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

Lot 11, DP 1248129, New
England Highway,
Lochinvar

NEW17P-0054A-AD
30 April 2021



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

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- Figure AD1: Site Plan & Approximate Test Locations
- Appendix A: Results of Field Investigations
- Appendix B: Results of Laboratory Testing
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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 (Cl-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 re-grading 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 8: Facing west 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 10: Facing southwest from near BH101.



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



Photograph 12: Facing northeast from near BH113.



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



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 TYPES

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.

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)								
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 [#]

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 Investigation (Ref: NEW17P-0054A-AA.Rev2, dated 19 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 (Ref: NEW17P-0054.AA.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:	[^] = Slow to very slow progress of 2.7 tonne excavator. [#] = Refusal or Practical refusal of 2.7 tonne excavator met on Weathered 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.

TABLE 3 – SUMMARY OF SHRINK / SWELL TESTING RESULTS

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

Location	Depth (m)	Material Description	I _{ss} (%)
BH207	0.50 – 0.70	(CH) CLAY	3.8
Previous Investigation (Ref: NEW17P-0054A-AA.Rev2, dated 19 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	I _{ss} (%)
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
Previous Investigation (Ref: NEW17P-0054.AA.Rev1, dated: 23 August 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 to 118 and 123 to 129	H2
	113, 114, 119 to 122 and 130 to 136	E
2	211 to 220	H2
	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, H1, H2 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.

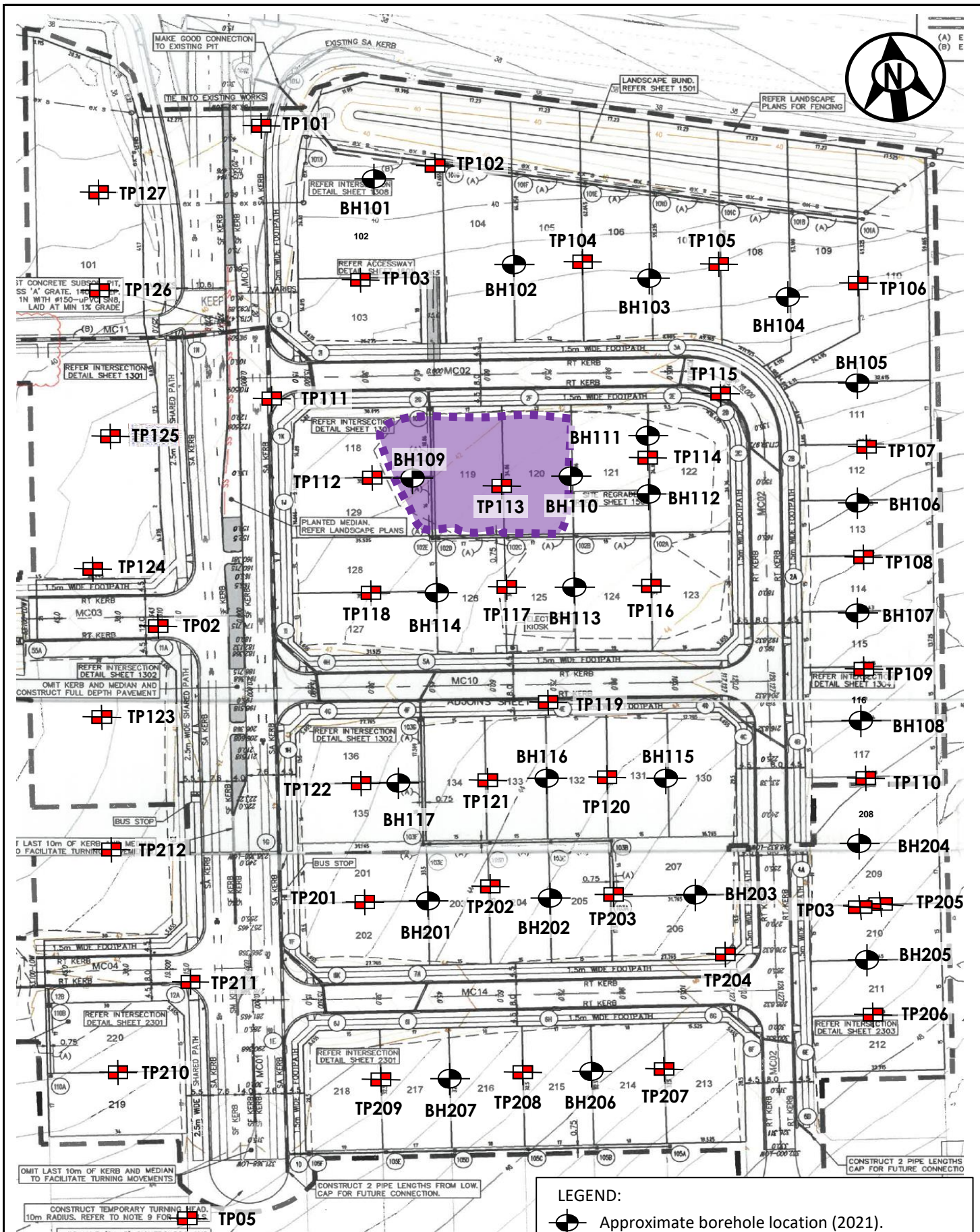
For and on behalf of Qualtest Laboratory (NSW) Pty Ltd.

A handwritten signature in black ink, appearing to read "Jason Lee". The signature is written in a cursive style with a large, looping initial 'J'.

Jason Lee
Principal Geotechnical Engineer




FIGURES


Figure AD1: Site Plan and Approximate Test Locations



Based on ADW Johnson drawings provided by client
 (Ref: 239591-ENG-1101, Revision: 4, dated: 02.11.20;
 Ref: 239591-ENG-1102, Revision: 3, dated: 21.08.20;
 Ref: 239591-ENG-2102, Revision: 1, dated: 21.08.20).

LEGEND:

-  Approximate borehole location (2021).
-  Approximate test pit location (Previous Investigations, 2017 & 2019).
-  Approximate extent of re-grade works.

	Client:	MCCLOY LOCHINVAR PTY LTD	Project No:	NEW17P-0054A
	Project:	PROPOSED SUBDIVISION - HEREFORD HILL, STAGES 1 & 2	Date:	14/04/2021
	Location:	LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR	Drawing No:	Figure AD1
	Title:	SITE PLAN & APPROXIMATE TEST LOCATIONS		

APPENDIX A:

Results of Field Investigations



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: BH101
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 26/2/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
AD/T	Not Encountered					CH	0.10m TOPSOIL: CLAY - medium to high plasticity, grey-brown and brown, root affected.	M > W _p	St - VSt	HP	220	TOPSOIL	
						CH	CLAY - medium to high plasticity, grey-brown and brown.					RESIDUAL SOIL	
		0.50m	0.5	CH								HP	210
		U50										HP	220
		0.75m	1.0	CI	1.00m CLAY - medium plasticity, pale grey and pale orange, trace fine to coarse grained sand, trace fine grained angular gravel.	M ~ W _p	VSt					HP	300
											HP	380	
				1.5	1.50m	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 low to medium plasticity.	D - M	MD - D			EXTREMELY WEATHERED ROCK	
				1.70m	1.70m		Hole Terminated at 1.70 m Very slow progress						
				2.0									

