.1		
Peak Converted Wet Density (t/m ³) :	2.104		
Hilf Density Ratio (%) :	105.5		
Minimum Specification :	95		
Moisture Specification :	-		
Site Selection :	-		
Soil Description :	-		
Remarks :	-		



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Liam A Mcdowall

Liam Mcdowall (Brisbane) - Branch Manager
NATA Accreditation Number
1162 / 1169



Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 9
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	02/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242134	242135	242136	242137
Test Number :	16	17	18	19
Sampling Method :	-	-	-	-
Date Sampled :	20/02/2018	20/02/2018	20/02/2018	20/02/2018
Date Tested :	20/02/2018	20/02/2018	20/02/2018	20/02/2018
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)
Material Source :	On Site (Crushed Basalt)	On Site (Crushed Basalt)	On Site (Crushed Basalt)	On Site (Crushed Basalt)
Lot Number :	536	531	538	-
Sample Location :	Lot 536 E 484478.211 N 6939723.702 RL 84.980	Lot 531 E 484460.925 N 6939725.025 RL 85.394	Lot 538 E 484477.389 N 6939732.444 RL 84.426	Embankment E 484447.702 N 6939735.176 RL 85.269
Test Depth (mm) :	150	150	150	150
Layer Depth (mm) :	-	-	-	-
Maximum Size (mm) :	19	19	19	19
Oversize Wet (%) :	-	-	-	-
Oversize Dry (%) :	-	-	-	-
Oversize Density (t/m ³) :	-	-	-	-
Field Moisture Content (%) :	13.4	13.3	14.0	14.4
Hilf MDR Number :	242134	242135	242136	242137
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1
Compactive Effort :	Standard	Standard	Standard	Standard
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Moisture Ratio (%) :	97.5	96.5	95.5	94.5
Field Wet Density (t/m ³) :	2.216	2.217	2.144	2.159
Optimum Moisture Content (%) :	13.8	13.8	14.7	15.3
Moisture Variation :	0.3	0.4	0.7	0.9
Peak Converted Wet Density (t/m ³) :	2.233	2.258	2.229	2.204
Hilf Density Ratio (%) :	99.0	98.0	96.0	98.0
Minimum Specification :	95	95	95	95
Moisture Specification :	-	-	-	-
Site Selection :	-	-	-	-
Soil Description :	-	-	-	-
Remarks :	-			



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Liam A Mc Dowall

Liam Mcdowall (Brisbane) - Branch Manager
NATA Accreditation Number
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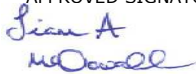


Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 10
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	02/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242138	242139	
Test Number :	20	21	
Sampling Method :	-	-	
Date Sampled :	20/02/2018	20/02/2018	
Date Tested :	20/02/2018	20/02/2018	
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	
Material Source :	On Site (Crushed Basalt)	On Site (Crushed Basalt)	
Lot Number :	533	534	
Sample Location :	Lot 533 E 484504.341 N 6939717.702 Final Level	Lot 534 E 484510.847 N 6939736.524 Final Level	
Test Depth (mm) :	150	150	
Layer Depth (mm) :	-	-	
Maximum Size (mm) :	19	19	
Oversize Wet (%) :	9	9	
Oversize Dry (%) :	-	-	
Oversize Density (t/m ³) :	2.636	2.564	
Field Moisture Content (%) :	13.4	13.5	
Hilf MDR Number :	242138	242139	
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	
Compactive Effort :	Standard	Standard	
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	
Moisture Ratio (%) :	94	99.5	
Field Wet Density (t/m ³) :	2.236	2.269	
Optimum Moisture Content (%) :	14.3	13.6	
Moisture Variation :	0.9	0.1	
Peak Converted Wet Density (t/m ³) :	2.229*	2.261*	
Hilf Density Ratio (%) :	100.5	100.5	
Minimum Specification :	95	95	
Moisture Specification :	-	-	
Site Selection :	-	-	
Soil Description :	-	-	
Remarks :	-		

