Proposed Subdivision -Hereford Hill, Stages 1 & 2 Site Classification

Lot 11, DP 1248129, New England Highway, Lochinvar

NEW17P-0054A-AD 30 April 2021



GEOTECHNICAL I LABORATORY I EARTHWORKS I QUARRY I CONSTRUCTION MATERIAL TESTING

30 April 2021

McCloy Lochinvar Pty Ltd Suite 1, Level 3, 426 King Street NEWCASTLE WEST NSW 2309

Attention: Mr Rylan Gibson

Dear Sir,

RE: PROPOSED SUBDIVISION – HEREFORD HILL, STAGES 1 & 2 LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR SITE CLASSIFICATION (LOTS 101 TO 136, AND LOTS 201 TO 220)

Please find enclosed our geotechnical report for the proposed residential subdivision Stages 1 & 2 to be located at Lot 11, DP 1248129, New England Highway, Lochinvar.

The report includes recommendations for Site Classification in accordance with AS2870-2011, "Residential Slabs and Footings" following the completion of site regrading earthworks.

If you have any questions regarding this report, please do not hesitate to contact Shannon Kelly, Ben Edwards, or the undersigned.

For and on behalf of Qualtest Laboratory (NSW) Pty Ltd

Jason Lee Principal Geotechnical Engineer

Table of Contents:

1.0		Introduction1	-
2.0		Desktop Study 1	-
3.0		Field Work	-
4.0		Site Description	,
	4.1	Site Regrade Works2	2
	4.2	Surface Conditions	;
	4.3	Subsurface Conditions	,
5.0		Laboratory Testing11	-
6.0		Site Classification to AS2870-2011	;
7.0		Limitations14	ŀ

Attachments:

- Figure AD1: Site Plan & Approximate Test Locations
- Appendix A: Results of Field Investigations
- Appendix B: Results of Laboratory Testing
- Appendix C: CSIRO Sheet BTF 18

1.0 Introduction

Qualtest Laboratory NSW Pty Ltd (Qualtest) is pleased to present this geotechnical site classification report to McCloy Lochinvar Pty Ltd (McCloy), for Stages 1 & 2 of the Hereford Hill residential subdivision located at Lot 11, DP 1248129, New England Highway, Lochinvar.

A preliminary Site Classification has previously been provided for Stages 1 & 2, (Qualtest Report Ref: NEW17P-0054A-AA.Rev2, 19 August 2020). Based on the brief and drawings provided in an email from McCloy dated 18 February 2021, it is understood the extent of Stages 1 & 2 has been revised (from 67 Lots during the preliminary assessment) to comprise subdivision into 55 residential lots (Stage 1 - Lots 102 to 136, Stage 2 - Lots 201 to 220), as shown on Figure AD1.

The scope of work included providing site classification with respect to reactive soils, in accordance with the requirements of AS2870-2011 'Residential Slabs and Footings', for Stages 1 & 2 following completion of site regrade works.

This report presents the results of the field work investigations and laboratory testing, and provides recommendations for the scope outlined above.

2.0 Desktop Study

The scope of work has included a review of the following reports by Qualtest:

- Level 1 Site Re-grade Assessment Report, 'Proposed Subdivision of Hereford Hill Stage 1, Lochinvar', (Report Reference: NEW20P-0146-AA.Rev1, 12 April 2021);
- Geotechnical Assessment, 'Proposed Subdivision Stages 1 & 2, Lot 11, DP 1248129, New England Highway, Lochinvar' (Report Reference: NEW17P-0054A-AA.Rev2, 19 August 2020); and,
- Preliminary Geotechnical Assessment, 'Proposed Subdivision Lots 1 to 3, DP 1218389, New England Highway, Lochinvar' (Report Reference: NEW17P-0054-AA.Rev1, 23 August 2017).

This report includes selected results from the reports referenced above, to supplement information collected during the current investigations where applicable. Reference should be made to the reports outlined above for further details of site conditions, field work and laboratory testing conducted, site supervision, and density testing carried out.

3.0 Field Work

The field work investigations were carried out on 26 February 2021 and 11 March 2021 and comprised of:

- DBYD search and visual check of proposed test locations for the presence of underground services;
- Site walkover to make observations of surface features at the property and in the immediate surrounding area;
- Excavation of twenty-four boreholes (BH101 to BH117 and BH201 to BH207) using a 2.7 tonne excavator equipped with a 300mm diameter auger attachment. Boreholes were terminated at depths of between 1.00m and 2.00m;
- Undisturbed samples (U50 tubes) and bulk disturbed samples were taken for subsequent laboratory testing;

• Boreholes were backfilled with the excavation spoil and compacted using the excavator auger and tracks.

Investigations were carried out by an experienced Geotechnical Engineer from Qualtest who located the boreholes, carried out the testing and sampling, produced field logs of the boreholes, and made observations of the site surface conditions.

Approximate borehole locations are shown on the attached Figure AD1. Boreholes were located in the field by handheld GPS and relative to existing site features including topographic features, lot boundaries, existing developments and trees.

Engineering logs of the boreholes are presented in Appendix A.

4.0 Site Description

4.1 Site Regrade Works

Following an initial site visit, stripping assessment and recommendations performed on 6 October 2020 (Qualtest Site Record Form ref. NEW20P-0146-SR01.Rev1, dated 12/04/2021), site re-grading for Stage 1 bulk earthworks was conducted between 16 and 19 October 2020.

Initial site stripping works consisted of the excavation of old swimming pool, previous building foundations and surrounding redundant services.

Re-grading works consisted of the removal of any further unsuitable materials, blending colluvium materials with site won Residual and stockpiled materials, along with cutting and filling activities to bring proposed residential lots within Stage 1 to design finish levels.

Re-grade works performed during the current Stage 1 bulk earthworks included filling within all or portions of Lots 118 to 120 and 129.

Refer to attached Figure AD1 for the approximate extent of lot re-grade works for this stage of the development.

Filling was performed using site stockpiled material won from excavations cut from around the site. The fill material could generally be described as mixtures of Residual (CI-CH) Silty Sandy CLAY and Extremely Weathered (EW) Siltstone / Sandstone, medium to high plasticity, brown / yellow in colour, with fine to coarse grained Sand and Gravel.

The depth of fill placed ranged in the order of 0.1m to about 1.7m, with the deeper fill within Lot 121 being in relation to the backfilling of an old swimming pool. The following approximate maximum depths of fill within each lot area are outlined below:

- Lot 118 0.3m
- Lot 119 0.3m;
- Lot 120 1.7m;
- Lot 129 0.3m.

The fill was compacted in maximum lifts of 0.3m thickness. Any unsuitable or deleterious material within the fill was removed by hand or mechanical means prior to final compaction of the material.

As the geotechnical testing authority engaged for the project, Qualtest state that the regrading works performed within Stage 1, was carried out to Level 1 criteria as defined in Clause 8.2 – Section 8, of AS3798-2007, "Guidelines on Earthworks for Commercial and Residential Developments". The recommendations of this report are based on our understanding of lot re-grade works from the Level 1 fill supervision by Qualtest. Qualtest should be informed without delay if additional earthworks are known to have been carried out.

4.2 Surface Conditions

The site of proposed Stages 1 & 2 comprises the northern part of Lot 11, DP1248129, known as No. 853 New England Highway, Lochinvar which is a roughly rectangular shaped allotment with a total plan area of about 13.7 hectares. Stages 3 to 5 are proposed to be constructed on the southern part of the lot.

The site is bounded by rural residential lots including open grass fields to the east, future stages 3 & 5 to the south, and by the New England Highway to the north, with residential properties fronting the New England Highway to the west of the site.

The site is judged to generally be well drained mostly by way of downhill surface runoff following natural ground contours.

The site was judged to have good trafficability by way of 4WD vehicle on the day of the field investigation. Selected photographs of the site taken on the day of the site investigations are shown below.



Photograph 1: From near BH116, in southern area of Stage 1, facing southwest.



Photograph 2: From near BH116, facing northwest.



Photograph 3: Facing southwest from eastern side of site, near BH107.



Photograph 4: Facing north from near BH107.



Photograph 5: Facing west from southern side of site, near BH206.

Photograph 6: Facing east from near BH206.



Photograph 7: Facing south from near BH104 in the north-eastern corner of the site.



Photograph 9: Facing southeast from near BH101 near the north-western corner of the site.



Photograph 8: Facing west from near BH104 in the north-eastern corner of the site.



Photograph 10: Facing southwest from near BH101.



Photograph 11: Facing north from near BH113 near the centre of the site.



Photograph 13: Facing southwest from near BH111 near the centre of Stage 1.



Photograph 12: Facing northeast from near BH113.



Photograph 14: Facing west from near BH111.

4.3 Subsurface Conditions

Reference to the 1:100,000 Cessnock Regional Geology Series Sheet 9132 indicates the site to be underlain by the Lochinvar Formation of the Dalwood Group, which is characterised by lithic feldspathic sandstone, siltstone, shale, tuff, basalt flows and erratics.

The typical soil types encountered at the borehole locations during the field investigation have been divided into geotechnical units as summarised in Table 1.

Table 2 contains a summary of the distribution of the above geotechnical units at the borehole locations.

TABLE 1 – SUMMARY OF GEOTECHNICAL UNITS AND SOIL TYPE	S
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Unit	Soil Type	Description
1A	Fill: Topsoil	Sandy CLAY - low plasticity, grey and dark brown, fine to coarse grained sand, with fine to medium grained angular to sub-angular gravel, root affected.
1B	FILL: Controlled	FILL: Sandy CLAY - medium plasticity, grey-brown, fine to coarse grained, with fine to coarse grained gravel, trace bricks.
1C	Fill: Uncontrolled	Not Encountered in boreholes during current investigation.
2	Topsoil	CLAY / Sandy CLAY – low to medium / medium to high plasticity, mostly grey-brown and brown, with fine to medium grained angular to sub-angular gravel in places, root affected.
3	Colluvium	Sandy CLAY - medium to high plasticity, dark brown, trace orange and pale grey, fine to coarse (mostly fine) grained, trace fine grained angular to sub-rounded gravel in places.
4	Residual Soil	CLAY – medium to high plasticity, colour combinations of grey-brown, brown, red-brown, orange, pale grey and pale orange, trace to coarse grained sand in places, trace fine grained angular gavel in places. Sandy CLAY / Clayey SAND - low to medium plasticity, generally grey and brown, with pale grey and orange, fine to coarse (mostly fine) grained sand, trace fine grained angular
		gravel.
5	Extremely Weathered (XW) Rock (with soil properties)	Andesite: breaks down into Clayey Gravelly SAND / Sandy CLAY - fine to coarse grained, colour combinations of grey- brown, pale grey, dark grey, orange and brown, fine to coarse grained angular to sub-angular gravel, fines of low to medium plasticity.
6	Highly Weathered (HW) to Moderately Weathered (MW) Rock	Silty SANDSTONE - fine to medium grained, pale grey to dark grey, trace orange to red-brown, estimated low strength, fractured.

Location	Unit 1A Fill: Topsoil	Unit 1B Fill: Controlled	Unit 1C Fill: Uncontrolled	Unit 2 Topsoil	Unit 3 Colluvium	Unit 4 Residual Soil	Unit 5 XW Rock	Unit 6 HW to MW Rock				
	Depth in metres (m)											
BH101	-	-	-	0.00 - 0.10	-	0.10 - 1.50	1.50 - 1.70^	-				
BH102	-	-	-	0.00 - 0.20	-	0.20 - 1.40	1.40 - 1.50#	-				
BH103	-	-	-	0.00 - 0.15	-	0.15 - 1.20	1.20 - 1.50^	-				
BH104	-	-	-	0.00 - 0.20	-	0.20 - 1.00	1.00 - 1.50^	-				
BH105	-	-	-	0.00 - 0.15	-	0.15 - 1.40	1.40 - 1.90^	-				
BH106	-	-	-	0.00 - 0.15	-	0.15 - 1.90^	-	-				
BH107	-	-	-	0.00 - 0.15	-	0.15 - 2.00	-	-				
BH108	-	-	-	0.00 - 0.20	-	0.20 - 2.00	-	-				
BH109	0.00 - 0.20	0.20 - 0.50	-	-	-	0.50 - 2.00	-	-				
BH110	0.00 - 0.20	-	-	-	-	0.20 - 2.00^	-	-				
BH111	-	-	-	0.00 - 0.10	0.10 - 0.25	0.25 - 2.00	-	-				
BH112	-	-	-	0.00 - 0.10	-	0.10 - 1.00	-	-				
BH113	-	-	-	0.00 - 0.30	-	0.30 - 1.40	1.40 - 1.80^	-				
BH114	-	-	-	0.00 - 0.10	0.10 - 0.20	0.20 - 1.45	1.45 - 2.00^	-				
BH115	-	-	-	0.00 - 0.15	-	0.15 - 1.50	1.50 - 1.90^	-				
BH116	-	-	-	0.00 - 0.10	-	0.10 - 2.00	-	-				
BH117	-	-	-	0.00 - 0.10	0.10 - 0.40	0.40 - 1.50	-	1.50 - 1.51#				

TABLE 2 – SUMMARY OF GEOTECHNICAL UNITS ENCOUNTERED AT EACH TEST LOCATION

Location	Unit 1A Fill: Topsoil	Unit 1B Fill: Controlled	Unit 1C Fill: Uncontrolled	Unit 2 Topsoil	Unit 3 Colluvium	Unit 4 Residual Soil	Unit 5 XW Rock	Unit 6 HW to MW Rock					
		Depth in metres (m)											
BH201	-	-	-	0.00 - 0.20	-	0.20 - 2.00	-	-					
BH202	-	-	-	0.00 - 0.20	-	0.20 - 2.00	-	-					
BH203	-	-	-	0.00 - 0.15	-	0.15 - 2.00	-	-					
BH204	-	-	-	0.00 - 0.15	-	0.15 - 1.80	1.80 - 2.00^	-					
BH205	-	-	-	0.00 - 0.15	-	0.15 - 2.00	-	-					
BH206	-	-	-	0.00 - 0.15	-	0.15 - 2.00	-	-					
BH207	-	-	-	0.00 - 0.10	-	0.10 - 1.40	1.40 - 2.00	-					
		Previous I	nvestigation (Ref	: NEW17P-0054A-	AA.Rev2, dated 19	9 August 2020)							
TP101	-	-	-	0.00 - 0.15	0.15 - 0.30	0.30 - 2.00	-	-					
TP102	-	-	-	0.00 - 0.10	0.10 - 0.20	0.20 - 2.00^	-	-					
TP103	-	-	-	0.00 - 0.10	0.10 - 0.35	0.35 - 2.00	-	-					
TP104	-	-	-	0.00 - 0.15	0.15 - 0.30	0.30 - 1.90^	-	-					
TP105	-	-	-	0.00 - 0.15	0.15 - 0.30	0.30 - 2.00^	-	-					
TP106	-	-	-	0.00 - 0.10	0.10 - 0.25	0.25 - 1.30	-	1.30 - 1.35#					
TP107	-	-	-	0.00 - 0.20	-	0.20 - 1.80*	-	-					
TP108	-	-	-	0.00 - 0.10	0.10 - 0.30	0.30 - 1.80^	-	-					
TP109	-	-	-	0.00 - 0.25	-	0.25 - 1.50	1.50 - 1.70^	-					
TP110	-	-	-	0.00 - 0.15	-	0.15 - 1.30	1.30 - 1.50^	-					
TP111	-	-	-	0.00 - 0.15	0.15 - 0.40	0.40 - 1.70	1.70 - 2.00	-					

Location	Unit 1A Fill: Topsoil	Unit 1B Fill: Controlled	Unit 1C Fill: Uncontrolled	Unit 2 Topsoil	Unit 3 Colluvium	Unit 4 Residual Soil	Unit 5 XW Rock	Unit 6 HW to MW Rock				
	Depth in metres (m)											
TP112	-	-	-	0.00 - 0.20	0.20 - 0.50	0.50 - 2.00	-	-				
TP113	-	-	-	0.00 - 0.15	0.15 - 0.30	0.30 - 1.90	-	-				
TP114	-	-	-	0.00 - 0.10	0.10 - 0.25	0.25 - 2.00	-	-				
TP115	-	-	-	0.00 - 0.10	0.10 - 0.20	0.20 - 2.00	-	-				
TP116	-	-	-	0.00 - 0.10	0.10 - 0.30	0.30 - 1.60	1.60 - 1.80^	-				
TP117	-	-	-	0.00 - 0.15	-	0.15 - 1.30	1.30 - 1.80^	-				
TP118	-	-	-	0.00 - 0.10	0.10 - 0.35	0.35 - 1.45	1.45 - 1.80	1.80 - 1.82#				
TP119	-	-	-	0.00 - 0.15	-	0.15 - 2.00	-	-				
TP120	-	-	-	0.00 - 0.20	-	0.20 - 1.90*	-	-				
TP121	-	-	-	0.00 - 0.20	-	0.20 - 2.00*	-	-				
TP122	-	-	-	0.00 - 0.10	0.10 - 0.40	0.40 - 2.00	-	-				
TP123	-	-	-	0.00 - 0.25	-	0.25 - 1.80^	-	-				
TP124	-	-	0.00 - 0.30	_	-	0.30 - 1.40^	-	-				
TP125	-	-	-	0.00 - 0.10	0.10 - 0.30	0.30 - 2.00	-	-				
TP126	-	-	-	0.00 - 0.15	0.15 - 0.25	0.25 - 1.60	1.60 - 1.90^	-				
TP127	-	-	-	0.00 - 0.15	0.15 - 0.35	0.35 - 1.20	1.20 - 1.90	1.90 - 2.00#				
TP201	-	-	-	0.00 - 0.20	0.20 - 0.40	0.40 - 2.00	-	-				
TP202	-	-	-	0.00 - 0.20	-	0.20 - 2.00	-	-				
TP203	-	-	-	0.00 - 0.15	-	0.15 - 2.00	-	-				
TP204	-	-	-	0.00 - 0.15	-	0.15 - 1.90	-	-				
TP205	-	-	-	0.00 - 0.20	0.20 - 0.40	0.40 - 1.80	1.80 - 1.90^	-				

Location	Unit 1A Fill: Topsoil	Unit 1B Fill: Controlled	Unit 1C Fill: Uncontrolled	Unit 2 Topsoil	Unit 3 Colluvium	Unit 4 Residual Soil	Unit 5 XW Rock	Unit 6 HW to MW Rock
				Depth	in metres (m)			
TP206	-	-	-	0.00 - 0.20	-	0.20 - 1.50	1.50 - 1.90^	-
TP207	-	-	-	0.00 - 0.15	-	0.15 - 0.80	0.80 - 1.70^	-
TP208	-	-	-	0.00 - 0.25	-	0.25 - 0.80	0.80 - 1.70^	-
TP209	-	-	-	0.00 - 0.15	-	0.15 - 2.00	-	-
TP210	-	-	-	0.00 - 0.15	-	0.15 - 1.90^	-	-
TP211	-	-	-	0.00 - 0.20	-	0.20 - 2.10*	-	-
TP212	-	-	-	0.00 - 0.20	0.20 - 0.40	0.40 - 1.90	-	-
		Previous	Investigation (Re	f: NEW17P-0054.A	A.Rev1, dated: 23	August 2017)	·	
TP02	-	-	-	0.00 - 0.18	0.18 - 0.50	0.50 - 1.10	1.10 - 2.40	-
TP03	-	-	-	0.00 - 0.08	0.08 - 0.25	0.25 - 1.50	1.50 - 2.30	-
TP05	-	-	-	0.00 - 0.20	0.20 - 0.70	0.70 - 1.50	1.50 - 2.40	-
Notes:			s of 2.7 tonne exc al of 2.7 tonne exc	cavator. cavator met on V	/eathered Rock.			·

No groundwater levels or inflows were encountered in the boreholes during the limited time that they remained open on the day of the field investigations.

It should be noted that groundwater conditions can vary due to rainfall and other influences including regional groundwater flow, temperature, permeability, recharge areas, surface condition, and subsoil drainage.

5.0 Laboratory Testing

Samples collected during the current field investigations were returned to our NATA accredited Warabrook Laboratory for testing which comprised of:

• (26 no.) Shrink / Swell tests.

Results of the laboratory testing are presented in Appendix B, with a summary of the Shrink/Swell test results presented in Tables 3.

Location	Depth (m)	Material Description	I _{ss} (%)
BH101	0.50 – 0.75	(CH) CLAY	2.8
BH102	0.65 – 0.80	(CH) CLAY	1.5
BH103	0.70 – 0.90	(CH) CLAY	2.2
BH104	0.50 – 0.65	(CH) CLAY	1.9
BH105	0.90 – 1.05	(CH) CLAY	2.7
BH106	0.60 - 0.80	(CH) CLAY	2.5
BH107	1.00 - 1.20	(CH) CLAY	3.4
BH108	0.50 – 0.75	(CH) CLAY	5.3
BH109	0.30 – 0.45	FILL: (CI) Sandy CLAY	1.9
BH109	0.60 – 0.75	(CH) CLAY	4.2
BH110	0.40 – 0.55	(CH) CLAY	4.6
BH111	1.00 – 1.25	(CH) CLAY	5.6
BH112	0.50 – 0.65	(CH) CLAY	3.5
BH113	0.50 – 0.70	(CH) CLAY	3.6
BH114	1.00 - 1.20	(CH) CLAY	5.5
BH115	0.90 – 1.05	(CH) CLAY	4.2
BH116	0.60 – 0.80	(CH) CLAY	3.6
BH117	0.95 – 1.15	(CH) CLAY	6.4
BH201	1.10 – 1.30	(CH) CLAY	5.9
BH202	0.50 – 0.65	(CH) CLAY	3.5
BH203	0.90 – 1.15	(CH) CLAY	4.8
BH204	0.50 - 0.65	(CH) CLAY	5.1
BH204	1.00 - 1.10	(CH) CLAY	5.6
BH205	0.50 – 0.70	(CH) CLAY	3.7
BH206	0.60 - 0.80	(CH) CLAY	3.8

TABLE 3 – SUMMARY OF SHRINK / SWELL TESTING RESULTS

Location	Depth (m)	Material Description	lss (%)
BH207	0.50 – 0.70	(CH) CLAY	3.8
Previ	ous Investigation	(Ref: NEW17P-0054A-AA.Rev2, dated 19 A	August 2020)
TP102	0.60 - 0.75	(CH) CLAY	5.1
TP103	0.60 - 0.75	(CH) CLAY	4.3
TP104	0.70 - 0.85	(CH) CLAY	1.7
TP105	0.50 - 0.80	(CH) CLAY	4.5
TP106	0.40 - 0.55	(CH) CLAY	4.0
TP107	0.70 - 0.85	(CH) CLAY	2.1
TP108	0.70 - 1.10	(CH) CLAY	5.8
TP109	1.00 - 1.30	(CH) CLAY	5.0
TP110	0.50 - 0.90	(CH) CLAY	5.4
TP112	0.90 - 1.20	(CH) CLAY	4.0
TP113	0.55 - 0.90	(CH) CLAY	6.2
TP114	0.50 - 0.80	(CH) CLAY	5.5
TP116	0.70 - 0.90	(CH) CLAY	4.9
TP117	0.70 - 0.90	(CH) CLAY	5.3
TP118	1.20 - 1.45	(CH) CLAY	2.6
TP120	0.50 - 0.65	(CH) CLAY	5.7
TP121	1.10 - 1.25	(CH) CLAY	7.2
TP122	0.60 - 0.90	(CH) CLAY	4.5
TP123	0.90 - 1.10	(CH) CLAY	6.4
TP124	0.60 - 0.75	(CH) CLAY	4.3
TP125	0.70 - 0.90	(CH) CLAY	5.1
TP126	0.50 - 0.75	(CH) CLAY	5.4
TP127	0.75 - 1.05	(CH) CLAY	7.6
TP201	0.80 - 1.00	(CH) CLAY	3.9
TP202	1.00 - 1.15	(CH) CLAY	5.2
TP203	0.70 - 0.85	(CH) CLAY	4.4
TP204	0.35 - 0.50	(CH) CLAY	3.9
TP205	0.40 - 0.55	(CH) CLAY	5.3
TP205	1.00 - 1.20	(CH) CLAY	6.1
TP206	0.40 - 0.70	(CH) CLAY	3.7

Location	Depth (m)	Material Description	lss (%)
TP207	0.40 - 0.60	(CH) CLAY	2.4
TP208	0.50 - 0.70	(CH) CLAY	3.7
TP209	0.70 - 0.90	(CH) CLAY	4.9
TP210	0.85 - 1.20	(CH) CLAY	3.2
TP211	0.60 - 0.85	(CH) CLAY	5.0
TP212	0.60 - 0.85	(CH) CLAY	2.8
Previ	ous Investigation	n (Ref: NEW17P-0054.AA.Rev1, dated: 23 Augus	st 2017)
TP02	0.50 – 0.70	(CI) CLAY	3.0
TP03	0.30 – 0.50	(CH) Sandy CLAY	7.4
TP05	0.50 – 0.75	(CH) CLAY	4.9

The results of laboratory shrink / swell tests indicate that the colluvial and residual clays at the site are generally highly to extremely reactive.

6.0 Site Classification to AS2870-2011

Based on the results of the field work and laboratory testing, residential lots located within Stages 1 & 2 of the Hereford Hill residential subdivision located at Lot 11, DP 1248129, known as No. 853 New England Highway, Lochinvar, are classified in their current condition, in accordance with AS2870-2011 '*Residential Slabs and Footings*' as shown in Table 4.

TABLE 4 – SITE CLASSIFICATION TO AS2870-2011

Stage	Lot Numbers	Site Classification
1	102 to 112, 115 to118 and 123 to 129	H2
	113, 114, 119 to 122 and 130 to 136	E
2	211 to 220	H2
2	201 to 210	E

A characteristic free surface movement in the range of 60mm to 75mm is estimated for the lots classified as **Class 'H2'** in their existing condition.

A characteristic free surface movement in the range of 75mm to 100mm is estimated for the lots classified as **Class 'E'** in their existing condition, except for Lots 119 and 120. A characteristic free surface movement in the range of 100mm to 120mm is estimated for lots 119 and 120 in their existing condition

The effects of changes to the soil profile by additional cutting and filling and the effects of past and future trees should be considered in selection of the design value for differential movement. If site re-grading works involving cutting or filling are performed after the date of this assessment the classification may change and further advice should be sought.

Footings for the proposed development should be designed and constructed in accordance with the requirements of AS2870-2011.

The classification presented above assumes that:

- All footings are founded in controlled fill (if applicable) or in the natural clayey soils or rock below all non-controlled fill, topsoil material and root zones, and fill under slab panels meets the requirements of AS2870-2011, in particular, the root zone must be removed prior to the placement of fill materials beneath slabs;
- The performance expectations set out in Appendix B of AS2870-2011 are acceptable, and that site foundation maintenance is undertaken to avoid extremes of wetting and drying;
- Footings are to be founded outside of or below all zones of influence resulting from existing or future service trenches;
- The constructional and architectural requirements for reactive clay sites set out in AS2870-2011 are followed;
- Adherence to the detailing requirement outlined in Section 5 of AS2870-2011 'Residential Slabs and Footings' is essential, in particular Section 5.6, 'Additional requirements for Classes *M*, *H*1, *H*2 and *E* sites' including architectural restrictions, plumbing and drainage requirements; and,
- Site maintenance complies with the provisions of CSIRO Sheet BTF 18, "Foundation Maintenance and Footing Performance: A Homeowner's Guide", a copy of which is attached in Appendix C.

All structural elements on all lots should be supported on footings founded beneath all uncontrolled fill, topsoil, layers of inadequate bearing capacity, soft/loose, wet or other potentially deleterious material.

If any localised areas of uncontrolled fill of depths greater than 0.4m are encountered during construction, footings should be designed in accordance with engineering principles for Class 'P' sites.

7.0 Limitations

The findings presented in the report and used as the basis for recommendations presented herein were obtained using normal, industry accepted geotechnical design practices and standards. To our knowledge, they represent a reasonable interpretation of the general conditions of the site.

The extent of testing associated with this assessment is limited to discrete test locations. It should be noted that subsurface conditions between and away from the test locations may be different to those observed during the field work and used as the basis of the recommendations contained in this report.

If subsurface conditions encountered during construction differ from those given in this report, further advice should be sought without delay.

Data and opinions contained within the report may not be used in other contexts or for any other purposes without prior review and agreement by Qualtest. If this report is reproduced, it must be in full.

If you have any further questions regarding this report, please do not hesitate to contact Shannon Kelly or the undersigned.

For and on behalf of Qualtest Laboratory (NSW) Pty Ltd.

an la

Jason Lee Principal Geotechnical Engineer

FIGURES

Figure AD1: Site Plan and Approximate Test Locations



APPENDIX A:

Results of Field Investigations

(LABORATORY	OSW)PTYL	t C P	ROJE	: I CT: F I ON : L	RING LOG - BOREHOLE MCCLOY PROJECT MANAGEMENT PTY PROPOSED SUBDIVISION - STAGES 1 & .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		PA JO LO	reh(Ge: B no Ggei Te:	:		BH101 1 OF 1 NEW17P-0054A BE 26/2/21
		YPE: OLE DIAM		TONNE	EXCA 300 m		R SURF	FACE RL: JM:	ŀ	HD			
	Drill	ing and San	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
AD/T	Not Encountered	0.50m U50 0.75m		- - - - - - - - -		СН	TOPSOIL: CLAY - medium to high plasticit <u>0.10m</u> grey-brown and brown, root affected. CLAY - medium to high plasticity, grey-brow brown.		M > w _p	St - VSt	HP	220 210 220	TOPSOIL RESIDUAL SOIL
	ž			1. <u>0</u> - - 1. <u>5</u>		CI SC	 1.00m CLAY - medium plasticity, pale grey and particular trace fine to coarse grained sand, trace fine angular gravel. 1.50m Extremely weathered Andesite with soil probreaks down into Clayey Gravelly SAND - to coarse grained, grey-brown, with some paldark grey and orange to brown, fine to coarse grained angular to sub-angular gravel, fine 	perties: ine to e grey to rse	[∞] »~ ₩ D - M	VSt MD - D	HP	300 380	EXTREMELY WEATHER ROCK
				- 2.0 - - -		nd Toe	medium plasticity. Hole Terminated at 1.70 m Very slow progress	/				CS /LP) Mojeture Condition
<u>Wat</u> ▼	- Wat (Dat - Wat I Wat I Wat I G G tra D	er Level e and time sh er Inflow er Outflow anges radational or ansitional stra efinitive or dis rata change	nown)	Notes, Sa U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mn Bulk s Envire (Glas: Acid s (Plast Bulk s Bulk s Photo Dynar	n Diame sample f ponmenta s jar, se Sulfate S ic bag, a Sample ionisationis ationis at	s ter tube sample or CBR testing I sample aled and chilled on site) oil Sample sir expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	S S F F St S VSt V H H	ncy ery Soft oft tiff ery Stiff lard riable V L D V V U	V L D D	29 50 10 20 20 20 20 20 20 20 20 20 20 20 20 20	n Dense	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%

(LABORATORY	NSW) PTY L	t C P	LIENT ROJE(: 1 CT: F ON: L	RING LOG - BOREHOLE MCCLOY PROJECT MANAGEMENT PTY PROPOSED SUBDIVISION - STAGES 1 & .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		PA JO LO	reh(Ge: B NO Ggei Te:	:		BH102 1 OF 1 NEW17P-0054A BE 26/2/21
		YPE: OLE DIAM		TONNE	EXCA 300 m		R SURF DATU	FACE RL: JM:	A	HD			
	Drill	ing and San	npling	1			Material description and profile information		-i	I	Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additionations
				-		СН	TOPSOIL: CLAY - medium to high plasticit grey-brown and brown, root affected.	у,					TOPSOIL
				-			CLAY - medium to high plasticity, grey-brow brown.	 wn and	~ ~		HP	210	RESIDUAL SOIL
	tered	0.65m		0. <u>5</u>		СН			≥	St - VSt	HP	220	
AD/T	Not Encountered	U50 0.80m		-			0.80m Sandy CLAY - low to medium plasticity, gre brown, with pale grey and orange, fine to c				-		
				- 1. <u>0</u> - -		CL	grained sand, trace fine grained angular gr		$M \sim w_P$	VSt	HP	280	
				-	/ / / 0	sc	1.40m Extremely weathered Andesite with soil pro 1.50m breaks down into Clayey Gravelly SAND -		D - M	MD - D	HP	390	EXTREMELY WEATHER ROCK
				- - 2.0_ - -			coarse grained, grey-brown, with some pal dark grey and orange to brown, fine to coa grained angular to sub-angular gravel, fine: (medium plasticity. Hole Terminated at 1.50 m Practical Refusal	rse					
<u>Wat</u> ▼	Wat (Dai Wat Wat I Wat	er Level e and time sh er Inflow er Outflow anges radational or ansitional stra	nown)	Notes, Sa U ₅₀ CBR E ASS B Field Test PID DCP(x-y)	50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S S Photo	Diame ample f onmenta s jar, se Sulfate S ic bag, a Sample	s ter tube sample or CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown)	S S F F St S VSt V H H	ncy /ery Soft Soft Stiff /ery Stiff łard <u>rriable</u> V L ME	V	29 50 10 20 20 20 20 20 20 20 20 20 20 20 20 20	CS (kP 25 5 - 50 0 - 100 00 - 200 00 - 400 400 	D Dry M Moist W Wet W _ρ Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%



CLIENT: McCLOY PROJECT MANAGEMENT PTY LTD

PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2

LOCATION: LOT 11, DP 1248129, NEW ENGLAND

HIGHWAY, LOCHINVAR

BOREHOLE NO:

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										DA				20/2/21
			YPE: DLE DIAM		TONNE	EXCA 300 m		R SURF DATU	ACE RL: M:	А	HD			
	[Drilli	ng and San	npling				Material description and profile information				Field	d Test	
METHOD		WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	//particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
					_		СН	TOPSOIL: CLAY - medium to high plasticity grey-brown and brown, root affected.	',					TOPSOIL
							сн	0.15m CLAY - medium to high plasticity, grey-brow brown.		M > w _P	St -	HP	200	RESIDUAL SOIL
AD/T		Not Enco	0.70m U50 0.90m		-		— — -	<u>0.90m</u>			VSt	HP	220	
I Lab and In Situ Tool					1. <u>0</u> -		CL	Sandy CLAY - low to medium plasticity, grey brown, with pale grey and orange, fine to co grained sand, trace fine grained angular gra 1.20m Extremely weathered Andesite with soil prop	barse avel.	$M \sim W_P$	VSt	HP	300	EXTREMELY WEATHERED
21 16:11 10.0.000 Datge					- 1.5		SC	breaks down into Clayey Gravelly SAND - fi coarse grained, grey-brown, with some pale dark grey and orange to brown, fine to coar grained angular to sub-angular gravel, fines medium plasticity.	ne to e grey to se	D - M	MD - D			ROCK
0T LIB 1.1.G.LB Log NON-CORED BOREHOLE - TEST PIT NEW17P-0054A-AD - BOREHOLE LOGS GPJ < <drawingfile>> 3004/2021 16:11 10.0.000 Datgel Lab and in Situ Tool</drawingfile>					- - 2.0 - - - - - - - - - - - - - - - - - -	- - - -	nd Tes	Hole Terminated at 1.50 m Very slow progress	Consiste				CS (kPa) Moisture Condition
	LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distict strata change		nown)	U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro (Glass Acid S (Plast Bulk S Bulk S Photo Dynar	Diame ample f onmenta s jar, se Sulfate S ic bag, a Sample ionisationis ationis and the second nic pende	ter tube sample or CBR testing il sample aled and chilled on site) ioil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	VS V S S F F St S VSt V H H	ery Soft oft irm tiff ery Stiff ard riable V L ME D VD	Vi La D	25 25 50 20 20 20 24 ery Lo 20 20 20 20 20 20 20 20 20 20 20 20 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400 pose n Dense	D Dry M Moist W Wet W _p Plastic Limit WL Liquid Limit Density Index <15%	



CLIENT: McCLOY PROJECT MANAGEMENT PTY LTD

PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2

LOCATION: LOT 11, DP 1248129, NEW ENGLAND

HIGHWAY, LOCHINVAR

BOREHOLE NO:

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						1	HGHWAY, LOCHINVAR		DA	IE:			26/2/21
		'YPE: Ole diam		TONNE	EXCA 300 m		R SURF DATU	FACE RL: JM:	Α	HD			
	Dril	ling and Sam	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor component		MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				_		СН	TOPSOIL: CLAY - medium to high plasticity grey-brown and brown, root affected.	y,					TOPSOIL
		0.50m				СН	CLAY - medium to high plasticity, grey-brov brown.		M > w _P	VSt	HP	280 300	RESIDUAL SOIL
AD/T	Not Encountered	U50 0.65m		-			Sandy CLAY - low to medium plasticity, gre brown, fine grained sand.	ey and	M < w _P	Н	HP	>600 >600	
10.11 10.0.000 שמוקפו רמע מוע זו טווא ייסט				1.0		GC	1.00m Extremely weathered Andesite with soil pro breaks down into Clayey Gravelly SAND - f coarse grained, grey-brown with some pale dark grey and orange to brown, fine to coar grained angular to sub-angular gravel, fines medium plasticity.	ine to grey to rse	D - M	MD - D	-		EXTREMELY WEATHERED ROCK
					<u> </u>		Hole Terminated at 1.50 m Slow progress						
	Water U₅₀ ✓ Water Level (Date and time shown) CBR ✓ Water Inflow ✓ Water Outflow Strata Changes B — Gradational or transitional strata — Definitive or distict		CBR E ASS	50mm Bulk s Enviro (Glass Acid S (Plast Bulk S S Photo Dynar	Diame ample f onmenta s jar, se Gulfate S ic bag, a Sample ionisationisation	s ter tube sample or CBR testing I sample aled and chilled on site) soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	S S F F St S VSt V H F	ncy /ery Soft Soft Stiff /ery Stiff lard rriable V L ME D VD	Vi La D M	22 25 50 20 20 20 20 20 20 20 20 20 20 20 20 20	n Dense	D Dry M Moist W Wet W _ρ Plastic Limit WL Liquid Limit Density Index <15%	



CLIENT: McCLOY PROJECT MANAGEMENT PTY LTD

PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2

LOCATION: LOT 11, DP 1248129, NEW ENGLAND

HIGHWAY, LOCHINVAR

BOREHOLE NO:

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						f	IIGHWAY, LOCHINVAR		DA	TE:			26/2/21
		TYPE: IOLE DIAN		TONNE :	EXCA 300 m		R SURF DATU	ACE RL: IM:	Α	HD			
	Dr	illing and San	npling				Material description and profile information				Field	l Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor component		MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				_		СН	TOPSOIL: CLAY - medium to high plasticity grey-brown and brown, root affected.	Ι,					TOPSOIL
	Encountered	0.90m		0.5_		СН	<u>o.15m</u> CLAY - medium to high plasticity, grey-brov brown.		M > Wp	St- VSt	HP HP HP	200 220 280	RESIDUAL SOIL
1 10.0.000 Datgel Lab and in Situ 1001	Not E	U50 1.05m		1. <u>0</u> - - -	6	CL	1.00m Sandy CLAY / Clayey SAND - low to mediu plasticity, grey and brown, fine grained sand 1.40m Extremply unathered Andesite with soil pro- Extremply unathered Andesite with soil pro-	d. 	M ~ Wp	VSt	HP HP	320 220	EXTREMELY WEATHERED
3PJ < <drawingfile>> 30/04/2021 16:11</drawingfile>				1. <u>5</u> - -		SC	Extremely weathered Andesite with soil pro breaks down into Clayey Gravelly SAND - f coarse grained, grey-brown, with some pale dark grey and orange to brown, fine to coar grained angular to sub-angular gravel, fines medium plasticity.	ine to e grey to se	D - M	MD - D			ROCK
0.T LIB 1.1.G.LB Log NON-CORED BOREHOLE - TEST PIT NEW17P-0054A-AD - BOREHOLE LOGS GPJ < <drawingfile>> 3004/2021 16:11 10.0.000 Datgel Lab and in Situ Tool I III III I III I III I III I III I IIII</drawingfile>				2. <u>0</u> - - -	<u>x . </u>		1.90m Hole Terminated at 1.90 m Slow progress						
	Water U ₅₀ Water Level (Date and time shown) CBR E Water Inflow ASS Water Outflow B		CBR E ASS B	50mm Bulk s Enviro (Glass Acid s (Plast Bulk s	n Diame ample f onmenta s jar, se Sulfate S	s ter tube sample or CBR testing I sample aled and chilled on site) ioil Sample ir expelled, chilled)	S S F F St S VSt V H H Fb F	'ery Soft oft irm atiff 'ery Stiff lard riable		<23 25 50 100 200 >40	- 50 - 100 0 - 200 0 - 400 00	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit	
	Gradational or transitional strata			DCP(x-y)	Photo Dynar	nic pene	n detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L D VD	L N D	ery Loo bose ledium ense ery De	Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



CLIENT: McCLOY PROJECT MANAGEMENT PTY LTD

PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2

LOCATION: LOT 11, DP 1248129, NEW ENGLAND

HIGHWAY, LOCHINVAR

BOREHOLE NO:

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1 OF 1

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Density Index 85 - 100%

VD

Very Dense

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		TYPE: OLE DIAM		TONNE	EXCA 300 m		R SURF DATU	FACE RL: JM:	Д	HD			
	Dril	ling and San	npling				Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
						сн	TOPSOIL: CLAY - medium to high plasticity grey-brown and brown, root affected.	у,					TOPSOIL
		0.60m U50		- - - - - - - -		СН	0.15m CLAY - medium to high plasticity, grey-brow brown.		M > w _P	St - VSt	HP	210	RESIDUAL SOIL
AD/T	Not Encountered	0.80m		- - - - - - - - - - - - - - - - - - -		SC	O.80m Clayey SAND / Sandy CLAY - fine to coars fine to medium) grained, dark grey and bro of low plasticity, trace fine grained angular	wn, fines	D - M	MD - D			RESIDUAL SOIL7 EXTREMELY WEATHERED ROCK
<u>Wat</u>	Wat (Da	ter Level te and time sł	nown)	2.0_ - - - - - - - - - - - - - - - - - - -	50mm Bulk s Enviro	n Diamet ample fo onmenta	1.90m Hole Terminated at 1.90 m Slow progress s er tube sample or CBR testing I sample aled and chilled on site)	S S F F St S	ncy /ery Soft Soft		<2 25 50	CS (kPa 25 5 - 50 0 - 100 00 - 200	D Dry M Moist W Wet
Stra	Wat	ter Inflow ter Outflow <u>anges</u> rradational or		ASS B Field Test	Acid S (Plast Bulk S	Sulfate S ic bag, a Sample	oil Sample ir expelled, chilled)	VSt V H H	/ery Stiff lard Friable V		20 >4 ery Lo	00 - 400 400	W _L Liquid Limit Density Index <15%
	D	ansitional stra efinitive or dis trata change		PID DCP(x-y) HP	Dynar	nic pene	n detector reading (ppm) trometer test (test depth interval shown) meter test (UCS kPa)		L MC D VD) M D	oose ledium ense erv De	n Dense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

QT LB 1.1.GLB Log NON-CORED BOREHOLE - TEST PIT NEW17P-0054A-AD - BOREHOLE LOGS.GPJ <</p>

6		LABORATORY		T T T T T T T T T T T T T T T T T T T	LIENT ROJE	: N CT: F	RING LOG - BOREHOLE McCLOY PROJECT MANAGEMENT PTY LTD PROPOSED SUBDIVISION - STAGES 1 & 2	PA JC	OREHO (GE: OB NO	:		BH107 1 OF 1 NEW17P-0054/
				L	OCATI		LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		GGEI	DBY	:	BE 26/2/21
DR	ILL T	YPE:	2.7	TONNE	EXCA							
		OLE DIAN			300 m		DATUM:		٩HD			
	Drill	ing and San	npling			1	Material description and profile information	1		Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additior observations
				-		СН	TOPSOIL: CLAY - medium to high plasticity, brown, root affected.					TOPSOIL
				-			0.15m CLAY - medium to high plasticity, brown.					RESIDUAL SOIL
				-						HP	170	
				0.5						HP	220	
				-		СН			St - VSt			
				-		CIT						
	Not Encountered			-								
AD/T	Not Enco	1.00m		1.0_				M > W _P		- HP	320	
		U50 1.20m		-		 	1.20m	-		HP	300	
				-			brown and pale grey, fine grained sand.					
				1. <u>5</u>					VSt	HP	250	
				-		CL				HP	250	
				-						ΗP	280	
				2.0		1	2.00m Hole Terminated at 2.00 m					
					-							
	END:			Notes, Sa				ncy /ery Sof	 +		CS (kPa 25	<u>Moisture Condition</u> D Dry
►	Wat (Dat Wat	er Level e and time sl er Inflow	hown)	CBR E ASS	Bulk s Enviro (Glass	ample f onmenta s jar, se	ior CBR testing S S al sample F F aled and chilled on site) St S Soil Sample VSt VSt	Soft Firm Stiff /ery Stif		2! 50 10 20	5 - 50 0 - 100 00 - 200 00 - 400	M Moist W Wet W _p Plastic Limit
	ta Cha			B Field Test	Bulk S ts	Sample	Fb F Density	lard riable V		/ery Lo	400 bose	Density Index <15%
	Gradational or transitional strata Definitive or distict strata change Field PID PID				Dynar	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) pmeter test (UCS kPa)	L MI D VE	D N C	.oose /lediur)ense /ery D	n Dense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

(LABORATORY (M			LIENT	: CT: ON:	RING LOG - BOREHOLE McCLOY PROJECT MANAGEMENT PTY LT PROPOSED SUBDIVISION - STAGES 1 & 2 LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		PA JO LO	reh(Ge: B NO GGEI TE:	:		BH108 1 OF 1 NEW17P-0054A BE 26/2/21
		YPE: OLE DIAM		TONNE	EXCA 300 m		DR SURFAC DATUM:		A	HD			
	Drill	ing and Sam	pling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/pa characteristics,colour,minor components	article	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
		0.50m		0.5		Сн	TOPSOIL: CLAY - medium to high plasticity, b root affected.	orown, 	M > w _P		HP	220 250	TOPSOIL RESIDUAL SOIL
AD/T	Not Encountered	U50 0.75m		- - 1.0_		СН	1.00m Sandy CLAY - low to medium plasticity, orange brown and pale grey, fine grained sand.	 e to		St - VSt	HP	320	
				-		CL	1.40m CLAY - medium to high plasticity, pale grey, wi some pale brown.		M ~ W	VSt - H	HP	380 - 450	
				1.5		СН	Brown, with pale grey, trace orange to red-brown.	wn.	M > W _P	VSt	HP HP HP HP	350 300 280 320 350	
				-			Hole Terminated at 2.00 m						
	Wat (Dat Wat Wat Wat <u>ta Cha</u> Gi	er Level e and time sh er Inflow er Outflow Inges radational or Insitional strat	own)	Notes, Sar U₅0 CBR E ASS B Field Test PID DCP(x-y)	50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S s Photoi	Diame ample f onmenta g jar, se culfate \$ c bag, s c bag, s cample	ter tube sample for CBR testing al sample valed and chilled on site) Soil Sample air expelled, chilled)	S So F Fir St Sti VSt Ve H Ha	ery Soft oft m	Vi	28 28 50 20 20 20 20 20 20 20 20 20 20 20 20 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400 pose n Dense	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%

				E	NGI	NEE	RING LOG - BOREHOLE		BO	REHO	DLE	NO:	BH109
(AS	t 🖉 c	LIENT	: 1	McCLOY PROJECT MANAGEMENT PTY	LTD	PA	GE:			1 OF 1
		LABORATORY			ROJE	CT: I	PROPOSED SUBDIVISION - STAGES 1 &	. 2	JO	B NO:			NEW17P-0054A
				L	OCATI	ON: I	OT 11, DP 1248129, NEW ENGLAND		LO	GGEL) BY	:	BE
						I	HIGHWAY, LOCHINVAR		DA	TE:			11/3/21
		TYPE: Ole dian		TONNE :	EXCA 300 m		DR SURF, DATU	ACE RL: M:	A	AHD			
	Dril	ling and San	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor components	/particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
2					0	CLAS			≥ŏ	δ ⁻	Ĕ		
				-		CL	FILL-TOPSOIL: Sandy CLAY - low plasticity and dark brown, fine to coarse grained sanc fine to medium grained angular to sub-angu gravel, root affected.	d, with					FILL: TOPSOIL
		0.30m U50		-		CI	FILL: Sandy CLAY - medium plasticity, grey fine to coarse grained, with fine to coarse gr gravel, trace bricks.	- <u> </u>			HP	230	FILL - CONTROLLED
		0.45m 0.60m		0. <u>5</u>			CLAY - medium to high plasticity, grey and red-brown.				HP	280	RESIDUAL SOIL
	ed	U50 0.75m		-					M > Wp				
AD/T	Not Encountered			- 1. <u>0</u>		СН				VSt	ΗP	220	
				-									
				- 1. <u>5</u>			1.40m Sandy CLAY - medium to high plasticity, bro orange and grey, fine to coarse grained san				HP HP	300 300	
				-		СН			M ~ W		HP	300	
				2.0			2.00m Hole Terminated at 2.00 m						
				-	-								
				-	-								
	- (Da – Wa ◀ Wa	ter Level te and time sl ter Inflow ter Outflow	nown)	Notes, Sa U₅₀ CBR E ASS	50mm Bulk s Enviro (Glass Acid S (Plasti	Diame ample f nmenta s jar, se Sulfate \$ c bag,	ter tube sample ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F Fi St S VSt V H H	ery Soft oft irm tiff ery Stiff ard		<2	1 <u>CS (kPa</u> 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet D W _p Plastic Limit
<u>St</u> 	tr D	anges radational or ansitional stra efinitive or dis trata change	ita	B Field Test PID DCP(x-y) HP	<u>ts</u> Photoi Dynan	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	Fb Fi Density	riable V L ME D VD	Lo D D	ery Lo bose ediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% e Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

¢	6	LABORATORY	TOS NSW) PTY		LIENT ROJE	: CT: ON :	RING LOG - BOREHOLE McCLOY PROJECT MANAGEMENT PTY PROPOSED SUBDIVISION - STAGES 1 & .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		PA JO LO	reh(Ge: B NO GGEI TE:	:		BH110 1 OF 1 NEW17P-0054A BE 11/3/21
		TYPE: OLE DIAN		TONNE	EXCA 300 m		DR SURF DATL	ACE RL:	ļ	HD			
-		ling and San					Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen		MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-		CL	FILL-TOPSOIL: Sandy CLAY - low plasticity dark brown, fine to coarse grained sand, wi medium grained angular to sub-angular gra affected.	ith fine to					FILL - TOPSOIL
		0.40m		-			CLAY - medium to high plasticity, red-brown brown.		-		HP	260	RESIDUAL SOIL
		U50 0.55m		0.5_							HP	200	
	ered			-		СН			M > w _P	St - VSt	HP	200	
AD/T	Not Encountered			1.0							HP	230	
AD				-			1.40m				HP	180	
				1. <u>5</u> - - -		CL	Sandy CLAY / Clayey SAND - medium plas grey to dark grey and orange to brown, fine grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets.	sticity, to coarse	$M \sim W_{P}$	VSt	HP	380	
							Hole Terminated at 2.00 m Slow progress						
LEC <u>Wa</u> r	Vater U Water Level CB (Date and time shown) E Water Inflow AS		Notes, Sa U ₅₀ CBR E ASS	50mm Bulk s Enviro (Glass Acid S	n Diame ample f onmenta s jar, se Sulfate \$	ter tube sample or CBR testing al sample aled and chilled on site) Soil Sample	S S F F St S VSt V	ery Soft oft irm tiff ery Stiff		<2 2 50 10 20	CS (kP2 25 5 - 50 0 - 100 00 - 200 00 - 400	D Dry M Moist W Wet W _p Plastic Limit	
	ata Ch G tr	ter Outflow anges iradational or ansitional stra efinitive or dis irata change		B Field Tes PID DCP(x-y) HP	Bulk S t <u>s</u> Photo Dynar	Sample ionisationisation	air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	1	lard riable V L MI D VC	Lo M D	ery Lo oose	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

CLIENT: McCLOY PROJECT MANAGEMENT PTY LTD

PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2

LOCATION: LOT 11, DP 1248129, NEW ENGLAND

HIGHWAY, LOCHINVAR

BOREHOLE NO:

PAGE:

DATE:

JOB NO:

LOGGED BY:

BH111

1 OF 1

NEW17P-0054A

Density Index 35 - 65%

Density Index 65 - 85%

Density Index 85 - 100%

MD

D

VD

Dense

Very Dense

Medium Dense

ΒE 11/3/21

		YPE: Ole diam		TONNE	EXCA 300 m		R SURFA DATUM	ACE RL: //:	A	HD			
	Drill	ing and San	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/p characteristics,colour,minor components		MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
						CL	TOPSOIL: Sandy CLAY - low plasticity, grey a dark brown, fine to coarse grained sand, root	and					TOPSOIL
				-		— — - СI	affected. Sandy CLAY - medium plasticity, dark brown, orange and pale grey, fine to coarse (mostly f	/ , trace fine)					
				-			0.25m grained. CLAY - medium to high plasticity, brown and red-brown.	^	-		HP	130	RESIDUAL SOIL
				-						St			
				0.5_							HP	120	
				-							HP	180	
	_			-		СН					HP	200	
	Not Encountered			-									
AD/T	Vot Enco	1.00m		1. <u>0</u>					M > W _P		HP	280	
		U50		-									
		1.25m					1.30m Sandy CLAY - medium plasticity, pale grey to		_				
				-			with brown, fine grained sand.	, grey,		VSt	HP	250	
				1.5_									
						CI							
				2.0	<u> </u>	1	2.00m						
				.	-		Hole Terminated at 2.00 m						
				-									
				-	-								
				-	1								
	SEND:			Notes, Sa				Consister				CS (kPa	
Wat				U₅₀ CBR			ter tube sample or CBR testing		ery Soft oft			25 5 - 50	D Dry M Moist
₹		er Level te and time sh	nown	E	Enviro	onmenta	I sample	F F	irm		50) - 100	W Wet
▶	•	e and time sr er Inflow	iowii)	ASS			aled and chilled on site) soil Sample		tiff ery Stiff)0 - 200)0 - 400	P
		er Outflow			(Plast	ic bag, a	ir expelled, chilled)		ard			100 - 400 100	
<u>Stra</u>		anges		B Field Tee		Sample			riable				Density Index: a159/
		radational or ansitional stra	ita	Field Test PID	_	ionisatio	n detector reading (ppm)	<u>Density</u>	V L		ery Lo oose	ose	Density Index <15% Density Index 15 - 35%

QT LIB 1.1.GLB Log NON-CORED BOREHOLE - TEST PIT NEW17P-0054A-AD - BOREHOLE LOGS GPJ <<DrawingFile>> 30/04/2021 16:12 10.0.000 Datgel Lab and in Situ Tool ►

DCP(x-y) HP

transitional strata

strata change

Definitive or distict

Hand Penetrometer test (UCS kPa)

Dynamic penetrometer test (test depth interval shown)



McCLOY PROJECT MANAGEMENT PTY LTD

BOREHOLE NO:

PAGE:

JOB NO:

LOGGED BY:

BH112

1 OF 1 NEW17P-0054A

ΒE

				_			IGHWAY, LOCHINVAR			TE:		•	11/3/21
		YPE: Ole diam		TONNE	EXCA 300 m		R SURI DATU	FACE RL: JM:	A	HD			
	Drill	ing and Sam	npling				Material description and profile information				Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	ty/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				_		CL	TOPSOIL: Sandy CLAY - low plasticity, gre dark brown, fine to coarse grained sand, rc						TOPSOIL
AD/T	Not Encountered	0.50m U50 0.65m		- - 0. <u>5</u> -		СН	CLAY - medium to high plasticity, brown ar red-brown.	/	M > w _p	St	HP	120	RESIDUAL SOIL
				- 1.0			1.00m				HP	180	
In Too				1.0			Hole Terminated at 1.00 m						
ɑ L B 1,1.G.B. L G NON-CORED BORRHOLE - TEST PIT NEWTYP-0054A.AD - BORRHOLE LOGS GPJ < style="text-align: red;" S004/2021 16:12 10:0:00 Datget Lab and in Silu 1oo													
	- Wat (Dat - Wat ■ Wat ata Cha ata Cha ata Cha ata Cha	er Level te and time sh er Inflow er Outflow anges radational or ansitional stra efinitive or dis rata change	nown)	Notes, Sa U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro (Glass Acid S (Plast Bulk S S Photo Dynar	Diame ample f nmenta s jar, se Gulfate S c bag, a c bag, a c bag, a conisationic pendo	E er tube sample or CBR testing sample led and chilled on site) oil Sample ir expelled, chilled) n detector reading (ppm) trometer test (test depth interval shown) meter test (UCS kPa)	S S F F St S VSt V H F	ncy fery Soft irm irm fery Stiff lard riable V L L M D V V	V Lu D	25 25 50 10 20 20 24 ery Lo 00se	5 - 50) - 100)0 - 200)0 - 400 400 pose n Dense	D Dry M Moist W Wet Wp Plastic Limit WL Liquid Limit Density Index <15%

(LABORATORY		C P	ENGI LIENT ROJE OCAT	BOREHOLE NO: PAGE: JOB NO: LOGGED BY: DATE:				BH113 1 OF 1 NEW17P-0054A BE 11/3/21				
		YPE: OLE DIAN		TONNE	EXCA 300 m		R SURFACE RL: DATUM:		4HD					
	Dril	ing and San	npling	1		1	Material description and profile information	1	1	Fiel	d Test			
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations		
				-		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	$M \sim W_P$				TOPSOIL		
	tered	0.50m	U50	<u>0m</u>	0	- 0. <u>5</u>			CLAY - medium to high plasticity, grey-brown, with red-brown.		St	HP	180	RESIDUAL SOIL
		U50 0.70m		-				Wp	1	HP	180			
AD/T	Not Encountered			- 1. <u>0</u>		СН		M < M	St -	HP	230			
				-			With Clayey Gravelly SAND pockets, pale brown.		VSt	HP	200			
				- 1. <u>5</u> -		SC	1.40m	D - M	MD - D			EXTREMELY WEATHER ROCK		
				2.0	ý., ý.,		1.80m Hole Terminated at 1.80 m Very slow progress							
	GEND:			- - - <u>Notes, Sa</u>				ency Very Sof	 		CS (kPa 25	a) <u>Moisture Condition</u> D Dry		
Water ✓ Water Level (Date and time shown) ► Water Inflow ✓ Water Outflow Strata Changes			ater Level CBR Bulk samp ate and time shown) (Glass jar, ater Inflow ASS Acid Sulfa ater Outflow (Plastic ba hanges B Bulk Samp			ample f onmenta s jar, se Sulfate S ic bag, a	or CBR testing S al sample F aled and chilled on site) St Soil Sample VSt air expelled, chilled) H Fb	Soft Firm Stiff Very Stif Hard Friable V	f	2! 50 10 20 >4	5 - 50 0 - 100 00 - 200 00 - 400 400	M Moist W Wet W _p Plastic Limit		
Gradational or transitional strata Definitive or distict strata change				Field Test PID DCP(x-y) HP	Photo Dynar	nic pen	Density Den detector reading (ppm) Etrometer test (test depth interval shown) meter test (UCS kPa)	L MI D	L Loose MD Medium Den			Density Index 15 - 35%		

				E	ENGINEERING LOG - BOREHOLE						DLE	NO:	BH114	
(LABORATORY		P		CT: ON:	McCLOY PROJECT MANAGEMENT PTY LT PROPOSED SUBDIVISION - STAGES 1 & 2 LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		JO LO	PAGE: JOB NO: LOGGED BY: DATE:			1 OF 1 NEW17P-0054A BE 11/3/21	
	DRILL TYPE: 2.7 TONNE EXCAVATOR SURFACE RL: BOREHOLE DIAMETER: 300 mm DATUM: AHD													
	Dril	ing and San	npling				Material description and profile information				Fiel	d Test		
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/p. characteristics,colour,minor components	particle	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations	
				0.5		CL CH	TOPSOIL: Sandy CLAY - low to medium plast dark brown, fine to coarse grained sand, root affected. Sandy CLAY - medium to high plasticity, dark trace orange, fine to coarse (mostly fine) grain sand, trace fine grained angular to sub-rounde gravel. CLAY - medium to high plasticity, grey-brown, red-brown.	/ brown, ned / ed /		St	HP	180	TOPSOIL COLLUVIUM — — — — — RESIDUAL SOIL — — —	
AD/T	Not Encountered	1.00m U50 1.20m	1.00m 1. U50	- - - 1. <u>0</u> -					M > Wp	VSt	HP 300 HP 380			
				- 1.5_ - - - 2.0		SC	1.40m 1.45m Sandy CLAY - low plasticity, pale brown, fine g sand. Extremely weathered Andesite with soil proper breaks down into Clayey Gravelly SAND - fine coarse grained, grey-brown, with some pale g dark grey and orange to brown, fine to mediur grained angular to sub-angular gravel, fines of medium plasticity.	rties: to prey to m	D - M	MD - D	HP	320	EXTREMELY WEATHERED ROCK	
LEG	iEND:			- - - - <u>-</u> - - - - - - - - - - - - - -	- - - - - - - - - - - - - - - - - - -	n Diame	Hole Terminated at 2.00 m Very slow progress		ery Soft		<2		D Dry	
Water Inflow Water Outflo Strata Changes Gradationa		er Level CBR e and time shown) er Inflow ASS er Outflow B nges B adational or Div			Enviro (Glass Acid S (Plast Bulk S	onmenta s jar, se Sulfate S ic bag, s Sample	for CBR testing S al sample F aled and chilled on site) St Soil Sample VSt air expelled, chilled) H Fb Der		oft rm iff ery Stiff ard iable V L	V	25 - 50 50 - 100 100 - 20 200 - 40 >400 Very Loose Loose		$\begin{array}{lll} W & Wet \\ W_p & Plastic Limit \end{array}$	
transitional strata —— Definitive or distict strata change				DCP(x-y) HP	Dynar	nic pen	etrometer test (test depth interval shown) meter test (UCS kPa)	MD Medium D D Dense VD Very Dens			lediun ense			

1										JLE	NO.	рпіз
6		LABORATORY		TD P		CT: ON:	ACCLOY PROJECT MANAGEMENT PTY LTD PROPOSED SUBDIVISION - STAGES 1 & 2 .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	JO LO	ge: B no Ggei Te:		:	1 OF 1 NEW17P-0054A BE 11/3/21
		YPE: OLE DIAN		FONNE	EXCA 300 m		R SURFACE RL: DATUM:	A	AHD			
	Dril	ing and Sar	npling	-			Material description and profile information			Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected. 0.15m					TOPSOIL
ADIT				-			CLAY - medium to high plasticity, brown.	-		HP	180	RESIDUAL SOIL
		0.50m		- 0.5								
		U50 0.65m		-						HP	150	
	pe			-		СН		M > W _P	St	HP HP	150 120	
	Not Encountered	0.90m		-							120	
	Not I	U50 1.05m		1. <u>0</u>						HP	180	
				-						HP	220	
				-			1.40m Sandy CLAY - low to medium plasticity, pale brown,	-	St - VSt			
				1. <u>5</u>		— — -	1.50m fine grained sand. Extremely weathered Andesite with soil properties: breaks down into Clayey Gravelly SAND / Sandy CLAY - fine to coarse grained, pale brown, with pale orange to orange and pale grey, fine to medium			HP	220	EXTREMELY WEATHERED ROCK
				-	- Solution - - - - - - - - - - - - - - - - - - -	SC	grained angular to sub-angular gravel, fines of low to medium plasticity.	D - M	MD - D			1M: SLOW PROGRESS. BECOMING HIGHLY WEATHERED ROCK.
				2.0			1.90m Hole Terminated at 1.90 m Very slow progress					
				-								
				-								
				-								

BOREHOLE NO:

BH115 1 OF 1

LEGEND: Moisture Condition Notes, Samples and Tests UCS (kPa) Consistency Very Soft U₅₀ CBR 50mm Diameter tube sample Dry Moist VS D <25 Water Bulk sample for CBR testing 25 - 50 s Soft Μ Water Level T Environmental sample F 50 - 100 Е Firm w Wet (Date and time shown) (Glass jar, sealed and chilled on site) St 100 - 200 Plastic Limit Stiff W_p Water Inflow ▶ Very Stiff 200 - 400 Acid Sulfate Soil Sample Liquid Limit ASS VSt W_{L} (Plastic bag, air expelled, chilled) Water Outflow н Hard >400 В Bulk Sample Fb Friable Strata Changes Density Index <15% Field Tests **Density** V Very Loose Gradational or QT LIB 1.1.GLB Density Index 15 - 35% PID Photoionisation detector reading (ppm) L Loose transitional strata DCP(x-y) Dynamic penetrometer test (test depth interval shown) MD Medium Dense Density Index 35 - 65% Definitive or distict HP Hand Penetrometer test (UCS kPa) D Dense Density Index 65 - 85% strata change VD Very Dense Density Index 85 - 100%

TEST PIT NON-CORED BOREHOLE g


ENGINEERING LOG - BOREHOLE

HIGHWAY, LOCHINVAR

McCLOY PROJECT MANAGEMENT PTY LTD

BOREHOLE NO:

PAGE:

DATE:

JOB NO:

BH116

1 OF 1

NEW17P-0054A

LOGGED BY: ΒE

11/3/21

						1	HIGHWAY, LOCHINVAR		DA	IE:			11/3/21
	RILL 1 OREH	YPE: OLE DIAM		TONNE	EXCA 300 m		R SURF, DATU	ACE RL: M:	A	.HD			
	Dril	ling and Sam	pling				Material description and profile information				Field	d Test	
МЕТНОD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor components	//particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-		CL	TOPSOIL: Sandy CLAY - low to medium pla dark brown, fine to coarse grained sand, roc affected. CLAY - medium to high plasticity, brown to r and grey.	ot/		VSt	HP	330	TOPSOIL
		0.60m		- 0. <u>5</u>							HP	280 200	
	untered	U50 0.80m		-					WP	St - VSt			
tgel Lab and In Situ Tool AD/T	Not Encountered			1. <u>0</u> - -		СН	Pale grey, with some orange and pale brow	n.			HP HP	210 230	
ingFile>> 30/04/2021 16:12 10.0.000 Da				- 1. <u>5</u> -							HP	330 300	
P-0054A-AD - BOREHOLE LOGS.GPJ < <draw< td=""><td></td><td></td><td></td><td> 2.0</td><td></td><td>CI</td><td>1.90m Sandy CLAY / Clayey SAND - medium plast 2.00m brown, with some orange and grey, fine to c grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets. Hole Terminated at 2.00 m</td><td></td><td>M ~ WP</td><td>VSt - H</td><td>HP</td><td>410</td><td>RESIDUAL SOIL / EXTREMELY WEATHERED ROCK</td></draw<>				2.0		CI	1.90m Sandy CLAY / Clayey SAND - medium plast 2.00m brown, with some orange and grey, fine to c grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets. Hole Terminated at 2.00 m		M ~ WP	VSt - H	HP	410	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
	- (Da – Wat ⊲ Wat r<u>ata Ch</u> – G tra	ter Level te and time sh ter Inflow ter Outflow	iown)	Notes, Sa U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S S Photoi Dynan	Diame ample f onmenta s jar, se culfate S c bag, a cample conisationic pen	IS ter tube sample or CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	S S F F St S VSt V H H	ncy /ery Soft im tiff /ery Stiff lard riable V L MD D V V	Lo M De	<2 25 50 10 20 >4 >4 ery Lo xose	- 50 - 100 0 - 200 0 - 400 00 ose	D Dry M Moist W Wet Wp Plastic Limit WL Liquid Limit Density Index <15%



ENGINEERING LOG - BOREHOLE

CLIENT: McCLOY PROJECT MANAGEMENT PTY LTD

PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2

LOCATION: LOT 11, DP 1248129, NEW ENGLAND

HIGHWAY, LOCHINVAR

BOREHOLE NO:

PAGE:

DATE:

JOB NO:

BH117

1 OF 1

NEW17P-0054A

LOGGED BY: BE

11/3/21

			YPE: Ole dian		TONNE :	EXCA 300 m		R SURF	ACE RL: M:	A	HD			
		Drilli	ing and San	npling				Material description and profile information				Field	d Test	
		WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	//particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
						131131	CL	TOPSOIL: Sandy CLAY - low to medium pla						TOPSOIL
					-			dark brown, fine to coarse grained sand, room affected.	/				_	
					-		СН	Sandy CLAY - medium to high plasticity, da trace orange, fine to coarse (mostly fine) grass sand, trace fine grained angular to sub-rour gravel.	ained			ΗP	180	
					- 0. <u>5</u>			0.40m CLAY - medium to high plasticity, grey-brow red-brown.	 /n, with		St - VSt	ΗP	230 -	RESIDUAL SOIL — — — — —
		intered			-					1 > Wp		HP	230	
	AUI	Not Encountered			-		СН			Σ		HP	280	
itu Tool			0.95m U50		1.0						VSt	HP	380	
el Lab and In S			<u>1.15m</u>		-									
のTLB 1.1.GLB Log NON-CORED BOREHOLE - TEST PIT NEW17P-0054A-AD - BOREHOLE LOGS GPJ < <drawingfile>> 30/04/2021 16:12 10.0.000 Datgel Lab and In Situ Tool</drawingfile>					- - 1.5		 -	1.30m Sandy CLAY / Clayey SAND - medium plas brown, with some orange and grey, fine to or grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets.	ticity, pale coarse	M ~ Wp	VSt - H			RESIDUAL SOIL 7
. 30/04/2021					-			Sitty SANDSTONE - fine to medium grained grey to dark grey, trace orange to red-brow estimated low strength, fractured.		┢┺╴				HIGHLY WEATHERED ROCK
GPJ < <drawingfile>></drawingfile>					-			Hole Terminated at 1.51 m Refusal						
OREHOLE LOGS.					- 2.0_	-								
17P-0054A-AD - E					-									
TEST PIT NEW					_									
HOLE.	.EGI Vate	END: er			Notes, Sa U ₅₀			is ter tube sample	Consister VS V	ncy /ery Soft		<u>U(</u> <2	CS (kPa) 25	Moisture Condition D Dry
D BORE	Y	Wate	er Level		CBR E			or CBR testing Il sample	1	Soft			5 - 50) - 100	M Moist W Wet
-CORED	-	•	e and time sl er Inflow	· ·	ASS	(Glass	s jar, se	aled and chilled on site) Soil Sample	St S	Stiff /ery Stiff		10	00 - 200 00 - 400	W _p Plastic Limit W _L Liquid Limit
NON 6	∢ Strat		er Outflow anges		В	(Plast		air expelled, chilled)	н н	lard riable		>4	100	
1.1.GLB Loi		Gr tra	radational or Insitional stra Insitive or dis	ata	Field Test PID DCP(x-y)	t <u>s</u> Photo	ionisatio	on detector reading (ppm) etrometer test (test depth interval shown)	<u>Density</u>	V L ME	Lo	ery Lo cose ledium	oose n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65%
QT LIB			ata change		HP	Hand	Penetro	meter test (UCS kPa)		D VD		ense ery De	ense	Density Index 65 - 85% Density Index 85 - 100%

				E	INGI	NEE	RING LOG - BOREHOLE		BC	REHO	DLE	NO:	BH201
C		ualt	69	st 🎽 o	LIENT	:	McCLOY PROJECT MANAGEMENT PTY	LTD	PA	GE:			1 OF 1
		LABORATORY	NSW)PTY		ROJE	CT:	PROPOSED SUBDIVISION - STAGES 1 &	<u>k</u> 2	JO	B NO			NEW17P-0054A
				L	OCAT		LOT 11, DP 1248129, NEW ENGLAND		LO	GGE) BY	' :	BE
							HIGHWAY, LOCHINVAR		DA	TE:			11/3/21
		YPE: OLE DIAM		TONNE	EXCA 300 m		DR SURF DATU	ACE RL:	ŀ	٩HD			
		ing and San					Material description and profile information		-		Fiel	d Test	
		<u>j</u>	1 3			z				~			-
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	y/particle ts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-		CL	TOPSOIL: Sandy CLAY - medium plasticity brown, fine to coarse grained sand, root aff	y, dark ected.	M < w _p				TOPSOIL
				- 0.5_			CLAY - medium to high plasticity, brown an grey-brown.			VSt	HP	330	RESIDUAL SOIL
	lered	0.80m		-						St - VSt	HP	180	
tu Tool AD/T	Not Encountered	U50 1.00m		1.0_			Pale gray and red-brown.		[⊿] ×		HP	230	
10.0.000 Datgel Lab and In Situ Tool AD,	2	1.10m U50		-		СН			× × W		HP	260	
		1.30m					Trace pale orange.						
21 16:12				1.5_						VSt	HP	280	
)/04/202											HP	300	
<drawingfile>> 3</drawingfile>				-							HP	280	
- E LOGS.GPJ <				2.0			2.00m						
OREHO							Hole Terminated at 2.00 m						
NON-CORED BOREHOLE - TEST PIT NEW17P-0054A-AD - BOREHOLE LOGS.GPJ < <drawingfile>> 3004/2021 16:12</drawingfile>				-	-								
LEC	GEND:	·I		Notes, Sa			t <u>s</u> ter tube sample	Consister	ncy ery Soft			- CS (kPa 25	a) Moisture Condition D Dry
		er Level		CBR E	Bulk s	sample	for CBR testing al sample	S S	oft irm		25	5 - 50 0 - 100	M Moist W Wet
	•	te and time sh er Inflow	nown)		(Glas	s jar, se	aled and chilled on site)	St S	tiff		10	00 - 200	W _p Plastic Limit
NON-C	Wat	er Outflow		ASS	(Plast	ic bag,	Soil Sample air expelled, chilled)	н н	'ery Stiff lard			00 - 400 400) W _L Liquid Limit
	ata Ch G	anges radational or		B Field Test	<u>ts</u>	Sample		Fb F Density	riable V		ery Lo	oose	Density Index <15%
	tra	ansitional stra efinitive or dis		PID DCP(x-y)	Dynai	mic pen	on detector reading (ppm) etrometer test (test depth interval shown)		L Me	D M		n Dense	
QT LIB		rata change		HP	Hand	Penetro	ometer test (UCS kPa)		D VD		ense ery D	ense	Density Index 65 - 85% Density Index 85 - 100%

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(00				RING LOG - BOREHOLE MCCLOY PROJECT MANAGEMENT PTY	LTD		REHO GE:	OLE	NO:	BH202
て		LABORATORY	NSW) PTY		ROJE	CT: F I ON : L	PROPOSED SUBDIVISION - STAGES 1 & .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		JO	b no Ggei Te:		′ :	NEW17P-0054A BE 11/3/21
		YPE: OLE DIAN		TONNE :	EXCA 300 m		R SURF DATU	FACE RL: JM:	A	AHD.			
	Drill	ing and San	npling				Material description and profile information				Fiel	ld Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-		CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine to coarse grained sand, ro affected.	asticity, oot			HP	200	
				-			CLAY - medium to high plasticity, brown an grey-brown. Red-brown and pale grey.	id				200	RESIDUAL SOIL
		0.50m U50 0.65m		0.5						St - VSt	HP	200	
	ed			-							HP	200	
	unter			-							HP	210	
AD/T	Not Encountered			1. <u>0</u>		СН			M > W _P		ΗP	210	
				-			Pale grey, with red-brown and pale orange.				HP	300	
				- 1. <u>5</u>						VSt	HP	380	
				-							HP	350	
				-							HP	280	
				-							HP	260	
				2.0			2.00m						
				-			Hole Terminated at 2.00 m						
LEG	SEND:			- Notes, Sa	mples a	Ind Test	s	Consiste	ncv			CS (kPa	Moisture Condition
	e <u>r</u> Wat (Dat ∙ Wat	er Level e and time sl er Inflow er Outflow	nown)	U₅₀ CBR E ASS	50mm Bulk s Enviro (Glass Acid S	n Diame sample f onmenta s jar, se Sulfate \$	[™] ter tube sample or CBR testing I sample aled and chilled on site) toil Sample air expelled, chilled)	VS V S S F F St S VSt V	/ery Soft Soft Firm Stiff /ery Stiff Hard		<: 2! 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
<u>Stra</u>	ta Cha			B Field Test	Bulk S	Sample	· · ·		riable V	V	ery Lo		Density Index <15%
	tra D	ansitional stra efinitive or dis rata change		PID DCP(x-y) HP	Dynar	nic pen	n detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)		L ME D VD	L D D	oose	n Dense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



ENGINEERING LOG - BOREHOLE

HIGHWAY, LOCHINVAR

McCLOY PROJECT MANAGEMENT PTY LTD

BOREHOLE NO:

PAGE:

DATE:

JOB NO:

LOGGED BY:

BH203

1 OF 1

NEW17P-0054A

ΒE 11/3/21

							F	IIGHWAY, LOCHINVAR		DA	IE:			11/3/21
			YPE: Ole diam		TONNE :	EXCA 300 m		R SURF DATU	ACE RL: IM:	A	\HD			
		Drill	ing and San	npling				Material description and profile information				Fiel	d Test	
METHOD		WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor component	y/particle is	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
					-		CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine to coarse grained sand, ro affected.						TOPSOIL
					-			CLAY - medium to high plasticity, red-brown grey.	n and pale			HP	220	RESIDUAL SOIL — — — —
		d			- 0. <u>5</u> - -							HP	230	
		Not Encountered	0.90m		- 1. <u>0</u>					~ wp		HP	330	
b and In Situ Too		Not E	U50 <u>1.15m</u>		-		СН			ž	VSt	ΗP	380	
16:12 10.0.000 Datgel La					1.5			Pale grey, with red-brown and pale orange.				HP	380	
QT LIB 1.1.G.LB Log NON-CORED BOREHOLE - TEST PIT NEW17P-0054A-AD - BOREHOLE LOGS.GPJ < <drawingfile>> 30/04/2021 16:12 10.0.000 Datget Lab and in Situ Tool I I I I I I I I I I I I I I I I I I</drawingfile>					-							HP	350 380	
	+				2.0			2.00m Hole Terminated at 2.00 m						
TEST PII NEW1/P-0004A-AU - DUREI					-									
	.EGE				Notes, Sa U ₅₀			<u>s</u> er tube sample	Consister	ncy /ery Soft			CS (kPa 25) Moisture Condition D Dry
	- -	Wat (Dat Wat Wat	er Outflow	nown)	CBR E ASS	Bulk s Enviro (Glass Acid S (Plasti	ample fo nmenta s jar, sea Sulfate S c bag, a	er tube sample or CBR testing I sample aled and chilled on site) ioil Sample ir expelled, chilled)	S S F F St S VSt V H H	oft irm tiff 'ery Stiff lard		25 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	
QT LIB 1.1.GLB Log	Strata	 Water Inflow Water Outflow trata Changes Gradational or transitional strata Definitive or distict strata change 			B Field Test PID DCP(x-y) HP	<u>ts</u> Photoi Dynan	nic pene	n detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Fb F Density	riable V L ME D VD	Lo D M D	ery Lo bose lediun ense ery Do	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 65 - 100%

(ENGII		RING LOG - BOREHOLE MCCLOY PROJECT MANAGEMENT PTY LTD		OREHO	OLE	NO:	BH204 1 OF 1
5		LABORATORY		P			PROPOSED SUBDIVISION - STAGES 1 & 2		BNO	:		NEW17P-0054
					OCAT		OT 11, DP 1248129, NEW ENGLAND	LC	GGE) BY	:	BE
						ł	HIGHWAY, LOCHINVAR	DA	TE:			11/3/21
		YPE: OLE DIAN		FONNE	EXCA 300 m		R SURFACE RL: DATUM:		AHD			
		ing and San					Material description and profile information	,		Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additic observations
				-		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.					
				-			CLAY - medium to high plasticity, brown.			HP	180	RESIDUAL SOIL
		0.50m		0.5						HP	150	
		U50 0.65m						M > W _P	St			
	red					СН						
AD/T	Not Encountered	1.00m		1. <u>0</u>			Grey.			HP	150	
	Ň	U50 1.10m								HP	250	
				-			<u>1.30m</u>		VSt	HP	280	
							Sandy CLAY - low to medium plasticity, pale grey and pale brown, fine grained sand, trace fine grained angular gravel.					
				1. <u>5</u>		CL		M < w	H / Fb			
						 sc	Extremely weathered Andesite with soil properties: breaks down into Clayey Gravelly SAND - fine to coarse grained, grey-brown with some pale grey to	D - M	D	-		RESIDUAL SOIL7 EXTREMELY WEATHE ROCK
				2.0			2.00m grained angular to sub-angular gravel, fines of low to medium grained angular to sub-angular gravel, fines of low to medium grained angular gravel, fines of low to					
				-			Hole Terminated at 2.00 m Slow progress					
LEG	END:			Notes, Sa				ency /ery Sof	t		CS (kPa 25	a) <u>Moisture Condition</u> D Dry
▼	Wat (Da Wat	er Level te and time sl er Inflow er Outflow	hown)	CBR E ASS	Enviro (Glass Acid S	onmenta s jar, se Sulfate S	or CBR testing S S al sample F S aled and chilled on site) St S Soil Sample VSt S	Soft Firm Stiff /ery Stif Hard		50 10 20	5 - 50 0 - 100 00 - 200 00 - 400 400	
	t a Ch a G tra	anges radational or ansitional stra efinitive or dis	ata	B Field Tes PID DCP(x-y) HP	Bulk S ts Photo Dynar	Sample ionisationisation		Friable V L MI D	Li ⊃ N	ery Lo		Density Index <15% Density Index 15 - 35% e Density Index 35 - 65% Density Index 65 - 85%

(RING LOG - BOREHOLE		REHO	DLE	NO:	BH205 1 OF 1
5		LABORATORY (NSW) PTY L	TD P	ROJE	CT: F ON: L	PROPOSED SUBDIVISION - STAGES 1 & 2 .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	JO LO	B NO GGEI TE:		:	NEW17P-0054. BE 11/3/21
		YPE: OLE DIAN		TONNE	EXCA 300 m	VATC			AHD.			
	Dril	ing and San	npling				Material description and profile information			Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additio observations
						CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.					TOPSOIL
				-			0.15m CLAY - medium to high plasticity, brown and grey-brown, trace fine grained angular gravel.			HP	140 150	RESIDUAL SOIL
		0.50m		0.5_		СН		M > W _P	St			
		U50 0.70m		-						HP	200	
AD/T	Not Encountered			- 1. <u>0</u> -			1.00m Sandy CLAY / Clayey SAND - low to medium plasticity, pale grey and pale brown, fine grained sand.			HP	200	
				- 1. <u>5</u> -		CL		M < w _p	H / Fb			
				2.0			2.00m					
				-	-		Hole Terminated at 2.00 m					
<u>Wat</u>	Wa (Da	er Level te and time si er Inflow	hown)	Notes, Sa U₅ CBR E ASS	50mm Bulk s Enviro (Glass	Diame ample f onmenta s jar, se	ter tube sample VS VS or CBR testing S S al sample F F aled and chilled on site) St S	ncy /ery Soft Soft Stiff /ery Stiff		<2 25 50 10	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400	D Dry M Moist W Wet W _p Plastic Limit
	ata Ch G tr	er Outflow anges radational or ansitional stra efinitive or dis rata change	ata	B PID DCP(x-y) HP	(Plast Bulk S t <u>s</u> Photo Dynar	ic bag, a Sample ionisationisation	air expelled, chilled) H H	lard Triable L ME D VD	V La D M D	>/ ery Lo pose	100 Dose n Dense	Density Index <15% Density Index 15 - 35%

6		LABORATORY	OSW) PTY L	t C P	LIENT ROJE(: 1 CT: F ON: L	RING LOG - BOREHOLE McCLOY PROJECT MANAGEMENT PTY LT PROPOSED SUBDIVISION - STAGES 1 & 2 .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		PA JO LO	REHO GE: B NO GGEI TE:	:		BH206 1 OF 1 NEW17P-0054A BE 26/2/21
		YPE: OLE DIAN		TONNE	EXCA 300 m		OR SURFAC		A	\HD			
	Dril	ing and San	npling	1		I	Material description and profile information			1	Field	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/pa characteristics,colour,minor components	article	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
	sred	0.60m U50 0.80m				сL СН	TOPSOIL: Sandy CLAY - low to medium plast dark brown, fine grained sand, root affected. <u>0.15m</u> CLAY - medium to high plasticity, brown and grey-brown, trace fine grained angular gravel. <u>0.80m</u> Sandy CLAY - low to medium plasticity, pale g and pale brown, fine grained sand.		A > Wp	St	HP	150	TOPSOIL
AD/T	Not Encountered			- 1. <u>0</u> - - - - 1. <u>5</u> - - - -		CL	Brown.		M < w _p	H / Fb			
				2.0			2.00m Hole Terminated at 2.00 m						
	Wat (Da - Wat Wat Wat ata Ch ata Ch ata Ch	er Level te and time sl er Inflow er Outflow anges radational or ansitional stra efinitive or dis	nown)	Notes, Sa U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S S Photo Dynar	Diame ample f onmenta s jar, se Sulfate S ic bag, a Sample ionisationis ationis and the second nic pende	ter tube sample or CBR testing Il sample aled and chilled on site) Soil Sample Air expelled, chilled)	S So F Fii St St VSt Ve H Ha	ery Soft oft m	- Vi La	22 25 50 20 20 20 24 ery Lo 00se	5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15%

(LABORATORY		C D P	LIENT ROJE	: I CT: F I ON : L	RING LOG - BOREHOLE McCLOY PROJECT MANAGEMENT PTY LTD PROPOSED SUBDIVISION - STAGES 1 & 2 OT 11, DP 1248129, NEW ENGLAND HGHWAY, LOCHINVAR	PA JO LO	REHO GE: B NO GGEI TE:	:		BH207 1 OF 1 NEW17P-0054A BE 26/2/21
		YPE: OLE DIAM		TONNE	EXCA 300 m		R SURFACE RL: DATUM:	ŀ	AHD			
	Dril	ing and San	npling				Material description and profile information			Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and addition: observations
	p	0.50m U50 0.70m		0.5_		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected. CLAY - medium to high plasticity, brown and grey-brown, trace fine grained angular gravel.	M > Wp	VSt	HP	200	TOPSOIL TRESIDUAL SOIL
AD/T	Not Encountered			- 1. <u>0</u> - - -		CL	 0.90m	M < Wp	H - Fb			RESIDUAL SOIL 7
				1. <u>5</u> - - - - 2.0		SC	2.00m	D - M	MD - D			EXTREMELY WEATHER
							Hole Terminated at 2.00 m					
	- Wat (Da - Wat ∎ Wat ata Ch ata Ch ata Ch ata Ch tra	er Level e and time sh er Inflow er Outflow anges radational or radational stra efinitive or dis rata change	hown) ita	Notes, Sa U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro (Glass Acid S (Plast Bulk S Bulk S Photo Dynar	n Diame sample f ponmenta s jar, se Sulfate S ic bag, a Sample ionisationis ationis at	er tube sample VS or CBR testing S I sample F aled and chilled on site) St oil Sample VSt uir expelled, chilled) H	/ mcy /ery Soft Soft Firm Stiff /ery Stiff Hard Friable V L D V U	V Lu D M	22 25 50 20 20 20 20 20 20 20 20 20 20 20 20 20	n Dense	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%

6		LABORATORY			LIENT: ROJEC	: N CT: F ON: L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	\$2	PA JO LO	st Pi Ge: B NO Ggei Te:	:		TP101 1 OF 1 NEW17P-0054A BE 12-9-19
		IENT TYP T LENGTI		2.7 TO 2.0 m		EXCA		FACE RL: JM:	ŀ	\HD			
	Drill	ing and San	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
						CL	Sandy CLAY - low to medium plasticity, dar fine to coarse grained sand, root affected.	rk brown,	M < W				TOPSOIL
				_		CI	©.15m Sandy CLAY - medium plasticity, dark brow dark grey, trace orange, fine to medium gra sand.	n and wn and ained			HP	350 - 390	
				0.5			0.30m				HP	380	RESIDUAL SOIL
		0.60m CBR / U50		-		СН			4 _P		HP	350	
	Not Encountered	0.80m		-					M > Wp	VSt	HP	390	
Ц	Not End			1.0			1.10m Sandy CLAY / Clayey SAND - medium plas green to grey and orange to brown, fine to	sticity,	-		HP	300	RESIDUAL SOIL /
				_			(mostly fine) grained sand, with fine to med grained angular to rounded gravel, trace ck pockets.	lium			HP	350	ROCK
		1.60m		1. <u>5</u>		CI							
		CBR		_					M < W	н			
		1.90m		2.0			2.00m Hole Terminated at 2.00 m						
				-									
LEG Wat	END:			Notes, Sar U ₅₀			<u>s</u> ter tube sample	Consister	ncy ery Soff	 :		CS (kPa 25	a) Moisture Condition D Dry
	Wat (Dat Wat	er Level e and time sl er Inflow er Outflow		CBR E ASS	Enviro (Glass Acid S (Plasti	nmenta jar, sea ulfate S c bag, a	or CBR testing I sample aled and chilled on site) Soil Sample air expelled, chilled)	F F St S VSt V H H	oft irm tiff ery Stiff ard		50 10 20	5 - 50 0 - 100 00 - 200 00 - 400 400	P
Stra	tra	anges radational or ansitional stra efinitive or dis rata change		B Field Test PID DCP(x-y) HP	Photoi Dynan	onisatio	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Fb F Density	riable V L M[D	Lo D M	ery Lo oose lediur ense	oose n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85%

(RING LOG - TEST PIT			ST PI GE:	T NC):	TP102
6	X	LABORATORY	NSW) PTY		ROJE	CT: F ON: L	PROPOSED SUBDIVISION - STAGES 1 & 2 OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		JO LO	b no Ggei Te:	-	:	NEW17P-0054A BE 12-9-19
		ient typ T lengti		2.7 TC 2.0 m		EXCA	VATOR SURFACE I 0.6 m DATUM:	RL:	A	AHD .			
	Drill	ing and San	npling			I	Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particl characteristics,colour,minor components	le	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
						CL	TOPSOIL: Sandy CLAY - low plasticity, dark browr fine to coarse grained sand, root affected.	٦,	4				TOPSOIL
				-		 CI	Sandy CLAY - medium plasticity, dark brown, trace		M < W _P	н	HP	480	
				-			orange and pale grey, sand is mostly fine grained, trace fine angular to sub-rounded gravel.	_/				- 510	RESIDUAL SOIL
				-			CLAY - medium to high plasticity, grey-brown.				HP	380	
		0.60m		0.5							HP	390	
		U50 0.75m		-		СН	Red-brown and brown.		M > W _P	VSt	HP	390	
				_					2				
ц	Not Encountered			1. <u>0</u>							HP	380	
	No			_			1.20m						
				_			Clayey Sandy GRAVEL - fine to medium grained (nominal 5mm), angular to sub-rounded. pale brow to brown and grey, fine to coarse grained sand, fin of medium plasticity.						RESIDUAL SOIL 7 EXTREMELY WEATHEF ROCK
				1.5									
				-	¢ 6 6 6 0 0	GC			М	D - VE	þ		
				_									
				-									
_				2.0			2.00m Hole Terminated at 2.00 m						
				-			Slow progress						
				-									
				-									
				-									
	END:			Notes, Sar U ₅₀			ts Cons ter tube sample VS	sisten Ve	cy ery Soft			CS (kPa 25	a) Moisture Condition D Dry
Nate	Wat	er Level		CBR E	Bulk s	ample f	for CBR testing S al sample F	So Fir	oft		25	5 - 50) - 100	M Moist W Wet
-		e and time sl er Inflow	hown)	ASS	(Glass	s jar, se	aled and chilled on site) St Soil Sample VSt	Sti			10)0 - 200)0 - 400	W _p Plastic Limit
− Stra	Wat ta Cha	er Outflow anges		в	(Plasti Bulk S		air expelled, chilled) H Fb	Ha	ard iable		>4	400	
	Gi tra De	radational or ansitional stra efinitive or dis rata change		Field Test PID DCP(x-y) HP	i <u>s</u> Photoi Dynar	ionisatio nic pen	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	<u>sity</u>	V L ME D	Lo D M	ery Lo oose lediun ense	oose n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85%

6		LABORATORY			LIENT ROJE(OCATI	: CT: ON: 	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & 2 OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		PA JO LO	st pi ⁻ ge: B no: ggei te:	:		TP103 1 OF 1 NEW17P-0054A BE 12-9-19
		IENT TYP		2.7 TC 2.0 m		EXCA I DTH :	VATOR SURFACE 0.6 m DATUM:	E RL:	A	HD			
METHOD	WATER	ing and San	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	Material description and profile information MATERIAL DESCRIPTION: Soil type, plasticity/par characteristics,colour,minor components	rticle	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type a	d Test Kesnit	Structure and additiona observations
				-		сL СН	Sandy CLAY - low to medium plasticity, dark bro 0.10m fine to coarse grained sand, root affected. Sandy CLAY - medium to high plasticity, dark bri trace orange, sand is mostly fine to medium gra trace fine to medium grained sub-angular grave 0.35m CLAY - high plasticity, red-brown and brown.	rown, ained,	M < W	н	HP	480 - 510 200	TOPSOIL COLLUVIUM
		0.60m U50 0.75m		0.5							HP	210 210 210	
ш	Not Encountered			- 1. <u>0</u> -		СН	Grey and brown.		M > W _P	St - VSt	HP HP HP	180 180 220 350	
				- - 1. <u>5</u> - - - - - - 2.0		SP	With Clayey Gravelly SAND pockets. <u>1.40m</u> Gravelly Clayey SAND - fine to coarse grained, grey and orange, with some dark grey, fine to medium grained angular to sub-angular gravel, of medium to high plasticity, with clay pockets.		М	D - VD			RESIDUAL SOIL / EXTREMELY WEATHER ROCK
LEG Wat	Wat (Dat	er Level e and time sl er Inflow	hown)	- - - - - - - - - - - - - - - - - - -	50mm Bulk s Enviro (Glass	Diame ample f nmenta jar, se	Hole Terminated at 2.00 m ts Ca ter tube sample V or CBR testing S al sample F aled and chilled on site) S	S So F Fir St Sti	ery Soft oft m ff		2!5010	CS (kPa 25 5 - 50 0 - 100 00 - 200	D Dry M Moist W Wet W _p Plastic Limit
Stra	l Wat ta Cha G tra D	er Outflow		ASS B <u>Field Test</u> PID DCP(x-y) HP	(Plasti Bulk S <u>s</u> Photoi Dynan	c bag, a ample onisationic pen	air expelled, chilled) F	H Ha	ery Stiff ard <u>able</u> V L ME D VD	Vi La D M	ery Lo	n Dense	WL Liquid Limit Density Index <15%

4		Juali	- es	st ² c		: 1	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD	0	PA	ST PI		D:	TP104 1 OF 1
		LABORATORY	NSW) PTY	LTD			PROPOSED SUBDIVISION - STAGES 1 & _OT 11, DP 1248129, NEW ENGLAND	2		B NO: GGEE		' :	NEW17P-0054A BE
				_`			HIGHWAY, LOCHINVAR			TE:		•	12-9-19
		IENT TYP		2.7 TO 2.0 m		EXCA		ACE RL: M:	ļ	AHD.			
	Drill	ing and San	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor components	/particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additior observations
						CL	TOPSOIL: Sandy CLAY - low plasticity, dark fine to coarse grained sand, root affected.	k brown,					TOPSOIL
				_			0.15m Sandy CLAY - medium to high plasticity, dar fine grained sand.	rk brown,			HP HP	450 510	
				-			CLAY - medium to high plasticity, grey and t	- <u> </u>	-		HP	>600	RESIDUAL SOIL
				0.5		СН					НР	>600	
		0.70m							× Wp				
	Not Encountered	U50 0.85m		_			0.80m Sandy CLAY / Clayey SAND - medium plast brown to brown and grey, fine to coarse grai sand, trace fine grained angular to sub-angu gravel, trace clay pockets.	ined	Σ	н	ΗP	>600	RESIDUAL SOIL 7 EXTREMELY WEATHEI ROCK
E	Not E			1.0 1.5		CI	1.50m				HP	>600	
				-		SC	Clayey Gravelly SAND - fine to coarse grain grey to grey and pale brown, fine to medium angular to sub-angular gravel, fines of mediu plasticity.	grained	м	D - VD			
				2.0	· · · · ·		1.90m Hole Terminated at 1.90 m Slow progress						<u> </u>
				-									
	END:			Notes, Sar			ts ter tube sample	<u>Consister</u> VS V	ncy ery Sof			CS (kPa 25	a) <u>Moisture Condition</u> D Dry
	Wat (Dat	er Level te and time sl ter Inflow ter Outflow	hown)	U₅₀ CBR E ASS B	Bulk s Enviro (Glass Acid S (Plasti	ample i nmenta ; jar, se ;ulfate \$	ter ube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H H	ery Son oft irm tiff ery Stiff ard riable		2: 5(1) 2(25 5 - 50 0 - 100 00 - 200 00 - 400 400	M Moist W Wet W _p Plastic Limit
<u></u>	G tra D	radational or ansitional stra efinitive or dis rata change		Field Test PID DCP(x-y) HP	<u>s</u> Photoi Dynan	onisati nic pen	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L MI D VE	La D M D	ense	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

				E	NGI	NEE	RING LOG - TEST PIT		TE	ST PI	T NC) :	TP105
6		ualt	es.		LIENT		McCLOY LOCHINVAR PTY LTD		PA	GE:			1 OF 1
	X	LABORATORY	NSW) PTY	LTD			PROPOSED SUBDIVISION - STAGES 1 &	. 2		BNO			NEW17P-0054A
				L	UCATI		OT 11, DP 1248129, NEW ENGLAND			GGE) BY	:	BE
							HIGHWAY, LOCHINVAR		DA	TE:			12-9-19
		IENT TYP T LENGTI		2.7 TO 2.0 m		EXCA I DTH :		ACE RL: M:	ļ	٩HD			
	Drill	ing and San	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component:	//particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
				_		CL	TOPSOIL: Sandy CLAY - low plasticity, dark fine to coarse grained sand, root affected.	c brown,					TOPSOIL
				_		 СН	0.15m Sandy CLAY - medium to high plasticity, day fine grained sand.	 rk brown,	-		HP HP	420 450	
							0.30m CLAY - medium to high plasticity, grey and t	 brown.	4		HP	550	RESIDUAL SOIL
		0.50m		0.5					M < Wp	н			
		U50		-		СН					НР	550	
	pe	0.80m											
ш	Not Encountered			- 1. <u>0</u> -			0.90m Clayey Gravelly SAND - fine to coarse grain grey to grey and pale brown, fine to medium angular to sub-angular gravel, fines of medi plasticity.	n grained					RESIDUAL SOIL7 EXTREMELY WEATHER ROCK
				- - 1.5_ -		SC	Gravel is fine to coarse grained in soil matrix	x.	М	D - VD			
							2.00m						
							Hole Terminated at 2.00 m Slow progress						
				-									
LEG	SEND:			Notes, Sa				Consister				CS (kPa	
	Wat (Dat Wat	er Level e and time sl er Inflow er Outflow	hown)	U ₅₀ CBR E ASS	Bulk s Enviro (Glass Acid S (Plasti	ample f nmenta jar, se sulfate \$ c bag, ;	ter tube sample or CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H H	ery Sof oft irm tiff ery Stiff ard		25 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	r .
<u>Stra</u>	tra De	anges radational or ansitional stra efinitive or dis rata change		B <u>Field Test</u> PID DCP(x-y) HP	<u>s</u> Photoi Dynan	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Fb F Density	riable V L MI D VE	Lo D M D	ery Lo bose lediur ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

				E	NGI	NEE	RING LOG - TEST PIT		TE	ST PI	r nc):	TP106
6		ualt	es		LIENT		ACCLOY LOCHINVAR PTY LTD		PA	GE:			1 OF 1
		LABORATORY	NSW) PTY	LTD			PROPOSED SUBDIVISION - STAGES 1 8	k 2		B NO:		_	NEW17P-0054A
				L	OCATI		OT 11, DP 1248129, NEW ENGLAND			ggee Te:) BY	:	BE 12-9-19
									DA	16.			12-9-19
		IENT TYPI T LENGTI		2.7 TC 2.0 m		EXCA I DTH :		ACE RL: M:	A	HD			
	Drill	ing and San	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	//particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
						CL	TOPSOIL: Sandy CLAY - low plasticity, dark	k brown,					TOPSOIL
				-			<u>0.10m</u> Interfor Coarse grained sand, root arected. Sandy CLAY - medium to high plasticity, da fine grained sand.	rk brown,	-				
				-		СН					HP	210	
		<u>0.40m</u> U50				СН	CLAY - medium to high plasticity, grey and	brown.	M > w _p	VSt	ΗP	220	RESIDUAL SOIL
ш	Not Encountered	0.55m		-			0.70m				HP	230	
	Not			- 1.0_ -		SC	Clayey Gravelly SAND / Sandy GRAVEL - f coarse grained, green to grey and pale grey brown, fine to coarse grained angular to sub gravel, fines of medium plasticity, trace clay	y to b-angular	D - M	D - VD			RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
				-	X X X X X X		1.30m 1.35m ANDESITE - pale grey to brown and grey to		D				
				- 1. <u>5</u> - - 2.0_ - - -			∖grey, estimated medium to high strength. Hole Terminated at 1.35 m Refusal						
<u>Wat</u> ▲	- Wat (Dat - Wat I Wat ata Cha ata Cha ata Cha ata Cha	er Level e and time sl er Inflow er Outflow anges radational or ansitional stra efinitive or dis rata change	nown) ta	Notes, Sar U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S S Photo Dynar	I Diame ample f onmenta s jar, se Gulfate S Gulfate S ac bag, a Sample ionisationisationis and period	s ter tube sample or CBR testing il sample aled and chilled on site) soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) imeter test (UCS kPa)	S S F F St S VSt V H H	ncy ery Soff oft tiff ery Stiff lard riable V L MI D VD	Vi La D M	25 50 10 20 20 20 20 20 20 20 20 20 20 20 20 20	n Dense	D Dry M Moist W Wet W, Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%

6		LABORATORY		st ² c	LIENT ROJE	: N CT: F I ON : L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 8 OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	& 2	Pa Joi Lo	st pi ge: b no: ggei te:	:		TP107 1 OF 1 NEW17P-0054A BE 13-9-19
		MENT TYP IT LENGTI		2.7 TC 2.0 m		EXCA IDTH:	VATOR SURF 0.6 m DATU	ACE RL: IM:	Д	HD			
	Dril	ling and San	npling			-	Material description and profile information				Fiel	ld Test	
МЕТНОD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	y/particle is	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-		CL	TOPSOIL: Sandy CLAY - low plasticity, dar fine to coarse grained sand, root affected.	k brown,					TOPSOIL
				-			0.20m CLAY - medium to high plasticity, grey-brow brown.	 vn and	NP NP		HP		RESIDUAL SOIL
				0. <u>5</u>		СН			M < w _P	Н	HP	>600	
	ntered	0.70m U50		-			0.80m				HP	>600	
ш	Not Encountered	0.85m		- 1. <u>0</u> -			Clayey Gravelly SAND - fine to coarse grain green to grey with orange to brown, fine to r grained angular to sub-angular gravel, fines medium plasticity, with clay pockets / bands	medium s of					RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
,				- 1. <u>5</u> -		SC	Dark grey and brown.		D - M	D - VD			
				2.0_			1.80m Hole Terminated at 1.80 m Slow progress						
				-	-								
<u>Wat</u> ▼	Wat (Da Wat I Wat ta Ch	ter Level te and time sl ter Inflow ter Outflow anges radational or		Notes, Sa U ₅₀ CBR E ASS B Field Tes: PID	50mm Bulk s Enviro (Glass Acid S (Plast Bulk S	n Diame ample f onmenta s jar, sea Sulfate S ic bag, a Sample	s er tube sample or CBR testing I sample aled and chilled on site) ioil Sample ir expelled, chilled) n detector reading (ppm)	S S F F St S VSt V H F	ncy /ery Soft aoft imm titiff /ery Stiff lard riable V L	V	<: 2! 50 10 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
	_ D	ansitional stra efinitive or dis rata change		DCP(x-y) HP	Dynar	nic pene	trometer test (test depth interval shown) meter test (UCS kPa)) M D			-

				F		NFF	RING LOG - TEST PIT		TE):	TP108
1							McCLOY LOCHINVAR PTY LTD			GE:		-	1 OF 1
4	X	uuu	65		ROJE	CT:	PROPOSED SUBDIVISION - STAGES 1	& 2		B NO:			NEW17P-0054A
		LABORATORY	NSW) PTY		OCAT	ION:	-OT 11, DP 1248129, NEW ENGLAND		LO	GGEL	ЭBY	:	BE
							HIGHWAY, LOCHINVAR			TE:			13-9-19
			c.	2770			VATOR SUR	FACE RL:					
		IT LENGT		2.0 m		IDTH:			A	HD			
	Dril	ling and Sar	npling				Material description and profile information				Fiel	d Test	
						NO			_	۲			
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plastici characteristics,colour,minor componer	ity/particle	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
Σ					0 U	CLAS			žΰ	о С	Ĕ		
						CL	TOPSOIL: Sandy CLAY - low plasticity, da 0.10m fine to coarse grained sand, root affected.	irk brown,					TOPSOIL
				-		 	Sandy CLAY - medium to high plasticity, d fine grained sand.	ark brown,	1				
				-		СН					HP	>600	
				-		<u> </u>	CLAY - medium to high plasticity, grey and	brown.	1				RESIDUAL SOIL
				-							HP	>600	
				0.5									
											HP	>600	
		0.70m											
	ered												
	count			-					< WP				
ш	Not Encountered	U50		-		СН			ν́Σ	н			
	Z			1.0_									
		1.10m		-									
				-							HP	550	
0				-									
				_									
				1.5									
				-		<u>1</u>	Sandy CLAY / Clayey SAND - medium pla		-				
					VIN.	4							RESIDUAL SOIL /
				-		sc	gey to dark grey and orange to brown, fine grained sand, with some fine to medium (r	e to coarse nostly fine)					RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
				-		SC	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trac 1.80m pockets.	e to coarse nostly fine)					EXTREMELY WEATHERED
				-		SC	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trad	e to coarse nostly fine)					EXTREMELY WEATHERED
				2.0		SC	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trad 1.80m pockets. Hole Terminated at 1.80 m	e to coarse nostly fine)					EXTREMELY WEATHERED
				2.0_		SC	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trad 1.80m pockets. Hole Terminated at 1.80 m	e to coarse nostly fine)					EXTREMELY WEATHERED
				2.0		SC	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trad 1.80m pockets. Hole Terminated at 1.80 m	e to coarse nostly fine)					EXTREMELY WEATHERED
				- 2.0_ -		SC	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trad 1.80m pockets. Hole Terminated at 1.80 m	e to coarse nostly fine)					EXTREMELY WEATHERED
				2.0		sc	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trad 1.80m pockets. Hole Terminated at 1.80 m	e to coarse nostly fine)					EXTREMELY WEATHERED
				2.0		SC	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trad 1.80m pockets. Hole Terminated at 1.80 m	e to coarse nostly fine)					EXTREMELY WEATHERED
1 54	GEND			-	-		grained sand, with some fine to medium (r grained angular to sub-angular gravel, trac <u>pockets.</u> Hole Terminated at 1.80 m Slow progress	e to coarse mostly fine) ce clay					EXTREMELY WEATHERED ROCK
LEC Wa	GEND:				- - - - - - - - - - - - - - - - - - -	nd Tes	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trad 1.80m pockets. Hole Terminated at 1.80 m Slow progress	e to coarse mostly fine) ce clay	ery Soft		<2	CS (kPa 25 5 50	a) Moisture Condition D Dry
<u>Wa</u>	ter Wa	ter Level			mples a 50mm Bulk s Enviro	nd Tess Diame	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trac <u>1.80m</u> pockets. Hole Terminated at 1.80 m Slow progress ter tube sample for CBR testing al sample	Consiste VS VS F F F F F	ery Soft oft irm		<2 25 50	25 5 - 50) - 100	a) Moisture Condition D Dry M Moist W Wet
<u>₩a</u> ▼	<u>ter</u> Wa (Da – Wa	ter Level te and time s ter Inflow	nown)		50mm Bulk s Envirc (Glass Acid S	nd Tes n Diame sample sign, se Sulfate 3	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trac 1.80m pockets. Hole Terminated at 1.80 m Slow progress Ester tube sample ter tube sample a sample aled and chilled on site) Soil Sample	Consiste Nostly fine) ce clay VS VS F St St VSt VSt	ery Soft oft irm tiff ery Stiff		<2 2 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400	A) Moisture Condition D Dry M Moist W Wet W _p Plastic Limit
	<u>ter</u> ✓ Wa (Da – Wa ◀ Wa	ter Level te and time si ter Inflow ter Outflow	hown)	<u>Notes, Sa</u> U ₅₀ CBR E	amples a 50mm Bulk s Enviro (Glass Acid S (Plast	nd Tes n Diame sample sign, se Sulfate 3	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trac 1.80m pockets. Hole Terminated at 1.80 m Slow progress	Consiste nostly fine) ce clay VS V S S F F St S VSt V H F	ery Soft oft irm		<2 2 50 10 20	25 5 - 50 0 - 100 00 - 200	EXTREMELY WEATHERED ROCK
	<u>tter</u> (Da – Wa' € Wa' ata Ch	ter Level te and time si ter Inflow ter Outflow			mples a 50mr Bulk s Envirc (Glass Acid S (Plast Bulk S Euk S	nd Tess n Diame ample comment ic bag, Sample	grained sand, with some fine to medium (r grained angular to sub-angular gravel, trac 1.80m pockets. Hole Terminated at 1.80 m Slow progress Ester tube sample ter tube sample a sample aled and chilled on site) Soil Sample	Consiste nostly fine) ce clay VS V S S F F St S VSt V H F	ery Soft oft irm tiff ery Stiff lard	V	<2 2 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	EXTREMELY WEATHERED ROCK

6		LABORATORY			LIENT ROJE	: I CT: F I ON : L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	<u>k</u> 2	PA JO LO	st pi ge: b no ggei te:	:		TP109 1 OF 1 NEW17P-0054A BE 13-9-19
		MENT TYP		2.7 TC 2.0 m		EXCA		ACE RL:	A	HD			
		ling and Sar		_			Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-	-	CL	TOPSOIL: Sandy CLAY - low plasticity, dar fine to coarse grained sand, root affected.	k brown,	M < Wp				TOPSOIL
				0.5			CLAY - medium to high plasticity, grey-brov				HP	250	RESIDUAL SOIL
	ered			-			Grey-brown and red-brown.				HP	250	
ш	Not Encountered			-		СН			M > w _p	VSt	HP	350	
50 50 50 50 50 50 50 50 50 50 50 50 50 5		<u>1.00m</u> U50		-							HP	350	
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		<u>1.30m</u>		-							HP	390	
				1. <u>5</u>		 SP	1.50m Extremely weathered Andesite with soil pro breaks down into Gravelly SAND - fine to co grained, green to grey with orange to brown coarse grained angular to sub-angular grav 1.70m	oarse n, fine to	D - M	VD	_		EXTREMELY WEATHERED ROCK
				-	-		Hole Terminated at 1.70 m Slow progress						
				2.0	-								
	SEND:			Notes, Sa	mples a	nd Tee	5	Consister				CS (kPa	a) Moisture Condition
	er Wat (Da - Wat Wat	ter Level te and time s ter Inflow ter Outflow anges	hown)	U ₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid s (Plast	n Diame sample f onmenta s jar, se Sulfate S	ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	VS V S S F F St S VSt V H H	iery Soft oft irm tiff ery Stiff ard riable		<: 2! 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
	G tra D	radational or ansitional stra efinitive or di rata change		Field Test PID DCP(x-y) HP	Photo Dynai	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	<u>Density</u>	V L D VD	L N D	ery Lo oose lediur ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

-							RING LOG - TEST PIT			ST PI	TNC):	TP110
6		uali	Tes	51						GE:			1 OF 1
		LABORATORY	NSW) PTY	LTD			PROPOSED SUBDIVISION - STAGES 1 &	62		B NO			NEW17P-0054A
				L	UCATI		OT 11, DP 1248129, NEW ENGLAND			GGEI	J BY	:	BE
							HIGHWAY, LOCHINVAR		DA	TE:			13-9-19
		IENT TYP T LENGTI		2.7 TO 2.0 m		EXCA IDTH:		ACE RL: JM:	A	AHD			
	Drill	ing and San	npling			•	Material description and profile information		1		Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
						CL	TOPSOIL: Sandy CLAY - low plasticity, dar fine to coarse grained sand, root affected.	k brown,	M < W				TOPSOIL
							0.15m	 vn.	~		HP	120	RESIDUAL SOIL
												- 150	
										C+ /	HP	150 -	
										St / VSt		230	
		0.50m		0.5							HP	140 -	
	-											250	
	Encountered										HP	300	
	coun	U50				СН	Grey-brown and red-brown.		× ×				
ш	Not En								Σ				
	ž	0.90m								VSt			
		0.3011		1							HP	360	
				1. <u>0</u>									
											HP	400	
												+00	
										н	HP	450	
						 SP	1.30m Extremely weathered Andesite with soil pro breaks down into Gravelly SAND - fine to c grained, green to grey with orange to brown coarse grained angular to sub-angular grav 1.50m	oarse n, fine to	D - M	VD			EXTREMELY WEATHER ROCK
				1.5	0.0		Hole Terminated at 1.50 m						
				-			Very slow progress						
				2.0									
				1									
				-									
				1									
LEG	END:			Notes, Sa	mples a	nd Tes	<u>s</u>	Consiste	ncy		U	CS (kPa	a) Moisture Condition
Wat	er			U ₅₀ CBR	50mm	n Diame	 ter tube sample or CBR testing	VS V	/ery Soft	İ	<	25 5 - 50	D Dry M Moist
T		er Level e and time sl		E	Enviro	onmenta	I sample	FF	irm		5	0 - 100	W Wet
▶	· Wat	er Inflow		ASS	Acid S	Sulfate S	aled and chilled on site) Soil Sample	VSt V	Stiff /ery Stiff		2	00 - 200 00 - 400	
Stre	Wat Ata Cha	er Outflow		В		ic bag, a Sample	air expelled, chilled)		lard riable		>	400	
<u></u>	G	radational or		Field Test	<u>s</u>		on detector reading (ppm)	Density	V L		ery Lo	oose	Density Index <15% Density Index 15 - 35%
		ansitional stra efinitive or dis		DCP(x-y)	Dynar	nic pen	etrometer test (test depth interval shown)		ME	D N	lediur	n Dense	e Density Index 35 - 65%
	st	rata change		HP	Hand	Penetro	meter test (UCS kPa)		D VD		ense 'ery D	ense	Density Index 65 - 85% Density Index 85 - 100%

6		LABORATORY			LIENT ROJE(: N CT: F I ON : L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & 2 .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	PA JC LC	ist Pi Age: DB No Dggei Ate:	:		TP111 1 OF 1 NEW17P-0054A BE 12-9-19
		IENT TYP T LENGTI		2.7 TC 2.0 m		EXCA IDTH:	VATOR SURFACE RL: 0.6 m DATUM:		AHD			
	Drill	ing and San	npling				Material description and profile information			Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
				_		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.					TOPSOIL
				-		— — - СI	Sandy CLAY - medium plasticity, dark grey to brown, fine to coarse (mostly fine) grained sand.	_	VSt	HP	220	
				0.5			0.40m CLAY - medium to high plasticity, brown to red-brown.	_		HP	180	RESIDUAL SOIL
		0.80m						M > W _P	St	HP	180	
ш	ot Encountered	CBR / U50 1.00m		1.0		СН				HP HP	180 220	
	Not			-			1.30m		VSt	HP	250	
				- 1. <u>5</u>		СН	Sandy CLAY / Clayey SAND - medium to high plasticity, pale brown to orange and grey, fine to coarse grained sand, with fine to medium grained angular to sub-angular gravel, with clay pockets.	M < w _p	н	HP	410	RESIDUAL SOIL7 EXTREMELY WEATHER ROCK
				-		sc	1.70m Extremely weathered Andesite with soil properties: breaks down into Clayey Gravelly SAND - fine to coarse grained, green to grey with orange to brown, fine to coarse grained angular to sub-angular gravel, fines of medium plasticity.	D - M	D - VE	HP -	420	EXTREMELY WEATHER ROCK
				2.0			2.00m Hole Terminated at 2.00 m					
				-								
	Wat (Dat Wat	er Level le and time sl er Inflow er Outflow	hown)	Notes, Sar U ₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid S (Plast	n Diame ample f onmenta s jar, se Sulfate S	ter tube sample VS or CBR testing S al sample F aled and chilled on site) St Soil Sample VSt air expelled, chilled) H	ency Very Sof Soft Firm Stiff Very Stif Hard Friable			CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
<u></u>	G tra D	anges radational or ansitional stra efinitive or dis rata change		Field Test PID DCP(x-y) HP	<u>s</u> Photo Dynar	ionisatio	Density Density Density Density Density Density meter test (test depth interval shown) meter test (UCS kPa)	V L M D V		/ery Lo .oose /lediur)ense /ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