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%

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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: BH102
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 26/2/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
AD/T	Not Encountered	U50 0.80m	0.65m	0.00		CH	TOPSOIL: CLAY - medium to high plasticity, grey-brown and brown, root affected.	M > W _p	St - VSt	HP	210	TOPSOIL
				0.20			CH					CLAY - medium to high plasticity, grey-brown and brown.
				0.80			CL			Sandy CLAY - low to medium plasticity, grey and brown, with pale grey and orange, fine to coarse grained sand, trace fine grained angular gravel.	HP	280
				1.40			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 low to medium plasticity. Hole Terminated at 1.50 m Practical Refusal	D - M	MD - D
1.50												

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 Gradational or transitional strata
 Definitive or distinct strata change

Notes, Samples and Tests

U₅₀ 50mm Diameter tube sample
 CBR Bulk sample for CBR testing
 E Environmental sample (Glass jar, sealed and chilled on site)
 ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
 B Bulk Sample
Field Tests
 PID Photoionisation detector reading (ppm)
 DCP(x-y) Dynamic penetrometer test (test depth interval shown)
 HP Hand Penetrometer test (UCS kPa)

Consistency

VS Very Soft <25
 S Soft 25 - 50
 F Firm 50 - 100
 St Stiff 100 - 200
 VSt Very Stiff 200 - 400
 H Hard >400
 Fb Friable

UCS (kPa)

<25
 25 - 50
 50 - 100
 100 - 200
 200 - 400
 >400

Moisture Condition

D Dry
 M Moist
 W Wet
 W_p Plastic Limit
 W_L Liquid Limit

Density

V Very Loose
 L Loose
 MD Medium Dense
 D Dense
 VD Very 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: BH103
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 26/2/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
AD/T	Not Encountered	U50		0.70m	0.15m	CH	TOPSOIL: CLAY - medium to high plasticity, grey-brown and brown, root affected.	M > W _p	St - VSt	HP	200	TOPSOIL
				0.90m	0.90m	CH	CLAY - medium to high plasticity, grey-brown and brown.					HP
					1.0	CL	Sandy CLAY - low to medium plasticity, grey and brown, with pale grey and orange, fine to coarse grained sand, trace fine grained angular gravel.	M ~ W _p	VSt	HP	300	
					1.20m	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 low to medium plasticity.	D - M	MD - D			
				1.50m			Hole Terminated at 1.50 m Very slow progress					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%

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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: BH104
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 26/2/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
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		
AD/T	Not Encountered	U50 0.65m		0.20m	CH	CH	TOPSOIL: CLAY - medium to high plasticity, grey-brown and brown, root affected.	M > W _p	VSt	HP	280	TOPSOIL		
				0.50m	CH	CH	CLAY - medium to high plasticity, grey-brown and brown.				VSt	HP	300	RESIDUAL SOIL
				0.60m	CL	CL	Sandy CLAY - low to medium plasticity, grey and brown, fine grained sand.	M < W _p	H	HP	>600	HP	>600	EXTREMELY WEATHERED ROCK
				1.00m	GC	GC	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	MD - D			
				1.50m			Hole Terminated at 1.50 m Slow progress							

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		

Density		Density Index
V	Very Loose	<15%
L	Loose	15 - 35%
MD	Medium Dense	35 - 65%
D	Dense	65 - 85%
VD	Very Dense	85 - 100%

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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: BH105
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 26/2/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
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		
Not Encountered		U50 1.05m		0.15m		CH	TOPSOIL: CLAY - medium to high plasticity, grey-brown and brown, root affected.	M > w _p	St - VSt	HP	200	TOPSOIL		
				0.5		CH	CLAY - medium to high plasticity, grey-brown and brown.					RESIDUAL SOIL		
				1.0		CL	Sandy CLAY / Clayey SAND - low to medium plasticity, grey and brown, fine grained sand.					HP	320	EXTREMELY WEATHERED ROCK
				1.40m		CL						HP	220	
				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	MD - D	
1.90m	SC													
				2.0			Hole Terminated at 1.90 m Slow progress							

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density	V Very Loose	Density Index <15%
L Loose	MD Medium Dense	Density Index 15 - 35%
D Dense	D Dense	Density Index 35 - 65%
VD Very Dense		Density Index 65 - 85%
		Density Index 85 - 100%

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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: BH106
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 26/2/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
AD/T	Not Encountered	0.60m		0.15m	CH	CH	TOPSOIL: CLAY - medium to high plasticity, grey-brown and brown, root affected.	M > w _p	St - VSt	HP	210	TOPSOIL
		U50		0.80m	CH	CH	CLAY - medium to high plasticity, grey-brown and brown.			HP	220	RESIDUAL SOIL
		0.80m		1.00m	SC	SC	Clayey SAND / Sandy CLAY - fine to coarse (mostly fine to medium) grained, dark grey and brown, fines of low plasticity, trace fine grained angular gravel.	D - M	MD - D			RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
				1.90m			Hole Terminated at 1.90 m Slow progress					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		

Density	Density Index
V Very Loose	<15%
L Loose	15 - 35%
MD Medium Dense	35 - 65%
D Dense	65 - 85%
VD Very Dense	85 - 100%

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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: BH107
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 26/2/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
AD/T Not Encountered		U50		0.15m		CH	TOPSOIL: CLAY - medium to high plasticity, brown, root affected.	M > W _p				TOPSOIL	
				0.5		CH	CLAY - medium to high plasticity, brown.					HP	170
				1.0	CH		St - VSt			HP	220		
				1.20m	CL	Sandy CLAY - low to medium plasticity, orange to brown and pale grey, fine grained sand.	VSt			HP	320		
						1.5	CL				HP	300	
						2.0	CL				HP	250	
							Hole Terminated at 2.00 m						

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		

Density	Density Index
V Very Loose	<15%
L Loose	15 - 35%
MD Medium Dense	35 - 65%
D Dense	65 - 85%
VD Very Dense	85 - 100%

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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: BH108
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 26/2/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
AD/T	Not Encountered	U50		0.50m	0.5	CH	TOPSOIL: CLAY - medium to high plasticity, brown, root affected.	M > w _p	St - VSt	HP	220	TOPSOIL
				0.75m	1.0	CH	CLAY - medium to high plasticity, brown.				250	RESIDUAL SOIL
					1.40m	CL	Sandy CLAY - low to medium plasticity, orange to brown and pale grey, fine grained sand.				320	
					1.5	CH	CLAY - medium to high plasticity, pale grey, with some pale brown.				380 - 450	
					1.40m						VSt - H	
					2.00m		Brown, with pale grey, trace orange to red-brown.				300	
			Hole Terminated at 2.00 m	280	320	350						

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		

Density	Density Index
V Very Loose	<15%
L Loose	15 - 35%
MD Medium Dense	35 - 65%
D Dense	65 - 85%
VD Very Dense	85 - 100%

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A-AD - BOREHOLE.LOGS.GPJ <<DrawingFile>> 30/04/2021 16:12 10.0.0.000 Datgel.Lab and In Situ Tool