* - denotes adjusted for oversize

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Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 11
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	08/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242202	242203	242204	
Test Number :	22	23	24	
Sampling Method :	-	-	-	
Date Sampled :	21/02/2018	21/02/2018	21/02/2018	
Date Tested :	21/02/2018	21/02/2018	21/02/2018	
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	
Material Source :	On Site Cut (Crushed Basalt)	On Site Cut (Crushed Basalt)	On Site Cut (Crushed Basalt)	
Lot Number :	583	545	-	
Sample Location :	Lot 583 E 484480.124 N 6939738.217 RL 84.705	Lot 545 E 484430.347 N 6939741.306 RL 85.790	Embankment E 484455.483 N 6939730.676 RL 85.440	
Test Depth (mm) :	150	150	150	
Layer Depth (mm) :	-	-	-	
Maximum Size (mm) :	19	19	19	
Oversize Wet (%) :	-	15	18	
Oversize Dry (%) :	-	-	-	
Oversize Density (t/m ³) :	-	2.640	2.533	
Field Moisture Content (%) :	17.7	13.9	14.1	
Hilf MDR Number :	242202	242203	242204	
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	
Compactive Effort :	Standard	Standard	Standard	
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	
Moisture Ratio (%) :	101.5	101.5	102.5	
Field Wet Density (t/m ³) :	2.222	2.280	2.277	
Optimum Moisture Content (%) :	17.5	13.7	13.7	
Moisture Variation :	-0.2	-0.2	-0.3	
Peak Converted Wet Density (t/m ³) :	2.175	2.278*	2.289*	
Hilf Density Ratio (%) :	102.0	100.0	99.5	
Minimum Specification :	95	95	95	
Moisture Specification :	-	-	-	
Site Selection :	-	-	-	
Soil Description :	Crushed BASALT	Crushed BASALT	Crushed BASALT	
Remarks :	-			

* - denotes adjusted for oversize

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	Document Code RF89-11

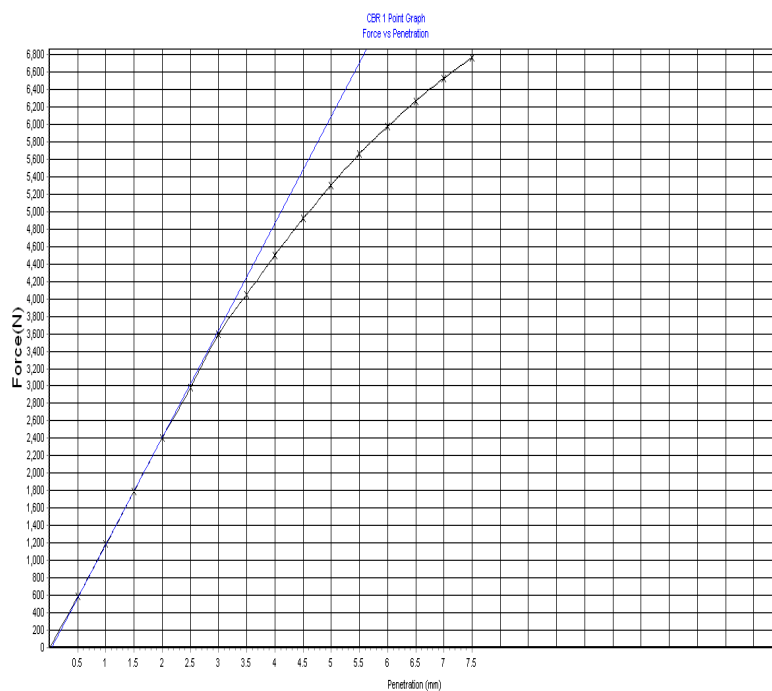


California Bearing Ratio Report (1 Point)

Client :	CCA WINSLOW	Report Number:	DL17/133 - 12
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	08/03/2018
Project Number :	DL17/133	Order Number :	33832
Project Name :	EARTHWORKS SUPERVISION	Test Method :	AS1289.6.1.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	


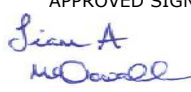
Sample Number :	242140	SAMPLE LOCATION	
Date Sampled :	20/02/2018	E 484504.341	
Date Tested :	27/02/2018	N 6939717.702	
Sampled By :	Liam Davidson	Final Level - 0.15m Below	
Sampling Method :	-	Lot Number :	-
Material Source :	On Site Cut (Stge 6)	Test Number :	1
Material Type :	Allotment Fill (Capping Layer)		
Remarks :	-		

Moisture Method :	AS1289.2.1.1		
Maximum Dry Density (t/m ³) :	1.916		
Optimum Moisture Content (%) :	14.7		
Compactive Effort :	Standard		
Nominated Percentage of MDD :	100		
Nominated Percentage of OMC :	100		
Achieved Percentage of MDD :	100		
Achieved Percentage of OMC :	100.0		
Dry Density Before Soak (t/m ³) :	1.916		
Dry Density After Soak (t/m ³) :	1.914		
Moisture Content Before Soak (%) :	14.7		
Moisture Content After Soak (%) :	16.2		
Density Ratio After Soak (%) :	100		
Field Moisture Content (%) :	14.3		
Top Moisture Content - After Penetration (%) :	16.6		
Total Moisture Content - After Penetration (%) :	14.9		
Soak Condition :	Soaked		
Soak Period (days) :	4		
Swell (%) :	0.0		
CBR Surcharge (kg) :	4.5	CBR 2.5mm (%) :	25
Oversize (%) :	-	CBR 5.0mm (%) :	25
Oversize Material Replaced (%) :	-	CBR Value (%) :	25



Liquid Limit Determination (iii). Curing Duration 48 hours.