(LABORATORY			LIENT ROJE	: I CT: F I ON : L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	32	PA JO LO	st pi ge: B no ggei te:	:		TP112 1 OF 1 NEW17P-0054A BE 12-9-19
		IENT TYP T LENGTI		2.7 TC 2.0 m		exca 'IDTH :		FACE RL: JM:	A	HD			
	Drill	ing and San	npling				Material description and profile information			1	Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor component	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-		CL	TOPSOIL: Sandy CLAY - low to medium pl. dark brown, fine to coarse grained sand, ro affected.						TOPSOIL
				-		— — -	CLAY - medium to high plasticity, grey and	brown.			HP	160	
				0.5_			0.50m				HP	160	RESIDUAL SOIL
				-			CLAT - High plasticity, grey-brown and red-	brown.	M > W _P	St	HP	180	
ш	Encountered	<u>0.90m</u>		1.0							ΗP	180	
_	Not E	U50 1.20m		-		СН					ΗP	180	
				-			Pale grey and orange to red-brown, with sa nodules.	indy			HP	410	
				1. <u>5</u>					M ~ W _P	н	ΗP	410	
				-		СН	1.70m Sandy CLAY / Clayey SAND - medium to h plasticity, pale grey to grey with some orang red-brown, fine to coarse grained sand, with medium grained angular to sub-angular gra clay pockets.	ge to h fine to	M < Wp				RESIDUAL SOIL7 EXTREMELY WEATHERED ROCK
				2.0	<u> </u>		2.00m Hole Terminated at 2.00 m						
				-	-								
	Wat (Dat	er Level le and time sl er Inflow er Outflow anges	hown)	Notes, Sa U ₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid s (Plast	n Diame sample f onmenta s jar, se Sulfate S	ts ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H H	ncy ery Soft oft irm tiff ery Stiff lard riable		<2 2 50 10 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
<u></u>	G tra De	radational or ansitional stra efinitive or dis rata change	ata	Field Tesi PID DCP(x-y) HP	<u>ts</u> Photo Dynai	ionisatio	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	Density	V L ME D VD	L N D	ery Lo bose lediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

6		LABORATORY			LIENT ROJE(: CT: ON:	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & 2 .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	P/ JC LC	ST PI AGE: DB NO DGGEI ATE:	:		TP113 1 OF 1 NEW17P-0054A BE 13-9-19
		IENT TYP T LENGTI		2.7 TC 2.0 m		EXCA	VATOR SURFACE RL 0.6 m DATUM:		AHD			
	Drill	ing and San	npling				Material description and profile information			Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
				_		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	م م				TOPSOIL
				_		 CI	0.15m		н	HP	550	
				_			0.30m CLAY - medium to high plasticity, red-brown and brown.	-		HP	400	RESIDUAL SOIL
		0.55m		0.5						HP	350	
Ш	Not Encountered	U50 0.90m				СН		M > w _p	VSt	HP	320	
				- 1.5_			Pale grey and orange to red-brown.		- H	HP	450	RESIDUAL SOIL 7
				-		СІ	Sandy CLAY / Clayey SAND - medium plasticity, grey to dark grey and orange to brown, fine to coarse grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets.	e M N N				EXTREMELY WEATHER ROCK
				2. <u>0</u> - - -			Hole Terminated at 1.90 m					
<u>Wat</u>	Wat (Dat Wat	er Level e and time sl er Inflow er Outflow anges	hown)	Notes, Sar U ₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid S (Plasti	Diame ample f nmenta jar, se sulfate \$	ter tube sample VS or CBR testing S al sample F aled and chilled on site) St Soil Sample VSt air expelled, chilled) H	tency Very So Soft Firm Stiff Very Stif Hard Friable			CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W Plastic Limit
	G tra D	radational or ansitional stra efinitive or dis rata change		Field Test PID DCP(x-y) HP	Photo Dynar	nic pen	Density Densit	L L M V		/ery Lo .oose /lediur)ense /ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

(RING LOG - TEST PIT			ST PI' GE:	T NC):	TP114 1 OF 1
6		LABORATORY	(NSW) PTY		ROJE	CT: ON:	PROPOSED SUBDIVISION - STAGES 1 & 2 LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		JO LO	b no: Ggei Te:		′ :	NEW17P-0054A BE 13-9-19
		IENT TYP		2.7 TC 2.0 m		EXCA	VATOR SURFACE F 0.6 m DATUM:	RL:	A	HD			
	Drill	ing and Sar	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	e	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
					} }	CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown fine to coarse grained sand, root affected.	,					TOPSOIL
				_		 CI	0.10m Intel to coalse grained said, root anected. Sandy CLAY - medium plasticity, dark brown, trace orange and pale grey, sand is mostly fine grained.		M < W _P		HP	550	
		0.50m		-			0.25m CLAY - medium to high plasticity, brown.		$M \sim W_P$	Н	HP HP	500 450	RESIDUAL SOIL
		0.50m		0.5_			Brown and red-brown.	F			HP	400	
		U50		_							HP	350	
Ш	Not Encountered	<u>0.80m</u>		- 1. <u>0</u> - 1. <u>5</u>		СН	1.60m		M > Wp	VSt	HP	320	
						СІ	Sandy CLAY / Clayey SAND - medium plasticity, pa grey to dark grey and orange to brown, fine to coar grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets.	ale se	M < w _P	н			RESIDUAL SOIL / EXTREMELY WEATHEN ROCK
				2.0	<u></u>		Hole Terminated at 2.00 m						
				-									
	Wat (Dat Wat	er Level te and time s er Inflow er Outflow anges	hown)	Notes, Sar U ₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid S (Plasti	Diame ample f nmenta jar, se sulfate \$	ts Consi ter tube sample VS for CBR testing S al sample F aled and chilled on site) St Soil Sample VSt air expelled, chilled) H	Sof Firr Stif Ver Hai	ry Soft rt n f y Stiff		<: 2! 50 10 20	<u>CS (kPa</u> 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
	G tra D	radational or ansitional stra efinitive or dis rata change		Field Test PID DCP(x-y) HP	<u>s</u> Photo Dynar	ionisati nic pen	Den detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)		V L ME D VD	Lo M D	ery Lo bose lediur ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

(LABORATORY	B	st ² c	LIENT ROJE(: 1 CT: F ON: L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	2	PA JO LO	st pi ge: B no ggei Te:	:		TP115 1 OF 1 NEW17P-0054A BE 13-9-19
		IENT TYP		2.7 TC 2.0 m		EXCA I DTH :		ACE RL: M:	ŀ	AHD			
METHOD	WATER	ing and San	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	Material description and profile information MATERIAL DESCRIPTION: Soil type, plasticity/ characteristics,colour,minor components	/particle	MOISTURE	CONSISTENCY DENSITY	Test Type ai	d Test Kesnt	Structure and additiona observations
Ш	Not Encountered	0.60m CBR / U50 0.80m				CL CI CH	TOPSOIL: Sandy CLAY - low plasticity, dark fine to coarse grained sand, root affected. Sandy CLAY - medium plasticity, dark brown orange and pale grey, mostly fine grained sa CLAY - medium to high plasticity, brown.	n, trace	M < w _P	н	HP HP HP	500 >600 >600 >600 550	TOPSOIL COLLUVIUM RESIDUAL SOIL
		1.20m CBR 1.40m		- - 1. <u>5</u> - - - - - - 2.0		СІ	1.20m Sandy CLAY / Clayey SAND - medium plasti grey to dark grey and orange to brown, fine t grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets. 2.00m	icity, pale to coarse			HP	550 >600	RESIDUAL SOIL7 EXTREMELY WEATHER ROCK
	SEND:						Hole Terminated at 2.00 m	Consister VS V	<u>ncy</u> ery Soft			CS (kPa 25	a) <u>Moisture Condition</u> D Dry
<u>Wat</u> ▲ <u>Stra</u>	Wat (Dat Wat Wat I Wat I Wat I G tra	er Level e and time sl er Inflow er Outflow anges radational or ansitional stra efinitive or dis rata change	ata	B Field Test PID DCP(x-y) HP	Bulk s Enviro (Glass Acid S (Plasti Bulk S S Photoi Dynan	ample f onmenta s jar, se Sulfate S c bag, a c bag, a c bag, a conisationisationic pen	en cube sample or CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	S S F Fi St S VSt V H H	rm iiff ery Stiff ard <u>iable</u> V L ME D VC	V L D M	2: 5(2(2(>(>(cery Lo oose	5 - 50 0 - 100 00 - 200 00 - 400 400 pose n Dense	M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%

(RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD			ST PI ⁻ GE:	ΓNC):	TP116 1 OF 1
5		LABORATORY	(NSW) PTY		ROJE	CT: ON:	PROPOSED SUBDIVISION - STAGES 1 & 2 _OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	2	JO LO	B NO GGEI TE:		:	NEW17P-0054A BE 13-9-19
-		IENT TYP		2.7 TC 2.0 m		EXCA	VATOR SURFA 0.6 m DATUN		ŀ	\HD			
	Dril	ing and Sar	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/p characteristics,colour,minor components	oarticle	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additior observations
						SM	TOPSOIL: Silty SAND - fine to coarse grained 0.10m grey-brown, fines of low plasticity, root affecte	d sand, ed.	м				TOPSOIL
				-			Sandy CLAY - medium plasticity, dark brown, orange and pale grey, sand is mostly fine gra trace tree roots.	trace	M ~ Wp		HP	550	
				-			0.30m CLAY - medium to high plasticity, red-brown a grey-brown.	 and		-	HP	410	RESIDUAL SOIL
				0.5_							HP	420	
	pe	<u>0.70m</u>		-							HP	420	
ш	Encountered	U50 0.90m		-					_ L	н			
	Not E			1. <u>0</u>		СН			M < W _P				
				-							HP	410	
				-									
				1.5_			1.60m						
				_		sc	Extremely weathered Andesite with soil prope breaks down into Clayey SAND - medium pla grey-brown to orange-brown, fine to coarse g sand, trace fine grained angular to sub-angula 1.80m gravel.	sticity, rained	D - M	D - VC			EXTREMELY WEATHER ROCK
				_			Hole Terminated at 1.80 m Slow progress						
				2.0									
				-									
				-									
	Wat (Dat Wat	er Level te and time s ter Inflow ter Outflow	<u> </u>	Notes, Sar U₅₀ CBR E ASS	50mm Bulk s Enviro (Glass Acid S (Plasti	Diame ample i nmenta i jar, se sulfate \$ c bag,	ter tube sample for CBR testing al sample aled and chilled on site)	S S F F St S VSt V	l ery Soff oft rm tiff ery Stiff ard		<2	25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet D W _p Plastic Limit
<u>Stra</u>	G tra D	anges radational or ansitional stra efinitive or dia rata change	ata	B Field Test PID DCP(x-y) HP	<u>s</u> Photoi Dynar	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) ymeter test (UCS kPa)	Fb F Density	riable V L MI D VD	Lo D M D	ery Lo bose ediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% e Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 1009

1							RING LOG - TEST PIT			ST PI	T NC	D:	TP117
6		LABORATORY	(NSW) PTY		ROJEC	CT: ON:	PROPOSED SUBDIVISION - STAGES 1 & 2 OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		JO LO	ge: B no Ggei Te:	-	' :	1 OF 1 NEW17P-0054A BE 13-9-19
		IENT TYP		2.7 TC 2.0 m		EXCA	VATOR SURFACE I 0.6 m DATUM:	RL:	ļ	\HD			
	Drill	ing and Sar	npling				Material description and profile information			1	Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/partici characteristics,colour,minor components	le	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
						CL	TOPSOIL: Sandy CLAY - medium to high plasticity dark brown, fine to coarse grained sand, root affected.	y,	M ~ W _P				TOPSOIL
				- - 0.5_			<u>0.15m</u>		M > Wp		HP	480	RESIDUAL SOIL
ш	: Encountered	0.70m U50 0.90m				СН	Grey with some pale orange.			н	HP HP HP	450 410 510	
	Not			1.0			1.30m		M < w _P		HP	550	
				- 1.5_ -		SC	Extremely weathered Andesite with soil properties: breaks down into Clayey Gravelly SAND - fine to coarse grained, grey-brown with some pale grey to dark grey and orange to brown, fine to coarse grained angular to sub-angular gravel, fines of medium plasticity.		D - M	D - VE			EXTREMELY WEATHER ROCK
					o		1.80m Hole Terminated at 1.80 m Slow progress						
				2.0									
				-									
	Wat (Dat Wat Wat	er Level te and time s er Inflow ter Outflow	hown)	Notes, San U ₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid S (Plasti	Diame ample f nmenta jar, se sulfate \$	ts Cons ter tube sample VS or CBR testing S al sample F aled and chilled on site) St Soil Sample VSt air expelled, chilled) H Fb	So Fii St Ve Ha	ery Soft oft rm		<: 2: 5: 1: 2:	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
<u></u>	G tra D	anges radational or ansitional stra efinitive or di rata change	ata	Field Test PID DCP(x-y) HP	<u>s</u> Photoi Dynan	onisati nic pen	Dense ben detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)		V L MI D VE	La D M D	ery Lo bose lediur ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

(Juali	Tes	st ² c	LIENT	:	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & 2	PA	ST PI		D:	TP118 1 OF 1 NEW17P-0054A
		LABORATORY	(NSW) PTY	LTD		ON:	LOT 11, DP 1248129, NEW ENGLAND	LC	GGE		/ :	BE
							HIGHWAY, LOCHINVAR					13-9-19
	-	ing and San		2.0 m	vv		0.6 m DATUM: Material description and profile information		AHD	Fiel	ld Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
					} }	CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root					TOPSOIL
				-		сн	<u>0.10m</u> dafk brown, inter to coarse grained sand, root affected			HP	550	
				0.5			0.35m CLAY - high plasticity, brown.	M < W		HP	>600	RESIDUAL SOIL
		0.60m		_			Red-brown and brown.			HP	>600	
				-						HP	550	
	tered	U50		_					н	HP	450	
ш	Encountered	0.85m		_		СН						
	Not E			1. <u>0</u>				~ MP				
		1.20m		-				ž		HP	550	
		U50 1.45m		-			1.45m					
				1. <u>5</u> -		SC	Extremely weathered Andesite with soil properties: breaks down into Clayey Gravelly SAND - fine to coarse grained, pale grey to dark grey and orange to brown, fine to coarse (mostly fine) grained angular to sub-angular gravel, fines of medium plasticity, with highly weathered pockets.	D - M	I D - VE)		EXTREMELY WEATHEF ROCK
				-	<u>* * · · *</u>	<u> </u>	ANDESITE - pale grey to dark grey and orange to brown, estimated medium to high strength.	┢	+	-		HIGHLY TO MODERATE
				2.0			Hole Terminated at 1.82 m Refusal					
				-								
	SEND:			Notes, Sa	mnlee o	nd Too	ts Consistr				CS (kPa	a) Moisture Condition
<u>Wat</u>	i <mark>er</mark> Wat (Da - Wat	er Level te and time sl ter Inflow ter Outflow		U ₅₀ CBR E ASS	50mm Bulk s Enviro (Glass Acid S	i Diame ample onmenta s jar, se Sulfate :	ter tube sample VS for CBR testing S al sample F aled and chilled on site) St Soil Sample VSt	Very Sof Soft Firm Stiff Very Stif Hard		- 2: 5: 1: 2:	25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet D W _p Plastic Limit
	a <u>ta Ch</u> a G tra D	anges radational or ansitional stra efinitive or dis rata change		B PID DCP(x-y) HP	Bulk S <u>s</u> Photo Dynar	Sample ionisati nic pen		F <u>riable</u> V L MI D	L D N C	'ery Lo oose	oose m Dense	Density Index <15% Density Index 15 - 35% e Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 1009

6		LABORATORY			LIENT ROJE(DCATI	: CT: ON: 	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		PA JO LO	st pi ge: B no ggei te:	:		TP119 1 OF 1 NEW17P-0054A BE 13-9-19
		IENT TYPI		2.7 TO 2.0 m		EXCA I DTH :		FACE RL: JM:	A	HD			
	Drill	ing and Sam	npling			7	Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
				_		SM	TOPSOIL: Sitty SAND - fine to coarse grain grey-brown, fines of low plasticity, root affect	ned sand, cted.	D - M				TOPSOIL
				_			0.15m CLAY - high plasticity, grey and red-brown.				HP HP	210 250	RESIDUAL SOIL
		0.50m		0.5							HP	300	
		U50		-							HP	350	
Е	Not Encountered	<u>0.80m</u>		- 1.0_ - - - 1.5_		СН			M > W _P	VSt	HP	310	
						сн	1.60m CLAY - medium to high plasticity, pale grey brown, with some pale orange, with some s pockets. 2.00m		M < w _p	н	HP	410	
				-			Hole Terminated at 2.00 m						
				-				1-2					
	Wat (Dat Wat	er Level te and time sh er Inflow er Outflow anges	iown)	Notes, San U ₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S	Diame ample f nmenta jar, se sulfate \$	ter tube sample or CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H H Fb F	ery Soft oft irm tiff ery Stiff lard riable		<: 2! 50 10 20 >4	<u>CS (kPa</u> 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	tra D	radational or ansitional stra efinitive or dis rata change	ta	Field Test PID DCP(x-y) HP	Photoi Dynan	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L MC D VD	L N D	'ery Lo oose lediur ense 'ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

(LABORATORY		st ^o c	ROJE	Γ: Ν CT: Γ ΊΟΝ: Ι	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	& 2	PA JO LO	st pi ge: B no ggei te:	:		TP120 1 OF 1 NEW17P-0054A BE 13-9-19
		IENT TYP		2.7 TC 2.0 m		EXCA /IDTH:	VATOR SURF 0.6 m DATU	FACE RL: JM:	A	AHD.			
	Drill	ing and Sar	npling			-	Material description and profile information		-1		Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-		CL	TOPSOIL: Sandy CLAY - low plasticity, dar fine to coarse grained sand, root affected.	rk brown,	M > Wp				TOPSOIL
				-			0.20m CLAY - medium to high plasticity, grey-brow red-brown.	 wn and			HP	420	RESIDUAL SOIL
		0.50m U50 0.65m		0.5_						н	HP	410	
	untered			-							HP	410	
Ш	Not Encountered			1.0		СН			M < Wp		HP	360	
				-			Grey with pale orange.			VSt	HP	380	
				-			1.80m				ΗP	390	
				-		sc	Clayey SAND / Sandy CLAY - fine to coars orange-brown, fines of low to medium plast	e grained, ticity, trace	D - M	D - VE	þ		RESIDUAL SOIL 7 EXTREMELY WEATHERED
				2. <u>0</u> - -	-		fine grained angular gravel. Hole Terminated at 1.90 m Very slow progress	/					ROCK
	- Wat (Dat - Wat ■ Wat ata Cha ata Cha tra	er Level te and time s er Inflow er Outflow anges radational or ansitional stra efinitive or di rata change	ata	Notes, Sa U ₅₀ CBR E ASS B Field Tes PID DCP(x-y) HP	50mr Bulk : Envir (Glas Acid : (Plas Bulk : ts Photo Dyna	n Diame sample f onmenta s jar, se Sulfate S tic bag, a Sample bionisatio mic pen	Is ter tube sample or CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	S S F F St S VSt V H H	incy /ery Soft Soft Firm Stiff /ery Stiff -tard Friable V L MC D V V	V Li D M	<2	n Dense	D Dry M Moist W Wet W, Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%

¢		LABORATORY		st ² c	LIENT	: N CT: F I ON : L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 8 .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	& 2	PA JO LO	st pi ge: B no ggei te:	:		TP121 1 OF 1 NEW17P-0054A BE 13-9-19
		IENT TYP		2.7 TC 2.0 m		EXCA I DTH :	VATOR SURF 0.6 m DATU	ACE RL: IM:	A	HD			
	Drill	ing and Sar	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-		CL	TOPSOIL: Sandy CLAY - low plasticity, darl fine to coarse grained sand, root affected.	k brown,	A × ×				TOPSOIL
				-			0.20m	and grey.			HP	250	RESIDUAL SOIL
				0. <u>5</u>							HP	350	
	ed			-							HP	380	
ш	Not Encountered	1.10m		- 1. <u>0</u>		СН			M > w _P	VSt	HP	360	
		U50 1.25m		-									
				- 1. <u>5</u>							HP HP	390 390	
5				-			Pale grey with orange				HP	420	
				- 2.0		CI	Sandy CLAY / Clayey SAND - medium plas brown, with some orange and grey, fine to o grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets. 2.00m	sticity, pale coarse	M M M M M	Н			RESIDUAL SOIL7 EXTREMELY WEATHERED ROCK
				-			Hole Terminated at 2.00 m Slow progress						
	Wat (Dat Wat	te and time s er Inflow er Outflow	hown)	Notes, Sa U ₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid S (Plast	n Diame sample f onmenta s jar, sea Sulfate S	s ter tube sample or CBR testing il sample aled and chilled on site) soil Sample air expelled, chilled)	S S F F St S VSt V H F	ncy /ery Soft Soft Stiff /ery Stiff Hard Friable		<2 25 50 10 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
<u>Stra</u>	_			Field Test PID DCP(x-y) HP	<u>ts</u> Photo Dynar	ionisatio	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L MC D VD	L N D	ery Lo bose lediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

6		LABORATORY		C Pl	LIENT: ROJE(OCATI	: CT: ON: 	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & 2 LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		PA JO	st pi ge: b no: ggei te:	:		TP122 1 OF 1 NEW17P-0054A BE 13-9-19
		IENT TYPI T LENGTH		2.7 TC 2.0 m		EXCA IDTH:	VATOR SURFACE F 0.6 m DATUM:	RL:	А	HD			
	Drill	ing and Sam	npling			z	Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	e HISOM	CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additionations
					} }	CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown 0.10m fine grained sand, root affected.	,	× ×				TOPSOIL
				-			CLAY - medium to high plasticity, grey and brown, trace fine grained sand.	-+	Σ				
				_		СН			M > w _P	VSt	HP	280	
				-			CLAY - high plasticity, grey wihth some	-+-					RESIDUAL SOIL
				0.5_			orange-brown.				HP	550	
		0.60m		-							HP	>600	
		U50		-									
	eq	000		-					٩		HP	>600	
	untere	0.90m		-					M < W	Н			
ш	Not Encountered			1.0					-				
	Ň						Grey-brown with some orange to red-brown.						
				-		СН							
				-							HP	550	
											HP	390	
				1.5									
											HP	380	
									M > w _P	VSt	HP	390	
									ž	vol		390	
				2.0			2.00m				HP	390	
				2.0			Hole Terminated at 2.00 m			<u> </u>			
				-									
				-									
				-									
				-									
LEG	END:			Notes, Sa				istency				CS (kPa	-
Wate	_	er Level		U ₅₀ CBR	Bulk s	ample f	ter tube sample VS for CBR testing S	Soft			25	25 5 - 50	D Dry M Moist
= -	(Dat	e and time sh er Inflow		E	(Glass	s jar, se	al sample F aled and chilled on site) St Seil Sample Vict	Firm Stiff			10) - 100)0 - 200	P
-4	Wat	er Outflow		ASS	(Plasti	c bag, i	Soil Sample VSt air expelled, chilled) H	Hard				00 - 400 400	W _L Liquid Limit
Stra	G	anges radational or		B Field Test PID	<u>s</u>	ample	Dn detector reading (ppm)	Friat ity	ble V L		ery Lo bose	oose	Density Index <15% Density Index 15 - 35%
	_ D	ansitional stra efinitive or dis rata change		DCP(x-y) HP	Dynan	nic pen	etrometer test (test depth interval shown) pometer test (UCS kPa)			м		n Dense	

(ENGI		RING LOG - TEST PIT			ST PI ⁻ GE:	T NC	D:	TP123
4	X	UQU	6				PROPOSED SUBDIVISION - STAGES	1&2		B NO	:		NEW17P-0054A
		LABORATORY	(NSW) PT		OCAT	ION: I	_OT 11, DP 1248129, NEW ENGLAND)	LO	GGE) BY	' :	BE
						I	HIGHWAY, LOCHINVAR		DA	TE:			13-9-19
		MENT TYP IT LENGTI		2.7 T(2.0 m		EXCA I DTH :		JRFACE RL: ATUM:		HD			
	Drill	ling and San	npling				Material description and profile information	on			Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plas characteristics,colour,minor compo	sticity/particle nents	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
						CL	TOPSOIL: Sandy CLAY - low plasticity, fine grained sand, root affected.		_		HP	>600	RESIDUAL SOIL
	tered			0. <u>5</u>					< Wp		HP	>600	
Ш	Not Encountered	0.90m U50 1.10m		1. <u>0</u>		СН			×	Н	HP HP	>600 450	
				1. <u>5</u>			1.60m Clayey SAND - fine to coarse grained, brown, with fine angular gravel.		D - M	D - VD	HP HP	450 420	RESIDUAL SOIL7 EXTREMELY WEATHERED ROCK
				2.0			1.80m Hole Terminated at 1.80 m Slow progress						
					-								
	GEND:	•		Notes, Sa			t <u>s</u> ter tube sample	Consiste	ency /ery Soft			CS (kPa 25	a) Moisture Condition D Dry
<u>Wa</u>		ter Level		CBR	Bulk s	ample	for CBR testing	s s	Soft		2	5 - 50	M Moist
	(Dat	te and time sl	hown)	E	(Glas	s jar, se	al sample aled and chilled on site)	St S	⁼irm Stiff		10	0 - 100 00 - 200	P
		ter Inflow ter Outflow		ASS			Soil Sample air expelled, chilled)		/ery Stiff Iard			00 - 400 400	W _L Liquid Limit
<u>Stra</u>	ata Cha			B Field Tes	Bulk S	Sample			riable V	1/	ery Lo		Density Index <15%
	tra	radational or ansitional stra efinitive or dis trata change	ata	PID DCP(x-y) HP	Photo Dynai	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)		L ME D	La D M D	oose lediur lense	n Dense ense	Density Index 15 - 35%

(Jualt	es	st ² c	LIENT	: 1	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & 2	PA	ST PI GE:		D:	TP124 1 OF 1 NEW17P-0054A
		LABORATORY (NSW) PTY	LTD			LOT 11, DP 1248129, NEW ENGLAND				' :	BE
							HIGHWAY, LOCHINVAR	DA	TE:			13-9-19
		IENT TYP T LENGTI		2.7 TC 2.0 m		EXCA	VATOR SURFACE RL 0.6 m DATUM:		AHD			
	Drill	ing and San	npling				Material description and profile information			Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
				-		SM	FILL-TOPSOIL: Silty SAND - fine to coarse grained, grey-brown, fines of low plasticity, with fine to medium grained angular to sub-angular gravel, root affected.	M				FILL: TOSPOIL
				-		SM	FILL: Silty Gravelly SAND - fine to coarse grained, grey, with dark grey and brown, fine to medium grained angular to sub-angular gravel, fines of low plasticity, trace fine to medium grained charcoal.	D - M				RESIDUAL SOIL
				- 0. <u>5</u>			CLAY - medium to high plasticity, brown, trace fine to coarse grained sand.			ΗP	>600	
	Encountered	0.60m U50		-		СН		M < W	н	HP	>600	
ш	Not En	0.75m		-			0.80m Clayey Gravelly SAND - fine to coarse grained, pale			HP	>600	RESIDUAL SOIL / EXTREMELY WEATHEF
				- 1. <u>0</u>			grey to dark grey and orange to brown, fine to medium grained angular gravel, fines of medium plasticity, trace clay pockets.					ROCK
				-		SC		D - M	D - VD			
				-			1.40m Hole Terminated at 1.40 m					
				1. <u>5</u> -			Slow progress					
				-								
				2.0								
				-								
				-								
LEG	SEND:			- Notes, Sa	mples a	nd Tes	ts Consist	encv			CS (kPa	a) Moisture Condition
	i <mark>er</mark> Wat (Dat - Wat	er Level e and time sl er Inflow er Outflow	nown)	U_{50} CBR E ASS	50mm Bulk s Enviro (Glass Acid S	Diame ample f nmenta jar, se sulfate \$	ter tube sample VS for CBR testing S al sample F aled and chilled on site) St Soil Sample VSt	Very Sof Soft Firm Stiff Very Stiff Hard		<: 2: 5: 1: 2:	25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W Plastic Limit
	e <mark>ta Cha</mark> G tra		ita	B <u>Field Test</u> PID DCP(x-y) HP	Bulk S <u>s</u> Photo Dynar	ample ionisationisation		Friable	Lo D M	ery Lo oose	oose n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85%

6			OSWIPT	st ² c	LIENT	: 1	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & 2	P	EST PI Age: DB No		D:	TP125 1 OF 1 NEW17P-00544
		COLUMN URY (L	OCATI		OT 11, DP 1248129, NEW ENGLAND		DGGE	DB۱	' :	BE
							HIGHWAY, LOCHINVAR	D	ATE:			12-9-19
		IENT TYP		2.7 TC 2.0 m		EXCA I DTH :	VATOR SURFACE RL: 0.6 m DATUM:		AHD			
	Drill	ing and San	npling				Material description and profile information			Fie	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additior observations
						CL	TOPSOIL: Sandy CLAY - low to medium plasticity, output dark brown, fine to coarse grained sand, root					TOPSOIL
				-		сн	affected. Sandy CLAY - medium to high plasticity, dark brown, trace orange, mostly fine to medium grained sand, trace fine to medium grained sub-angular gravel.	M < W		HP	>600	
				_			0.30m			HP	410	RESIDUAL SOIL
				0.5				~ Wp			410	
		0.70m		-				Σ		HP	550	
	ered	U50 0.90m		-					н	HP	>600	
ш	Not Encountered	0.0011		- 1. <u>0</u>		СН				HP	>600	
	z			- - 1. <u>5</u>			Grey and brown.	M ~ Wp		HP	450 410	
						 SP	1.60m Gravelly Clayey SAND - fine to coarse grained, pale grey and orange, with some dark grey, fine to medium grained angular to sub-angular gravel, fines of medium to high plasticity, with clay pockets.	M	D - VE	D	600	RESIDUAL SOIL 7
				2.0	<u>,</u>		2.00m Hole Terminated at 2.00 m					
	GEND:										<u>CS (kP</u>	-
	Wat (Dat Wat	er Level e and time sl er Inflow er Outflow anges	nown)	U ₅₀ CBR E ASS B	Bulk s Enviro (Glass Acid S (Plasti	ample i nmenta ; jar, se ;ulfate \$	or CBR testing S al sample F aled and chilled on site) St Soil Sample VSt air expelled, chilled) H	√ery Sc Soft Firm Stiff √ery Sti Hard Friable		2 5 1 2	25 5 - 50 0 - 100 00 - 200 00 - 400 400	P
	G tra D	radational or ansitional stra efinitive or dis rata change		Field Test PID DCP(x-y) HP	i <u>s</u> Photoi Dynar	onisati nic pen	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	V L N	ID N	/ery L .oose /lediui)ense /ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

(RING LOG - TEST PIT			ST PI [.] GE:	T NC):	TP126
4	X	LABORATORY	(NSW) PTY		ROJEC	CT: ON:	PROPOSED SUBDIVISION - STAGES 1 & 2 OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		JO LO	ge: B No: Ggei Te:		:	NEW17P-00544 BE 12-9-19
		IENT TYP T LENGT		2.7 TO 2.0 m		EXCA	VATOR SURFACE 0.6 m DATUM:	E RL:	A	HD			
	Drill	ing and Sar	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/par characteristics,colour,minor components	rticle	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additior observations
				-		CL	TOPSOIL: Sandy CLAY - low to medium plastici dark brown, fine to coarse grained sand, root affected.	ity,	M < Wp				TOPSOIL
						— — - СI	Sandy CLAY - medium plasticity, dark brown an				HP	380	
							CLAY - high plasticity, grey-brown.	and. 			HP	280	RESIDUAL SOIL
		0.50m		0.5						VSt	HP	250	
		U50									HP	220	
	þ	0.75m									HP	280 410	
ш	Not Encountered			1.0		СН			M > w _P		HP	450	
				- - - 1.5_			With Clayey Gravelly SAND bands (approx. 50n thick), trace highly weathered pockets on easter wall of test pit.			Н			
						GC	Extremely weathered Andesite with soil properti breaks down into Clayey Sandy GRAVEL / Grav SAND - fine to coarse grained angular to sub-ar gravel, pale brown, with some dark grey, fine to coarse grained sand, fines of medium plasticity. 1.90m	velly ngular	D - M	D - VC)		EXTREMELY WEATHEN ROCK
				2.0			Hole Terminated at 1.90 m Slow progress						
Wat	Wat (Dat	er Level e and time s er Inflow er Outflow	hown)	Notes, Sar U ₅₀ CBR E ASS	50mm Bulk s Enviro (Glass Acid S (Plasti	Diame ample f nmenta jar, se sulfate \$ c bag, a	trube sample V or CBR testing S I sample F aled and chilled on site) S soil Sample VS air expelled, chilled) F	S So F Fir St Sti St Ve H Ha	ry Soft ft m ff ry Stiff rd		<2 2 50 10 20	CS (kP 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W Plastic Limit
<u>Stra</u>	tra De	anges radational or ansitional stra efinitive or dis rata change		B <u>Field Tests</u> PID DCP(x-y) HP	<u>s</u> Photoi Dynan	nic pen		⁻ b Fri ensity	able V L MD D VD	Lo M D	ery Lo bose lediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% e Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 1009

(LABORATORY			LIENT ROJE(OCATI	: 1 CT: F ON: L F	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	& 2	PA JO LO	st pi ge: B no ggei te:	:		TP127 1 OF 1 NEW17P-0054A BE 12-9-19
		IENT TYP T LENGTI		2.7 TC 2.0 m		EXCA IDTH:		FACE RL: JM:	A	HD			
METHOD	WATER	ing and San	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	Material description and profile information MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type a	ld Test	Structure and additional observations
						CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine to coarse grained sand, ro affected.	asticity, oot					TOPSOIL
				-		 CI	<u>0.15m</u> Sandy CLAY - medium plasticity, dark brow dark grey, trace orange, fine to medium gra sand.				HP HP	450 500	
				- 0. <u>5</u>			0.35m CLAY - high plasticity, grey-brown.		M < W	н	HP	>600	RESIDUAL SOIL
		0.75m		-							HP	>600	
	ered			-		СН					HP	>600	
ш	Not Encountered	U50		- 1. <u>0</u>					× %	VSt	HP HP	390 350	
	Not	1.05m		-					Σ		HP	300	
				- - 1. <u>5</u> - -		sc	1.20m Extremely weathered Andesite with soil probreaks down into Clayey Gravelly SAND - 1 coarse grained, pale brown, with some dar fine to medium grained angular to sub-ang gravel, fines of medium plasticity, with clay	^f ine to k grey, ular	D - M	D - VE	-		EXTREMELY WEATHER ROCK
				- 2.0	<u>∘_⁄ ∘∕</u> × × × × · · ×		ANDESITE - dark grey with some pale grey 2.00m brown, fractured, estimated medium to high	 y and n strength.	D		-		HIGHLY TO MODERATEI WEATHERED ROCK
				-			Hole Terminated at 2.00 m Practical Refusal						
	Wat (Dat Wat	er Level e and time sl er Inflow er Outflow	hown)	Notes, Sa U₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid S (Plasti	i Diame ample f onmenta s jar, se Sulfate S	is ter tube sample or CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H F	⊥ /ery Soft ioft irm atiff /ery Stiff lard iriable		<: 2: 5: 1: 2:	ICS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
<u>ətra</u>	tra De	anges radational or ansitional stra efinitive or dis rata change		Field Test PID DCP(x-y) HP	<u>:s</u> Photo Dynar	ionisatio	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L MD D VD	L N D	ense	n Dense	Density Index <15% Density Index 15 - 35% Density Index 15 - 65% Density Index 65 - 85% Density Index 85 - 100%
6		LABORATORY			CLIENT	: N CT: F ION: L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	& 2	PA JO LO	st pi ge: B no ggei te:	:		TP201 1 OF 1 NEW17P-0054A BE 20-9-19
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		IENT TYP		2.7 T(2.0 m		exca 'IDTH :		FACE RL: JM:		HD			
	Drill	ing and San	npling			_	Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
					-	CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine grained sand, root affected	asticity, d.	M < Wp				TOPSOIL
						 СН	Sandy CLAY - medium to high plasticity, de and brown, sand is mostly fine grained, trac grained angular to sub-angular gravel.	ark grey ce fine			HP	240	
				0. <u>5</u>			0.40m CLAY - medium to high plasticity, brown an grey-brown.	 id	-	VSt	HP	280	RESIDUAL SOIL
	red	0.80m									HP	280	
ш	Not Encountered	U50 1.00m		1. <u>0</u>			Pale grey with orange to red-brown.		^d ∧		- HP	410	
LEC Wat						СН			×	н	HP	420	
				1. <u>5</u>							HP	410	
				2.0			2.00m				HP	400	
					-		Hole Terminated at 2.00 m						
	Wat (Dat Wat	er Level te and time sl er Inflow er Outflow anges	hown)	Notes, Sa U ₅₀ CBR E ASS B	50mn Bulk s Envire (Glas Acid s (Plasi	n Diame sample f onmenta s jar, se Sulfate S	s ter tube sample or CBR testing I sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt N H F	Pincy Very Soft Soft Firm Stiff Very Stiff Hard Friable		<2 25 50 10 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
	G tra D	radational or ansitional stra efinitive or dis rata change		Field Tes PID DCP(x-y) HP	<u>ts</u> Photo Dyna	ionisatio mic pene	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Density	V L ME D VD	L N D	ery Lo oose lediun ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