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: BH109
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information				Field Test		Structure and additional observations		
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
AD/T	Not Encountered	0.30m				CL	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.	M > w _p	VSt			FILL: TOPSOIL
		U50 0.45m		0.20m		CI	FILL: Sandy CLAY - medium plasticity, grey-brown, fine to coarse grained, with fine to coarse grained gravel, trace bricks.			HP	230	FILL - CONTROLLED
		0.60m		0.50m			CLAY - medium to high plasticity, grey and red-brown.			HP	280	RESIDUAL SOIL
		U50 0.75m				CH				HP	220	
				1.40m			Sandy CLAY - medium to high plasticity, brown to orange and grey, fine to coarse grained sand.			HP	300	
						CH				HP	300	
				2.00m			Hole Terminated at 2.00 m					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		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: BH110
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
AD/T Not Encountered		0.40m				CL	FILL-TOPSOIL: Sandy CLAY - low plasticity, grey to dark brown, fine to coarse grained sand, with fine to medium grained angular to sub-angular gravel, root affected.	M > w _p	St - VSt	HP	260	FILL - TOPSOIL
		U50 0.55m		CH		CLAY - medium to high plasticity, red-brown and brown.	HP			200	RESIDUAL SOIL	
				CH			HP			200		
				CH			HP			230		
				1.40m	CL	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.	M ~ w _p	VSt	HP	180		
				2.00m			Hole Terminated at 2.00 m Slow progress					

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 Gradational or transitional strata
 Definitive or distinct strata change

Notes, Samples and Tests
U₃₀ 50mm Diameter tube sample
CBR Bulk sample for CBR testing
E Environmental sample (Glass jar, sealed and chilled on site)
ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B Bulk Sample
Field Tests
PID Photoionisation detector reading (ppm)
DCP(x-y) Dynamic penetrometer test (test depth interval shown)
HP Hand Penetrometer test (UCS kPa)

Consistency
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
Fb Friable
Density
V Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

UCS (kPa)
<25
25 - 50
50 - 100
100 - 200
200 - 400
>400
Moisture Condition
D Dry
M Moist
W Wet
W_p Plastic Limit
W_L Liquid Limit
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: BH111
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
AD/T	Not Encountered	U50	1.00m	1.00		CL	TOPSOIL: Sandy CLAY - low plasticity, grey and dark brown, fine to coarse grained sand, root affected.	M > W _p		HP	130	TOPSOIL	
						CI	Sandy CLAY - medium plasticity, dark brown, trace orange and pale grey, fine to coarse (mostly fine) grained.					COLLUVIUM	
						CH	CLAY - medium to high plasticity, brown and red-brown.					RESIDUAL SOIL	
						St						HP	120
						HP	180						
						HP	200						
	1.25m	1.25	1.30	CI	Sandy CLAY - medium plasticity, pale grey to grey, with brown, fine grained sand.	VSt	HP	250					
			2.00	2.00		Hole Terminated at 2.00 m							

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
H	Hard	>400		
Fb	Friable			
Density		V	Very Loose	Density Index <15%
L	Loose			Density Index 15 - 35%
MD	Medium Dense			Density Index 35 - 65%
D	Dense			Density Index 65 - 85%
VD	Very Dense			Density Index 85 - 100%

OT.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



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: BH112
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
AD/T	Not Encountered	0.50m		0.5		CL	TOPSOIL: Sandy CLAY - low plasticity, grey and dark brown, fine to coarse grained sand, root affected.	M > w _p	St	HP	120	TOPSOIL
		U50				CH	CLAY - medium to high plasticity, brown and red-brown.			HP	180	RESIDUAL SOIL
		0.65m		1.0			Hole Terminated at 1.00 m			HP	180	

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A-AD - BOREHOLE.LOGS.GPJ <<DrawingFile>> 30/04/2021 16:12 10.0.0.000 Datgel.Lab and In Situ Tool

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₅₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Density V Very Loose L Loose MD Medium Dense D Dense VD Very 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: BH113
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
AD/T	Not Encountered			0.30m		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M ~ w _p				TOPSOIL	
		0.50m	0.5				CLAY - medium to high plasticity, grey-brown, with red-brown.			HP	180	RESIDUAL SOIL	
		U50								St	HP		180
		0.70m								M > w _p	HP		210
				1.0		CH				HP	230		
				1.40m			With Clayey Gravelly SAND pockets, pale brown.			St - VSt	HP	200	
				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 medium grained angular to sub-angular gravel, fines of low to medium plasticity.	D - M	MD - D			EXTREMELY WEATHERED ROCK	
				1.80m			Hole Terminated at 1.80 m Very slow progress						
				2.0									

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%

OT 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



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: BH114
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information				Field Test		Structure and additional observations				
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		
AD/T	Not Encountered	U50	1.20m	1.00m		CL	0.10m TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M > W _p	St	HP	180	TOPSOIL		
						CH	0.20m Sandy CLAY - medium to high plasticity, dark brown, trace orange, fine to coarse (mostly fine) grained sand, trace fine grained angular to sub-rounded gravel.					COLLUVIUM		
						CH	CLAY - medium to high plasticity, grey-brown, with red-brown.					RESIDUAL SOIL		
						CH						HP	250	
						CH						HP	300	
						CH						HP	320	
						CL	1.40m 1.45m Sandy CLAY - low plasticity, pale brown, fine grained sand.	D - M	MD - D	HP	320	EXTREMELY WEATHERED ROCK		
						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 medium grained angular to sub-angular gravel, fines of low to medium plasticity.							
							Hole Terminated at 2.00 m Very slow progress							

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		

Density	Density Index
V Very Loose	<15%
L Loose	15 - 35%
MD Medium Dense	35 - 65%
D Dense	65 - 85%
VD Very Dense	85 - 100%

OT.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



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: BH115
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
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		
AD/T	Not Encountered					CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.					TOPSOIL		
							CLAY - medium to high plasticity, brown.					RESIDUAL SOIL		
		0.50m		0.5							HP	180		
		U50 0.65m									HP	150		
		0.90m									HP	150		
		U50 1.05m									HP	120		
												HP	180	
												HP	220	
												HP	220	
												HP	220	
						CL	Sandy CLAY - low to medium plasticity, pale brown, 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 grained angular to sub-angular gravel, fines of low to medium plasticity.					EXTREMELY WEATHERED ROCK		
							Hole Terminated at 1.90 m Very slow progress					1M: SLOW PROGRESS. BECOMING HIGHLY WEATHERED ROCK.		

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density		
V Very Loose		Density Index <15%
L Loose		Density Index 15 - 35%
MD Medium Dense		Density Index 35 - 65%
D Dense		Density Index 65 - 85%
VD Very Dense		Density Index 85 - 100%

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A-AD - BOREHOLE LOGS.GPJ <<Drawing File>> 30/04/2021 16:12 10.0.000 Datgel Lab and In Situ Tool



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: BH116
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information				Field Test		Structure and additional observations														
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												
AD/T Not Encountered		U50		0.60m	0.5	CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M > W _p			HP	330	RESIDUAL SOIL											
							CLAY - medium to high plasticity, brown to red-brown and grey.						VSt	HP	280	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK								
														HP	200									
													St - VSt	HP	210									
														HP	230									
														HP	330									
														HP	300									
														1.90m		CH		Pale grey, with some orange and pale brown.						
														2.00m		CI		Sandy CLAY / Clayey SAND - medium plasticity, pale brown, with some orange and grey, fine to coarse grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets. Hole Terminated at 2.00 m	M ~ W _p	VSt - H	HP	410	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK	

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)
VS Very Soft	<25
S Soft	25 - 50
F Firm	50 - 100
St Stiff	100 - 200
VSt Very Stiff	200 - 400
H Hard	>400
Fb Friable	

Moisture Condition
D Dry
M Moist
W Wet
W _p Plastic Limit
W _L Liquid Limit

Density	Density Index
V Very Loose	<15%
L Loose	15 - 35%
MD Medium Dense	35 - 65%
D Dense	65 - 85%
VD Very Dense	85 - 100%