Site Selection :	-
Soil Description :	Crushed BASALT

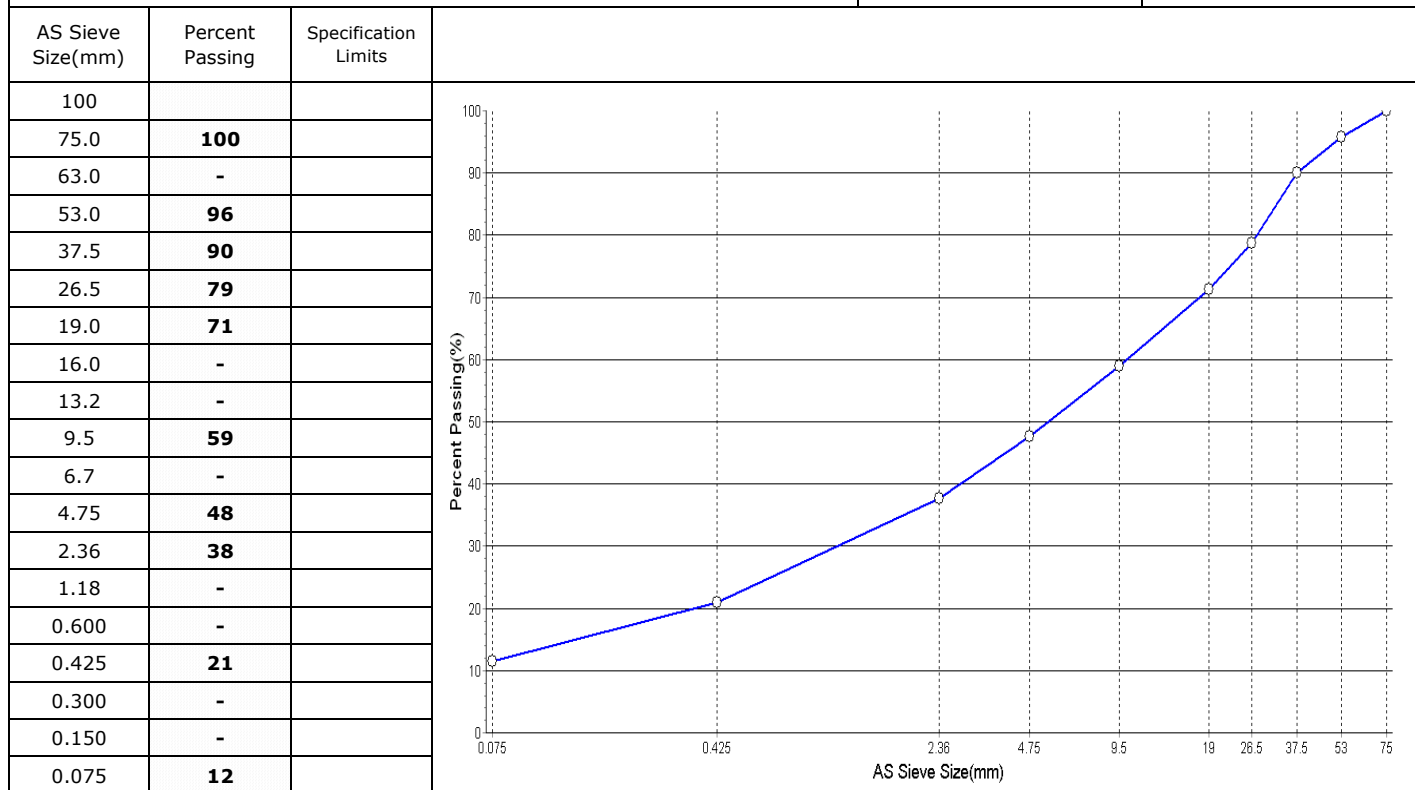
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	Document Code RF39-10