(LABORATORY	TOS NSW) PTY		LIENT ROJE(OCATI	: 1 CT: F ION: L F	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	k 2	PA JO LO	st pi ge: B no ggei te:	:		TP202 1 OF 1 NEW17P-0054A BE 20-9-19
		IENT TYPI T LENGTI		2.7 TC 2.0 m		EXCA IDTH:		ACE RL: IM:	ŀ	HD			
METHOD	WATER	ing and San	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	Material description and profile information MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	ı/particle s	MOISTURE	CONSISTENCY DENSITY	Test Type	d Test Kesnlt	Structure and additiona observations
				-		CL	TOPSOIL: Sandy CLAY - low to medium pla dark brown, fine grained sand, root affected		M < W _P				TOPSOIL
				- - 0.5_			O.20m CLAY - medium to high plasticity, brown an grey-brown. Red-brown and pale grey.				HP	280 230	RESIDUAL SOIL
	itered			-						VSt	HP	230	
ш	Not Encountered	1.00m U50 1.15m		1. <u>0</u> -		СН	Pale grey, with red-brown and pale grey.		M > w _P		HP	420	
				- 1. <u>5</u>						н			
							2.00m				HP HP	450 420	
						1	Hole Terminated at 2.00 m						
LEG	GEND:			- - - <u>Notes, Sa</u>				Consiste				CS (kPa	-
Wat	Wat (Dat - Wat Wat		nown)	U₅₀ CBR E ASS B	Bulk s Enviro (Glass Acid S (Plast Bulk S	ample f onmenta s jar, se Sulfate S	ter tube sample or CBR testing Il sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H F Fb F	Yery Soft Soft Stiff Yery Stiff Iard Friable		25 50 10 20 >4	25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	tra D	radational or ansitional stra efinitive or dis rata change		Field Test PID DCP(x-y) HP	Photo Dynar	nic pen	n detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	<u>Density</u>	V L ME D VD	L N D	'ery Lo oose lediun ense 'ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

Ç		LABORATORY			LIENT ROJE(DCATI	: 1 CT: F ON: L F	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR		PA JO LO	st pi ge: B no ggei te:	:		TP203 1 OF 1 NEW17P-0054A BE 20-9-19
		IENT TYPI T LENGTH		2.7 TO 2.0 m		EXCA I DTH :		FACE RL: JM:	ŀ	HD			
	Drill	ing and San	npling			7	Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
				_		CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine grained sand, root affected 0.15m	asticity, d.	M ~ M				TOPSOIL
							CLAY - medium to high plasticity, brown an grey-brown. Red-brown and pale grey.			VSt	HP HP HP	220 210 550	RESIDUAL SOIL
	itered	0.70m U50 0.85m		-							HP	>600	
Ш	Not Encountered			1.0 		СН			M > w _P	н	HP	550	
				- 1.5_ -			Pale grey, with red-brown and pale grey.				HP	500	
				-							HP	510	
				2.0	//////		2.00m Hole Terminated at 2.00 m				-		
				-									
<u>Wat</u>	Wat (Dat Wat	er Level e and time sl er Inflow er Outflow anges	10wn)	Notes, Sar U₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid S (Plasti	Diame ample f nmenta jar, se sulfate S	ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H F	ncy ery Soft oft irm tiff ery Stiff lard riable		<: 2! 50 10 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
	Gi tra De	radational or ansitional stra efinitive or dis rata change	ita	Field Test PID DCP(x-y) HP	Photoi Dynan	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	<u>Density</u>	V L ME D VC	L N D	ery Lo oose lediur ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

(OS		LIENT ROJE(: 1 CT: F ON: L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	8.2	PA JO LO	st pi ge: B no ggei Te:	:		TP204 1 OF 1 NEW17P-0054A BE 20-9-19
		IENT TYPI T LENGTI		2.7 TC 2.0 m		EXCA		ACE RL:	ļ	\HD			
	Drill	ing and San	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				_		CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine grained sand, root affected	asticity, d.	⊸ × M				TOPSOIL
		0.35m		-			0.15m	 Id		St	HP HP	150 180	RESIDUAL SOIL
		CBR / U50		0.5						VSt	HP HP	210 320	
		0.55m		_		СН			~ Wp		HP	420	
Е	Not Encountered			- - 1. <u>0</u> -			Brown to red-brown and dark grey.		×	н	HP	550	
				- 1. <u>5</u> -		SC	and brown, trace orange, fine grained angu fines of low plasticity, with clay pockets / ba	ılar gravel,	М	D			EXTREMELY WEATHERED
				2.0			1.90m Hole Terminated at 1.90 m						
<u>Wat</u> ▼	Wat (Dat Wat I Wat I ta Cha Gi tra	er Level e and time sl er Inflow er Outflow Inges radational or unsitional stra sfinitive or dis	ita	Notes, Sau U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S S Photo	Diame ample f onmenta s jar, se Sulfate S c bag, a c bag, a c bag, a	ts ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown)	S S F F St S VSt V H H	ncy ery Soft oft irm tiff ery Stiff ard riable V L MI	V L	2: 5: 1: 2: 2: 2: 2: 2: 2: 2: 2: 2: 2: 2: 2: 2:	CS (kPz 25 5 - 50 0 - 100 00 - 200 00 - 400 400 	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%

6		LABORATORY		st ² c	LIENT ROJE	: N CT: F I ON : L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 8 .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	k 2	PA JO LO	st pi ge: B no ggei te:	:		TP205 1 OF 1 NEW17P-0054A BE 20-9-19
		IENT TYP		2.7 TC 2.0 m		EXCA		ACE RL: IM:	A	HD			
	Drill	ing and San	npling	_		1	Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	//particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-	-	CL	TOPSOIL: Sandy CLAY - low to medium pla dark brown, fine grained sand, root affected	asticity, I.					TOPSOIL
		0.40m		-		 СН	0.20m CLAY - medium to high plasticity, brown and grey-brown.			VSt	HP	300	COLLUVIUM / RESIDUAL SOIL
		U50 0.55m		0. <u>5</u>			CLAY - medium to high plasticity, pale grey- and orange to red-brown.	 -brown			HP	450	RESIDUAL SOIL
				-					× K	н	HP	550	
	ered			_					Ě		HP	400 390	
ш	ot Encountered	1.00m		1.0		СН							
	Not	U50		-						VSt	HP	380	
		1.20m		-									
				- 1. <u>5</u>			1.40m Clayey SAND / Sandy CLAY - medium plas grey and pale brown, trace pale orange, fine with silt.		< W _P	н	_		
				-			1.80m		ž				
						sc	Clayey Gravelly SAND - fine to coarse grain 1.90m brown with some grey, trace dark grey and fine grained angular gravel, fines of low plase	orange,	D	D			RESIDUAL SOIL7 EXTREMELY WEATHERED ROCK
LEG Watu				2. <u>0</u> - -	-		Hole Terminated at 1.90 m Slow progress						
LEG Wat	Wat (Dat Wat Wat ta Cha	er Level te and time sl er Inflow er Outflow anges radational or	hown)	Notes, Sa U ₅₀ CBR E ASS B Field Test	50mm Bulk s Enviro (Glass Acid S (Plast Bulk S	n Diame ample f onmenta s jar, se Sulfate S ic bag, a Sample	er tube sample or CBR testing I sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H H	very Soft soft irm tiff very Stiff lard riable V	V	25 25 50 10 20 >2 'ery Lo	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400 xoose	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15%
	tra D(ansitional stra efinitive or dis rata change		PID DCP(x-y) HP	Dynar	nic pene	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)		L ME D VD) N D	oose lediun lense lery De	n Dense ense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

(LABORATORY			LIENT ROJE	: I CT: F I ON : L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	\$ 2	PA JO LO	st pi ge: B no ggei te:	:		TP206 1 OF 1 NEW17P-0054A BE 20-9-19
	• -	IENT TYP		2.7 TC 2.0 m		EXCA I DTH :	VATOR SURF 0.6 m DATU	ACE RL: JM:	A	HD			
	Drill	ing and San	npling	-			Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen		MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-		CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine grained sand, root affected						TOPSOIL
		<u>0.40m</u> U50 0.70m		- - 0. <u>5</u>		сн	0.20m CLAY - medium to high plasticity, brown an grey-brown, trace fine grained angular grav		M > wp	VSt	HP HP HP	210 210 220 400	RESIDUAL SOIL
	Not Encountered			-			0.90m			Н	HP	550	
10.0.000 Datgel Lab and In Situ Tool	Not Enc			1. <u>0</u> - - -		sc	Clayey Gravelly SAND - fine to coarse grai and brown, trace orange, fine grained angu fines of low plasticity.		М	D			RESIDUAL SOIL 7 EXTREMELY WEATHERED ROCK
< < > 30-10-2019 10:01 10.0.000				-		GP	1.50m Extremely weathered Andesite with soil pro- breaks down into Sandy GRAVEL - fine to grained angular, grey to brown and red-bro orange, fine to coarse grained sand.	coarse	D - M				EXTREMELY WEATHERED ROCK
NON-CORED BORRHOLE - TEST PIT NEWT/P-00544 - TEST PITS LOGS GPJ < KITAMINGFIRES- I ▲ I ▲ IIA IIA IIA IIA IIA IIA IIA IIA	GEND:			2.0	mples a	nd Tes	Hole Terminated at 1.90 m Slow progress	Consiste	ncy			CS (kPa	a) Moisture Condition
	EGEND: Vater (Date and time shown) Water Inflow Vater Outflow trata Changes Gradational or transitional strata			U ₅₀ CBR E ASS B Field Test	50mm Bulk s Enviro (Glass Acid S (Plast Bulk S	n Diame sample f onmenta s jar, se Sulfate \$		VS V S S F F St S VSt V H H	Very Soft Soft Stiff Very Stiff Iard V		<2 25 50 10 20	25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
	tra D			PID DCP(x-y) HP	Photo Dynar	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	Penalty	L ME D VD	L N D	oose	n Dense	Density Index 15 - 35%

6		LABORATORY			LIENT ROJE(: 1 CT: F ON: L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	\$ 2	PA JO LO	st pi ge: B no ggei te:	:		TP207 1 OF 1 NEW17P-0054A BE 20-9-19
		IENT TYP		2.7 TO 2.0 m		EXCA I DTH :		FACE RL: JM:	ŀ	HD			
	Drill	ing and Sar	npling			z	Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
						CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine grained sand, root affected	asticity, d.					TOPSOIL
		0.40m		_			0.15m CLAY - medium to high plasticity, brown an grey-brown, trace fine grained angular grav		> WP		HP	210	RESIDUAL SOIL
		0.40m U50 0.60m		0.5		СН			× W	VSt	HP		
	itered						With Sandy GRAVEL pockets.						
ш	Not Encountered			- - 1.0 - -		GP	0.80m Extremely weathered Andesite with soil problem breaks down into Sandy GRAVEL - fine to grained angular, brown to grey-brown, trac- grey and pale orange, fine to coarse graine	coarse e pale	D - M	D	-		EXTREMELY WEATHER ROCK
				- 1.5_			1.70m Hole Terminated at 1.70 m						
				_			Slow progress						
				- 2.0									
				-									
	Wat (Dat Wat Wat	er Level te and time si er Inflow er Outflow anges	í í	Notes, Sar U ₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid S (Plasti	Diame ample f nmenta jar, se sulfate S	ts ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H F	ncy 'ery Soft oft irm tiff 'ery Stiff lard iriable		<: 2: 5: 1: 2:	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
	G tra D	radational or ansitional stra efinitive or dis rata change		Field Test PID DCP(x-y) HP	<u>s</u> Photoi Dynar	ionisatio	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	<u>Density</u>	V L ME D VD	L D D	ery Lo oose lediur ense ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

6		LABORATORY	OSW) PTY		LIENT	: N CT: F ON: L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	& 2	PA JO LO	st pi ge: B no: ggei te:	:		TP208 1 OF 1 NEW17P-0054A BE 20-9-19
		IENT TYPI T LENGTI		2.7 TO 2.0 m		EXCA I DTH :		FACE RL: JM:	A	HD			
METHOD	WATER	ing and San	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	Material description and profile information MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type a	Result Result	Structure and additiona observations
ш		0.50m U50 0.70m				CL	0.25m CLAY - medium to high plasticity, brown an grey-brown, trace fine grained angular grav 0.80m Extremely weathered Andesite with soil probreaks down into Sandy GRAVEL - fine to grained angular, brown to grey-brown, trace grey and pale orange, fine to coarse graineweakly cemented.	d. 	^с м м Д - М	VSt	HP HP HP	250 300 250 200	TOPSOIL RESIDUAL SOIL
►	<u>r</u> Wato (Dat Wato Wato a Cha	er Level e and time sk er Inflow er Outflow mges radational or	í í		50mm Bulk s Envirc (Glass Acid S (Plasti Bulk S	Diame ample f nmenta jar, sea ulfate S c bag, a ample	1.70m Hole Terminated at 1.70 m Very slow progress Set ter tube sample or CBR testing il sample aled and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm)	S S F F St S VSt V H F	ncy fery Soft irm tiff fery Stiff lard riable V L	V	<2 25 50 10 20	CS (kPa 25 5 - 50 - 100 00 - 200 00 - 400 000	D Dry M Moist W Wet W _p Plastic Limit

(Juali		st ² c	LIENT	: 1	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 8	& 2	PA	st pi Ge: B No		D:	TP209 1 OF 1 NEW17P-0054A
		LABORATORY	(NSW) PTY		OCATI		LOT 11, DP 1248129, NEW ENGLAND			GGEI	D BY	/ :	BE
						EXCA		ACE RL:					20-9-19
IE	-	ing and Sar		2.0 m	vv	IDTH:	0.6 m DATU Material description and profile information	IM:	A	\HD	Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	y/particle is	MOISTURE	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
				-		CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine grained sand, root affected						TOPSOIL
				-			0.15m CLAY - medium to high plasticity, brown an grey-brown.	 d	-		HP	300	RESIDUAL SOIL
				-					M > W		HP	280 200	
				0.5_						VSt	HP	210	
		<u>0.70m</u>		-			Red-brown and brown.				HP HP HP	260 380 450	
	tered	U50 0.90m		-							HP	>600 >600	
ш	Not Encountered			1. <u>0</u>		СН						2000	
	2			- - 1. <u>5</u>			With Clayey Gravelly SAND pockets / band grey and red-brown to brown.	s, pale	M < w _p	н	HP	>600	
				-							HP	>600	
				2.0			2.00m Hole Terminated at 2.00 m						
				-									
				-									
1 54				Notes 2		nd T		Constat					
	Wat (Dat - Wat ∎ Wat	er Level te and time s er Inflow ter Outflow	hown)	Notes, Sar U ₅₀ CBR E ASS B	50mm Bulk s Enviro (Glass Acid S (Plasti	i Diame ample f onmenta s jar, se Sulfate \$	ter tube sample for CBR testing al sample valed and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H F	ncy /ery Soft aoft /irm /ery Stiff /ery Stiff lard /riable		- 2: 5: 1: 2:	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
<u>Stra</u>	tra D	anges radational or ansitional stra efinitive or dis rata change		B Field Test PID DCP(x-y) HP	<u>s</u> Photo Dynar	ionisati nic pen	on detector reading (ppm) etrometer test (test depth interval shown) ometer test (UCS kPa)	Density	N L M D V	L N D	/ery Lo oose /lediur)ense /ery D	n Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

6			'OS		LIENT ROJE(: N CT: F ON: L	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & .OT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	2	PA JO LO	st pi ge: B no ggei te:	:		TP210 1 OF 1 NEW17P-0054A BE 20-9-19
		IENT TYPE T LENGTH		2.7 TC 2.0 m		EXCA I DTH :		ACE RL: M:	A	HD			
	Drill	ing and Sam	pling			7	Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component:	/particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and addition observations
						CL	TOPSOIL: Sandy CLAY - low to medium pla dark brown, fine grained sand, root affected	asticity,	M ~ W				TOPSOIL
				- - 0.5_			CLAY - medium to high plasticity, grey and t	 orown.		VSt	HP	230	RESIDUAL SOIL
											HP	560	
ш	Not Encountered	0.85m		- - 1.0		СН			M > w _P		HP	580 500	
	Ž	U50 1.20m		- - 1. <u>5</u>						Н	HP	450	
				-		sc	1.70m Clayey Gravelly SAND - fine to coarse grain and brown, trace orange, fine grained angul fines of low plasticity. 1.90m		D - M	D	HP	450	RESIDUAL SOIL7 EXTREMELY WEATHER ROCK
				2.0			Hole Terminated at 1.90 m Slow progress						
	Wat (Dat Wat Wat Wat <u>ta Cha</u> G tra	er Level e and time sh er Inflow er Outflow anges radational or ansitional strat efinitive or dis	own) ta	Notes, Sar U ₅₀ CBR E ASS B Field Test PID DCP(x-y)	50mm Bulk s Enviro (Glass Acid S (Plasti Bulk S s Photo	Diame ample f nmenta i jar, se culfate S c bag, a ample onisatio	s ter tube sample or CBR testing il sample aled and chilled on site) soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown)	S S F F St S VSt V H F	ncy fery Soft oft tiff ery Stiff lard riable V L ME	Vi	25 25 50 20 20 20 20 20 20 20 20 20 20 20 20 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400 00 - 400 400 00 - 400	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15% Density Index 15 - 35%

Ç				st ² c	LIENT	: 1	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 &	& 2	PA	st pi ge: b no		D:	TP211 1 OF 1 NEW17P-0054A
		LABORATORT	(NOW) P11		OCAT		LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR			ggei Te:) BY	:	BE 20-9-19
_		IENT TYP		2.7 TC 2.0 m		EXCA IDTH :		FACE RL: JM:	A	HD			
	Drill	ling and Sar	npling	1			Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
				-	- } }	CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine grained sand, root affected	asticity, d.	M ~ Wp				TOPSOIL
				-			0.20m CLAY - medium to high plasticity, brown an grey-brown.	 Id			HP	280	RESIDUAL SOIL
		0.60m		0.5						VSt	ΗP	240	
		CBR / U50 0.85m		-							HP	300	
	ered			-							HP	550	
	Not Encountered			1. <u>0</u> -		СН			M > w _P	н	HP	500	
Laga				-							HP	450	
-				- 1.5_			Red-brown, with some brown.				HP	390	
				-						VSt	HP	380	
				2. <u>0</u>		sc	2.00m Clayey Gravelly SAND - fine to coarse grain a 10m and brown, trace orange, fine grained angu		D - M	D			RESIDUAL SOIL /
				-			2.10m and brown, acce orange, fine granted angu fines of low plasticity. Hole Terminated at 2.10 m Slow progress	/					ROCK
	EGEND: /ater (Date and time shown) — Water Inflow - Water Outflow trata Changes Gradational or transitional strata — Definitive or distict strata change			Notes, Sa U ₅₀ CBR E ASS B Field Tes: PID	50mm Bulk s Enviro (Glass Acid s (Plast Bulk s	n Diame sample f onmenta s jar, se Sulfate S ic bag, a Sample	ts ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm)	S S F F St S VSt V H H	ncy ery Soft oft irm tiff ery Stiff ard riable V L	V	<2 25 50 10 20	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400	D Dry M Moist W Wet W _p Plastic Limit
	D	efinitive or di		DCP(x-y) HP	Dynai	nic pen	etrometer test (test depth interval shown) meter test (UCS kPa)		ME D VD) N D		n Dense ense	-

6		LABORATORY			LIENT ROJE	: CT: ION: 	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION - STAGES 1 & LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	& 2	PA JO LO	st pi Ge: B no Ggei Te:	:		TP212 1 OF 1 NEW17P-0054A BE 20-9-19
		ient typi T lengti		2.7 TC 2.0 m		EXCA I DTH :		FACE RL: JM:	A	AHD .			
METHOD	WATER	ing and San	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	Material description and profile information MATERIAL DESCRIPTION: Soil type, plasticit characteristics,colour,minor componen	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type a	d Test Kesnlt	Structure and additional observations
				-		CL	TOPSOIL: Sandy CLAY - low to medium pl dark brown, fine grained sand, root affected	asticity, d.	M < Wp				TOPSOIL
				-		сн	0.20m CLAY - medium to high plasticity, brown an grey-brown, trace fine to medium grained c fragments.	 Id Sharcoal	M > W	VSt	HP	250	COLLUVIUM
				0. <u>5</u>			0.40m CLAY - medium to high plasticity, brown an grey-brown, trace red-brown.	 id			HP	450	RESIDUAL SOIL
		0.60m U50		-							HP HP	550 >600	
ш	Not Encountered	<u>0.85m</u>		- - 1. <u>0</u>					M < w _P		HP	>600	
				-		СН				н	HP	450	
				1. <u>5</u>					M > w _P		HP HP HP	450 440 420	
				_			1.90m				HP	420	
				2. <u>0</u> - -	-		Hole Terminated at 1.90 m						
<u>Wat</u> ▼	Wat (Dat Wat Wat ta Cha	er Level e and time sh er Inflow er Outflow Inges radational or	,	Notes, Sa U ₅₀ CBR E ASS B Field Test	50mn Bulk s Enviro (Glass Acid s (Plast Bulk s	n Diame sample f onmenta s jar, se Sulfate \$ ic bag, s Sample	ter tube sample for CBR testing al sample aled and chilled on site) Soil Sample air expelled, chilled)	S S F F St S VSt V H F	very Soft soft irm stiff very Stiff lard riable V	V	<2	CS (kPa 25 5 - 50 0 - 100 00 - 200 00 - 400 400 pose	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit Density Index <15%
	De	nsitional stra afinitive or dis ata change		PID DCP(x-y) HP	Dynai	nic pen	on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)		L ME D VE	D M D	oose lediun ense ery D	n Dense ense	Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%

¢	6	LABORATORY			LIENT ROJE	: N CT: F	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION LOT 1 - 3, DP 1218389 LOCHINVAR		PA JO	st pi ge: b no ggei te:	:		TP02 1 OF 1 NEW17P-0054 BE 19-4-17
		MENT TYP		5t Exc 2.0 m		KUBO	DTA SURF. 0.5 m DATU	ACE RL: M:		1.5 m	ı		
	Dri	lling and Sar	npling				Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	//particle s	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
						CL	Sandy CLAY - low plasticity, dark grey-brow grained sand, trace silt, root affected.	n, fine	M < W				TOPSOIL
		0.50m	41. <u>(</u>	 0 0.5		— — - СН	0.18m Sandy CLAY - medium to high plasticity, dar grey-brown, fine grained sand.		_	St	HP HP HP HP	190 160 180 280	COLLUVIUM / POSSIBLE RESIDUAL
	ered	CBR U50 (0.70m	40.5	 5 1.0		СІ	grained gravel, sub-rounded. Pockets of dense sand, fine to coarse grain	ed.	M > W _P	VSt	HP	200	
α TLB 1.1.GLB LOG NON-CORED BORKHOLE - TEST PTI NEW77P-0054.GPJ < I I I I I I I I I E E	Not Encountered		40.0 39.5	 		SP	<u>1.10m</u> Extremely weathered Pebbly SANDSTONE properties: breaks down into SAND - fine to grained, with highly weathered pockets incre- with depth.	coarse	D - M	VD			EXTREMELY TO HIGHLY
ESTPIT NEW17P-0054.GPJ < <drawing< th=""><th></th><th></th><th>39.0</th><th>0 2.<u>5</u> </th><th>-</th><th></th><th>Hole Terminated at 2.40 m</th><th></th><th></th><th></th><th></th><th></th><th></th></drawing<>			39.0	0 2. <u>5</u> 	-		Hole Terminated at 2.40 m						
	(Da Wa ■Wa ata Ch C 	ter Level te and time s ter Inflow ter Outflow anges fradational or ansitional stra lefinitive or dia trata change	ata	Notes, Sa U ₅₀ CBR E ASS B Field Tes: PID DCP(x-y) HP	50mm Bulk s Enviro (Glass Acid S (Plast Bulk S Bulk S Photo Dynar	Diame ample f onmenta s jar, se Sulfate S ic bag, a Sample ionisationis ationis and the second second second secon	Es ter tube sample or CBR testing il sample aled and chilled on site) Soil Sample air expelled, chilled) on detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	S S F F St S VSt V H F	ncy /ery Soft irm :tiff /ery Stiff lard rriable V L D VD	V Lu D D	22 25 50 20 20 20 20 20 20 20 20 20 20 20 20 20	5 - 50 0 - 100 00 - 200 00 - 400 400 pose n Dense	D Dry M Moist W Wet Wp, Plastic Limit WL Liquid Limit Density Index <15% Density Index 15 - 35%

6				t C P	LIENT	: N CT: F	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION		PA(JOE	B NO	:		TP03 1 OF 1 NEW17P-0054
				Ľ	UCAII		OT 1 - 3, DP 1218389 LOCHINVAR			ggee Te:	JBA	:	BE 19-4-17
				5t Exc				RL:		7.0 m	1		
TES		T LENGT		2.0 m	W	DTH:			A	HD	I		I
	Drill	ing and San	npling			7	Material description and profile information				Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity/particle characteristics,colour,minor components	WOISTLIRE	CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additiona observations
						SM	Silty SAND - fine to medium grained, dark		- M				
			-	-		CL	Sandy CLAY - low to medium plasticity, dark	-7	s ≥		1		SLOPE WASH
			-				grey-brown, fine grained sand, trace of silt.	;	Ś		HP	230	
			-	-			Sandy CLAY - medium to high plasticity, brown with some grey, fine grained sand.	ו			HP	210	RESIDUAL
			-	-					Å ∧	VSt	HP	200	
		0.50m	46.5	0.5_					Σ		HP	300	
		CBR	-	-									
		U50 0.75m	-	-							HP HP	350 400	
		0.7011	-	-									
			-			СН					HP	510	
	red		46.0	1.0			Becoming grey with some orange-brown.						
	ounte								° ×				
ш	Encountered		-	-				:	× ≥	Н			
	Not		-	-									
			-										
			-	-									
			45.5	1.5_			1.50m Extremely weathered SANDSTONE with soil	-+-			-		EXTREMELY WEATHER
			-	-			properties: excavates as SAND - fine to coarse grained, pale grey-brown.						ROCK
			-				granioa, palo groy brown.						
			-										
			_						- M	VD			
			45.0	2.0	· · · · · · · · · · · · · · · · · · ·				- 101	VD			
			-	1 -									
			-	-			With some highly weathered rock excavating as fin	e					
							2.30m to coarse grained gravel. Hole Terminated at 2.30 m	_+					
			-	-									
			44.5	2.5									
			-	-									
			-	-									
			-	-									
			_	_									
LEG Wat	END:		1	Notes, Sa U ₅₀			ter tube sample VS	istency Very				CS (kPa 25	a) <u>Moisture Condition</u> D Dry
<u>vvat</u>		er Level	0	CBR E	Bulk s	ample f	or CBR testing S	Soft			25	5 - 50) - 100	M Moist W Wet
-	•	e and time sl	<i>'</i>		(Glass	jar, se	aled and chilled on site) St	Firm Stiff			10	00 - 200	W _p Plastic Limit
		er Inflow er Outflow	4	ASS			Soil Sample VSt air expelled, chilled) H	Very Hard)0 - 400 400	W _L Liquid Limit
<u>Stra</u>	ta Cha		,	B Field Test	Bulk S	ample	Fb Dens	Friab itv	le V	V	ery Lo	ose	Density Index <15%
		radational or ansitional stra	ita	PID	Photo		on detector reading (ppm)	<u></u>	L	Lo	oose		Density Index 15 - 35%
		efinitive or dis rata change	stict [DCP(x-y) HP			etrometer test (test depth interval shown) meter test (UCS kPa)		MD D		lediun ense	n Dense	 Density Index 35 - 65% Density Index 65 - 85%

¢	6	LABORATORY	OS	ct C P	LIENT ROJE	: M CT: F	RING LOG - TEST PIT McCLOY LOCHINVAR PTY LTD PROPOSED SUBDIVISION OT 1 - 3, DP 1218389 LOCHINVAR		PA JO LO	st pi' ge: b no: ggei te:	:		TP05 1 OF 1 NEW17P-0054 BE 19-4-17
		MENT TYP		4t Exc 2.0 m		IDTH:	SURF 0.5 m DATU	ACE RL:		4.9 m \HD	ו		
		ling and San		2.0 11			Material description and profile information	////	<i></i>		Fiel	d Test	
METHOD	WATER	SAMPLES	RL (m)	DEPTH (m)	GRAPHIC LOG	CLASSIFICATION SYMBOL	MATERIAL DESCRIPTION: Soil type, plasticity characteristics,colour,minor component	y/particle ts	MOISTURE CONDITION	CONSISTENCY DENSITY	Test Type	Result	Structure and additional observations
						SM	Silty SAND - fine grained, dark grey-brown, clay, root affected.	trace	м				TOPSOIL
		0.50m	44.5 <u></u>	 0. <u>5</u>		CH	0.20m CLAY - medium to high plasticity, brown, tra grained sand.		M > W _P	VSt	HP HP HP	200 210 200	COLLUVIUM / POSSIBLE RESIDUAL
		U50					0.70m				HP	230	
ш	Not Encountered	<u>0.75m</u>	44. <u>0</u> 43.5	 		CI	Sandy CLAY - medium plasticity, brown, fin medium grained sand, with fine grained gra sub-angular.		M < w _p	Н	HP	>600	RESIDUAL SOIL
OT LIB 1.1.GLB Log NON-CORED BOREHOLE - TEST PIT NEW17P-0054.GPJ < <drawingfile>> 24-10-2019 13:22 10.0.000 Datget Lab and In Situ Tool</drawingfile>			43. <u>0</u> 42.5	2.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	GC	1.50m Extremely weathered Pebbly SANDSTONE properties: excavates as Clayey Sandy GR fine to coarse grained, with highly weathere pockets.	AVEL -	D - M	VD			EXTREMELY TO HIGHLY WEATHERED ROCK
EST PIT NEW17P-0054.GPJ < <drawingf< td=""><td></td><td></td><td>42.0</td><td>_ 2.5_ </td><td>- - -</td><td></td><td>Hole Terminated at 2.40 m</td><td></td><td></td><td></td><td></td><td></td><td></td></drawingf<>			42.0	_ 2.5_ 	- - -		Hole Terminated at 2.40 m						
	(Da – Wai ⊲ Wai r<u>ata Ch</u> – G tr _ D	ter Level te and time sl ter Inflow ter Outflow	hown) ita	I Notes, Sa U ₅₀ CBR E ASS B Field Test PID DCP(x-y) HP	50mm Bulk s Enviro (Glass Acid S (Plast Bulk S Bulk S Photo Dynar	n Diame sample f onmenta s jar, sea Sulfate S sulfate S ic bag, a Sample ionisatic nic pene	E ter tube sample or CBR testing I sample aled and chilled on site) soil Sample air expelled, chilled) an detector reading (ppm) etrometer test (test depth interval shown) meter test (UCS kPa)	S S F F St S VSt V H F	I ncy fery Soft soft irm stiff fard iriable V L ME D VD	V La D	<2	n Dense	D Dry M Moist W Wet W _p Plastic Limit U V _L Liquid Limit Density Index <15% Density Index 15 - 35%

APPENDIX B:

Results of Laboratory Testing



- 02 4968 4468 т٠
- 02 4960 9775
- F: E: W: E: admin@qualtest.com.au W: www.qualtest.com.au ABN: 98 153 268 896

Report No: SSI:NEW21W-0908-S01 **Issue No: 1 Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. (all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 31/03/2021 Sample Details Sample ID: NEW21W-0908-S01 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH101 - (0.5 - 0.75m) Date Tested: 23/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 0.6 4.8 Moisture Content before (%): Shrinkage Moisture Content (%): 31.5 32.8 Moisture Content after (%): Est. inert material (%): 36.9 1% Est. Unc. Comp. Strength before (kPa): 310 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 170 Major Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 2.8



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Report No: SSI:NEW21W-0908-S02 Issue No: 1 **Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. (all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 29/03/2021 Sample Details Sample ID: NEW21W-0908-S02 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH102 - (0.65 - 0.8m) Date Tested: 23/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): -1.6 2.7 Moisture Content before (%): Shrinkage Moisture Content (%): 18.4 21.2 Moisture Content after (%): Est. inert material (%): 27 2 7% Est. Unc. Comp. Strength before (kPa): >600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 450 Cracking during shrinkage: Minor Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 1.5



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Report No: SSI:NEW21W-0908-S03 Issue No: 1 **Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. (all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 29/03/2021 Sample Details Sample ID: NEW21W-0908-S03 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH103 - (0.7 - 0.9m) Date Tested: 23/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): -0.3 4.0 Moisture Content before (%): Shrinkage Moisture Content (%): 28.5 26.5 Moisture Content after (%): Est. inert material (%): 28 7 7% Est. Unc. Comp. Strength before (kPa): >600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 550 Cracking during shrinkage: Minor Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 2.2



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Report No: SSI:NEW21W-0908-S04 Issue No: 1 **Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. (all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 30/03/2021 Sample Details Sample ID: NEW21W-0908-S04 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH104 - (0.5 - 0.65m) Date Tested: 23/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): -0.6 3.4 Moisture Content before (%): Shrinkage Moisture Content (%): 25.3 26.7 Moisture Content after (%): Est. inert material (%): 29.3 7% Est. Unc. Comp. Strength before (kPa): >600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 460 Cracking during shrinkage: Major Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 1.9

Comments



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Report No: SSI:NEW21W-0908-S05 **Issue No: 1 Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. (all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 30/03/2021 Sample Details Sample ID: NEW21W-0908-S05 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH105 - (0.9 - 1.05m) Date Tested: 23/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): -1.4 4.9 Moisture Content before (%): Shrinkage Moisture Content (%): 30.1 29.1 Moisture Content after (%): Est. inert material (%): 32 1 1% Est. Unc. Comp. Strength before (kPa): 470 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): >600 Cracking during shrinkage: Minor Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 2.7



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Report No: SSI:NEW21W-0908-S06 Issue No: 1 **Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. (all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 30/03/2021 Sample Details Sample ID: NEW21W-0908-S06 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH106 - (0.6 - 0.8m) Date Tested: 23/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): -1.4 4.4 Moisture Content before (%): Shrinkage Moisture Content (%): 22.3 21.8 Moisture Content after (%): Est. inert material (%): 25.4 2% Est. Unc. Comp. Strength before (kPa): 400 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 350 Cracking during shrinkage: Nil Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 2.5



Shrink S	N II						Report			Issue N
	Swell	Index	Repo	rt						13500 1
lient:	McCloy Pr PO Box 22 Dangar N	214	gement Pty Lt	d		NA	The inclu stan	ıded in this docun dards.	s, calibrations an nent are traceable	C 17025-Testing. Id/or measurements e to Australian/nation ns tested or sampled
oject No.: oject Name:	NEW17P- Proposed		- Stage 1 & 2	2			ITATION NA	proved Signato nior Geotechn TA Accredited e of Issue: 7/0	ician) Laboratory Nu	
ample Det	ails									
mple ID:		EW21W-0908	8-S07							
mpling Metho	od: TI	he results out	lined below app	ly to the sampl	e as receive	d				
aterial:	S	andy Clay			Date Sam	pled:	11/03/2	2021		
ource:	0	n-Site Insitu			Date Sub	mitted:	12/03/2	2021		
ecification:		o Specificatio								
oject Locatio		-	Highway, Lochir	ivar						
mple Locatio prehole/Pit Nu		H107 - (1.0 - H107	1.2m)							
orehole/Pit De										
ate Tested:		3/03/2021								
well Test			VC 1	289.7.1.1	Shrink	Test			٨٥	1289.7.
vell on Satura Disture Conte		%):	2.4 31.9		11	n drying (%	-	4.8		
oisture Conte	nt after (%):	39.3		Est. iner	e Moisture material (%	6):	1%		
st. Unc. Comp	nt after (%). Strength): before (kPa	39.3 a): 410		Est. iner Crumblir		%): hrinkage:	-		
st. Unc. Comp st. Unc. Comp	nt after (%). Strength). Strength): before (kPa	39.3 a): 410		Est. iner Crumblir	: material (% ig during sl	%): hrinkage:	1% Nil		
t. Unc. Comp t. Unc. Comp	nt after (%). Strength). Strength): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ig during sl	%): hrinkage:	1% Nil		
st. Unc. Comp st. Unc. Comp h <mark>rink Swe</mark> l	nt after (% b. Strength b. Strength): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		
t. Unc. Comp t. Unc. Comp	nt after (% b. Strength b. Strength): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		
t. Unc. Comp t. Unc. Comp hrink Swe	nt after (% b. Strength b. Strength): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		·····
t. Unc. Comp t. Unc. Comp hrink Swe	nt after (% o. Strength o. Strength): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil	· · · · · · · · · · · · · · · · · · ·	
t. Unc. Comp t. Unc. Comp hrink Swe	nt after (% o. Strength o. Strength): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		
t. Unc. Comp t. Unc. Comp hrink Swe	nt after (% o. Strength o. Strength): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil	· · · · · · · · · · · · · · · · · · ·	
t. Unc. Comp t. Unc. Comp hrink Swe	nt after (% b. Strength b. Strength II): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		
t. Unc. Comp t. Unc. Comp hrink Swe	nt after (% b. Strength b. Strength II): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		······
t. Unc. Comp t. Unc. Comp hrink Swe	nt after (% b. Strength b. Strength II): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		+
st. Unc. Comp st. Unc. Comp hrink Swe	ent after (% b. Strength b. Strength II): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		· · · · · · · · · · · · · · · · · · ·
t. Unc. Comp t. Unc. Comp hrink Swe 10.0 MsI (%) Hws - 450 0.0	ent after (% b. Strength b. Strength II): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		·····
t. Unc. Comp t. Unc. Comp nrink Swe 10.0 (%) Esh Swell (%) Esh -5.0	ent after (% b. Strength b. Strength II): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		· · · · · · · · · · · · · · · · · · ·
t. Unc. Comp t. Unc. Comp hrink Swe	ent after (% b. Strength b. Strength II): before (kPa	39.3 a): 410	Shrinkage	Est. iner Crumblir	: material (% ng during sl during shr	%): hrinkage:	1% Nil		
t. Unc. Comp t. Unc. Comp nrink Swel 10.0 (%) Esh (%) Swel (%) Unc. (%) Unc. (%) (%) Swel (%) (%) Swel (%) (%) Swel (%) (%) Swel (%) (%) Swel (%) (%) Swel (%) (%) Swel (%) (%) Swel (%) (%) Swel (%) (%) Swel (%)	ent after (% b. Strength b. Strength II): before (kPa	39.3 a): 410 : 140	20.0	Est. iner Crumblir	material (% ng during sh during shr Sw ell	%): hrinkage:	1% Nil	45.0	50.0