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A-AD - BOREHOLE LOGS.GPJ <-DrawingFile> 30/04/2021 16:12 10.0.0.000 Datgel Lab and In Situ Tool



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: BH117
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
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		
AD/T	Not Encountered	U50	0.95m	1.15m		CL	0.10m TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M > W _p	St - VSt	HP	180	TOPSOIL		
						CH	0.40m Sandy CLAY - medium to high plasticity, dark brown, trace orange, fine to coarse (mostly fine) grained sand, trace fine grained angular to sub-rounded gravel.					HP	230	COLLUVIUM
						CH	0.40m CLAY - medium to high plasticity, grey-brown, with red-brown.					HP	230	RESIDUAL SOIL
						CH	1.30m CLAY - medium to high plasticity, grey-brown, with red-brown.					HP	280	
						CH	1.50m Sandy CLAY / Clayey SAND - medium plasticity, pale brown, with some orange and grey, fine to coarse grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets.					VSt - H	380	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
						SANDSTONE	1.51m Silty SANDSTONE - fine to medium grained, pale grey to dark grey, trace orange to red-brown, estimated low strength, fractured. Hole Terminated at 1.51 m Refusal					D		HIGHLY WEATHERED ROCK

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 Gradational or transitional strata
 Definitive or distinct strata change

Notes, Samples and Tests
U₅₀ 50mm Diameter tube sample
CBR Bulk sample for CBR testing
E Environmental sample (Glass jar, sealed and chilled on site)
ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B Bulk Sample
Field Tests
PID Photoionisation detector reading (ppm)
DCP(x-y) Dynamic penetrometer test (test depth interval shown)
HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A-AD - BOREHOLE LOGS.GPJ <<DrawingFile>> 30/04/2021 16:12 10.0.0.000 Datgel Lab and In Situ Tool



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: BH201
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations				
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			
AD/T	Not Encountered	0.80m				CL	TOPSOIL: Sandy CLAY - medium plasticity, dark brown, fine to coarse grained sand, root affected.	M < W _p				TOPSOIL			
		U50		0.20m		CLAY - medium to high plasticity, brown and grey-brown.				HP	330	RESIDUAL SOIL			
		1.00m		1.0	CH		Pale gray and red-brown.	M > W _p	VSt	St - VSt	HP	180			
		1.10m		0.5							HP	230			
		U50		1.30m						Trace pale orange.				HP	260
				1.5								VSt		HP	280
				2.0			Hole Terminated at 2.00 m			HP	300				
										HP	280				

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
H	Hard	>400		
Fb	Friable			
Density		V	Density Index <15%	
L	Loose		Density Index 15 - 35%	
MD	Medium Dense		Density Index 35 - 65%	
D	Dense		Density Index 65 - 85%	
VD	Very Dense		Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A-AD - BOREHOLE LOGS.GPJ <<DrawingFile>> 30/04/2021 16:12 10.0.0.000 Datgel.Lab and In Situ Tool



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: BH202
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
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		
AD/T Not Encountered		U50 0.65m		0.50m		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M > W _p		HP	200	TOPSOIL		
						CH	CLAY - medium to high plasticity, brown and grey-brown. Red-brown and pale grey.			St - VSt	HP	200	RESIDUAL SOIL	
											HP	200		
											HP	210		
											HP	210		
											HP	300		
											VSt	HP	380	
												HP	350	
												HP	280	
												HP	260	
				2.00m			Hole Terminated at 2.00 m							

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
H	Hard	>400		
Fb	Friable			

Density		Density Index	
V	Very Loose	<15%	Density Index <15%
L	Loose	15 - 35%	Density Index 15 - 35%
MD	Medium Dense	35 - 65%	Density Index 35 - 65%
D	Dense	65 - 85%	Density Index 65 - 85%
VD	Very Dense	85 - 100%	Density Index 85 - 100%

OT.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



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: BH203
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
AD/T	Not Encountered	0.90m				CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M > W _p	VS _t	HP	220	TOPSOIL
		U50				CH	CLAY - medium to high plasticity, red-brown and pale grey.			HP	230	RESIDUAL SOIL
		1.15m								HP	330	
										HP	380	
										HP	380	
							Pale grey, with red-brown and pale orange.			HP	350	
										HP	380	
							Hole Terminated at 2.00 m					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)
VS Very Soft	<25
S Soft	25 - 50
F Firm	50 - 100
St Stiff	100 - 200
VS _t Very Stiff	200 - 400
H Hard	>400
Fb Friable	

Moisture Condition
D Dry
M Moist
W Wet
W _p Plastic Limit
W _L Liquid Limit

Density	Density Index
V Very Loose	<15%
L Loose	15 - 35%
MD Medium Dense	35 - 65%
D Dense	65 - 85%
VD Very Dense	85 - 100%

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A-AD - BOREHOLE.LOGS.GPJ <-DrawingFile--> 30/04/2021 16:12 10.0.0.000 Datgel.Lab and In Situ Tool



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: BH204
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations				
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			
AD/T Not Encountered		0.50m		0.5		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M > W _p	St	HP	180	TOPSOIL			
		U50 0.65m				CH	CLAY - medium to high plasticity, brown.						HP	150	RESIDUAL SOIL
		1.00m		1.0		CH	Grey.						HP	150	
		U50 1.10m				CL	Sandy CLAY - low to medium plasticity, pale grey and pale brown, fine grained sand, trace fine grained angular gravel.				M < W _p	H / Fb	HP	250	
						CL	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 medium grained angular to sub-angular gravel, fines of low to medium plasticity.				D - M	D	HP	280	
				2.0	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 medium grained angular to sub-angular gravel, fines of low to medium plasticity.						RESIDUAL SOIL / EXTREMELY WEATHERED ROCK			
							Hole Terminated at 2.00 m Slow progress								

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		

Density	Density Index
V Very Loose	<15%
L Loose	15 - 35%
MD Medium Dense	35 - 65%
D Dense	65 - 85%
VD Very Dense	85 - 100%

OT.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



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: BH205
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 11/3/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
AD/T Not Encountered		0.50m		0.5		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M > w _p	St	HP	140	TOPSOIL
		U50				CH	CLAY - medium to high plasticity, brown and grey-brown, trace fine grained angular gravel.			HP	150	RESIDUAL SOIL
		0.70m		1.0		CL	Sandy CLAY / Clayey SAND - low to medium plasticity, pale grey and pale brown, fine grained sand.	M < w _p	H / Fb	HP	200	
				1.5		CL				HP	200	
				2.0			Hole Terminated at 2.00 m					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		

Density	Density Index
V Very Loose	<15%
L Loose	15 - 35%
MD Medium Dense	35 - 65%
D Dense	65 - 85%
VD Very Dense	85 - 100%

OT.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



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: BH206
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 26/2/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
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		
AD/T Not Encountered		U50		0.15m		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M > w _p	St	HP	150	TOPSOIL		
				0.60m		CH	CLAY - medium to high plasticity, brown and grey-brown, trace fine grained angular gravel.					RESIDUAL SOIL		
				0.80m		CL	Sandy CLAY - low to medium plasticity, pale grey and pale brown, fine grained sand.			M < w _p	H / Fb	HP	180	
				1.0m		CL	Brown.							
				2.0m		CL	Hole Terminated at 2.00 m							

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		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: BH207
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 26/2/21