Quality of Materials Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 13
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	08/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	33832
Project Number :	DL17/133	Test Method :	Q103A
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242140	SAMPLE LOCATION	
Sampling Method :	-	E 484504.341	
Sampled By :	Liam Davidson	N 6939717.702	
Date Sampled :	20/02/2018	Final Level - 0.15m Below	
Date Tested :	20/02/2018	Test Number :	1
Material Type :	Allotment Fill (Capping Layer)	Lot Number :	-
Material Source :	On Site Cut (Stge 6)	Specification Number :	
Remarks :	-		



	Test Method	Results	Results	Specification
Liquid Limit (%) :	Q104A	40	Weighted PI :	357
Plastic Limit (%) :	Q105	23.2	L.S. x % Passing 0.425 mm	168
Plasticity Index (%) :	Q105	17	Ratio of % Passing (0.075 / 0.425)	0.57
Linear Shrinkage (%) :	Q106	8		


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Shrink Swell Index Report

<p>Client : CCA WINSLOW Address : 1587 IPSWICH ROAD, ROCKLEA, QLD, 4106 Project Name : EARTHWORKS SUPERVISION Project Number : DL17/133 Location: EDEN'S CROSSING , STAGE 6</p>	<p>Report Number: DL17/133 - 14 Report Date : 08/03/2018 Order Number : 33832 Test Method : AS1289.7.1.1</p> <p style="text-align: right;">Page 1 of 1</p>
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Sample Number :	242140			
Test Number :	1			
Sampling Method :	-			
Sampled By :	Liam Davidson			
Date Sampled :	20/02/2018			
Date Tested :	27/02/2018			
Material Type :	Allotment Fill (Capping Layer)			
Material Source :	On Site Cut (Stge 6)			
Sample Location :	E 484504.341 N 6939717.702 Final Level - 0.15m Below			
Inert Material Estimate (%) :	0			
PP before (kPa) :	350			
PP after (kPa) :	290			
Shrinkage Moisture Content (%) :	14.7			
Shrinkage (%) :	1.2			
Swell Moisture Content Before (%) :	14.8			
Swell Moisture Content After (%) :	17.8			
Swell (%) :	0.3			
Unit Weight (t/m ³) :	2.03			
Shrink Swell Index Iss (%) :	0.7			
Visual Classification :	Sandy CLAY (XW Basalt)			
Cracking :	Yes			
Crumbling :	Yes			
Remarks :	Remoulded @ 95% MDD @ OMC.			

 <p style="text-align: center;">Accredited for compliance with ISO/IEC 17025 - Testing.</p>	<p style="text-align: center;">APPROVED SIGNATORY</p> <p style="text-align: center;"><i>Liam A Mcdowall</i></p> <p style="text-align: center;">Liam Mcdowall (Brisbane) - Branch Manager NATA Accreditation Number 1162 / 1169</p>
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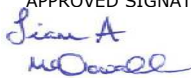
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Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 15
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	26/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	37618
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242786	242787	242788	242789
Test Number :	25	26	27	28
Sampling Method :	-	-	-	-
Date Sampled :	16/03/2018	16/03/2018	16/03/2018	16/03/2018
Date Tested :	16/03/2018	16/03/2018	16/03/2018	16/03/2018
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)
Material Source :	On Site Stockpile	On Site Stockpile	On Site Stockpile	On Site Stockpile
Lot Number :	548	547	547	546
Sample Location :	Lot 548 E 484055.860 N 6939789.170 RL 85.425	Lot 547 E 484445.527 N 6939797.703 RL 85.040	Lot 547 E 484431.757 N 6939782.694 RL 85.250	Lot 546 E 484432.059 N 6939758.424 RL 85.307
Test Depth (mm) :	150	150	150	150
Layer Depth (mm) :	-	-	-	-
Maximum Size (mm) :	19	19	19	19
Oversize Wet (%) :	10	-	-	-
Oversize Dry (%) :	-	-	-	-
Oversize Density (t/m ³) :	2.495	-	-	-
Field Moisture Content (%) :	16.6	19.5	17.8	14.0
Hilf MDR Number :	242786	242787	242788	242789
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1
Compactive Effort :	Standard	Standard	Standard	Standard
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Moisture Ratio (%) :	93	99.5	100	86
Field Wet Density (t/m ³) :	2.209	2.145	2.146	2.134
Optimum Moisture Content (%) :	17.8	19.6	17.8	16.3
Moisture Variation :	1.2	0.1	0.0	2.2
Peak Converted Wet Density (t/m ³) :	2.172*	2.120	2.118	2.151
Hilf Density Ratio (%) :	101.5	101.0	101.5	99.0
Minimum Specification :	95	95	95	95
Moisture Specification :	-	-	-	-
Site Selection :	-	-	-	-
Soil Description :	Crushed Weathered BASALT	Crushed Weathered BASALT	Crushed Weathered BASALT	Crushed Weathered BASALT
Remarks :	-			