Shrink Swell Index - Iss (%): 3.4



Shrink S	well	Index R	eport							Issue No
	McCloy Pro PO Box 22 Dangar NS		ent Pty Ltd			NA		e results of the tes luded in this docu indards.	ment are traceable	17025-Testing. I/or measurements to Australian/nationa s tested or sampled.
Project No.: Project Name:	NEW17P-0 Proposed S		age 1 & 2				ITATION N	enior Geotechr	Laboratory Nu	
ample Deta	ils									
ample ID:		W21W-0908-S08								
ampling Metho	d: The	e results outlined	below apply t	to the sample	e as received	ł				
aterial:	Cla	ау			Date Sam	-	11/03/	2021		
ource:	On	-Site Insitu			Date Sub	mitted:	12/03/	2021		
pecification:		Specification								
roject Location		w England Highw	-	r						
ample Location		1108 - (0.5 - 0.75n	ר)							
orehole/Pit Nur		1108								
orehole/Pit Dep										
ate Tested:	25/	/03/2021		39.7.1.1	Shrink					1289.7.1
oisture Conten	t before (%	-	2.9		Shrinkag	n drying (% e Moisture	Content			
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp.	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50		Shrinkag Est. inert Crumblin		Content %): hrinkage:	(%): 31.3 1%		
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp.	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50		Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil		
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp.	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl	Content %): hrinkage:	(%): 31.3 1% Nil		
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp.	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil		
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil		· · · · · · · · · · · · · · · · · · ·
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil		
bisture Conten bisture Conten bit. Unc. Comp. bit. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil		· · · · · · · · · · · · · · · · · · ·
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil	•••••	
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil		· · · · · · · · · · · · · · · · · · ·
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oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil		
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil		
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil		· · · · · · · · · · · · · · · · · · ·
oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell	t before (%) t after (%) Strength k Strength a	%): 32 : 42 Defore (kPa): 28	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil		
oisture Conten oisture Conten oisture Conten st. Unc. Comp. st. Unc. Comp. hrink Swell (%) Ilon (%) Il	t before (%) t after (%) Strength t Strength a	6): 32 20 efore (kPa): 29 after (kPa): 80	2.9 2.8 50	Shrinkage	Shrinkag Est. inert Crumblin	e Moisture material (% g during sl during shr	Content %): hrinkage:	(%): 31.3 1% Nil	45.0	50.0
Shrink (%) Esh - 200 -0.0 -0.0 -0.0	t before (%) t after (%) Strength t Strength a	6): 32 : 42 Defore (kPa): 29 after (kPa): 80	2.9 2.8 50)	20.0	Shrinkag Est. inert Crumblin Cracking	e Moisture material (% g during sh Guring shr Sw ell	Content (6): hrinkage:	(%): 31.3 1% Nil Nil	45.0	50.0

Shrink Swell Index - Iss (%): 5.3

Comments



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Report No: SSI:NEW21W-0908-S09 Issue No: 1 **Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. (all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 31/03/2021 Sample Details Sample ID: NEW21W-0908-S09 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Sandy Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH109 - (0.3 - 0.45m) Date Tested: 25/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): -1.3 3.4 Moisture Content before (%): Shrinkage Moisture Content (%): 21.7 25.5 Moisture Content after (%): Est. inert material (%): 36 1 6% Est. Unc. Comp. Strength before (kPa): >600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 100 Cracking during shrinkage: Major Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 1.9

Comments



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Report No: SSI:NEW21W-0908-S10 **Issue No: 1 Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 31/03/2021 Sample Details Sample ID: NEW21W-0908-S10 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH109 - (0.6 - 0.75m) Date Tested: 25/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 1.3 6.9 Moisture Content before (%): Shrinkage Moisture Content (%): 26.5 23.9 Moisture Content after (%): Est. inert material (%): 5% 28 6 Est. Unc. Comp. Strength before (kPa): 360 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 160 Cracking during shrinkage: Minor Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 4.2



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Shrink	Swe	II Inc	aex R	epor	[
lient:	PO Bo	/ Project x 2214 r NSW 2	Manageme 2309	ent Pty Ltd			N	T ir s	cluded in this docu andards.	sts, calibrations and ment are traceable	17025-Testing. d/or measurements to Australian/nation s tested or sampled.
roject No.: roject Name		7P-0054A ed Subdi		ige 1 & 2				DITATION	pproved Signate Senior Geotechr IATA Accredited ate of Issue: 7/	nician) I Laboratory Nu	
ample De	etails										
ample ID:		NEW21\	W-0908-S11								
ampling Met	thod:	The resu	ults outlined	below apply	to the samp	le as receive	ed				
aterial:		Clay				Date San	-	11/03	/2021		
ource:		On-Site	Insitu			Date Sub	omitted:	12/03	/2021		
pecification:		No Spec									
oject Locati			gland Highwa	-	ar						
ample Locat			(0.4 - 0.55m	1)							
orehole/Pit N		BH110	-								
orehole/Pit [ate Tested:	Depth (m)										
		25/03/20	JZT								
well Test					89.7.1.1					AS	1289.7.
wall on Catu	iration (%	۱.	4.					<u>/</u>].	6.0		
		-				11	n drying (%	-			
well on Satu loisture Cont	tent befo	re (%):	23	3.3		Shrinka	ge Moisture	Content	(%): 24.8		
oisture Cont oisture Cont	tent befo tent after	re (%): (%):	23 33	3.3 3.5		Shrinkag Est. iner	ge Moisture t material (e Content %):	(%): 24.8 6		
oisture Cont oisture Cont st. Unc. Corr	tent befor tent after np. Streng	re (%): (%): gth befor	23 33 re (kPa): 48	3.3 3.5 30		Shrinkag Est. iner Crumbli	ge Moisture t material (ng during s	Content %): shrinkage	(%): 24.8 6 : Nil		
oisture Conf oisture Conf st. Unc. Com st. Unc. Com	tent befor tent after np. Streng np. Streng	re (%): (%): gth befor	23 33 re (kPa): 48	3.3 3.5 30		Shrinkag Est. iner Crumbli	ge Moisture t material (Content %): shrinkage	(%): 24.8 6		
oisture Conf oisture Conf st. Unc. Com st. Unc. Com	tent befor tent after np. Streng np. Streng	re (%): (%): gth befor	23 33 re (kPa): 48	3.3 3.5 30	Shrinkage	Shrinkag Est. iner Crumbli Cracking	ge Moisture t material (ng during s g during sh	Content %): shrinkage	(%): 24.8 6 : Nil		
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Shrink Swell Index - Iss (%): 4.6

Comments



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P	lcCloy Project N O Box 2214 vangar NSW 23	-	'ty Ltd		NA	The results of the included in this d standards.	mpliance with ISO/IEC 1 e tests, calibrations and/ ocument are traceable to relate only to the items	or measurements o Australian/nationa
oject No.: N	IEW17P-0054A					V. all		
roject Name: P			1 & 2		WORLD RE	COGNISED (Senior Geote	ited Laboratory Num	
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mple ID:		/-0908-S12						
mpling Method	: The resul	ts outlined below	w apply to the	sample as receiv				
aterial:	Clay			Date Sa	-	11/03/2021		
ource:	On-Site I			Date Su	bmitted:	12/03/2021		
ecification: oject Location:	No Speci							
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Shrink Swell Index - Iss (%): 5.6

Comments



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Report No: SSI:NEW21W-0908-S13 Issue No: 1 **Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 26/03/2021 Sample Details Sample ID: NEW21W-0908-S13 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH112 - (0.5 - 0.65m) Date Tested: 19/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 2.5 5.0 Moisture Content before (%): Shrinkage Moisture Content (%): 23.2 25.4 Moisture Content after (%): Est. inert material (%): 3% 35.2 Est. Unc. Comp. Strength before (kPa): 300 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 150 Cracking during shrinkage: Moderate Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 3.5



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Report No: SSI:NEW21W-0908-S14 Issue No: 1 **Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 26/03/2021 Sample Details Sample ID: NEW21W-0908-S14 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH113 - (0.5 - 0.7m) Date Tested: 19/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 3.0 4.9 Moisture Content before (%): Shrinkage Moisture Content (%): 31.1 33.2 Moisture Content after (%): 40.8 Est. inert material (%): 2% Est. Unc. Comp. Strength before (kPa): 450 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 200 Cracking during shrinkage: Major Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 3.6



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oisture C	onten	t before	(%):	31	.1		Shrinka	ge Moistur	e Content	: (%): 31.0		
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t. Unc. C	omp.		n before	(kPa): 30			Crumbli		shrinkage			
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t. Unc. C t. Unc. C	comp. comp. comp.	Strength Strength	n before	(kPa): 30	0	Shrinkage	Crumbli Crackin	ng during s g during sh	shrinkage	: Nil		
t. Unc. C t. Unc. C 1rink S	Somp.	Strength Strength	n before	(kPa): 30	0	Shrinkage	Crumbli Crackin	ng during s g during sh	shrinkage	: Nil		
t. Unc. C t. Unc. C 1rink S	comp. comp. comp.	Strength Strength	n before	(kPa): 30	0	Shrinkage	Crumbli Crackin	ng during s g during sh	shrinkage	: Nil		
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t. Unc. C t. Unc. C nrink S	comp. comp. well	Strength Strength	n before	(kPa): 30	0	Shrinkage	Crumbli Crackin	ng during s g during sh	shrinkage	: Nil		·····
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t. Unc. C t. Unc. C 1rink S	comp. comp. well	Strength Strength	n before	(kPa): 30	0	Shrinkage	Crumbli Crackin	ng during s g during sh	shrinkage	: Nil		
t. Unc. C t. Unc. C nrink S	Comp. Comp. Comp. 10.0 - 5.0 - -5.0 -	Strength Strength	n before	(kPa): 30	0	Shrinkage	Crumbli Crackin	ng during s g during sh	shrinkage	: Nil		
t. Unc. C t. Unc. C nrink S	comp. comp. well	Strength Strength	n before	(kPa): 30	0	Shrinkage	Crumbli Crackin	ng during s g during sh	shrinkage	: Nil		
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Report No: SSI:NEW21W-0908-S16 **Issue No: 1** Shrink Swell Index Report Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 26/03/2021 Sample Details Sample ID: NEW21W-0908-S16 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: Date Submitted: **On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH115 - (0.9 - 1.05m) Date Tested: 19/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 1.0 7.1 Moisture Content before (%): Shrinkage Moisture Content (%): 33.4 34.9 Moisture Content after (%): 40.1 Est. inert material (%): 3% Est. Unc. Comp. Strength before (kPa): 220 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: Moderate 160 Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 4.2



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Report No: SSI:NEW21W-0908-S17 Issue No: 1 **Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 26/03/2021 Sample Details Sample ID: NEW21W-0908-S17 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH116 - (0.6 - 0.8m) Date Tested: 19/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 0.4 6.3 Moisture Content before (%): Shrinkage Moisture Content (%): 32.9 36.1 Moisture Content after (%): 38.5 Est. inert material (%): 1% Est. Unc. Comp. Strength before (kPa): 200 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 150 Cracking during shrinkage: Major Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 3.6

Comments



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Report No: SSI:NEW21W-0908-S18 Issue No: 1 **Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 9/04/2021 Sample Details Sample ID: NEW21W-0908-S18 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH117 - (0.95 - 1.15m) Date Tested: 19/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 9.4 6.9 Moisture Content before (%): Shrinkage Moisture Content (%): 29.7 29.7 Moisture Content after (%): Est. inert material (%): 40 2 3 Est. Unc. Comp. Strength before (kPa): 400 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: Nil 70 Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 6.4



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Report No: SSI:NEW21W-0908-S19 Issue No: 1 Shrink Swell Index Report Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. (Ill Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 26/03/2021 Sample Details Sample ID: NEW21W-0908-S19 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: Date Submitted: **On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH201 - (1.1 - 1.3m) Date Tested: 19/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 2.2 9.5 Moisture Content before (%): Shrinkage Moisture Content (%): 35.1 36.6 Moisture Content after (%): 37.3 Est. inert material (%): 1% Est. Unc. Comp. Strength before (kPa): 360 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 200 Cracking during shrinkage: Major Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 5.9



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Report No: SSI:NEW21W-0908-S20 Issue No: 1 Shrink Swell Index Report Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD BEC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 26/03/2021 Sample Details Sample ID: NEW21W-0908-S20 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Sandy Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH202 - (0.5 - 0.65m) Date Tested: 19/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): -0.5 6.3 Moisture Content before (%): Shrinkage Moisture Content (%): 30.2 30.0 Moisture Content after (%): Est. inert material (%): 28 6 2% Est. Unc. Comp. Strength before (kPa): 300 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 250 Cracking during shrinkage: Moderate Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 3.5

Comments


Shrink Swell Index Report	Shrink Sv		- D			Report	No: SSI:NEV	Issue No
PO Box 2214 Dangar NSW 2309 Project No:: NEW17P-0054A Project Name: Proposed Subdivision - Stage 1 & 2 ample Details ample Details ample Details ample Details ample Details ample Di : NEW21W-0908-S21 ampling Method: The results outlined below apply to the sample as received aterial: Clay Date Sampled: 11/03/2021 Date Submitted: 12/03/2021 pecification: New England Highway, Lochinvar ample Location: BH203 (0.9 - 1.15m) orchole/Plt Number: BH203 orchole/Plt Number: BH203 orchole/Plt Number: BH203 to fisture Content after (%): 2.1.0 to isture Content after (%): 2.8.6 st. Unc. Comp. Strength before (kPa): 100 brink Swell frink Swell	····· ···· ··· ··· ··· ··· ··· ··· ···	vell index	(Report					
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ample Details Imple ID: NEW21W-0908-521 Impling Method: The results outlined below apply to the sample as received taterial: Clay Date Sampled: 11/03/2021 Date Submitted: 12/03/2021 Date Submit	•		n - Stage 1 & 2			CREDITATION NAT	ior Geotechnician) A Accredited Laborato	
Imple ID: NEW21W-0908-S21 Impling Method: The results outlined below apply to the sample as received aterial: Clay Date Sampled: 11/03/2021 Date Submitted: 12/03/2021 pecification: No Specification oglet Location: New England Highway, Lochinvar Imple Location: BH203 - (0.9 - 1.15m) brehole/Pit Number: BH203 orehole/Pit Submitted: 12/03/2021 Well Test AS 1289.7.1.1 Shrink Test AS 1289.7 Shrink on drying (%): 5.7 Shrink on drying (%): 5.7 Shrink on drying (%): 5.7 Shrink on drying (%): 2.0.5 Est. Inert material (%): 2 Crumbling during shrinkage: Nil t. Unc. Comp. Strength after (kPa): 100 Tracking during shrinkage: Nil t. Unc. Comp. Strength after (kPa): 100 Shrinkage Swell	ample Detail	S						
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burce: On-Site Insitu Date Submitted: 12/03/2021 pecification: No Specification roject Location: New England Highway, Lochinvar ample Location: BH203 - (0.9 - 1.15m) perhole/Pit Number: BH203 prehole/Pit Depth (m): 0.9 - 1.15 tat Tested: 25/03/2021 Well Test AS 1289.7.1.1 well on Saturation (%): 5.8 oisture Content before (%): 21.0 oisture Content after (%): 28.6 st. Unc. Comp. Strength before (kPa): 600 st. Unc. Comp. Strength after (kPa): 100 hrink Swell hrink Swell Multiple Strength after (kPa): 100 Shrinkage Swell	mpling Method:	The results ou	tlined below apply	to the sample as	received			
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Shrink Swell Index - Iss (%): 4.8

Comments

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oisture Co oisture Co st. Unc. C st. Unc. C hrink S Multiple S Marine S Marine S	ontent bef ontent afte comp. Stree comp. S	ore (%): er (%): ngth befor	27 36 7 e (kPa): 38	8 7.8 6.7 80		Shrink o Shrinkag Est. iner Crumbli Cracking	n drying (⁶ ge Moistur t material ng during s g during st	e Content (%): shrinkage	(%): 27.4 1 : Nil		
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Shrink Swell Index - Iss (%): 5.1

Comments

Form No: 18932, Report No: SSI:NEW21W-0908-S22



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Dient:	PO B		Manageme	-	•				tandards.	sts, calibrations and ment are traceable	
Project No. Project Nai	.: NEW [.] me : Propo	17P-0054 <i>A</i> osed Subdi		age 1 & 2				EDITATION	Approved Signat Senior Geotechi NATA Accredited Date of Issue: 7/	nician) I Laboratory Nu	
ample [Details										
ample ID:		NEW21	W-0908-S23	ł							
ampling M	lethod:	The resu	ults outlined	below apply	to the samp	le as receive	d				
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ource:		On-Site				Date Sub	mitted:	12/03	3/2021		
pecificatio		No Spec									
oject Loc ample Loc			gland Highw (1.0 - 1.1m)	ay, Lochinva	ar						
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well on Sa oisture Co oisture Co st. Unc. Co	aturation (% ontent befo ontent afte omp. Strer omp. Strer	ore (%): r (%): ngth befor	28 40 re (kPa): 60	9 3.3 0.0 00		Shrink o Shrinkaç Est. iner Crumblin Crackinç	n drying (' ge Moistur t material ng during s g during sl	e Content (%): shrinkage	(%): 28.6 1 : Nil	AS	1289.7.
vell on Sa oisture Co oisture Co st. Unc. Co st. Unc. Co	aturation (% ontent befo ontent afte omp. Strer omp. Strer	ore (%): r (%): ngth befor	28 40 re (kPa): 60	9 3.3 0.0 00		Shrink o Shrinkaç Est. iner Crumblin Crackinç	n drying (' ge Moistur t material ng during s g during sl	e Content (%): shrinkage	(%): 28.6 1 : Nil	AS	1289.7.
vell on Sa oisture Co oisture Co oit. Unc. Co ot. Unc. Co hrink S	aturation (% ontent befo ontent afte omp. Strer omp. Strer	ore (%): r (%): ngth befor	28 40 re (kPa): 60	9 3.3 0.0 00		Shrink o Shrinkaç Est. iner Crumblin Crackinç	n drying (' ge Moistur t material ng during s g during sl	e Content (%): shrinkage	(%): 28.6 1 : Nil	AS	1289.7.
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well on Sa oisture Co oisture Co st. Unc. Co st. Unc. Co hrink S	aturation (% ontent befo ontent afte omp. Strer omp. Strer	ore (%): r (%): ngth befor	28 40 re (kPa): 60	9 3.3 0.0 00		Shrink o Shrinkaç Est. iner Crumblin Crackinç	n drying (' ge Moistur t material ng during s g during sl	e Content (%): shrinkage	(%): 28.6 1 : Nil	AS	1289.7.
vell on Sa oisture Co oisture Co oit. Unc. Co ot. Unc. Co hrink S	aturation (% ontent befo ontent afte omp. Strer omp. Strer	ore (%): r (%): ngth befor	28 40 re (kPa): 60	9 3.3 0.0 00		Shrink o Shrinkaç Est. iner Crumblin Crackinç	n drying (' ge Moistur t material ng during s g during sl	e Content (%): shrinkage	(%): 28.6 1 : Nil		1289.7. [•]
vell on Sa oisture Co oisture Co oit. Unc. Co ot. Unc. Co hrink S	aturation (% ontent befo ontent afte omp. Strer omp. Strer	ore (%): r (%): ngth befor	28 40 re (kPa): 60	9 3.3 0.0 00		Shrink o Shrinkaç Est. iner Crumblin Crackinç	n drying (' ge Moistur t material ng during s g during sl	e Content (%): shrinkage	(%): 28.6 1 : Nil		1289.7. [•]
well on Sa oisture Co oisture Co st. Unc. Co st. Unc. Co hrink S	aturation (% ontent befo ontent afte omp. Strer omp. Strer	ore (%): r (%): ngth befor	28 40 re (kPa): 60	9 3.3 0.0 00		Shrink o Shrinkaç Est. iner Crumblin Crackinç	n drying (' ge Moistur t material ng during s g during sl	e Content (%): shrinkage	(%): 28.6 1 : Nil		1289.7.
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well on Sa oisture Co oisture Co st. Unc. Co st. Unc. Co	aturation (% ontent before ontent after omp. Strent omp. Strent well	ore (%): r (%): ngth befor	28 40 re (kPa): 60	9 3.3 0.0 00		Shrink o Shrinkaç Est. iner Crumblin Crackinç	n drying (' ge Moistur t material ng during s g during sl	e Content (%): shrinkage	(%): 28.6 1 : Nil	AS	1289.7.
vell on Sa oisture Co oisture Co st. Unc. Co at. Unc. Co hrink S ^(%) Esw	aturation (% ontent before ontent after omp. Strent omp. Strent well	ore (%): r (%): ngth befor	28 40 re (kPa): 60	9 3.3 0.0 00		Shrink o Shrinkaç Est. iner Crumblin Crackinç	n drying (' ge Moistur t material ng during s g during sl	e Content (%): shrinkage	(%): 28.6 1 : Nil	AS	1289.7.
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well on Sa oisture Co oisture Co st. Unc. Co st. Unc. Co hrink S Nswell (%) Esh - Swell (%) Esw	aturation (% ontent before ontent after omp. Strent omp. Strent well	ore (%): r (%): ngth befor	28 40 re (kPa): 60	9 3.3 0.0 00	Shrinkage	Shrink o Shrinkaç Est. iner Crumblin Crackinç	n drying (⁶ ge Moistur t material ng during si g during si Sw ell	e Content (%): shrinkage	(%): 28.6 1 : Nil	AS	1289.7.

Shrink Swell Index - Iss (%): 5.6

Comments

Form No: 18932, Report No: SSI:NEW21W-0908-S23



- 02 4968 4468
- т٠ 02 4960 9775
- F: E: W: E: admin@qualtest.com.au W: www.qualtest.com.au ABN: 98 153 268 896

Report No: SSI:NEW21W-0908-S24 Issue No: 1 Shrink Swell Index Report Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD REC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 1/04/2021 Sample Details Sample ID: NEW21W-0908-S24 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH205 - (0.5 - 0.7m) Date Tested: 29/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): -0.5 6.7 Moisture Content before (%): Shrinkage Moisture Content (%): 33.4 33.5 Moisture Content after (%): 37.6 Est. inert material (%): 1% Est. Unc. Comp. Strength before (kPa): 250 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): 100 Cracking during shrinkage: Major Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 3.7

Comments



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Report No: SSI:NEW21W-0908-S25 Issue No: 1 Shrink Swell Index Report Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. (all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD REC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 1/04/2021 Sample Details Sample ID: NEW21W-0908-S25 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH206 - (0.6 - 0.8m) Date Tested: 29/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): -0.6 6.9 Moisture Content before (%): Shrinkage Moisture Content (%): 29.5 31.8 Moisture Content after (%): Est. inert material (%): 34.3 1% Est. Unc. Comp. Strength before (kPa): 310 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 170 Major Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 3.8

Comments



- 02 4968 4468
- т٠ 02 4960 9775
- F: E: W: E: admin@qualtest.com.au W: www.qualtest.com.au ABN: 98 153 268 896

Report No: SSI:NEW21W-0908-S26 Issue No: 1 **Shrink Swell Index Report** Client: McCloy Project Management Pty Ltd Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests calibrations and/or measurements PO Box 2214 included in this document are traceable to Australian/national Dangar NSW 2309 standards. ΝΔΤ Results provided relate only to the items tested or sampled. all Project No.: NEW17P-0054A Approved Signatory: Brent Cullen Project Name: Proposed Subdivision - Stage 1 & 2 BLD REC (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 1/04/2021 Sample Details Sample ID: NEW21W-0908-S26 Sampling Method: The results outlined below apply to the sample as received Material: **Date Sampled:** 11/03/2021 Clay Source: **Date Submitted: On-Site Insitu** 12/03/2021 Specification: No Specification Project Location: New England Highway, Lochinvar Sample Location: BH207 - (0.5 - 0.7m) Date Tested: 29/03/2021 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 0.1 6.9 Moisture Content before (%): Shrinkage Moisture Content (%): 29.6 31.7 Moisture Content after (%): Est. inert material (%): 35.0 1% Est. Unc. Comp. Strength before (kPa): 420 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: Nil 140 Shrink Swell Shrinkage Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 50.0 45.0 Moisture Content (%) Shrink Swell Index - Iss (%): 3.8

Comments



Report No: CBR:NEW19W-3213--S01

Issue No: 1

- 1: 02 4968 4468 F: 02 4960 9775 E: admin@qualtest.com.au W: www.qualtest.com.au ABN: 98 153 268 896

Client:	F	PO Box 2	roject Mai 214 ISW 2309	•	nt Pty L	.td			ΝΑΤΑ	Accredited for compliance with ISO/IEC The results of the tests, calibrations and this document are traceable to Australia Results provided relate only to the item This report shall not be reproduced exc	d/or measurements included an/national standards. s tested or sampled.
Principa	I:									0 m	
Project N		NEW17P-	-0054A							y. all	
-		Proposed	Subdivisi	on - Sta	ge 1 &	2			WORLD RECOGNISED		
Sample Sample II			9W-3213-	-\$01				Date Sa	n pled: 13/09/2	019	
-					D	4		Date Sa	ipieu. 15/09/2	019	
Sampling Specifica		-	ed by Eng	-	Depar	Imeni		Source:	On Site		
-		-	ecification						_		
Location			- (1.60 - 1	,				Material	Sandy (Clay	
Project L	ocation	New E	ngland Hi	ghway, I	Lochinv	/ar					
Load v	s Pen	etratio	n						Test Resu	ılts	
1.8	T									AS 1289.6.1.1 - 2014	
	-	: i	1 1		: :	÷			CBR At 2.5m		6
1.0		÷ ÷			÷ ÷				Maximum Dry D		1.39
1.6							1.1.1			ure Content (%):	32.5
							-			ore Soaking (t/m³):	1.39
1.4										efore Soaking (%):	100.5
1.4		1		1		÷				nt before Soaking (%):	32.2
	1 :	: :	: :		: :	:	: :	: :		before Soaking (%):	98.0
1.2	trader	. izro i en	redere 🙀		÷					er Soaking (t/m³):	1.37
î	_ :	: :		:	: :	÷	: :	: :		fter Soaking (%):	98.5
k K	-		1		: :				Swell (%):		2.0
1.0	+	· · · · · · · · · · · · · · · · · · ·	- de constru							nt of Top 30mm (%):	41.2
ы В		1			: :					nt of Remaining Depth (%): 36.0
Load on Piston (kN) 8.0		1757 - 181							Compactive Eff	ort:	Standard
bad		Z 1 -			· ·						AS 1289.5.1
Ľ	† :	E H H		-	: :	1			Surcharge Mas		9.00
0.6	+		se i presi p		er er er				Period of Soaki		4
	∔ ÷7				÷ ÷				Oversize Mater		0
0.4	1	i i : 			: 				CBR Moisture (Content Method:	AS 1289.2.1
0.4	T				: :					Contont $(0/)$	26.0
	† / E				: :	:			Field Moisture (26.9
0.2	÷ 🖡 de la							; ;	Curing Time (hr	s).	48
	1 :			:	: :	÷					
	1 :	: :	:	:	: :	:	: :	: :			
0.0							10.0 11				
(0.0 1.0	2.0 3.0				9.0	10.0 11	.0 12.0 13.			
					n (mm)						

California Bearing Ratio Test Report

Comments

Method of establishing plasticity level: Visual Assessment



Report No: CBR:NEW19W-3213--S02

Client:	McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309		Accredited for compliance with ISO/IEC The results of the tests, calibrations and/ this document are traceable to Australian Results provided relate only to the items. This report shall not be reproduced exception	or measurements included in /national standards. tested or sampled.
Principal: Project No.: Project Name:	NEW17P-0054A Proposed Subdivision - Stage 1 & 2		Approved Signatory: Dane Cul (Senior Geotechnician) NATA Accredited Laboratory N Date of Issue: 30/09/2019	
Sample Det				
Sample ID:	NEW19W-3213S02	Date Sample	ed: 13/09/2019	
Sampling Meth Specification:	od: Sampled by Engineering Department No Specification	Source:	On Site	
-	-			
Location:	TP111 - (0.8 - 1.0m)	Material:	Clay	
Project Locatio	n: New England Highway, Lochinvar			
Load vs Pe	netration		Test Results	
+ :	: : : ; : : : : :		AS 1289.6.1.1 - 2014	
1.6 - · · · ·			CBR At 2.5mm (%):	4.0
	/:		Maximum Dry Density (t/m³):	1.31
+ .			Optimum Moisture Content (%):	36.0
1.4 - · · · ·			Dry Density before Soaking (t/m ³):	1.32
			Density Ratio before Soaking (%):	101.0
	/:		Moisture Content before Soaking (%):	36.5
1.2 - · · · ·			Moisture Ratio before Soaking (%):	100.5
		- E 🦻 🔁	Dry Density after Soaking (t/m ³):	1.29
2	/		Density Ratio after Soaking (%):	99.0
₹ 1.0 - · · · ·	· · · · · · · · · · · · · · · · · · ·		Swell (%):	2.0
: to			Moisture Content of Top 30mm (%):	47.9
ien i			Moisture Content of Remaining Depth (%	o): 38.8
Load on Piston (kN)			Compactive Effort:	Standard
: – oac				AS 1289.5.1.
			Surcharge Mass (kg):	9.00
0.6			Period of Soaking (Days):	4
+			Oversize Material (%):	0
0.4 - · · · ·	. / 1 9 - 19 - 19 - 19 - 19 - 19 - 19 - 19		CBR Moisture Content Method:	AS 1289.2.1.
			Field Moisture Content (%):	36.7
<u>7</u>			Curing Time (hrs) :	30.7 48
0.2 - · · / :				40
↓ / ∃				
0.0	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$			
0.0 1.	0 2.0 3.0 4.0 5.0 6.0 7.0 6.0 9.0 10.	.0 11.0 12.0 13.0		
0.0 1.	0 2.0 5.0 4.0 5.0 6.0 7.0 6.0 9.0 10.	.0 11.0 12.0 13.0		

Comments

Method of establishing plasticity level: Visual Assessment



Report No: CBR:NEW19W-3213--S03

Client:	McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309		Accredited for compliance with ISO/IEC 170: The results of the tests, calibrations and/or n this document are traceable to Australandan. Results provided relate only to the items test This report shall not be reproduced except in	neasurements included in tional standards. ed or sampled.
Principal: Project No.: Project Name:	NEW17P-0054A Proposed Subdivision - Stage 1 & 2		WORLD RECOGNISED ACCREDITATION	
Sample De Sample ID:	tails NEW19W-3213S03	Date Sample	ed: 13/09/2019	
Sampling Meth Specification: Location:	 and: Sampled by Engineering Department No Specification TP115 - (0.6 - 0.8m) on: New England Highway, Lochinvar 	Source: Material:	On Site Clay	
Load vs Pe			Test Results	
1.3 1.2 1.1 1.1 1.0 0.9 0.9 0.9 0.7 0.7 0.6 0.6 0.6 0.5 0.5			AS 1289.6.1.1 - 2014 CBR At 2.5mm (%): Maximum Dry Density (t/m ³): Optimum Moisture Content (%): Dry Density before Soaking (t/m ³): Density Ratio before Soaking (%): Moisture Content before Soaking (%): Moisture Ratio before Soaking (%): Dry Density after Soaking (t/m ³): Density Ratio after Soaking (%): Swell (%): Moisture Content of Top 30mm (%): Moisture Content of Remaining Depth (%): Compactive Effort: Surcharge Mass (kg): Period of Soaking (Days): Oversize Material (%):	5 1.60 23.5 1.61 100.5 23.0 98.5 1.58 98.5 1.5 27.1 24.8 Standard AS 1289.5.1.1 9.00 4 0

Comments

Method of establishing plasticity level: Visual Assessment



Vui		nia Bearing Ra		Ceport		
Client	:	McCloy Project Manageme PO Box 2214 Dangar NSW 2309	nt Pty Ltd		Accredited for compliance with ISO/IEC 17 The results of the tests, calibrations and/or this document are traceable to Australian/n Results provided relate only to the items te This report shall not be reproduced except	measurements included in ational standards. sted or sampled.
•	ct No.:	NEW17P-0054A Proposed Subdivision - Sta	ge 1 & 2		WORLD RECOGNISED ACCREDITATION	
	ple De					
Sample	e ID:	NEW19W-3213S04		Date Sampl	led: 13/09/2019	
-	-	nod: Sampled by Engineering	Department			
-	ication:	No Specification		Source:	On Site	
ocatio	on:	TP119 - (0.5 - 0.8m)		Material:	Clay	
Project	t Locati	on: New England Highway, I	_ochinvar			
oad	vs Pe	enetration			Test Results	
	1.1 + · · · ·				AS 1289.6.1.1 - 2014	
				E E	CBR At 2.5mm (%):	5
	1.0 - · · · ·				Maximum Dry Density (t/m ³):	1.53
			E E F		Optimum Moisture Content (%):	26.0
	0.0			: : :	Dry Density before Soaking (t/m ³):	1.53
	0.9 - · · · ·				Density Ratio before Soaking (%):	100.0
	÷				Moisture Content before Soaking (%):	26.5
	0.8 - · · ·				Moisture Ratio before Soaking (%):	101.0
	+				Dry Density after Soaking (t/m ³):	1.52
î	0.7				Density Ratio after Soaking (%):	99.0
(k	+				Swell (%):	1.0
ton	0.6 - · · · ·	• • • • • • • • • • • • • • • • • • •		dered ered	Moisture Content of Top 30mm (%):	32.5
Pis	-				Moisture Content of Remaining Depth (%)	: 27.1
Load on Piston (kN)	0.5				Compactive Effort:	Standard AS 1289.5.1.
Ľ	0.4 - · · ·				Surcharge Mass (kg):	9.00
					Period of Soaking (Days):	4
	0.3				Oversize Material (%):	0
	····				CBR Moisture Content Method:	AS 1289.2.1.
	0.2		···· · · · · · · · · · · · · · · · · ·		Sample Moisture Content	AS 1289.2.1.
					Field Moisture Content (%):	26.3
	0.1				Curing Time (hrs) :	48
	0.0			· · ·		
		.0 2.0 3.0 4.0 5.0 6.0 7	7.0 8.0 9.0 10.0	11.0 12.0 13.0		
		Penetration			11	

Comments

The results outlined above apply to the sample as received Method of establishing plasticity level: Visual Assessment



Depart No. CDD.NEW/40W/ 2266 - 604

Client	:	McCloy Project Management Pty Lto PO Box 2214 Dangar NSW 2309	1	Accredited for compliance with ISO/IEC 170. The results of the tests, calibrations and/or n this document are traceable to Australian/na Results provided relate only to the items test This report shall not be reproduced except in	neasurements included in tional standards. ed or sampled.
-	ct No.:	NEW17P-0054A Proposed Subdivision - Stage 1 & 2		Approved Signatory: Adam Dwye (Senior Geotechnician) NATA Accredited Laboratory Nun Date of Issue: 2/10/2019	
Samp Sampl	ole Det e ID:	ails NEW19W-3266S01	Date Sampl	ed: 20/09/2019	
		od: Sampled by Engineering Departn	-		
	ication:	No Specification	Source:	On-Site	
Locati		TP204 - 0.35 to 0.55m	Material:	CLAY	
		n: New England Highway, Lochinva			
-		netration	•	Test Results	
-Uau		netration		AS 1289.6.1.1 - 2014	
	1.1			CBR At 2.5mm (%):	6
	1		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Maximum Dry Density (t/m ³):	1.43
	1.0 - · · · ·			Optimum Moisture Content (%):	30.5
	+ :			Dry Density before Soaking (t/m ³):	1.44
	0.9			Density Ratio before Soaking (%):	101.0
	- :			Moisture Content before Soaking (%):	31.0
	0.8	aadaa ka k	· · · · · · · · · · · · · · · · · · ·	Moisture Ratio before Soaking (%):	101.0
				Dry Density after Soaking (t/m ³):	1.43
-	0.7 + · · · .	🥕 сі са стали с		Density Ratio after Soaking (%):	100.0
(kN	1			Swell (%):	1.0
uo	0.6 - · · · /			Moisture Content of Top 30mm (%):	37.8
oist				Moisture Content of Remaining Depth (%):	31.6
Load on Piston (kN)	0.5			Compactive Effort:	Standard AS 1289.5.1.
P	0.4			Surcharge Mass (kg):	9.00
	0.4			Period of Soaking (Days):	4
				Oversize Material (%):	0
	0.3++++++++++++++++++++++++++++++++++++			CBR Moisture Content Method:	AS 1289.2.1
	0.2		· · · · · · · · · · · · · · · · · · ·	Sample Moisture Content	AS 1289.2.1.
	- -			Field Moisture Content (%):	31.7
	0.1			Curing Time (hrs) :	90
	0.0	0 2.0 3.0 4.0 5.0 6.0 7.0 8.0	9.0 10.0 11.0 12.0 13.0		

Comments

The results outlined above apply to the sample as received Method of establishing plasticity level: Visual Assessment



Sample ID: Sample ID: Sampling M Specificatio Location: Project Loca	me: Proposed Subdivision - Stage 1 & 2 Details NEW19W-3266S02 Method: Sampled by Engineering Department	Date Samp Source: Material:	Image: Non-Site Clark CCREDITATION Approved Signatory: Adam Dwyr (Senior Geotechnician) NATA Accredited Laboratory Nu Date of Issue: 10/10/2019 Ied: 20/09/2019 On-Site CLAY Image: Clark As 1289.6.1.1 - 2014 CBR At 2.5mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%): Moisture Ratio before Soaking (%):	
Sample ID: Sampling M Specificatio cocation: Project Loca Locad vs 1.3 1.2 1.1 1.1 1.0 	NEW19W-3266S02 Method: Sampled by Engineering Department on: No Specification TP211 - 0.60 to 0.85m cation: New England Highway, Lochinvar	Source:	On-Site CLAY Test Results AS 1289.6.1.1 - 2014 CBR At 2.5mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	1.41 31.5 1.42 100.5
Sampling M Specificatio Cocation: Project Loca Locad vs 1.3 1.2 1.1 1.1 1.0 	Method: Sampled by Engineering Departmenton:No SpecificationTP211 - 0.60 to 0.85mcation:New England Highway, Lochinvar	Source:	On-Site CLAY Test Results AS 1289.6.1.1 - 2014 CBR At 2.5mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	1.41 31.5 1.42 100.5
Specificatio cocation: Project Loca .oad vs I 1.3 + - 1.2 + - 1.1 + - 1.0 + - 0.9 + -	on:No SpecificationTP211 - 0.60 to 0.85mcation:New England Highway, Lochinvar		CLAY Test Results AS 1289.6.1.1 - 2014 CBR At 2.5mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	1.41 31.5 1.42 100.5
Location: Project Location: Droject Location: 1.3 + - 1.2 + - 1.1 + - 1.0 + - 0.9 + -	TP211 - 0.60 to 0.85m cation: New England Highway, Lochinvar		CLAY Test Results AS 1289.6.1.1 - 2014 CBR At 2.5mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	1.41 31.5 1.42 100.5
Project Loca -Oad vs 1.3 1.2 1.1 1.0 0.9 -	ation: New England Highway, Lochinvar	Material:	AS 1289.6.1.1 - 2014 CBR At 2.5mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	1.41 31.5 1.42 100.5
Load vs l			AS 1289.6.1.1 - 2014 CBR At 2.5mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	1.41 31.5 1.42 100.5
1.3 + · · 1.2 + · 1.1 + · 1.0 + - 0.9 + -	Penetration		AS 1289.6.1.1 - 2014 CBR At 2.5mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	1.41 31.5 1.42 100.5
1.3 - · · · · · · · · · · · · · · · · · ·			AS 1289.6.1.1 - 2014 CBR At 2.5mm (%): Maximum Dry Density (t/m³): Optimum Moisture Content (%): Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	1.41 31.5 1.42 100.5
1.2 + · · · · · · · · · · · · · · · · · ·			CBR At 2.5mm (%): Maximum Dry Density (t/m ³): Optimum Moisture Content (%): Dry Density before Soaking (t/m ³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	1.41 31.5 1.42 100.5
1.1 + · · · · · · · · · · · · · · · · · ·			Maximum Dry Density (t/m ³): Optimum Moisture Content (%): Dry Density before Soaking (t/m ³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	31.5 1.42 100.5
1.0 - 0.9 - <u>-</u>			Dry Density before Soaking (t/m³): Density Ratio before Soaking (%): Moisture Content before Soaking (%):	1.42 100.5
1.0 - <u>-</u> 0.9 - <u>-</u>			Density Ratio before Soaking (%): Moisture Content before Soaking (%):	100.5
0.9			Moisture Content before Soaking (%):	
0.9				31.6
+			Moisture Ratio before Soaking (%):	
+				101.0
rd on Piston (kN)	🚚 !		Dry Density after Soaking (t/m ³):	1.40
ad on Piston (k			Density Ratio after Soaking (%):	99.0
ad on Pistor			Swell (%):	1.5
u Die Hier	<mark>7</mark>		Moisture Content of Top 30mm (%):	39.6
u 0.6			Moisture Content of Remaining Depth (%)	: 32.7
0			Compactive Effort:	Standard AS 1289.5.1.
<u> </u>			Surcharge Mass (kg):	9.00
			Period of Soaking (Days):	4
0.4 - ·			Oversize Material (%):	0
0.3+		· · · · · · · · · · · · · · · · · · ·	CBR Moisture Content Method:	AS 1289.2.1.
+			Sample Moisture Content	AS 1289.2.1.
0.2+	· · · · · · · · · · · · · · · · · · ·		Field Moisture Content (%):	AS 1269.2.1. 30.5
			Curing Time (hrs) :	30.5 120
0.1 -				120
0.0	1.0 2.0 3.0 4.0 5.0 6.0 7.0 8.0 9.0 1	10.0 11.0 12.0 13.0		
	Penetration (mm)			