DRILL TYPE: 2.7 TONNE EXCAVATOR
BOREHOLE DIAMETER: 300 mm

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
AD/T Not Encountered		0.50m		0.5		CL	0.10m TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M > W _p	VSt	HP	200	TOPSOIL
		U50				CH	CLAY - medium to high plasticity, brown and grey-brown, trace fine grained angular gravel.					
		0.70m		1.0		CL	0.90m Sandy CLAY - low to medium plasticity, pale grey and pale brown, fine grained sand.	M < W _p	H - Fb	HP	280	
				1.5		SC	1.40m 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 medium grained angular to sub-angular gravel, fines of low to medium plasticity.	D - M	MD - D			
				2.0		2.00m Hole Terminated at 2.00 m						

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%

OT.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



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
 PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
 LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: **TP101**
 PAGE: 1 OF 1
 JOB NO: NEW17P-0054A
 LOGGED BY: BE
 DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
E	Not Encountered	CBR / U50	0.60m	0.15m		CL	Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p				TOPSOIL	
						CI	Sandy CLAY - medium plasticity, dark brown and dark grey, trace orange, fine to medium grained sand.			HP	350 - 390	COLLUVIUM	
						CH	CLAY - high plasticity, pale brown to brown.			HP	380	RESIDUAL SOIL	
						CH				HP	350		
						CH				HP	390		
		CBR	0.80m	1.10m			Sandy CLAY / Clayey SAND - medium plasticity, green to grey and orange to brown, fine to coarse (mostly fine) grained sand, with fine to medium grained angular to rounded gravel, trace clay pockets.	M > w _p	VSt	HP	300	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK	
		CBR	1.60m	1.50m									
		CBR	1.90m	2.00m									
				2.00m			Hole Terminated at 2.00 m						

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 Gradational or transitional strata
 Definitive or distinct strata change

Notes, Samples and Tests
 U₅₀ 50mm Diameter tube sample
 CBR Bulk sample for CBR testing
 E Environmental sample (Glass jar, sealed and chilled on site)
 ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
 B Bulk Sample
Field Tests
 PID Photoionisation detector reading (ppm)
 DCP(x-y) Dynamic penetrometer test (test depth interval shown)
 HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
 PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
 LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: **TP102**
 PAGE: 1 OF 1
 JOB NO: NEW17P-0054A
 LOGGED BY: BE
 DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50 0.75m	0.60m	0.00		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < Wp				TOPSOIL
				0.10		CI	Sandy CLAY - medium plasticity, dark brown, trace orange and pale grey, sand is mostly fine grained, trace fine angular to sub-rounded gravel.	H	HP	480	COLLUVIUM	
				0.20		CH	CLAY - medium to high plasticity, grey-brown. Red-brown and brown.	M > Wp	VSt	HP	510	RESIDUAL SOIL
				0.50							HP	380
				1.00	HP	390						
1.20	HP	380										
1.50		GC	Clayey Sandy GRAVEL - fine to medium grained (nominal 5mm), angular to sub-rounded. pale brown to brown and grey, fine to coarse grained sand, fines of medium plasticity.	M	D - VD			1.50	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK			
2.00												
Hole Terminated at 2.00 m Slow progress												

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 --- Gradational or transitional strata
 — Definitive or distinct strata change

Notes, Samples and Tests
 U₃₀ 50mm Diameter tube sample
 CBR Bulk sample for CBR testing
 E Environmental sample (Glass jar, sealed and chilled on site)
 ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
 B Bulk Sample
Field Tests
 PID Photoionisation detector reading (ppm)
 DCP(x-y) Dynamic penetrometer test (test depth interval shown)
 HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density	V Very Loose	Density Index <15%
L Loose	MD Medium Dense	Density Index 15 - 35%
D Dense	D Dense	Density Index 35 - 65%
VD Very Dense		Density Index 65 - 85%
		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: TP103
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
E	Not Encountered	U50 0.75m	0.60m	0.00	0.10m	CL	Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p	H	HP	480	TOPSOIL	
				0.10	0.35m	CH	Sandy CLAY - medium to high plasticity, dark brown, trace orange, sand is mostly fine to medium grained, trace fine to medium grained sub-angular gravel.				510		COLLUVIUM
				0.35	0.50	CH	CLAY - high plasticity, red-brown and brown.	M > w _p	St - VSt	200	HP	210	RESIDUAL SOIL
				0.50	1.00		180						
				1.00	1.40m		180						
				1.40	1.50	SP	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 - VD	HP	220	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK	
1.50	2.00m	350											
				2.00	2.00m		Hole Terminated at 2.00 m						

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 --- Gradational or transitional strata
 — Definitive or distinct strata change

Notes, Samples and Tests
 U₃₀ 50mm Diameter tube sample
 CBR Bulk sample for CBR testing
 E Environmental sample (Glass jar, sealed and chilled on site)
 ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
 B Bulk Sample
Field Tests
 PID Photoionisation detector reading (ppm)
 DCP(x-y) Dynamic penetrometer test (test depth interval shown)
 HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP104
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
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		
E	Not Encountered	U50 0.85m	0.70m	0.00		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p	H	HP	>600	TOPSOIL		
				0.15		CH	Sandy CLAY - medium to high plasticity, dark brown, fine grained sand.					HP	450	COLLUVIUM
				0.30		CH	CLAY - medium to high plasticity, grey and brown.					HP	510	RESIDUAL SOIL
				0.50		CH						HP	>600	
				0.80		CI	Sandy CLAY / Clayey SAND - medium plasticity, pale brown to brown and grey, fine to coarse grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets.					HP	>600	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
1.00	SC	Clayey Gravelly SAND - fine to coarse grained, pale grey to grey and pale brown, fine to medium grained angular to sub-angular gravel, fines of medium plasticity.	M	D - VD										
				1.50										
				1.90			Hole Terminated at 1.90 m Slow progress							

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 Gradational or transitional strata
 Definitive or distinct strata change

Notes, Samples and Tests
U₃₀ 50mm Diameter tube sample
CBR Bulk sample for CBR testing
E Environmental sample (Glass jar, sealed and chilled on site)
ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B Bulk Sample
Field Tests
PID Photoionisation detector reading (ppm)
DCP(x-y) Dynamic penetrometer test (test depth interval shown)
HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density	V Very Loose	Density Index <15%
L Loose	MD Medium Dense	Density Index 15 - 35%
D Dense	D Dense	Density Index 35 - 65%
VD Very Dense	D Dense	Density Index 65 - 85%
		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: TP105
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information				Field Test		Structure and additional observations				
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		
E	Not Encountered	U50		0.50m		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < W _p	H	HP	420	TOPSOIL		
				0.15m		CH	Sandy CLAY - medium to high plasticity, dark brown, fine grained sand.					HP	450	COLLUVIUM
				0.30m		CH	CLAY - medium to high plasticity, grey and brown.					HP	550	RESIDUAL SOIL
				0.90m		CH						HP	550	
				2.00m		SC	Gravel is fine to coarse grained in soil matrix.					M	D - VD	
				2.0			Hole Terminated at 2.00 m Slow progress							

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 --- Gradational or transitional strata
 — Definitive or distinct strata change