* - denotes adjusted for oversize

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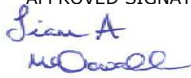


Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 16
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	26/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	37618
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242790		
Test Number :	29		
Sampling Method :	-		
Date Sampled :	16/03/2018		
Date Tested :	16/03/2018		
Material Type :	Allotment Fill (Capping Layer)		
Material Source :	On Site Stockpile		
Lot Number :	549		
Sample Location :	Lot 549 E 484462.900 N 6939782.445 Final Level		
Test Depth (mm) :	150		
Layer Depth (mm) :	-		
Maximum Size (mm) :	19		
Oversize Wet (%) :	11		
Oversize Dry (%) :	-		
Oversize Density (t/m ³) :	2.574		
Field Moisture Content (%) :	15.2		
Hilf MDR Number :	242790		
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1		
Compactive Effort :	Standard		
Field Density Method :	AS1289.5.8.1 & 5.7.1		
Moisture Method :	AS1289.2.1.1		
Moisture Ratio (%) :	99		
Field Wet Density (t/m ³) :	2.203		
Optimum Moisture Content (%) :	15.4		
Moisture Variation :	0.2		
Peak Converted Wet Density (t/m ³) :	2.247*		
Hilf Density Ratio (%) :	98.0		
Minimum Specification :	95		
Moisture Specification :	-		
Site Selection :	-		
Soil Description :	Crushed Weathered BASALT		
Remarks :	-		

* - denotes adjusted for oversize

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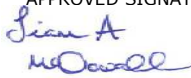


Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 17
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	27/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	37618
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242816	242817	242818
Test Number :	30	31	32
Sampling Method :	-	-	-
Date Sampled :	17/03/2018	17/03/2018	17/03/2018
Date Tested :	17/03/2018	17/03/2018	17/03/2018
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)
Material Source :	On Site Stockpile	On Site Stockpile	On Site Stockpile
Lot Number :	566	562	535
Sample Location :	Lot 566 E 484413 N 6939764 Final Level	Lot 562 E 484433 N 6939801 Final Level	Lot 535 E 484477.923 N 6939748.833 Final Level
Test Depth (mm) :	150	150	150
Layer Depth (mm) :	-	-	-
Maximum Size (mm) :	19	19	19
Oversize Wet (%) :	-	9	9
Oversize Dry (%) :	-	-	-
Oversize Density (t/m ³) :	-	2.511	2.625
Field Moisture Content (%) :	14.6	17.4	17.2
Hilf MDR Number :	242816	242817	242818
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1
Compactive Effort :	Standard	Standard	Standard
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Moisture Ratio (%) :	102.5	92.5	98
Field Wet Density (t/m ³) :	2.145	2.212	2.204
Optimum Moisture Content (%) :	14.2	18.8	17.5
Moisture Variation :	-0.3	1.3	0.3
Peak Converted Wet Density (t/m ³) :	2.111	2.216*	2.172*
Hilf Density Ratio (%) :	101.5	100.0	101.5
Minimum Specification :	95	95	95
Moisture Specification :	-	-	-
Site Selection :	-	-	-
Soil Description :	Crushed weathered BASALT	Crushed weathered BASALT	Crushed weathered BASALT
Remarks :	-		

* - denotes adjusted for oversize

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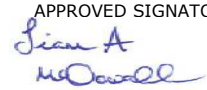


Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 18
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	27/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	37618
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242819		
Test Number :	33		
Sampling Method :	-		
Date Sampled :	17/03/2018		
Date Tested :	17/03/2018		
Material Type :	Road Embankment		
Material Source :	On Site Stockpile		
Lot Number :	-		
Sample Location :	Road Embankment E 484452.867 N 6939727.970 RL 86.400		
Test Depth (mm) :	150		
Layer Depth (mm) :	-		
Maximum Size (mm) :	19		
Oversize Wet (%) :	8		
Oversize Dry (%) :	-		
Oversize Density (t/m ³) :	2.660		
Field Moisture Content (%) :	15.1		
Hilf MDR Number :	242819		
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1		
Compactive Effort :	Standard		
Field Density Method :	AS1289.5.8.1 & 5.7.1		
Moisture Method :	AS1289.2.1.1		
Moisture Ratio (%) :	100		
Field Wet Density (t/m ³) :	2.171		
Optimum Moisture Content (%) :	15.1		
Moisture Variation :	0.0		
Peak Converted Wet Density (t/m ³) :	2.131*		
Hilf Density Ratio (%) :	102.0		
Minimum Specification :	95		
Moisture Specification :	-		
Site Selection :	-		
Soil Description :	Crushed weathered BASALT		
Remarks :	-		