Comments

The results outlined above apply to the sample as received Method of establishing plasticity level: Visual Assessment



	ЗW	ell Inc	iex R	ehou							Issue No
ient:	PO	Cloy Project l Box 2214 Igar NSW 2	C C	ent Pty Ltd					Accredited for complia The results of the tests this document are trac Results provided relate This report shall not be	a, calibrations and/or r eable to Australian/na e only to the items tes	measurements include ational standards. ted or sampled.
incipal: oject No.: oject Nam		V17P-0054A posed Subdi		ige 1 & 2			WORLD	DITATION	Approved Signate (Senior Geotechr NATA Accredited Date of Issue: 30	nician) I Laboratory Nur	
ample D	etails										
mple ID:		NEW19W-32	223S01			Client Sa	-	-			
st Reques	t No.:	-					g Method:	Sampled	l by Enginee	ring Departn	nent
iterial:		Clay				Date San	npled:	13/09/20	19		
urce:		On Site				Date Sub	mitted:	18/09/20	19		
ecification		No Specifica									
oject Loca		New England		_ochinvar, N	ISW						
mple Loca rehole Nu		TP102 - (0.6	i - 0.75m)								
renole Nu		TP102 : 0.6 - 0.75									
vell Tes				AS 12	89.7.1.1	Shrink	Test			AS	1289.7.1
ell on Sat	uration	(%):	6.	2		Shrink o	n drying (%	6):	6.1		
oisture Co			29	9.3			je Moisture		t (%): 27.8		
oisture Co				3.1			t material (-	1.0		
	-	ength befor ength after					ng during s J during sh	-	: Nil Mode		
nrink Sv						Orackiną	g during sh	iiikage.	Widde		
	ven			•	Shrinkag	e 🔶	Sw ell				
	10.0 _ · · ·	· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·						
	10.0			· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·			÷	:
	10.0	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·				· · · · · · · · · · · · · · · · · · ·				
	10.0 <u> </u>								*		
	-								*		
	5.0 - · · ·								*		
	-						•		*		
	5.0 - · · ·	+ + +							*		
	5.0 - · · · ·	+ + +									
	5.0 - · · ·	+							*		
(%) Esh - Swell (%) Esw	5.0 - · · · ·	+							•		
Shrink (%) Esh - Swell (%) Esw	5.0 - · · · · 0.0	+ +							*		
Shrink (%) Esh - Swell (%) Esw	5.0 - · · · ·	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0
Shrink (%) Esh - Swell (%) Esw	5.0 - · · · ·	5.0	10.0	15.0		25.0 isture Conter		35.0	40.0	45.0	50.0

Comments



Shrink S	woll Indox	Poport			Report N	lo: SSI:NEW19	W-3223S02 Issue No:
Client: N P	CCloy Project Mana O Box 2214 Angar NSW 2309	-			The res this doc Results	ted for compliance with ISO/IEC 1 ults of the tests, calibrations and/o ument are traceable to Australian/ provided relate only to the items to ort shall not be reproduced excep	r measurements included ir national standards. ested or sampled.
Principal: Project No.: N	EW17P-0054A roposed Subdivision	- Stage 1 & 2			WORLD RECOGNISED (Senio	ved Signatory: Adam Dwy or Geotechnician) Accredited Laboratory Ni of Issue: 25/09/2019	
Sample Detai	ls						
ample ID:	NEW19W-3223S	02	C	Client Samp	le ID: -		
est Request No.	-		S	Sampling Me	ethod: Sampled by	Engineering Depart	ment
laterial:	Clay		0	Date Sample	d: 13/09/2019		
ource:	On Site		0	Date Submit	ted: 18/09/2019		
pecification:	No Specification						
Project Location: Sample Location: Borehole Number Borehole Depth (I	New England High TP103 - (0.6 - 0.75 TP103	-	W				
Swell Test	117. 0.0 - 0.73	AS 128	9.7.1.1	Shrink Te	est	AS	1289.7.1.
well on Saturation	on (%):	2.0		Shrink on d		6.7	
loisture Content	before (%):	29.7	:	Shrinkage N	loisture Content (%): 28.7	
loisture Content		34.9		Est. inert ma		1.0	
-	Strength before (kP	-		-	luring shrinkage:	Nil	
st. Unc. Comp. S	Strength after (kPa)	90		Cracking du	ring shrinkage:	Moderate	
Shrink Swell							
			Shrinkage	٠	Sw ell		
10.0 T	······						
-				-			:
× s					· · ·		
Shrink (%) Esh - Swell (%) Esw			••••		·		
- (%							
we							-
ە.0			1 1				+ I
Esh							
1 (%							:
± -5.0 - ·					· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	
hrin 🛉			1				
s –				:			÷
-10.0 + -					:		
0.0	5.0 10	0 15.0	20.0	25.0 3	0.0 35.0	40.0 45.0	50.0
			Moistu	re Content (%)		
Shrink Swell	Index - Iss (%)	43					

Comments



PO Bóx 2214 Dangar NSW 2309 Principal: Project No.: NEW17P-0054A Project Name: Proposed Subdivision - Stage 1 & 2 Comple Details ample ID: NEW19W-3223S03 Client Sample ID: - est Request No.: - est Request No.: - Iaterial: Clay On Site Date Sampled: 13/09/2019 Date Sampled: 13/09/2019 Date Submitted: 18/09/2019 Date Submitted: 18/09/2019	Shrink Swell Index Report	
Alerti. In Coop Flogar Management Pry Lud Dangar NSW 2309 Principal: Project Name: Proposed Subdivision - Stage 1 & 2 imple Details ample D: NEW19W-3223-S03 angle lD: NEW19W-3223-S03 est Request No: - Idential: Clay Date Sampled D: - Sampling Method: Sampled by Engineering Department Date Sampled D: - Sampled Details well Test		Issue No
Project Nome: NEW17P-0054A Project Name: Proposed Subdivision - Stage 1 & 2 Sample Details ample DE: NEW19W-3223-S03 est Request Nome: New York Stage 1 & 2 Sample Details ample ID: NEW19W-3223-S03 est Request Nome: Sampled by Engineering Department: Date of Issue : 2509/2019 Date Sampled by Engineering Department: Date Submitted: 18/09/2019 Date S	PO Box 2214	The results of the tests, calibrations and/or measurements included this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled.
Project Nome: NEW17P-0054A Project Name: Proposed Subdivision - Stage 1 & 2 Sample Details ample DE: NEW19W-3223-S03 est Request Nome: New York Stage 1 & 2 Sample Details ample ID: NEW19W-3223-S03 est Request Nome: Sampled by Engineering Department: Date of Issue : 2509/2019 Date Sampled by Engineering Department: Date Submitted: 18/09/2019 Date S	Principal:	
Project Name: Proposed Subdivision - Stage 1 & 2 Proceedings of the set of t	-	Approved Signatory: Adam Dwyer
ample ID: NEW19W-3223-S03 Client Sample ID: - est Request No:: - Sampling Method: Sampled by Engineering Department laterial: Clay Date Sampled by Engineering Department Date Sampled: 13/09/2019 Date Submitted: 18/09/2019 Date Submitted: 18/09/2019 Date Submitted: 18/09/2019 Date Submitted: 18/09/2019 Date Submitted: 18/09/2019 Submitted: 18/09/2019 Date Submitted: 18/09/2019 Date Submitted: 18/09/2019 Date Submitted: 18/09/2019 Shrink Cest P104 - (0.7 - 0.86m) Shrink Cest P104 - (0.7 - 0.86m) Shrink condrying (%): 2.5 Shrink condrying (%): 2.5 Shrinkage Moisture Content (%): 10.7 Est. inert material (%): 1.0 Cracking during shrinkage: Mil Cracking during shrinkage: Mil Cracking during shrinkage: Mil Shrink Swell	Project Name: Proposed Subdivision - Stage 1 & 2	WORLD RECOGNISED (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686
set Request No:: - Sampled by Engineering Department laterial: Clay Date Sampled: Sampled by Engineering Department Date Sampled: 13/09/2019 Date Submitted: 13/09/2019	Sample Details	
haterial: Clay Date Sampled: 13/09/2019 Date Submitted: 18/09/2019 Date Submitted: 18/09/2019 Shrink on drying (%): 2.5 Shrinkage MolSture Content (%): 10.0 Crumbling during shrinkage: Nil Cracking during shrinkage: Milor Point Swell Point Swell Point Swell Point Strength after (%Pa): > 600 Swell Point Strength after (%Pa): > 600 Swell	-	-
ource: On Site Date Submitted: 18/09/2019 pecification: No Specification roject Location: New England Highway, Lochinvar, NSW ample Location: TP104 gorehole Number: TP108 bioture Content before (%): 1.0 Disture Content before (%): 18.2 Disture Content after (%): 2.4 st. Unc. Comp. Strength before (kPa): > 600 st. Unc. Comp. Strength after (kPa): > 600 binrink Swell Our multing during shrinkage: Nil cracking during shrinkage: Milor tracking during shrinkage: Milor tracking during shrinkage: Milor binrink Swell Our multing during shrinkage: Milor tracking during shrinkage: Milor binrink Swell Disture Content (%): 10, 20, 25, 30, 35, 40, 45, 50, Misture Content (%):	est Request No.: -	Sampling Method: Sampled by Engineering Department
pecification: No Specification roject Location: New England Highway, Lochinvar, NSW ample Location: TP104 - (0.7 - 0.85m) orehole Depth (m): 0.7 - 0.85 well on Saturation (%): 1.0 loisture Content defore (%): 12.2 bisiture Content thefore (%): 24.4 st. Unc. Comp. Strength before (kPa): > 600 st. Unc. Comp. Strength after (kPa): > 600 st. Unc. St. Unc. St. Unc. St	faterial: Clay	Date Sampled: 13/09/2019
Project Location: New England Highway, Lochinvar, NSW ample Location: TP104 - (0.7 - 0.85m) borehole Number: Weell Test: AS 1289.7.1.1 well on Saturation (%): Shrink Test AS 1289.7.1 Shrink and drying (%): 2.5 Shrinkage Moisture Content (%): 1.0 1.0 Shrinkage Moisture Content (%): 1.7 Est. inert material (%): 1.0 1.0 Crumbling during shrinkage: Nil Minor Shrink Test AS 1289.7.1 Shrink on drying (%): 2.5 Shrinkage Moisture Content (%): 17.7 Est. inert material (%): 1.0 Crumbling during shrinkage: Nil Crumbling during shrinkage: Minor Weil Shrinkage Sw ell Sw ell Sw ell Minor Minor	ource: On Site	Date Submitted: 18/09/2019
ample Location: TP104 - (0.7 - 0.85m) iorehole Number: TP104 iorehole Depth (m): 0.7 - 0.85 well Test AS 1289.7.1.1 Nrink Test AS 1289.7.1.1 Shrink Test AS 1289.7.1.1 Shrink on drying (%): 2.5 Shrinkage Moisture Content (%): 17.7 Est. inert material (%): 1.0 Crumbling during shrinkage: Nil Cracking during shrinkage: Minor Shrink Swell Shrinkage Swell	pecification: No Specification	
torehole Number: TP104 iorehole Depth (m): 0.7 - 0.85 well Test AS 1289.7.1.1 Well on Saturation (%): 1.0 Disture Content before (%): 18.2 loisture Content after (%): 24.4 st. Unc. Comp. Strength before (kPa): > 600 st. Unc. Comp. Strength after (kPa): > 600	•	
sorehole Depth (m): 0.7-0.85 well Test AS 1289.7.1.1 well on Saturation (%): 1.0 loisture Content before (%): 18.2 loisture Comp. Strength before (%): 24.4 st. Unc. Comp. Strength after (kPa): > 600 st. Unc. Comp. St. Comp.	- , ,	
well Test AS 1289.7.1.1 well on Saturation (%): 1.0 toisture Content before (%): 18.2 toisture Content after (%): 24.4 st. Unc. Comp. Strength before (kPa): > 600 st. Unc. Comp. Strength after (kPa): > 600 strinkage Swell Shrinkage Swell		
well on Saturation (%): 1.0 loisture Content before (%): 18.2 loisture Content after (%): 2.5 Shrinkage Moisture Content (%): 17.7 Est. inert material (%): 1.0 Crumbling during shrinkage: Nil Cracking during shrinkage: Minor Shrinkage Swell Shrinkage Swell	orenole Depth (m): 0.7 - 0.85	
bisture Content before (%): loisture Content after (%): st. Unc. Comp. Strength before (kPa): > 600 Strinkage Moisture Content (%): 17.7 Est. inert material (%): Crumbling during shrinkage: Nil Cracking during shrinkage: Ni		
bisture Content after (%): 24.4 st. Unc. Comp. Strength before (kPa): > 600 st. Unc. Comp. Strength after (kPa): > 600 shrink Swell Shrinkage Swell Shrinkage Swell		
st. Unc. Comp. Strength before (kPa): > 600 Trumbling during shrinkage: Nil Cracking during shrinkage: Minor Shrink Swell		
st. Unc. Comp. Strength after (kPa): > 600 Cracking during shrinkage: Minor thrink Swell		
Shrink Swell Shrinkage Swell		
Shrinkage Swell Shrinkage Swell Swell Shrinkage Swell		
10.0 10.0		s ♦ Swell
⁴ (%) How ⁴ (%		
(%) Hig (%)		
(%) Hig (%)	10.0	
(%) How		
-10.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%)		
-10.0	δ.0+	
-10.0	δ.0+	
-10.0	δ.0	
-10.0	δ.0+	
-10.0	δ.0+	
-10.0	≩ ≝ 5.0+·····	
0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%)	≩ ≝ 5.0+·····	
0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%)	≥ 5.0	
Moisture Content (%)	Shrink (%) Shrink (%)	
	Shrink (%) Shrink (%)	
	Su 5.0 Su 5.0 Su 5.0 Su 6 Su 6	25.0 30.0 35.0 40.0 45.0 50.0
	S.0 S.0 US S.0 S.0 S.0 S.0 S.0 S.0 S.0 S.	

Comments



		Report No: SSI:NEW19W-3223S0 Issue No:
	vell Index Report	
PO	Cloy Project Management Pty Ltd Box 2214 ngar NSW 2309	Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. This report shall not be reproduced except in full.
Principal:		
	W17P-0054A	Approved Signatory: Adam Dwyer
Project Name: Pro	pposed Subdivision - Stage 1 & 2	WORLD RECOGNISED (Senior Geotechnician) ACCREDITATION NATA Accredited Laboratory Number: 18686 Date of Issue: 25/09/2019
ample Details	5	
ample ID:	NEW19W-3223S04	Client Sample ID: -
est Request No.:	-	Sampling Method: Sampled by Engineering Department
laterial:	Clay	Date Sampled: 13/09/2019
ource:	On Site	Date Submitted: 18/09/2019
pecification:	No Specification	
roject Location:	New England Highway, Lochinvar, NSW	
ample Location:	TP105 - (0.5 - 0.8m)	
orehole Number:	TP105	
orehole Depth (m		
well Test	AS 1289.7.1.1	
well on Saturation		Shrink on drying (%): 7.3
loisture Content b		Shrinkage Moisture Content (%): 28.2
loisture Content a	fter (%): 31.0 rength before (kPa): 580	Est. inert material (%): 1.0 Crumbling during shrinkage: Nil
-	rength after (kPa): 200	Cracking during shrinkage: Minor
Shrink Swell		
	Shrinkage	Swell
10.0 + · ·		
10.0		
>		
Shrink (%) Esh - Swell (%) Esw		
(%)		
S 0.0	-+ <u>i</u> + <u>i</u> + <u>i</u> + <u>i</u>	
lsh	· · · · · · ·	
E (%		
¥ -5.0 - · ·		·····;·······;······;······;······;·····
ri Li		
o –		
-10.0 - · ·		
		25.0 30.0 35.0 40.0 45.0 50.0
0.0	5.0 10.0 15.0 20.0	20.0 00.0 40.0 40.0 00.0
0.0		
0.0		sture Content (%)

Comments



- 02 4968 4468
- т٠ 02 4960 9775
- F: E: W: E: admin@qualtest.com.au W: www.qualtest.com.au ABN: 98 153 268 896

Report No: SSI:NEW19W-3223--S05 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 25/09/2019 Sample Details Sample ID: NEW19W-3223--S05 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 13/09/2019 Source: **Date Submitted:** On Site 18/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar, NSW Sample Location: TP106 - (0.4 - 0.55m) **Borehole Number:** TP106 Borehole Depth (m): 0.4 - 0.55 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 1.7 6.3 Shrinkage Moisture Content (%): 28.1 Moisture Content before (%): 28.8 Moisture Content after (%): Est. inert material (%): 35.9 1.0 Est. Unc. Comp. Strength before (kPa): 500 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 250 Minor Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 4.0

Comments



- 02 4968 4468
- т٠ 02 4960 9775
- F: E: W: E: admin@qualtest.com.au W: www.qualtest.com.au ABN: 98 153 268 896

Report No: SSI:NEW19W-3223--S06 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 25/09/2019 Sample Details Sample ID: NEW19W-3223--S06 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 13/09/2019 Source: **Date Submitted:** On Site 18/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar, NSW Sample Location: TP107 - (0.7 - 0.85m) **Borehole Number:** TP107 Borehole Depth (m): 0.7 - 0.85 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 1.9 2.8 Moisture Content before (%): Shrinkage Moisture Content (%): 18.9 18.4 Moisture Content after (%): Est. inert material (%): 27.3 1.0 Est. Unc. Comp. Strength before (kPa): > 600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 400 Moderate Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 2.1

Comments



Shrink Swell Index Report	Report No: SSI:NEW19W-3223S0 Issue No:
Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309	Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included it this document are traceable to Australian/rational standards. Results provided relate only to the items tested or sampled. This report shall not be reproduced except in full.
Principal: Project No.: NEW17P-0054A Project Name: Proposed Subdivision - Stage 1 & 2	WORLD RECOGNISED ACCREDITATION
Sample Details	
ample ID: NEW19W-3223S07	Client Sample ID: -
est Request No.: -	Sampling Method: Sampled by Engineering Department
laterial: Clay	Date Sampled: 13/09/2019
ource: On Site	Date Submitted: 18/09/2019
pecification: No Specification	
roject Location: New England Highway, Lochinvar, NSV	V
cample Location: TP108 - (0.7 - 1.10m)	
Borehole Number: TP108	
Borehole Depth (m): 0.7 - 1.10	
Swell Test AS 1289	0.7.1.1 Shrink Test AS 1289.7.1.
well on Saturation (%): 6.7	Shrink on drying (%): 7.1
Noisture Content before (%): 28.9	Shrinkage Moisture Content (%): 29.9
Noisture Content after (%): 40.5 Est. Unc. Comp. Strength before (kPa): 390	Est. inert material (%): 1.0 Crumbling during shrinkage: Nil
Est. Unc. Comp. Strength after (kPa): 110	Cracking during shrinkage: Minor
Shrink Swell	Shrinkage 🔶 Sw ell
-	
10.0	
≥	
چ س 5.0	
□ 5.0 (%) 	
Shrink (%) Shrink	20.0 25.0 30.0 35.0 40.0 45.0 50.0
U 5.0 (%) HI S U S S	20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%)
U 5.0 (%) Hui S.0 -5.0 -10.0 -10.0	

Comments



	Swell In	dex Rep	oort			Report No: 55	I:NEW19W-322 Iss	3S0 ue No:
Client:	McCloy Projec PO Box 2214 Dangar NSW	t Management F 2309	Pty Ltd			The results of the test this document are tra Results provided relation	ance with ISO/IEC 17025-Testing. ts, calibrations and/or measuremer ceable to Australian/national stand te only to the items tested or samp be reproduced except in full.	ards.
Principal: Project No.: Project Name	NEW17P-0054 Proposed Sub		1 & 2		WORLD RECO	GNIBED (Senior Geotech	d Laboratory Number: 186	686
Sample De	etails							
ample ID:	NEW19W-	3223S08		Client Sa	mple ID: -			
est Request	No.: -			Sampling	Method: S	ampled by Enginee	ering Department	
aterial:	Clay			Date Sam	-	3/09/2019		
ource:	On Site			Date Sub	mitted: 1	8/09/2019		
pecification:	•							
roject Locat ample Locat	•	and Highway, Loch	invar, NSW					
Sorehole Nun	•	.0 - 1.3m)						
	oth (m): 1.0 - 1.3							
well Test	•	Δ	S 1289.7	.1.1 Shrink	Test		AS 1289	71
well on Satu		2.6			n drying (%):	7.6		
loisture Con	tent before (%):	30.7		Shrinkag	e Moisture C	ontent (%): 30.1		
	tent after (%):	35.4			material (%)			
	np. Strength befo				g during shr during shrin	-	_	
et line Con		I (KF d). 100		Clacking	during sinni	kage: Majo	1	
st. Unc. Con								
			Shr	inkage	Sw ell			
st. Unc. Con Chrink Sw			Shr	inkage 🔶	Sw ell			
Shrink Sw		· · · · · · · · · · · · · · · · · · ·	Shr	inkage	Sw ell			
hrink Sw	ell		Shr	inkage	Sw ell			
hrink Sw ۱۵			Shr	inkage 🔶	Sw ell			
hrink Sw ۱۵	ell	· · · · · · · · · · · · · · · · · · ·	Shr	inkage	Sw ell			
hrink Sw ۱۵			Shr	inkage	Sw ell			
hrink Sw ۱۵	eli		Shr	inkage	Sw ell			
t hrink Sw ۱۵			Shr	inkage	Sw ell			
t hrink Sw ۱۵	eli		Shr	inkage	Sw ell			•
hrink Sw ۱۵	eli		Shr	inkage	Sw ell			· ·
5hrink Sw ۱۵	ell	+ + +	Shr	inkage	Sw ell			•
(%) Esh - Swell (%) Esw	ell		Shr	inkage	Sw ell			· ·
t hrink Sw ۱۵	ell		Shr	inkage	Sw ell			•
Shrink (%) Esh - Swell (%) Esw	ell	10.0	Shr			35.0 40.0	45.0 50.	· · ·
Shrink (%) Esh - Swell (%) Esw	ell	10.0			30.0	35.0 40.0	45.0 50.	· · ·

Comments



	Swell Index	k Report		ĸ		NEW19W-3223S Issue No
lient:	McCloy Project Mana PO Box 2214 Dangar NSW 2309	agement Pty Ltd			The results of the tests, c this document are traceat	with ISO/IEC 17025-Testing. alibrations and/or measurements include le to Australian/national standards. nly to the items tested or sampled. produced except in full.
rincipal:				NAL		
roject No.:	NEW17P-0054A				Approved Signatory	y: Adam Dwyer
oject Name:	Proposed Subdivisio	n - Stage 1 & 2		WORLD RECORM	ISED (Senior Geotechnic	ian) aboratory Number: 18686
ample De						
mple ID:	NEW19W-3223{	509		Sample ID: -		
st Request N			-		mpled by Engineerir	ng Department
aterial:	Clay				09/2019	
ource:	On Site		Date S	ubmitted: 18/	09/2019	
ecification:	No Specification					
oject Locatio		hway, Lochinvar, NS	W			
orehole Num	•	m)				
	h (m): 0.5 - 0.9					
well Test		AS 128	9.7.1.1 Shrir	k Test		AS 1289.7.1
vell on Satur		6.3		on drying (%):	6.6	
	ent before (%):	27.5		age Moisture Co		
	ent after (%):	37.5		ert material (%):	1.0	
a une com	p. Strength before (kF	-		ling during shrin ng during shrink	-	
	n Strength after (kPa			ng duning sinnin	uge. Millor	
t. Unc. Com	p. Strength after (kPa): 100		<u> </u>	•	
		-	Shrinkage	Sw ell		
t. Unc. Com		-	1			
t. Unc. Com nrink Swe		-	1			· · · · · · · · · · · · · · · · · · ·
t. Unc. Comp nrink Swe		-	1			
t. Unc. Comp nrink Swe		-	1		<u>,</u>	
t. Unc. Comp nrink Swe		-	1			
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t. Unc. Com nrink Swe		-	1			
n rink Swe		-	1		- 	
n rink Swe		-	1		· · · · ·	
n rink Swe 10.1 (%) Esh - 0.1 (%) (%) (%)		-	1		+ + +	
n rink Swe		-	1		+ + +	
nrink Swer 10.1 (%) Esw (%) Swer (%) Esw (%) Swer (%) Swe		-	Shrinkage 9	Sw ell		45.0 50.0
nrink Swer 10.1 (%) Esw (%) Swer (%) Esw (%) Swer (%) Swe			Shrinkage	Sw ell		45.0 50.0

Comments



Shrink Sv	vell Index	Report			Report No:	SSI:NEW19W	-3223S10 Issue No: 1
Client: Mc PO	Cloy Project Manage Box 2214 ngar NSW 2309	-			The results of this document Results provid	compliance with ISO/IEC 1702 the tests, calibrations and/or m are traceable to Australian/nati ed relate only to the items teste all not be reproduced except in	easurements included in ional standards. ed or sampled.
	W17P-0054A pposed Subdivision - :	Stage 1 & 2			ECOGNIBED (Senior Ge DITATION NATA Acc	Signatory: Adam Dwyer totechnician) redited Laboratory Num ue: 25/09/2019	
Sample Details	3						
Sample ID:	NEW19W-3223S10		CI	lient Sample ID:	-		
est Request No.:	-		Sa	ampling Method:	Sampled by Eng	ineering Departm	ent
laterial:	Clay		Da	ate Sampled:	13/09/2019		
Source:	On Site		Da	ate Submitted:	18/09/2019		
Specification:	No Specification						
Project Location: Sample Location: Sorehole Number: Sorehole Depth (m	New England Highwa TP112 - (0.9 - 1.20m) TP112	-	W				
Swell Test	1. 0.3 - 1.20	AS 128	9.7.1.1 S	hrink Test		AS	289.7.1.
Swell on Saturation	ו (%):	1.8		hrink on drying (%	%): e	6.4	
Noisture Content b	efore (%):	29.0	S	hrinkage Moisture	Content (%): 2	9.6	
Aoisture Content a	fter (%):	33.9	E	st. inert material (%): 5	0.0	
st. Unc. Comp. St	rength before (kPa):	300		rumbling during s	-	Jil	
st. Unc. Comp. St	rength after (kPa):	210	C	racking during sh	rinkage: N	<i>l</i> inor	
Shrink Swell							
			Shrinkage	♦ Sw ell			
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Shrink (%) Esh - Swell (%) E			:			:	:
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	5.0 10.0	15.0		25.0 30.0 e Content (%)	35.0 40.0) 45.0	50.0
-10.0 - · ·	5.0 10.0	15.0		25.0 30.0 e Content (%)	35.0 40.0) 45.0	50.0

Comments



hrinl	k Sw	eu inc									
ient:	Mc0 PO	Cloy Project N Box 2214 ngar NSW 23	lanageme	•	•			Th thi Re	ccredited for complian re results of the tests, s document are trace esults provided relate ris report shall not be	, calibrations and/or eable to Australian/na only to the items tes	measurements include ational standards. sted or sampled.
rincipal: roject No. roject Nai		N17P-0054A posed Subdiv	vision - Sta	ge 1 & 2				ECOGNISED (S	pproved Signato Senior Geotechn ATA Accredited ate of Issue: 30	iician) Laboratory Nu	
ample [
mple ID:		NEW19W-32	23S11			Client Sa	mple ID:	-			
st Reque	est No.:	-				Sampling	Method:	Sampled I	by Engineer	ing Departn	nent
iterial:		Clay				Date Sam	pled:	13/09/201	9		
urce:		On Site				Date Sub	mitted:	18/09/201	9		
ecificatio	on:	No Specificat	ion								
oject Loc		New England	Highway, L	ochinvar, N	ISW						
mple Loc		TP113 - (0.5	5 - 0.9m)								
rehole N		TP113									
rehole D	epth (m)	0.55 - 0.9									
vell on Sa			6.0		89.7.1.1	11	n drying (%	-	7.9		
vell on Sa bisture Co bisture Co t. Unc. Co	aturation ontent be ontent af omp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0	09.7.1.1	Shrink or Shrinkag Est. inert Crumblin	n drying (% e Moisture material (' g during s	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co	aturation ontent be ontent af comp. Str	efore (%): ter (%):	31 38 e (kPa): 36	6 .5 .2 0	09.7.1.1	Shrink or Shrinkag Est. inert Crumblin	n drying (% e Moisture material ('	Content %): hrinkage:	(%): 31.3 1.0		1289.7.1
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vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co	aturation ontent be ontent af comp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0	Shrinkage	Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co	aturation ontent be ontent af comp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co	aturation ontent be ontent af omp. Str omp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa Disture Co Disture Co Disture Co t. Unc. Co Trink S	aturation ontent be ontent af comp. Str comp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co hrink S	aturation ontent be ontent af omp. Str omp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		· · · · · · · · · · · · · · · · · · ·
vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co hrink S	aturation ontent be ontent af comp. Str comp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co hrink S	aturation ontent be ontent af fomp. Str fomp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co hrink S	aturation ontent be ontent af comp. Str comp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co hrink S	aturation ontent be ontent af fomp. Str fomp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co hrink S	aturation ontent be ontent af fomp. Str fomp. Str fomp. Str fomp. Str for a for a fo	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa bisture Co bisture Co t. Unc. Co t. Unc. Co hrink S	aturation ontent be ontent af fomp. Str fomp. Str	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
vell on Sa Disture Co Disture Co Disture Co t. Unc. Co Trink S	aturation ontent be ontent af fomp. Str fomp. Str fomp. Str fomp. Str for a for a fo	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
sell on Sa Disture Co Disture Co t. Unc. Co t. Unc. Co t. Unc. Co Shrink Si Shrink Si	aturation ontent be ontent af fomp. Str fomp. Str fomp. Str fomp. Str for a for a fo	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0		Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (' g during s during sh	Content %): hrinkage:	(%): 31.3 1.0 Nil		
sell on Sa Disture Co Disture Co t. Unc. Co t. Unc. Co t. Unc. Co Shrink Si Shrink Si	aturation ontent be ontent af comp. Str comp. Str comp. Str 	efore (%): ter (%): ength before ength after (31 38 (kPa): 36 kPa): 10	6 .5 .2 0 0	Shrinkage	Shrink or Shrinkag Est. inert Crumblin Cracking	n drying (% e Moisture material (g during s during sh Sw ell	Content %): hrinkage: rinkage:	(%): 31.3 1.0 Nil Minor		
sell on Sa Disture Co Disture Co t. Unc. Co t. Unc. Co t. Unc. Co Shrink Si Shrink Si	aturation ontent be ontent af comp. Str comp. Str comp. Str 	efore (%): ter (%): ength before	31 38 e (kPa): 36	6 .5 .2 0 0	Shrinkage	Shrink or Shrinkag Est. inert Crumblin Cracking	a drying (% e Moisture material (' g during s during sh Sw ell	Content %): hrinkage:	(%): 31.3 1.0 Nil	45.0	50.0

Comments



	Swell Index	-					
lient:	McCloy Project Mana PO Box 2214 Dangar NSW 2309	igement Pty Ltd			The result this docum Results pr	for compliance with ISO/IE s of the tests, calibrations are tent are traceable to Austral ovided relate only to the iter s hall not be reproduced ex	nd/or measurements included lian/national standards. ns tested or sampled.
rincipal: roject No.: roject Name	NEW17P-0054A Proposed Subdivisior	n - Stage 1 & 2			COGNIBED (Senior	d Signatory: Adam E Geotechnician) .ccredited Laboratory Issue: 30/09/2019	
ample De ample ID:	etails NEW19W-3223S	212	Client	Sample ID:			
est Request		512		ng Method:	- Compled by E		
aterial:						ngineering Depa	anment
	Clay			ampled:	13/09/2019		
ource:	On Site		Date 5	ubmitted:	18/09/2019		
pecification: roject Locati	•	way, Lochinvar, NS۱	Λ/				
ample Locat		-	, v				
orehole Nun	,						
	th (m): 0.5 - 0.8						
well Test		AS 128	9.7.1.1 Shrin	k Test		Α	S 1289.7.1
well on Satu	ration (%):	4.3	Shrink	on drying (%):	7.8	
	tent before (%):	30.7		age Moisture		31.6	
	tent after (%):	35.0		ert material (%	-	1.0	
		'a): 350	11 Crumb	ling during sl	nrinkage:	Nil	
	np. Strength before (kP	. 140		na durina chr	inkaga	Minor	
st. Unc. Com	np. Strength after (kPa)	: 140		ng during shr	inkage:	Minor	
	np. Strength after (kPa)		Cracki		inkage:	Minor	
st. Unc. Com	np. Strength after (kPa)			ng during shr	inkage:	Minor	
st. Unc. Con <mark>hrink Sw</mark>	np. Strength after (kPa)		Cracki		inkage:	Minor	
st. Unc. Con <mark>hrink Sw</mark>	np. Strength after (kPa)		Cracki		inkage:	Minor	
st. Unc. Com hrink Sw 10	ell		Cracki		inkage:	Minor	
st. Unc. Com hrink Sw 10	np. Strength after (kPa)		Cracki		inkage:	Minor	
st. Unc. Com hrink Sw 10	ell		Cracki		inkage:	Minor	
st. Unc. Com hrink Sw 10	ell		Cracki		inkage:	Minor	
st. Unc. Com hrink Sw 10	ell		Cracki		inkage:	Minor	
st. Unc. Com hrink Sw 10	ell		Cracki		inkage:	Minor	· · · · · · · · · · · · · · · · · · ·
st. Unc. Com hrink Sw 10	ell		Cracki		inkage:	Minor	· · · · · · · · · · · · · · · · · · ·
st. Unc. Com hrink Sw 10	ell		Cracki		inkage:	Minor	· · · · · · · · · · · · · · · · · · ·
st. Unc. Com hrink Sw 10 MSJ (%) Esh - (%) (%)	ell		Cracki		inkage:	Minor	· · · · · · · · · · · · · · · · · · ·
st. Unc. Com hrink Sw 10 Shrink (%) Esw 2 Shrink (%) Esw 2 5	ell		Cracki		inkage:	Minor	· · · · · · · · · · · · · · · · · · ·
st. Unc. Com hrink Sw 10	ell .0 .0 .0 .0 .0 .0 .0		Shrinkage	Sw ell			
st. Unc. Com hrink Sw 10 Shrink (%) Esw 2 Shrink (%) Esw 2 5	ell 0.0		Shrinkage	Sw ell		Minor	
st. Unc. Com hrink Sw 10 Shrink (%) Esw 2 Shrink (%) Esw 2 5	ell .0 .0 .0 .0 .0 .0 .0		Shrinkage	Sw ell			50.0

Comments



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Report No: SSI:NEW19W-3224--S01 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 30/09/2019 Sample Details Sample ID: NEW19W-3224--S01 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 13/09/2019 Source: **Date Submitted:** On Site 18/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP116 - (0.7 - 0.9m) **Borehole Number:** TP116 Borehole Depth (m): 0.7 - 0.9 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 4.2 6.8 Moisture Content before (%): Shrinkage Moisture Content (%): 26.0 25.6 Moisture Content after (%): Est. inert material (%): 29.6 2.0 Est. Unc. Comp. Strength before (kPa): 590 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 180 Minor Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 4.9

Comments



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Report No: SSI:NEW19W-3224--S02 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 30/09/2019 Sample Details Sample ID: NEW19W-3224--S02 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 13/09/2019 Source: **Date Submitted:** On Site 18/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP117 - (0.7 - 0.9m) **Borehole Number:** TP117 Borehole Depth (m): 0.7 - 0.9 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 6.2 6.5 Moisture Content before (%): Shrinkage Moisture Content (%): 27.3 28.8 Moisture Content after (%): Est. inert material (%): 37.1 1.0 Est. Unc. Comp. Strength before (kPa): 450 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 130 Minor Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 5.3

Comments



SULU	k Sw	vell Ind	lex R	epor	t						V-3224S(Issue No
Client:	PO	Cloy Project M Box 2214 ngar NSW 2	•	nt Pty Ltd					ccredited for complian ne results of the tests is document are trace esults provided relate nis report shall not be	 calibrations and/or r eable to Australian/na only to the items tes 	measurements included ational standards. sted or sampled.
Principal: Project No Project Na		W17P-0054A posed Subdiv		ge 1 & 2				ECOGNISED (S	pproved Signati Senior Geotechr ATA Accredited ate of Issue: 25	nician) Laboratory Nur	
ample											
ample ID:		NEW19W-32	24S03			Client Sar	•	-			
est Reque	est No.:	-				Sampling		Sampled	by Engineer	ring Departn	nent
aterial:		Clay				Date Sam	-	13/09/201	19		
ource:		On Site				Date Subr	nitted:	18/09/201	19		
pecificatio		No Specificat									
roject Loc		New England		ochinvar							
ample Loo orehole N		TP118 - (1.2 TP118	- 1.45M)								
		1.2 - 1.45									
well Te	st			AS 12	89.7.1.1	Shrink	Test			AS	1289.7.1
well on Sa		(%):	2.6		••••••		drying (%	.):	3.4		
oisture C	ontent b	efore (%):	20	.9		Shrinkag	e Moisture	Content	(%): 20.8		
oisture C		• •	26				material (-	1.0		
	-	ength before		0		11	g during s	-	Nil		
	-	rength after ((kPa): 25	0		Cracking	during sh	rinkage:	Mode	rate	
hrink S	Swell				Chrinker		Sw ell				
					Shrinkage	•	Swei				
	10.0		• • • • • • • • • •			<u>.</u>				· · · · · · · · · · · · · ·	
	10.0	· · · · · · · · · · · · · · · · · · ·				· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		- 10	· · · · · · · · · · · · · · · · · · ·	
MS	10.0 - · · · ·			-		· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·		· · · · · · · · · · · · · · · · · · ·	
6) Esw	10.0 - · · · · · · · · · · · · · · · · · ·										
ill (%) Esw	-	· · · · · · · · · · · · · · · · · · ·									
Swell (%) Esw	5.0 - · · ·										
h - Swell (%) Esw	-		·····								
) Esh - Swell (%) Esw	5.0 - · · ·										
(%) Esh - Swell (%) Esw	5.0 - · · · · 0.0										
rink (%) Esh - Swell (%) Esw	5.0 - · · ·	-+ - + - +					· · · · · · · · · · · · · · · · · · ·				
Shrink (%) Esh - Swell (%) Esw	5.0 - · · · · 0.0						· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·			
Shrink (%) Esh - Swell (%) Esw	-5.0 - · · · ·						· · · · · · · · · · · · · · · · · · ·				
Shrink (%) Esh - Swell (%) Esw	5.0 - · · · · 0.0 5.0 - · · · ·	5.0	10.0	15.0	20.0	25.0	30.0	35 0	40.0	45.0	50.0
Shrink (%) Esh - Swell (%) Esw	-5.0 - · · · ·	5.0	10.0	15.0	20.0 Moi	25.0 sture Content	30.0	35.0	40.0	45.0	50.0