Notes, Samples and Tests
 U₃₀ 50mm Diameter tube sample
 CBR Bulk sample for CBR testing
 E Environmental sample (Glass jar, sealed and chilled on site)
 ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
 B Bulk Sample
Field Tests
 PID Photoionisation detector reading (ppm)
 DCP(x-y) Dynamic penetrometer test (test depth interval shown)
 HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:00 10.0.0.000 Datgep.Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
 PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
 LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: **TP106**
 PAGE: 1 OF 1
 JOB NO: NEW17P-0054A
 LOGGED BY: BE
 DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
E	Not Encountered	0.40m	U50	0.5		CL	0.10m TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M > Wp	VSt	HP	210	TOPSOIL	
		CH				0.25m Sandy CLAY - medium to high plasticity, dark brown, fine grained sand.	COLLUVIUM						
		CH				CLAY - medium to high plasticity, grey and brown.	RESIDUAL SOIL						
		CH				0.70m	HP					220	
		SC				1.0 Clayey Gravelly SAND / Sandy GRAVEL - fine to coarse grained, green to grey and pale grey to brown, fine to coarse grained angular to sub-angular gravel, fines of medium plasticity, trace clay pockets.	HP					230	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
							1.30m						
							1.35m	D					
							ANDESITE - pale grey to brown and grey to dark grey, estimated medium to high strength. Hole Terminated at 1.35 m Refusal						HIGHLY TO MODERATELY WEATHERED ROCK
							1.5						
							2.0						

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 --- Gradational or transitional strata
 — Definitive or distinct strata change

Notes, Samples and Tests
 U₅₀ 50mm Diameter tube sample
 CBR Bulk sample for CBR testing
 E Environmental sample (Glass jar, sealed and chilled on site)
 ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
 B Bulk Sample
Field Tests
 PID Photoionisation detector reading (ppm)
 DCP(x-y) Dynamic penetrometer test (test depth interval shown)
 HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density	V Very Loose	Density Index <15%
L Loose	MD Medium Dense	Density Index 15 - 35%
D Dense	VD Very Dense	Density Index 35 - 65%
		Density Index 65 - 85%
		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP107
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	0.70m				CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < W _p	H	HP	450	TOPSOIL
		U50				CH	CLAY - medium to high plasticity, grey-brown and brown.			HP	>600	RESIDUAL SOIL
		0.85m				SC	Clayey Gravelly SAND - fine to coarse grained, green to grey with orange to brown, fine to medium grained angular to sub-angular gravel, fines of medium plasticity, with clay pockets / bands.			HP	>600	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
									D - M D - VD			
							Hole Terminated at 1.80 m Slow progress					

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 Gradational or transitional strata
 Definitive or distinct strata change

Notes, Samples and Tests
U₃₀ 50mm Diameter tube sample
CBR Bulk sample for CBR testing
E Environmental sample (Glass jar, sealed and chilled on site)
ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B Bulk Sample
Field Tests
PID Photoionisation detector reading (ppm)
DCP(x-y) Dynamic penetrometer test (test depth interval shown)
HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP108
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50		0.70m		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p	H	HP	>600	TOPSOIL
				0.30m		CH	Sandy CLAY - medium to high plasticity, dark brown, fine grained sand.				>600	COLLUVIUM
				0.5		CH	CLAY - medium to high plasticity, grey and brown.				>600	RESIDUAL SOIL
				1.0		CH					550	
				1.60m		SC	Sandy CLAY / Clayey SAND - medium plasticity, pale grey to dark grey and orange to brown, fine to coarse grained sand, with some fine to medium (mostly fine) grained angular to sub-angular gravel, trace clay pockets.					RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
				1.80m			Hole Terminated at 1.80 m Slow progress					
				2.0								

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density	V Very Loose	Density Index <15%
L Loose	MD Medium Dense	Density Index 15 - 35%
D Dense	D Dense	Density Index 35 - 65%
VD Very Dense	D Dense	Density Index 65 - 85%
		Density Index 85 - 100%

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:00 10.0.000 Datagee Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP109
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
E	Not Encountered	U50	1.00m	1.00		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p					TOPSOIL
							CLAY - medium to high plasticity, grey-brown.			HP	250	RESIDUAL SOIL	
							Grey-brown and red-brown.			HP	250		
										HP	350		
			1.30m	1.50					VSt				
			1.30m	1.50						HP	350		
				1.50			Extremely weathered Andesite with soil properties: breaks down into Gravelly SAND - fine to coarse grained, green to grey with orange to brown, fine to coarse grained angular to sub-angular gravel.	D - M	VD				EXTREMELY WEATHERED ROCK
				1.70			Hole Terminated at 1.70 m Slow progress						

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density	V Very Loose	Density Index <15%
L Loose	MD Medium Dense	Density Index 15 - 35%
D Dense		Density Index 35 - 65%
VD Very Dense		Density Index 65 - 85%
		Density Index 85 - 100%

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019 10:00 10.0.000 Datgel.Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP110
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50	0.50m	0.5		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < Wp				TOPSOIL
			0.90m	1.0		CH	CLAY - medium to high plasticity, grey-brown. Grey-brown and red-brown.	M > Wp	St / VSt	HP	120 - 150 150 230 140 - 250 300	RESIDUAL SOIL
				1.5		SP	Extremely weathered Andesite with soil properties: breaks down into Gravelly SAND - fine to coarse grained, green to grey with orange to brown, fine to coarse grained angular to sub-angular gravel.	D - M	VD	HP	360 400 450	EXTREMELY WEATHERED ROCK
							Hole Terminated at 1.50 m Very slow progress					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:00 10.0.0.000 Datagel Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP111
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations				
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			
E	Not Encountered	0.80m CBR / U50 1.00m		0.00		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M > W _p		HP	220	TOPSOIL			
				0.15		CI	Sandy CLAY - medium plasticity, dark grey to brown, fine to coarse (mostly fine) grained sand.					VSt	COLLUVIUM		
				0.40		CH	CLAY - medium to high plasticity, brown to red-brown.					St	HP	180	RESIDUAL SOIL
				0.5											
				1.0		CH	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.					H	HP	180	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
				1.30											
				1.5		SC	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 - VD	HP	410	EXTREMELY WEATHERED ROCK
1.70															
2.0										Hole Terminated at 2.00 m					

LEGEND:		Notes, Samples and Tests		Consistency		UCS (kPa)		Moisture Condition	
Water		U ₃₀	50mm Diameter tube sample	VS	Very Soft	<25	D	Dry	
Water Level (Date and time shown)		CBR	Bulk sample for CBR testing	S	Soft	25 - 50	M	Moist	
Water Inflow		E	Environmental sample (Glass jar, sealed and chilled on site)	F	Firm	50 - 100	W	Wet	
Water Outflow		ASS	Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)	St	Stiff	100 - 200	W _p	Plastic Limit	
Strata Changes		B	Bulk Sample	VSt	Very Stiff	200 - 400	W _L	Liquid Limit	
--- Gradational or transitional strata		Field Tests		H	Hard	>400			
— Definitive or distinct strata change		PID	Photoionisation detector reading (ppm)	Fb	Friable				
		DCP(x-y)	Dynamic penetrometer test (test depth interval shown)	Density		V	Very Loose	Density Index <15%	
		HP	Hand Penetrometer test (UCS kPa)	L	Loose			Density Index 15 - 35%	
				MD	Medium Dense			Density Index 35 - 65%	
				D	Dense			Density Index 65 - 85%	
				VD	Very Dense			Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019.10:01 10.0.000 Datagel.Lab.and.In.Situ.Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP112
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50	0.90m 1.20m	0.00		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M > W _p	St			TOPSOIL
				0.20		CH	CLAY - medium to high plasticity, grey and brown.			HP	160	COLLUVIUM
				0.50		CH	CLAY - high plasticity, grey-brown and red-brown.			HP	160	RESIDUAL SOIL
				1.00		CH	Pale grey and orange to red-brown, with sandy nodules.	HP	180			
				1.50		CH		HP	410	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK		
				1.70		CH	Sandy CLAY / Clayey SAND - medium to high plasticity, pale grey to grey with some orange to red-brown, fine to coarse grained sand, with fine to medium grained angular to sub-angular gravel, with clay pockets.	HP	410			
2.00												Hole Terminated at 2.00 m