* - denotes adjusted for oversize

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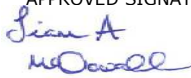


Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 19
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	27/03/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	37618
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242870	242871	
Test Number :	34	35	
Sampling Method :	-	-	
Date Sampled :	19/03/2018	19/03/2018	
Date Tested :	19/03/2018	19/03/2018	
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	
Material Source :	On Site Stockpile	On Site Stockpile	
Lot Number :	578	579	
Sample Location :	Lot 578 E 484369.245 N 6939800.297 Final Level	Lot 579 E 484372.871 N 6939812.922 Final Level	
Test Depth (mm) :	150	150	
Layer Depth (mm) :	-	-	
Maximum Size (mm) :	19	19	
Oversize Wet (%) :	16	11	
Oversize Dry (%) :	-	-	
Oversize Density (t/m ³) :	2.470	2.503	
Field Moisture Content (%) :	11.3	14.2	
Hilf MDR Number :	242870	242871	
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	
Compactive Effort :	Standard	Standard	
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	
Moisture Ratio (%) :	78	101	
Field Wet Density (t/m ³) :	2.181	2.226	
Optimum Moisture Content (%) :	14.5	14.0	
Moisture Variation :	3.2	-0.1	
Peak Converted Wet Density (t/m ³) :	2.19*	2.239*	
Hilf Density Ratio (%) :	99.5	99.5	
Minimum Specification :	95	95	
Moisture Specification :	-	-	
Site Selection :	-	-	
Soil Description :	Crushed BASALT	Crushed BASALT	
Remarks :	-		

* - denotes adjusted for oversize

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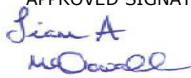


Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 20
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	05/04/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	37618
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	243031	243032	243033
Test Number :	36	37	38
Sampling Method :	-	-	-
Date Sampled :	21/03/2018	21/03/2018	21/03/2018
Date Tested :	21/03/2018	21/03/2018	21/03/2018
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)
Material Source :	On Site Stockpile	On Site Stockpile	On Site Stockpile
Lot Number :	506	505	504
Sample Location :	Lot 506 E 484548.894 N 6939729.946 RL 81.849	Lot 505 E 484550.400 N 6939744.930 RL 81.701	Lot 504 E 484551.050 N 6939756.867 RL 81.440
Test Depth (mm) :	150	150	150
Layer Depth (mm) :	-	-	-
Maximum Size (mm) :	19	19	19
Oversize Wet (%) :	12	13	11
Oversize Dry (%) :	-	-	-
Oversize Density (t/m ³) :	2.493	2.499	2.463
Field Moisture Content (%) :	15.3	14.3	15.5
Hilf MDR Number :	243031	243032	243033
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1
Compactive Effort :	Standard	Standard	Standard
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	AS1289.2.1.1
Moisture Ratio (%) :	102	100.5	101
Field Wet Density (t/m ³) :	2.205	2.128	2.189
Optimum Moisture Content (%) :	15.0	14.2	15.3
Moisture Variation :	-0.2	-0.1	-0.1
Peak Converted Wet Density (t/m ³) :	2.226*	2.216*	2.224*
Hilf Density Ratio (%) :	99.0	96.0	98.5
Minimum Specification :	95	95	95
Moisture Specification :	-	-	-
Site Selection :	-	-	-
Soil Description :	Crushed BASALT	Crushed BASALT	Crushed BASALT
Remarks :	-		

* - denotes adjusted for oversize

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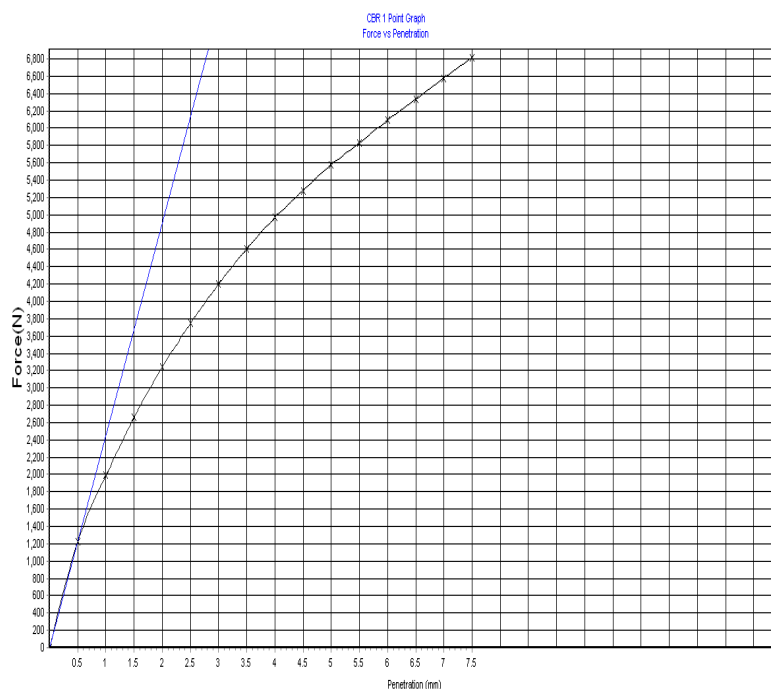