Comments



	ell Index Report	Report No: SSI:NEW19W-3224 Issue N
Client: McClo PO B	oy Project Management Pty Ltd ox 2214 ar NSW 2309	Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements inclu- this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. This report shall not be reproduced except in full.
	17P-0054A osed Subdivision - Stage 1 & 2	Approved Signatory: Adam Dwyer (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 3/10/2019
Sample Details		
ample ID:	NEW19W-3224S04	Client Sample ID: -
est Request No.: -	-	Sampling Method: Sampled by Engineering Department
laterial:	Clay	Date Sampled: 13/09/2019
ource:	On Site	Date Submitted: 18/09/2019
pecification:	No Specification	
•	New England Highway, Lochinvar	
	TP120 - (0.5 - 0.65m)	
orehole Number:	TP120	
orehole Depth (m):	0.5 - 0.65	
well Test	AS 1289.	7.1.1 Shrink Test AS 1289.7.
well on Saturation (%	%): 3.6	Shrink on drying (%): 8.4
loisture Content befo	ore (%): 26.8	Shrinkage Moisture Content (%): 27.6
loisture Content afte		Est. inert material (%): 1.0
	ngth before (kPa): 290	Crumbling during shrinkage: Nil
st. Unc. Comp. Strer	ngth after (kPa): 130	Cracking during shrinkage: Minor
Shrink Swell		
	Sh	nrinkage 🔶 Swell
10.0 + · · · · ·		
10.0		
-		
-		
-	·····	
-		
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(%) Esh - Swell (%) Esw		
Shrink (%) Esh - Swell (%) Esw		
-		
Shrink (%) Esh - Swell (%) Esw	5.0 10.0 15.0 2	20.0 25.0 30.0 35.0 40.0 45.0 50.0
Shrink (%) Esw -10.0 -10.0	5.0 10.0 15.0 2	20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%)
Shrink (%) Esw -10.0 -10.0	5.0 10.0 15.0 2	

Comments



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Report No: SSI:NEW19W-3224--S05 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 8/10/2019 Sample Details Sample ID: NEW19W-3224--S05 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 13/09/2019 Source: **Date Submitted:** On Site 18/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP121 - (1.10 - 1.25m) **Borehole Number:** TP121 Borehole Depth (m): 1.10 - 1.25 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 9.4 8.2 Moisture Content before (%): Shrinkage Moisture Content (%): 27.2 28.4 Moisture Content after (%): Est. inert material (%): 39.6 2.0 Est. Unc. Comp. Strength before (kPa): 370 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 80 Nil Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 7.2

Comments



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Report No: SSI:NEW19W-3224--S06 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 3/10/2019 Sample Details Sample ID: NEW19W-3224--S06 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 13/09/2019 Source: **Date Submitted:** On Site 18/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP122 - (0.6 - 0.9m) **Borehole Number: TP122** Borehole Depth (m): 0.6 - 0.9 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 7.3 4.5 Moisture Content before (%): Shrinkage Moisture Content (%): 20.8 20.5 Moisture Content after (%): Est. inert material (%): 32.2 1.0 Est. Unc. Comp. Strength before (kPa): > 600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 190 Minor Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 4.5

Comments



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Report No: SSI:NEW19W-3224--S07 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 8/10/2019 Sample Details Sample ID: NEW19W-3224--S07 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 13/09/2019 Source: **Date Submitted:** On Site 18/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP123 - (0.9 - 1.10m) **Borehole Number: TP123** Borehole Depth (m): 0.9 - 1.10 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 10.0 6.6 Moisture Content before (%): Shrinkage Moisture Content (%): 23.3 24.5 Moisture Content after (%): Est. inert material (%): 34.2 1.0 Est. Unc. Comp. Strength before (kPa): 550 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 100 Nil Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 6.4

Comments



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Report No: SSI:NEW19W-3224--S08 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 3/10/2019 Sample Details Sample ID: NEW19W-3224--S08 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 13/09/2019 Source: **Date Submitted:** On Site 18/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP124 - (0.6 - 0.75m) **Borehole Number:** TP124 Borehole Depth (m): 0.6 - 0.75 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 5.5 4.9 Shrinkage Moisture Content (%): 21.0 Moisture Content before (%): 21.3 Moisture Content after (%): Est. inert material (%): 29.4 5.0 Est. Unc. Comp. Strength before (kPa): >600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 370 Minor Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 4.3

Comments



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Report No: SSI:NEW19W-3224--S09 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 3/10/2019 Sample Details Sample ID: NEW19W-3224--S09 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 13/09/2019 Source: **Date Submitted:** On Site 18/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP125 - (0.7 - 0.9m) **Borehole Number:** TP125 Borehole Depth (m): 0.7 - 0.9 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 4.4 7.0 Moisture Content before (%): Shrinkage Moisture Content (%): 27.5 29.3 Moisture Content after (%): Est. inert material (%): 34.5 1.0 Est. Unc. Comp. Strength before (kPa): >600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 170 Minor Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 5.1

Comments



shrink S	well Index	Report		Repo	rt No: SSI:NEW1	Issue No:
lient:	McCloy Project Mana PO Box 2214 Dangar NSW 2309	-			Accredited for compliance with ISO/IE The results of the tests, calibrations ar his document are traceable to Austral Results provided relate only to the iten This report shall not be reproduced ex	d/or measurements included an/national standards. ns tested or sampled.
	NEW17P-0054A Proposed Subdivision	- Stage 1 & 2		WORLD RECOGNISED	Approved Signatory: Adam E (Senior Geotechnician) WATA Accredited Laboratory Date of Issue: 4/10/2019	
ample Deta	nils					
ample ID:	NEW19W-3224S	10	Client Sa	nple ID: -		
est Request No).: -		Sampling	Method: Sampled	by Engineering Depa	artment
aterial:	Clay		Date Sam	pled: 13/09/20	19	
ource:	On Site		Date Sub	nitted: 18/09/20	19	
pecification:	No Specification					
roject Location	: New England High	way, Lochinvar				
ample Locatior	1: TP126 - (0.5 - 0.75	im)				
orehole Numbe	er: TP126					
orehole Depth	(m): 0.5 - 0.75					
well Test		AS 1289	.7.1.1 Shrink	Test	Α	S 1289.7.1
well on Saturat	ion (%):	0.4		drying (%):	9.5	
oisture Conten	t before (%):	35.5	Shrinkag	e Moisture Content	: (%): 34.5	
oisture Conten		40.4		material (%):	1.0	
	Strongth hoforo (kP	-		g during shrinkage	e: Nil	
st. Unc. Comp. st. Unc. Comp.	Strength after (kPa)	: 120	Cracking	during shrinkage:	Moderate	
st. Unc. Comp.	Strength after (kPa)	: 120	Cracking	during shrinkage:	Moderate	
st. Unc. Comp.	Strength after (kPa)		Cracking	during shrinkage: Swell	Moderate	
st. Unc. Comp.	Strength after (kPa)				Moderate	
st. Unc. Comp. h <mark>rink Swell</mark>	Strength after (kPa)				Moderate	· · · · · · · · · · · · · · · · · · ·
at. Unc. Comp. hrink Swell	Strength after (kPa)				Moderate	· · · · · · · · · · · · · · · · · · ·
st. Unc. Comp. hrink Swell	Strength after (kPa)				Moderate	
st. Unc. Comp. hrink Swell	Strength after (kPa)				Moderate	· · · · · · · · · · · · · · · · · · ·
st. Unc. Comp. hrink Swell	Strength after (kPa)				Moderate	
st. Unc. Comp. hrink Swell	Strength after (kPa)				Moderate	
st. Unc. Comp. hrink Swell	Strength after (kPa)				Moderate	· · · · · · · · · · · · · · · · · · ·
st. Unc. Comp. hrink Swell	Strength after (kPa)				Moderate	· · · · · · · · · · · · · · · · · · ·
st. Unc. Comp. hrink Swell	Strength after (kPa)				Moderate	
st. Unc. Comp. hrink Swell	Strength after (kPa)				Moderate	
st. Unc. Comp. hrink Swell 10.0 MSI (%) IIIMS - USI (%) IIIMS - USI (%)	Strength after (kPa)				Moderate	· · · · · · · · · · · · · · · · · · ·
st. Unc. Comp. hrink Swell	Strength after (kPa)				Moderate	· · · · · · · · · · · · · · · · · · ·
st. Unc. Comp. hrink Swell 10.0 (%) Suring (%) (%) (%) (%) (%) (%) (%) (%) (%) (%)	Strength after (kPa)	S	Shrinkage	Sw ell		
st. Unc. Comp. hrink Swell 10.0 (%) Esh (%) Swell (%) Unc. Comp. (%) Swell (%) Swell (Strength after (kPa)	S	Shrinkage	Sw ell	Moderate	
st. Unc. Comp. hrink Swell 10.0 (%) Ilens (%)	Strength after (kPa)	S	Shrinkage	Sw ell		

Comments



hrink S	Swell Ir	ndex R	eport				Report No: SS		Issue No
ient:	McCloy Proje PO Box 2214 Dangar NSW	C C	nt Pty Ltd				The results of the tes this document are tra Results provided rela	ance with ISO/IEC 1702 ts, calibrations and/or me ceable to Australian/nati te only to the items teste be reproduced except in t	easurements include onal standards. ed or sampled.
incipal: oject No.: oject Name:	NEW17P-005 Proposed Sul		ge 1 & 2			WORLD RECO	(Senior Geotect NATA Accredite	d Laboratory Num	
ample Det	aile						Date of Issue: 4	1/10/2019	
mple ID:		/-3224S11			Client Sar	nple ID: -			
st Request N		011 011			Sampling		ampled by Enginee	ering Departm	ent
terial:	Clay				Date Sam		3/09/2019	ning Doparan	
urce:	On Site				Date Subr		3/09/2019		
ecification:		Section.			Date Subi		5/09/2019		
oject Locatio	No Specif	and Highway, L	ochinvar						
mple Locatio	-	0.75 - 1.05m)	ochinvai						
rehole Numb	,	0.10 1.0011							
rehole Depth	i (m): 0.75 - 1.0	5							
vell Test			AS 128	89.7.1.1	Shrink	Test		AS 1	289.7.1
ell on Satura	tion (%):	6.2				drying (%):	10.6	-	
	nt before (%):	34	.9		-		ontent (%): 34.2		
oisture Conte	• •	42				material (%)			
	Stronath ho	f ore (kPa): 35				g during shri	-		
t. Unc. Comp	-							r	
t. Unc. Comp	. Strength after	er (kPa): 90			Cracking	during shrin	kage: Mino	1	
-	. Strength after	er (kPa): 90			Cracking		kage: Mino	1	
t. Unc. Comp	. Strength after	er (kPa): 90	•	Shrinkage		during shrin Swell	kage: Mino	1	
t. Unc. Comp	o. Strength afte	er (kPa): 90		Shrinkage	Cracking		Kage: Mino	· · · · · · · · · · · · · · · · · · · ·	
t. Unc. Comp nrink Swe	o. Strength afte	er (kPa): 90		Shrinkage	Cracking		Kage: Mino	· · · · · · · · · · · · · · · · · · · ·	
t. Unc. Comp	o. Strength after	er (kPa): 90			•		Kage: Mino		
t. Unc. Comp	o. Strength after	er (kPa): 90		Shrinkage	•		Kage: Mino	•	
t. Unc. Comp	o. Strength after	er (kPa): 90			•		Kage: Mino	· · · · · · · · · · · · · · · · · · ·	
t. Unc. Comp	b. Strength after	er (kPa): 90			•		Kage: Mino		
t. Unc. Comp	b. Strength after	er (kPa): 90			•		Kage: Mino		· · · · · · · · · · · · · · · · · · ·
t. Unc. Comp	b. Strength after	er (kPa): 90			•		Kage: Mino	· · · · · · · · · · · · · · · · · · ·	
t. Unc. Comp	b. Strength after	er (kPa): 90			•		Kage: Mino	· · · · · · · · · · · · · · · · · · ·	
t. Unc. Comp	b. Strength after	er (kPa): 90			•		Kage: Mino		
t. Unc. Comp nrink Swe 10.0 Ms 5.0 (%) Head (%) Uno.	b. Strength after	er (kPa): 90			•		Kage: Mino		
t. Unc. Comp	b. Strength after	er (kPa): 90			•		Kage: Mino		
t. Unc. Comp nrink Swel 10.0 (%) Unov (%) Unov (b. Strength aft				•	Sw ell			
t. Unc. Comp nrink Swel 10.0 (%) Unov (%) Unov (b. Strength after	er (kPa): 90		20.0	25.0	Sw ell	Kage: Mino 5.0 40.0	45.0	50.0
t. Unc. Comp nrink Swel 10.0 (%) Unov (%) Unov (b. Strength aft			20.0	•	Sw ell			50.0

Comments



				Repor	rt No: SSI:NEW1	9W-3284S0 Issue No:
	well Index	-			Accredited for compliance with ISO//EC	
P	cCloy Project Manage O Box 2214 angar NSW 2309	ement Pty Ltd			The results of the tests, calibrations an this document are traceable to Australi Results provided relate only to the item This report shall not be reproduced exc	d/or measurements included ir an/national standards. s tested or sampled.
Principal:				NAIA	XX	
	EW17P-0054A				Approved Signatory: Adam D	wyer
Project Name: Pi	oposed Subdivision -	Stage 1 & 2		ACCREDITATION	(Senior Geotechnician) NATA Accredited Laboratory Date of Issue: 3/10/2019	Number: 18686
Sample Detail						
Sample ID:	NEW19W-3284S0 ²	1		ample ID:		
est Request No.:			-		by Engineering Depa	irtment
laterial:	Clay		Date Sa			
ource:	On Site		Date Su	bmitted: 26/09/20	19	
pecification:	No Specification					
Project Location:	New England Highw	-				
Sample Location: Sorehole Number:	TP201 - (0.8 - 1.0m) TP201					
Borehole Depth (n						
Swell Test		AS 1289		k Test	A	S 1289.7.1.
well on Saturatio		0.2		on drying (%):	6.9	
loisture Content		34.7		age Moisture Content		
Aoisture Content	trength before (kPa)	36.9		ert material (%): ling during shrinkage	1.0 •: Nil	
	trength after (kPa):	120		ng during shrinkage:	Major	
				.gg		
Shrink Swell		■ S	hrinkage	Sw ell		
10.0 T ·						
10.0				· · ·	· · ·	•
>	: :		: :			-
Х Ш 5.0+-						
(%)						:
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<u>ه</u> 0.0			-i + i	- i - i - 🍎	· · · · ·	
Shrink (%) Esh - Swell (%)				and the second		-
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 ₹ -5.0 - ·	· · · · · · · · · · · · · · · · · · ·					
shrit						÷
0,						÷
-10.0 - •	••••••					· · · · · · · · · · · · · · · · · · ·
0.0	5.0 10.0	15.0	20.0 25.0	30.0 35.0	40.0 45.0	50.0
			Moisture Conte	ent (%)		
Shrink Swall	ndex - Iss (%):	3 9				
	114CA - 133 (/0).	0.0				

Comments


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- т٠ 02 4960 9775
- F: E: W: E: admin@qualtest.com.au W: www.qualtest.com.au ABN: 98 153 268 896

Report No: SSI:NEW19W-3284--S02 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 3/10/2019 Sample Details Sample ID: NEW19W-3284--S02 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 20/09/2019 Source: **Date Submitted:** On Site 26/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP202 - (1.0 - 1.15m) **Borehole Number:** TP202 Borehole Depth (m): 1.0 - 1.15 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 3.6 7.6 Moisture Content before (%): Shrinkage Moisture Content (%): 28.0 29.0 Moisture Content after (%): Est. inert material (%): 37.1 1.0 Est. Unc. Comp. Strength before (kPa): 410 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 130 Minor Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 5.2

Comments



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Report No: SSI:NEW19W-3284--S03 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 8/10/2019 Sample Details Sample ID: NEW19W-3284--S03 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 20/09/2019 Source: **Date Submitted:** On Site 26/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP203 - (0.7 - 0.85m) **Borehole Number:** TP203 Borehole Depth (m): 0.7 - 0.85 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 4.8 5.5 Moisture Content before (%): Shrinkage Moisture Content (%): 24.3 24.6 Moisture Content after (%): Est. inert material (%): 33.4 2.0 Est. Unc. Comp. Strength before (kPa): > 600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 140 Nil Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 4.4

Comments



hrink	SIAL	ell Inde			f					13500	e No
lient:	McClo PO B	by Project Ma ox 2214 ar NSW 230	anagemei	-				The res this do Results	sults of the tests, calibra cument are traceable to	ISO/IEC 17025-Testing, ations and/or measurements i Australian/national standard the items tested or sampled, uced except in full.	s.
rincipal: roject No.: roject Nam		17P-0054A osed Subdivis	sion - Sta	ge 1 & 2				COGNISED (Seni	oved Signatory: A or Geotechnician) Accredited Labo of Issue: 3/10/20) pratory Number: 18686	3
ample D	etails] [
mple ID:		NEW19W-3284	4S04			Client Sa	mple ID:	-			
st Reques	t No.:					Sampling	Method:	Sampled by	Engineering	Department	
aterial:	(Clay				Date Sam	pled:	20/09/2019			
ource:	(On Site				Date Sub	mitted:	26/09/2019			
ecificatior	ז :	No Specificatio	n								
oject Loca		New England H		ochinvar							
mple Loca		ГР204 - (0.35 ·									
orehole Nu	mber:	FP204									
orehole De	pth (m): ().35 - 0.5									
well Tes	st			AS 12	89.7.1.1	Shrink	Test			AS 1289.	7.1
vell on Sat	-	%):	0.1	l		Shrink or	n drying (%	-	7.0		_
						11					
oisture Co			32				e Moisture	-	-		
oisture Co	ntent afte	r (%):	35	.0		Est. inert	material (%	6):	1.0		
oisture Co t. Unc. Co	ntent afte mp. Strei	r (%): ngth before	35 (kPa): 36	.0 0		Est. inert Crumblin	a material (% ng during sl	%): hrinkage:	1.0 Nil		
bisture Con t. Unc. Co t. Unc. Co	ntent afte mp. Strei mp. Strei	r (%):	35 (kPa): 36	.0 0		Est. inert Crumblin	material (%	%): hrinkage:	1.0		_
oisture Co t. Unc. Co	ntent afte mp. Strei mp. Strei	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkade	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
bisture Con t. Unc. Co t. Unc. Co	ntent afte mp. Strei mp. Strei	r (%): ngth before	35 (kPa): 36	.0 0	Shrinkage	Est. inert Crumblin Cracking	a material (% ng during sl	%): hrinkage:	1.0 Nil		
oisture Col it. Unc. Co it. Unc. Co <mark>hrink Sv</mark>	ntent afte mp. Strei mp. Strei	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkage	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
oisture Col it. Unc. Co it. Unc. Co <mark>hrink Sv</mark>	ntent afte mp. Strer mp. Strer vell	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkage	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
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bisture Con it. Unc. Co it. Unc. Co hrink Sv	ntent afte mp. Strer mp. Strer vell	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkage	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
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bisture Con it. Unc. Co it. Unc. Co hrink Sv	ntent afte mp. Stren mp. Stren vell	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkage	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
bisture Con it. Unc. Co it. Unc. Co hrink Sv	ntent afte mp. Stren mp. Stren vell	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkage	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
bisture Con it. Unc. Co it. Unc. Co hrink Sv	ntent afte mp. Stren mp. Stren vell	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkage	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
bisture Con it. Unc. Co it. Unc. Co hrink Sv	ntent afte mp. Stren mp. Stren vell	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkage	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
bisture Con it. Unc. Co it. Unc. Co hrink Sv	ntent afte mp. Stren mp. Stren vell	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkage	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
oisture Con it. Unc. Co it. Unc. Co nrink Sv (%) Esh - Swell (%) (%) Esh - (%)	ntent afte mp. Stren mp. Stren vell	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkage	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
Shrink (%) Esh - Swell (%) Esh	ntent afte mp. Stren mp. Stren vell 10.0 - · · · · · 5.0 - · · · · -5.0 - · · · ·	r (%): ngth before	35 (kPa): 36	.0 0 0	Shrinkage	Est. inert Crumblin Cracking	material (% g during sl during shr	%): hrinkage:	1.0 Nil		
Shrink (%) Esh - Swell (%) Esh	ntent afte mp. Stren mp. Stren vell 10.0 5.0 -5.0 -5.0 10.0 	er (%): ngth before ngth after (k	35 (kPa): 36 Pa): 19			Est. inert Crumblin Cracking	material (% ng during sh during shr Sw ell	6): nrinkage: inkage:	1.0 Nil Major		
Shrink (%) Esh - Swell (%) Esh	ntent afte mp. Stren mp. Stren vell 10.0 - · · · · · 5.0 - · · · · -5.0 - · · · ·	r (%): ngth before	35 (kPa): 36	.0 0 0	20.0	Est. inert Crumblin Cracking	material (% ng during sh during shr Sw ell	%): hrinkage:	1.0 Nil Major	45.0 50.0	
Shrink (%) Esh - Swell (%) Esh	ntent afte mp. Stren mp. Stren vell 10.0 5.0 -5.0 -5.0 	er (%): ngth before ngth after (k	35 (kPa): 36 Pa): 19		20.0	Est. inert Crumblin Cracking	material (% ng during sh during shr Sw ell	6): nrinkage: inkage:	1.0 Nil Major	45.0 50.0	

Comments



hrink :	Swell	Index R	epor	t			Report			Issue No:
lient:	McCloy Pro PO Box 22 Dangar NS		nt Pty Ltd				Th this Re	credited for compliance e results of the tests, s document are tracer sults provided relate of is report shall not be n	calibrations and/or n able to Australian/na only to the items test	neasurements included tional standards. ted or sampled.
rincipal:								MK)		
roject No.:	NEW17P-0							oproved Signato		r
roject Name:	: Proposed S	Subdivision - Sta	ge 1 & 2				DITATION N/	enior Geotechni ATA Accredited ate of Issue: 8/1	Laboratory Nun	nber: 18686
ample De	tails									
ample ID:		9W-3284S05			Client Sar	-	-			
est Request N	No.: -				Sampling		Sampled b	by Engineeri	ng Departm	nent
aterial:	Clay				Date Sam	pled:	20/09/201	9		
ource:	On Site	e			Date Sub	mitted:	26/09/201	9		
pecification:	No Spe	ecification								
roject Locatio		ngland Highway, L	ochinvar							
ample Locati		- (0.4 - 0.55m)								
orehole Num										
orehole Dept	: h (m): 0.4 - 0.	.55								
well Test			AS 12	89.7.1.1	Shrink	Test			AS '	1289.7.1
well on Satur	ation (%):	2.0	6		Shrink or	n drying (%	b):	8.2		
		/ · · · · · · · · · · · · · · · · · · ·					0			
oisture Conte		-	.8		Shrinkag			(%): 34.6		
oisture Conte	ent after (%)	: 36	.9		Est. inert	material (%):	1.0		
oisture Conte st. Unc. Com	ent after (%) p. Strength b	: 36 before (kPa): 23	.9 0		Est. inert Crumblin	material (' g during s	%): hrinkage:	1.0 Nil		
oisture Conte	ent after (%) p. Strength b	: 36 before (kPa): 23	.9 0		Est. inert Crumblin	material (%): hrinkage:	1.0		
oisture Conte st. Unc. Com	ent after (%) p. Strength b p. Strength a	: 36 before (kPa): 23	.9 0		Est. inert Crumblin	material (' g during s	%): hrinkage:	1.0 Nil		
oisture Conte st. Unc. Com st. Unc. Com	ent after (%) p. Strength b p. Strength a	: 36 before (kPa): 23	.9 0	Shrinkage	Est. inert Crumblin	material (' g during s	%): hrinkage:	1.0 Nil		
oisture Conte st. Unc. Com st. Unc. Com	ent after (%) p. Strength b p. Strength a	: 36 before (kPa): 23	9.9 0 0	Shrinkage	Est. inert Crumblin	material (g during s during sh	%): hrinkage:	1.0 Nil		
oisture Conte st. Unc. Com st. Unc. Com	ent after (%) p. Strength I p. Strength a ell	: 36 before (kPa): 23	9.9 0 0	Shrinkage	Est. inert Crumblin	material (g during s during sh	%): hrinkage:	1.0 Nil		·····
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oisture Conto st. Unc. Com st. Unc. Com hrink Swe 10.	ent after (%) p. Strength t p. Strength a ell	: 36 before (kPa): 23	9.9 0 0	Shrinkage	Est. inert Crumblin	material (g during s during sh	%): hrinkage:	1.0 Nil		· · · · · · · · · · · · · · · · · · ·
oisture Conto st. Unc. Com st. Unc. Com hrink Swe 10.	ent after (%) p. Strength t p. Strength a ell	: 36 before (kPa): 23	9.9 0 0	Shrinkage	Est. inert Crumblin	material (g during s during sh	%): hrinkage:	1.0 Nil		
oisture Conto st. Unc. Com st. Unc. Com hrink Swe 10.	ent after (%) p. Strength t p. Strength a ell	: 36 before (kPa): 23	9.9 0 0	Shrinkage	Est. inert Crumblin	material (g during s during sh	%): hrinkage:	1.0 Nil		
oisture Conto st. Unc. Com st. Unc. Com hrink Swe 10.	ent after (%) p. Strength t p. Strength a ell	: 36 before (kPa): 23	9.9 0 0	Shrinkage	Est. inert Crumblin	material (g during s during sh	%): hrinkage:	1.0 Nil		·····
oisture Conto st. Unc. Com st. Unc. Com hrink Swe 10.	ent after (%) p. Strength t p. Strength a ell	: 36 before (kPa): 23	9.9 0 0	Shrinkage	Est. inert Crumblin	material (g during s during sh	%): hrinkage:	1.0 Nil		· · · · · · · · · · · · · · · · · · ·
oisture Conto st. Unc. Com st. Unc. Com hrink Swe 10. 83 (%) Ness (%) Ness (%) Ness (%) Ness (%) Ness (%)	ent after (%) p. Strength t p. Strength a ell	: 36 before (kPa): 23	9.9 0 0	Shrinkage	Est. inert Crumblin	material (g during s during sh	%): hrinkage:	1.0 Nil	· · · · · · · · · · · · · · · · · · ·	
oisture Conto st. Unc. Com st. Unc. Com hrink Swe 10.	ent after (%) p. Strength t p. Strength a all	: 36 before (kPa): 23	9.9 0 0	Shrinkage	Est. inert Crumblin	material (g during s during sh	%): hrinkage:	1.0 Nil		
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oisture Conta st. Unc. Com st. Unc. Com hrink Swe 10. 83 (%) Ilense (%) Ilense (%) Swe (%) Ilense (%) Ilense (%) Swe (%) Swe (ent after (%) p. Strength t p. Strength a all o - o - o - o - o - o - o - o - o - o - o - o - o - o - o - o - o - - - - - - - - - - - - -	: 36 before (kPa): 23 after (kPa): 14	9 0 0	20.0	Est. inert Crumblin Cracking	material (g during s during sh Sw ell	%): hrinkage: rinkage:	1.0 Nil Nil	45.0	
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incipal:								TA	01K		
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	Details		004 000			Client Se					
mple ID:		NEW19W-32	284506			Client Sa	-	-			
st Reque	est No.:	-				Sampling			d by Enginee	ring Depar	tment
terial:		Clay				Date Sam	-	20/09/20			
urce:		On Site				Date Sub	mitted:	26/09/20)19		
ecificatio		No Specifica		ochinyor							
oject Loo mple Loo		New England TP205 - (1.0									
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	aturation	n (%):	7.				n drying (%	6):	7.2		
		efore (%):	32	2.3			e Moisture		t (%): 31.0		
isturo 🔿	ontont a	fter (%):	43	3.4		Ect inort	material (0/ \.	1.0		
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t. Unc. C	Comp. St Comp. St	rength befor		30)	Shrinkag	Crumblir Cracking	ng during s during sh	shrinkag	e: Nil	rate	
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Comments



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Report No: SSI:NEW19W-3284--S07 **Issue No: 1** Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 3/10/2019 Sample Details Sample ID: NEW19W-3284--S07 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 20/09/2019 Source: **Date Submitted:** On Site 26/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP206 - (0.4 - 0.7m) **Borehole Number:** TP206 Borehole Depth (m): 0.4 - 0.7 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 0.4 6.4 Moisture Content before (%): Shrinkage Moisture Content (%): 26.5 26.5 Moisture Content after (%): Est. inert material (%): 35.6 1.0 Est. Unc. Comp. Strength before (kPa): > 600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 200 Major Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 3.7

Comments



	k 914	vell Inc	lov P	onor	ł					W-3284S Issue No
lient:	Mc PO	Cloy Project I Box 2214 ngar NSW 2	Manageme	-				The results of th this document a Results provider	ompliance with ISO/IEC 17 le tests, calibrations and/or re traceable to Australian/n d relate only to the items te not be reproduced except	measurements include national standards. ested or sampled.
rincipal: roject No roject Na	o.: NE	W17P-0054A pposed Subdi	Ą	ige 1 & 2				Approved Si (Senior Geo) ignatory: Adam Dwy	er
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mple ID:	Details	NEW19W-32	284508			Client Sam	nple ID: -			
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oject Loo mple Lo prehole N	cation: ocation: Number:	No Specifica New England TP207 - (0.4 TP207 : 0.4 - 0.6	d Highway, I	₋ochinvar						
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Comments



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Report No: SSI:NEW19W-3284--S09 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 14/10/2019 Sample Details Sample ID: NEW19W-3284--S09 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 20/09/2019 Source: **Date Submitted:** On Site 26/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP208 - (0.5 - 0.7m) **Borehole Number:** TP208 Borehole Depth (m): 0.5 - 0.7 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 0.2 6.6 Moisture Content before (%): Shrinkage Moisture Content (%): 26.7 28.5 Moisture Content after (%): Est. inert material (%): 34.5 1.0 Est. Unc. Comp. Strength before (kPa): 500 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 320 Nil Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 3.7

Comments



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Report No: SSI:NEW19W-3284--S10 **Issue No: 1** Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 10/10/2019 Sample Details Sample ID: NEW19W-3284--S10 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 20/09/2019 Source: **Date Submitted:** On Site 26/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP209 - (0.7 - 0.9m) **Borehole Number:** TP209 Borehole Depth (m): 0.7 - 0.9 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 2.8 7.4 Moisture Content before (%): Shrinkage Moisture Content (%): 29.5 29.4 Moisture Content after (%): Est. inert material (%): 34.9 1.0 Est. Unc. Comp. Strength before (kPa): 470 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 180 Major Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 4.9

Comments



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lient:	Mc PO	Cloy Project M Box 2214 ngar NSW 23	lanageme	-	-			\frown	Accredited for complia The results of the tests this document are trac Results provided relate This report shall not be	eable to Australian/n e only to the items te:	ational standards. sted or sampled.
rincipal: roject No roject Na		W17P-0054A posed Subdiv	ision - Sta	ige 1 & 2				DITATION	Approved Signate (Senior Geotechr NATA Accredited Date of Issue: 10	nician) I Laboratory Nu	
	Details										
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est Reque	est No.:	-				Sampling		Sampleo	d by Enginee	ring Departr	nent
aterial:		Clay				Date Sam	•	20/09/20)19		
ource:		On Site				Date Sub	nitted:	26/09/20)19		
oecificatio oject Loo ample Loo orehole N orehole D	cation: ocation: Number:	No Specificat New England TP210 - (0.85 TP210 : 0.85 - 1.2	Highway, L	₋ochinvar							
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Comments



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ample D	etails									
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est Reques	t No.: -				Sampling	Method:	Sampled by	y Engineeri	ng Departm	ent
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ource:	On	Site			Date Subr	nitted:	26/09/2019)		
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roject Loca	tion: Ne	w England Highwa	ay, Lochinvar							
ample Loca	ation: TP	211 - (0.6 - 0.85m	ı)							
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oisture Con st. Unc. Co st. Unc. Co hrink Sw MSH (%) Esh - Swell (%) Esh	ntent after mp. Streng mp. Streng vell 10.0 5.0 	(%): th before (kPa) th after (kPa):	36.5 : 290 160	20.0	Est. inert Crumblin Cracking	material (⁴ g during shi Sw ell Sw ell	%): hrinkage: rinkage:	1.0 Nil Nil	45.0	

Comments



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Report No: SSI:NEW19W-3284--S13 Issue No: 1 Shrink Swell Index Report Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. Results provided relate only to the items tested or sampled. Client: McCloy Project Management Pty Ltd PO Box 2214 Dangar NSW 2309 This report shall not be reproduced except in full. NATA **Principal:** Project No.: NEW17P-0054A Approved Signatory: Adam Dwver Project Name: Proposed Subdivision - Stage 1 & 2 WORLD RECOGNISED (Senior Geotechnician) NATA Accredited Laboratory Number: 18686 Date of Issue: 10/10/2019 Sample Details Sample ID: NEW19W-3284--S13 **Client Sample ID:** Test Request No.: **Sampling Method:** Sampled by Engineering Department Material: Clay **Date Sampled:** 20/09/2019 Source: **Date Submitted:** On Site 26/09/2019 Specification: No Specification **Project Location:** New England Highway, Lochinvar Sample Location: TP212 - (0.6 - 0.85m) **Borehole Number:** TP212 Borehole Depth (m): 0.6 - 0.85 AS 1289.7.1.1 AS 1289.7.1.1 Swell Test Shrink Test Swell on Saturation (%): Shrink on drying (%): 0.0 5.0 Moisture Content before (%): Shrinkage Moisture Content (%): 25.8 26.2 Moisture Content after (%): Est. inert material (%): 33.6 2.0 Est. Unc. Comp. Strength before (kPa): > 600 Crumbling during shrinkage: Nil Est. Unc. Comp. Strength after (kPa): Cracking during shrinkage: 290 Moderate Shrink Swell Shrinkage ٠ Sw ell 10.0 Shrink (%) Esh - Swell (%) Esw 5.0 0.0 -5.0 -10.0 0.0 5.0 10.0 15.0 20.0 25.0 30.0 35.0 40.0 45.0 50.0 Moisture Content (%) Shrink Swell Index - Iss (%): 2.8

Comments



Califorr	nia Bearing Ratio T	est Report	Report No: CBR:NEW17	W-1491S01 Issue No: 1
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Principal: Project No.: Project Name:	NEW17P-0054 Proposed Subdivision		WORLD RECOGNISED ACCREDITATION	
Sample Det				
Sample ID:	NEW17W-1491S01	Date Sampl	led: 19/04/2017	
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	Penetration (mm)		11	

Comments

Moisture Content Method Performed as Per AS1289.2.1.1. Laboratory Moisture Ratio (LMR): 102.0% Laboratory Density Ratio (LDR): 101.0%



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	ifornia Bearing Ratio	rest Report		
	Po Box 2214 Dangar NSW 2309		Accredited for compliance with IS The results of the tests, calibration measurements included in this do to Australian/national standards Approved Signatory: Dane Cullen (Senior Geotechnician) NATA Accredited Laboratory Num Date of Issue: 8/05/2017	ns and/or ccument are tracea
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Comments

Moisture Content Method Performed as Per AS1289.2.1.1. Laboratory Moisture Ratio (LMR): 102.0% Laboratory Density Ratio (LDR): 99.5%



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Comments

APPENDIX C:

CSIRO Sheet BTF 18

Foundation Maintenance and Footing Performance: A Homeowner's Guide

Foundation Maintenance and Footing Performance: A Homeowner's Guide



BTF 18 replaces Information Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870, the Residential Slab and Footing Code.

Causes of Movement

Settlement due to construction

There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

Erosion

All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

Saturation

This is particularly a problem in clay soils. Saturation creates a boglike suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume – particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

Seasonal swelling and shrinkage of soil

All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

Shear failure

This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.
- In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

GENERAL DEFINITIONS OF SITE CLASSES							
Class	Foundation						
А	Most sand and rock sites with little or no ground movement from moisture changes						
S	Slightly reactive clay sites with only slight ground movement from moisture changes						
М	Moderately reactive clay or silt sites, which can experience moderate ground movement from moisture changes						
Н	Highly reactive clay sites, which can experience high ground movement from moisture changes						
E	Extremely reactive sites, which can experience extreme ground movement from moisture changes						
A to P	Filled sites						
Р	Sites which include soft soils, such as soft clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soils subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise						

Tree root growth

Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- · Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

Unevenness of Movement

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- · Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

Effects of Uneven Soil Movement on Structures

Erosion and saturation

Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpends).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

Seasonal swelling/shrinkage in clay

Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring.



As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

Movement caused by tree roots

In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

Complications caused by the structure itself

Most forces that the soil causes to be exerted on structures are vertical - i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

Effects on full masonry structures

Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

Trees can cause shrinkage and damage

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

Effects on framed structures

Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation cause a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

Effects on brick veneer structures

Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem.

Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

 Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.

- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870.

AS 2870 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

Prevention/Cure

Plumbing

Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

Ground drainage

In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the stormwater collection system is usually an easy solution.

It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

Protection of the building perimeter

It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS		
Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows stick slightly	<5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired	5–15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted	15–25 mm but also depend on number of cracks	4



should extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

Condensation

In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

Warning: Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

The garden

The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

Existing trees

Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

Information on trees, plants and shrubs

State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

Excavation

Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.

The information in this and other issues in the series was derived from various sources and was believed to be correct when published.

The information is advisory. It is provided in good faith and not claimed to be an exhaustive treatment of the relevant subject.

Further professional advice needs to be obtained before taking any action based on the information provided.

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