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
H	Hard	>400		
Fb	Friable			
Density			Density Index	
V	Very Loose		<15%	
L	Loose		15 - 35%	
MD	Medium Dense		35 - 65%	
D	Dense		65 - 85%	
VD	Very Dense		85 - 100%	

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Dargel.Lab.and.In.Situ.Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP113
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
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		
E	Not Encountered	U50	0.55m	0.5		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p	H	HP	550	TOPSOIL		
						CI	Sandy CLAY - medium plasticity, dark brown, trace orange and pale grey, mostly fine grained sand, trace small tree roots.					COLLUVIUM		
						0.90m	1.0	CH	CLAY - medium to high plasticity, red-brown and brown.	M > w _p	VSt	HP	400	RESIDUAL SOIL
												HP	350	
												HP	320	
												HP	450	
1.60m	1.5	CI	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.	M < w _p	H	HP	450	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK						
						HP	450							
				2.0			Hole Terminated at 1.90 m							

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datgel.Lab and In Situ Tool

LEGEND:	Notes, Samples and Tests	Consistency	UCS (kPa)	Moisture Condition
Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	U ₅₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable	<25 25 - 50 50 - 100 100 - 200 200 - 400 >400	D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
		Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense		Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
 PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
 LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: **TP114**
 PAGE: 1 OF 1
 JOB NO: NEW17P-0054A
 LOGGED BY: BE
 DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations					
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				
E	Not Encountered	U50	0.50m	0.5		CL	0.10m TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p				TOPSOIL				
						CI	0.25m Sandy CLAY - medium plasticity, dark brown, trace orange and pale grey, sand is mostly fine grained.	M < w _p		HP	550	COLLUVIUM				
						CH	Brown and red-brown.	M ~ w _p	H	HP	500	RESIDUAL SOIL				
										HP	450					
										HP	400					
								0.80m		1.0		M > w _p	VSt	HP	320	
										1.5					HP	350
				2.0		CI	1.60m Sandy CLAY / Clayey SAND - medium plasticity, pale grey to dark grey and orange to brown, fine to coarse grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets.	M < w _p	H			RESIDUAL SOIL / EXTREMELY WEATHERED ROCK				
				2.00m			Hole Terminated at 2.00 m									

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 --- Gradational or transitional strata
 — Definitive or distinct strata change

Notes, Samples and Tests
 U₃₀ 50mm Diameter tube sample
 CBR Bulk sample for CBR testing
 E Environmental sample (Glass jar, sealed and chilled on site)
 ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
 B Bulk Sample
Field Tests
 PID Photoionisation detector reading (ppm)
 DCP(x-y) Dynamic penetrometer test (test depth interval shown)
 HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP115
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered			0.60m		CL	0.10m TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p	H			TOPSOIL
			0.80m	CI		0.20m Sandy CLAY - medium plasticity, dark brown, trace orange and pale grey, mostly fine grained sand.	HP			500	COLLUVIUM	
			1.20m	CH		CLAY - medium to high plasticity, brown.	HP			>600	RESIDUAL SOIL	
			1.40m				HP			>600		
			1.20m				HP			550		
		1.40m	CI	1.20m Sandy CLAY / Clayey SAND - medium plasticity, pale grey to dark grey and orange to brown, fine to coarse grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets.	HP	550	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK					
				2.00m			2.00m Hole Terminated at 2.00 m					

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₃₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Consistency VS Very Soft <25 S Soft 25 - 50 F Firm 50 - 100 St Stiff 100 - 200 VSt Very Stiff 200 - 400 H Hard >400 Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
		Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Dargel.Lab.and.In.Situ.Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP116
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50	0.70m 0.90m	0.10m	SM	TOPSOIL: Silty SAND - fine to coarse grained sand, grey-brown, fines of low plasticity, root affected.	M					TOPSOIL
				0.30m	CI	Sandy CLAY - medium plasticity, dark brown, trace orange and pale grey, sand is mostly fine grained, trace tree roots.	M ~ W _p		HP	550	COLLUVIUM	
				0.5	CH	CLAY - medium to high plasticity, red-brown and grey-brown.	M < W _p	H	HP	410	RESIDUAL SOIL	
				HP					420			
				HP					420			
1.0			HP	410								
1.60m	SC	Extremely weathered Andesite with soil properties: breaks down into Clayey SAND - medium plasticity, grey-brown to orange-brown, fine to coarse grained sand, trace fine grained angular to sub-angular gravel.	D - M D - VD				EXTREMELY WEATHERED ROCK					
1.80m												
				2.0		Hole Terminated at 1.80 m Slow progress						

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₃₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datgel.Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP117
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
E	Not Encountered	0.70m				CL	TOPSOIL: Sandy CLAY - medium to high plasticity, dark brown, fine to coarse grained sand, root affected.	M ~ W _p				TOPSOIL	
		U50-				CH	CLAY - medium to high plasticity, grey-brown.	M > W _p	H	HP	480	RESIDUAL SOIL	
		0.90m					CH	Grey with some pale orange.	M < W _p	H	HP	450	
								CH			HP	410	
						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 - VD	HP	510		
							Hole Terminated at 1.80 m Slow progress					EXTREMELY WEATHERED ROCK	

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₃₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datagel.Lab.and.In.Situ.Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP118
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50	0.60m	0.00	0.10m	CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p	H	HP	550	TOPSOIL
				0.10	0.35m	CH	Sandy CLAY - medium to high plasticity, dark brown, trace orange, fine to coarse (mostly fine) grained sand, trace fine grained angular to sub-rounded gravel.					COLLUVIUM
				0.35	0.50	CH	CLAY - high plasticity, brown.					RESIDUAL SOIL
				0.50	1.00	CH	Red-brown and brown.					HP >600
				0.85	1.20	CH						HP >600
				1.20	1.45m	CH						HP 550
		U50	1.45m	1.45m	1.45m	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 - MD - VD	D	D	550	EXTREMELY WEATHERED ROCK
			1.80m	1.82m	1.82m		ANDESITE - pale grey to dark grey and orange to brown, estimated medium to high strength. Hole Terminated at 1.82 m Refusal					HIGHLY TO MODERATELY WEATHERED ROCK

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		

Density		Density Index
V	Very Loose	<15%
L	Loose	15 - 35%
MD	Medium Dense	35 - 65%
D	Dense	65 - 85%
VD	Very Dense	85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
 PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
 LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: **TP119**
 PAGE: 1 OF 1
 JOB NO: NEW17P-0054A
 LOGGED BY: BE
 DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations				
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			
E	Not Encountered	U50		0.50m		SM	TOPSOIL: Silty SAND - fine to coarse grained sand, grey-brown, fines of low plasticity, root affected.	D - M					TOPSOIL		
							CLAY - high plasticity, grey and red-brown.				HP	210	RESIDUAL SOIL		
											HP	250			
											HP	300			
											HP	350			
														HP	310
				0.80m			CLAY - medium to high plasticity, pale grey and pale brown, with some pale orange, with some sandy clay pockets.								
				1.50m											
				2.00m			Hole Terminated at 2.00 m								

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019.10:01.10.0.000.Datgel.Lab.and.in.Situ.Tool