California Bearing Ratio Report (1 Point)

Client : CCA WINSLOW	Report Number: DL17/133 - 21
Address : 1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date : 05/04/2018
Project Number : DL17/133	Order Number : 37618
Project Name : EARTHWORKS SUPERVISION	Test Method : AS1289.6.1.1
Location: EDEN'S CROSSING , STAGE 6	Page 1 of 1

Sample Number : 242791	SAMPLE LOCATION
Date Sampled : 16/03/2018	E 484431.757
Date Tested : 22/03/2018	N 6939782.694
Sampled By : Liam Davidson	RL 85.250
Sampling Method : -	Lot Number : -
Material Source : On Site Stockpile (West of Stage 8)	Test Number : 2
Material Type : Allotment Fill (Capping Layer)	
Remarks : -	

Moisture Method :	AS1289.2.1.1
Maximum Dry Density (t/m ³) :	2.005
Optimum Moisture Content (%) :	10.8
Compactive Effort :	Standard
Nominated Percentage of MDD :	100
Nominated Percentage of OMC :	100
Achieved Percentage of MDD :	100
Achieved Percentage of OMC :	100.0
Dry Density Before Soak (t/m ³) :	2.005
Dry Density After Soak (t/m ³) :	2.004
Moisture Content Before Soak (%) :	10.8
Moisture Content After Soak (%) :	13.2
Density Ratio After Soak (%) :	100
Field Moisture Content (%) :	12.4
Top Moisture Content - After Penetration (%) :	16.5
Total Moisture Content - After Penetration (%) :	16.2
Soak Condition :	Soaked
Soak Period (days) :	4
Swell (%) :	0.0
CBR Surcharge (kg) :	4.5
Oversize (%) :	-
Oversize Material Replaced (%) :	-



CBR Surcharge (kg) :	4.5	CBR 2.5mm (%) :	30
Oversize (%) :	-	CBR 5.0mm (%) :	30
Oversize Material Replaced (%) :	-	CBR Value (%) :	30

Liquid Limit Determination (iii). Curing Duration 48 hours.

Site Selection :	-
Soil Description :	Clayey SAND, with basalt, brown.

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Quality of Materials Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 22
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	05/04/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	37618
Project Number :	DL17/133	Test Method :	AS1289.3.6.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	242791	SAMPLE LOCATION	
Sampling Method :	-	E 484431.757	
Sampled By :	Liam Davidson	N 6939782.694	
Date Sampled :	16/03/2018	RL 85.250	
Date Tested :	21/03/2018	Test Number :	2
Material Type :	Allotment Fill (Capping Layer)	Lot Number :	-
Material Source :	On Site Stockpile (West of Stage 8)	Specification Number :	
Remarks :	-		

AS Sieve Size(mm)	Percent Passing	Specification Limits	
100	100		
75.0	96		
63.0	-		
53.0	93		
37.5	87		
26.5	82		
19.0	76		
16.0	-		
13.2	71		
9.5	64		
6.7	59		
4.75	55		
2.36	46		
1.18	36		
0.600	28		
0.425	25		
0.300	22		
0.150	17		
0.075	13		

AS Sieve Size(mm)

		Test Method	Results		
Liquid Limit (%) :		AS1289.3.1.1	38	Shrinkage Comments :	Cracking And Curling Occurred
Plastic Limit (%) :		AS1289.3.2.1	24	Mould Length (mm) :	250
Plasticity Index (%) :		AS1289.3.3.1	14	Sample History	Oven Dried
Linear Shrinkage (%) :		AS1289.3.4.1	6		
Soil Description :					


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Shrink Swell Index Report

Client : CCA WINSLOW Address : 1587 IPSWICH ROAD, ROCKLEA, QLD, 4106 Project Name : EARTHWORKS SUPERVISION Project Number : DL17/133 Location: EDEN'S CROSSING , STAGE 6	Report Number: DL17/133 - 23 Report Date : 05/04/2018 Order Number : 37618 Test Method : AS1289.7.1.1 <p style="text-align: right;">Page 1 of 1</p>
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Sample Number :	242791			
Test Number :	2			
Sampling Method :	-			
Sampled By :	Liam Davidson			
Date Sampled :	16/03/2018			
Date Tested :	26/03/2018			
Material Type :	Allotment Fill (Capping Layer)			
Material Source :	On Site Stockpile (West of Stage 8)			
Sample Location :	E 484431.757 N 6939782.694 RL 85.250			
Inert Material Estimate (%) :	0			
PP before (kPa) :	-			
PP after (kPa) :	440			
Shrinkage Moisture Content (%) :	13.5			
Shrinkage (%) :	0.8			
Swell Moisture Content Before (%) :	13.4			
Swell Moisture Content After (%) :	16			
Swell (%) :	0			
Unit Weight (t/m ³) :	2.04			
Shrink Swell Index Iss (%) :	0.5			
Visual Classification :	Sandy CLAY traces of gravel.			
Cracking :	Yes			
Crumbling :	No			
Remarks :	Remoulded @ 95% MDD @ OMC.			

 <p style="text-align: center;">Accredited for compliance with ISO/IEC 17025 - Testing.</p>	<p style="text-align: center;">APPROVED SIGNATORY</p> <p style="text-align: center;"><i>Liam A Mcdowall</i></p> <p style="text-align: center;">Liam Mcdowall (Brisbane) - Branch Manager NATA Accreditation Number 1162 / 1169</p>
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Hilf Density Ratio Report

Client :	CCA WINSLOW	Report Number:	DL17/133 - 24
Address :	1587 IPSWICH ROAD, ROCKLEA, QLD, 4106	Report Date :	10/04/2018
Project Name :	EARTHWORKS SUPERVISION	Order Number :	37618
Project Number :	DL17/133	Test Method :	AS1289.5.8.1 & 5.7.1
Location:	EDEN'S CROSSING , STAGE 6	Page 1 of 1	

Sample Number :	243309	243310	
Test Number :	39	40	
Sampling Method :	-	-	
Date Sampled :	04/04/2018	04/04/2018	
Date Tested :	04/04/2018	04/04/2018	
Material Type :	Allotment Fill (Capping Layer)	Allotment Fill (Capping Layer)	
Material Source :	On Site (Crushed Basalt)	On Site (Crushed Basalt)	
Lot Number :	-	-	
Sample Location :	E 484547 N 6939744 Final Level	E 484555 N 6939764 Final Level	
Test Depth (mm) :	150	150	
Layer Depth (mm) :	-	-	
Maximum Size (mm) :	19	19	
Oversize Wet (%) :	-	-	
Oversize Dry (%) :	-	-	
Oversize Density (t/m ³) :	-	-	
Field Moisture Content (%) :	13.2	10.0	
Hilf MDR Number :	243309	243310	
Hilf MDR Method :	AS1289.5.1.1 & 5.7.1	AS1289.5.1.1 & 5.7.1	
Compactive Effort :	Standard	Standard	
Field Density Method :	AS1289.5.8.1 & 5.7.1	AS1289.5.8.1 & 5.7.1	
Moisture Method :	AS1289.2.1.1	AS1289.2.1.1	
Moisture Ratio (%) :	72.5	69	
Field Wet Density (t/m ³) :	2.156	2.149	
Optimum Moisture Content (%) :	18.2	14.5	
Moisture Variation :	4.7	4.4	
Peak Converted Wet Density (t/m ³) :	2.108	2.102	
Hilf Density Ratio (%) :	102.5	102.0	
Minimum Specification :	95	95	
Moisture Specification :	-	-	
Site Selection :	-	-	
Soil Description :	Crushed BASALT	Crushed BASALT	
Remarks :	-		



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APPROVED SIGNATORY

Liam A Mcdowall

Liam Mcdowall (Brisbane) - Branch Manager
NATA Accreditation Number
1162 / 1169

Important Information about Your Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you — should apply the report for any purpose or project except the one originally contemplated.*

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,

- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ—sometimes significantly—from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.*

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time to perform additional study.* Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that

have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer for Additional Assistance

Membership in ASFE/THE BEST PEOPLE ON EARTH exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.



8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733 Facsimile: 301/589-2017
e-mail: info@asfe.org www.asfe.org

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