LEGEND:	Notes, Samples and Tests	Consistency	UCS (kPa)	Moisture Condition
Water	U ₃₀ 50mm Diameter tube sample	VS Very Soft	<25	D Dry
Water Level (Date and time shown)	CBR Bulk sample for CBR testing	S Soft	25 - 50	M Moist
Water Inflow	E Environmental sample (Glass jar, sealed and chilled on site)	F Firm	50 - 100	W Wet
Water Outflow	ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)	St Stiff	100 - 200	W _p Plastic Limit
Strata Changes	B Bulk Sample	VSt Very Stiff	200 - 400	W _L Liquid Limit
Gradational or transitional strata	Field Tests	H Hard	>400	
Definitive or distinct strata change	PID Photoionisation detector reading (ppm)	Fb Friable		
	DCP(x-y) Dynamic penetrometer test (test depth interval shown)	Density	V Very Loose	Density Index <15%
	HP Hand Penetrometer test (UCS kPa)	L Loose		Density Index 15 - 35%
		MD Medium Dense		Density Index 35 - 65%
		D Dense		Density Index 65 - 85%
		VD Very Dense		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP120
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
E	Not Encountered					CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M > Wp				TOPSOIL	
			0.50m	0.5			CLAY - medium to high plasticity, grey-brown and red-brown.		H	HP	420	RESIDUAL SOIL	
			U50 0.65m							HP	410		
				1.0		CH	Grey with pale orange.	M < Wp		HP	410		
				1.5					HP	380			
				1.80m						HP	360		
				1.90m		SC	Clayey SAND / Sandy CLAY - fine to coarse grained, orange-brown, fines of low to medium plasticity, trace fine grained angular gravel.	D - M D - VD		HP	380	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK	
				2.0			Hole Terminated at 1.90 m Very slow progress			HP	390		

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density		
V Very Loose	Density Index <15%	
L Loose	Density Index 15 - 35%	
MD Medium Dense	Density Index 35 - 65%	
D Dense	Density Index 65 - 85%	
VD Very Dense	Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PITS LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datgel.Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP121
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50 1.25m	1.10m	0.00		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine to coarse grained sand, root affected.	M < Wp				TOPSOIL
				0.20		CLAY - high plasticity, brown to red-brown and grey.					RESIDUAL SOIL	
				0.50						HP	250	
				1.00						HP	350	
				1.50						HP	380	
				1.80			Pale grey with orange					
				2.00			Sandy CLAY / Clayey SAND - medium plasticity, pale brown, with some orange and grey, fine to coarse grained sand, trace fine grained angular to sub-angular gravel, trace clay pockets.	M < Wp		H		RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
				2.00			Hole Terminated at 2.00 m Slow progress					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
H	Hard	>400		
Fb	Friable			
Density				
V	Very Loose		Density Index <15%	
L	Loose		Density Index 15 - 35%	
MD	Medium Dense		Density Index 35 - 65%	
D	Dense		Density Index 65 - 85%	
VD	Very Dense		Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datgel.Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: TP122
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50	0.60m	0.10m		CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine grained sand, root affected.	M < w _p				TOPSOIL
						CH	CLAY - medium to high plasticity, grey and brown, trace fine grained sand.	M > w _p	VSt	HP	280	COLLUVIUM
						CH	CLAY - high plasticity, grey with some orange-brown.	M < w _p	H	HP	550	RESIDUAL SOIL
						CH	Grey-brown with some orange to red-brown.	M > w _p	VSt	HP	390	
				2.00m			Hole Terminated at 2.00 m					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		

Density	Density Index
V Very Loose	<15%
L Loose	15 - 35%
MD Medium Dense	35 - 65%
D Dense	65 - 85%
VD Very Dense	85 - 100%

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datgel.Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP123
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	0.90m				CL	TOPSOIL: Sandy CLAY - low plasticity, dark brown, fine grained sand, root affected.					TOPSOIL
		U50			0.25m		CLAY - high plasticity, grey and grey-brown, trace orange.			HP	>600	RESIDUAL SOIL
		1.10m			0.5					HP	>600	
					1.0	CH			H	HP	>600	
					1.5				HP	450		
					1.60m	SC	Clayey SAND - fine to coarse grained, grey and brown, with fine angular gravel.	D - M D - VD		HP	420	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
					1.80m		Hole Terminated at 1.80 m Slow progress					
					2.0							

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%

OT LIB 1.1.GLB Log NON-CORED BOREHOLE - TEST PIT NEW17P-0054A - TEST PITS LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datgel Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP124
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 13-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50 0.75m		0.5		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				FILL
						CH	CLAY - medium to high plasticity, brown, trace fine to coarse grained sand.	M < w _p	H	HP	>600	RESIDUAL SOIL
						SC	Clayey Gravelly SAND - fine to coarse grained, pale grey to dark grey and orange to brown, fine to medium grained angular gravel, fines of medium plasticity, trace clay pockets.	D - M	D - VD	HP	>600	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
				1.5			Hole Terminated at 1.40 m Slow progress					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		

Density		Density Index
V	Very Loose	<15%
L	Loose	15 - 35%
MD	Medium Dense	35 - 65%
D	Dense	65 - 85%
VD	Very Dense	85 - 100%

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019.10:01 10.0.0.000 Datgel.Lab.and.In.Situ.Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
 PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
 LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: **TP125**
 PAGE: 1 OF 1
 JOB NO: NEW17P-0054A
 LOGGED BY: BE
 DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50	0.70m	0.90m		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p	H	HP	>600	TOPSOIL
						CH	Sandy CLAY - medium to high plasticity, dark brown, trace orange, mostly fine to medium grained sand, trace fine to medium grained sub-angular gravel.					COLLUVIUM
						CH	CLAY - high plasticity, red-brown and brown.	M > w _p	H	HP	410	RESIDUAL SOIL
						CH	Grey and brown.					
						CH		M ~ w _p	H	HP	>600	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
CH		HP	>600									
						SP	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 - VD			
							Hole Terminated at 2.00 m					

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₃₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample	Consistency VS Very Soft <25 S Soft 25 - 50 F Firm 50 - 100 St Stiff 100 - 200 VSt Very Stiff 200 - 400 H Hard >400 Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datgel.Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
 PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
 LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: **TP126**
 PAGE: 1 OF 1
 JOB NO: NEW17P-0054A
 LOGGED BY: BE
 DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
E	Not Encountered	U50		0.50m		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M < W _p				TOPSOIL	
				0.25m		CI	Sandy CLAY - medium plasticity, dark brown and dark grey, trace orange, fine medium grained sand.			HP	380	COLLUVIUM	
										HP	280	RESIDUAL SOIL	
										VSt	HP	250	
											HP	220	
											HP	280	
											HP	410	
				1.0		CH	CLAY - high plasticity, grey-brown.	M > W _p					
				1.5			With Clayey Gravelly SAND bands (approx. 50mm thick), trace highly weathered pockets on eastern wall of test pit.		H				
				1.60m									
				1.90m		GC	Extremely weathered Andesite with soil properties: breaks down into Clayey Sandy GRAVEL / Gravelly SAND - fine to coarse grained angular to sub-angular gravel, pale brown, with some dark grey, fine to coarse grained sand, fines of medium plasticity.	D - MD	D - VD			EXTREMELY WEATHERED ROCK	
				2.0			Hole Terminated at 1.90 m Slow progress						

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		

Density	Density Index
V Very Loose	<15%
L Loose	15 - 35%
MD Medium Dense	35 - 65%
D Dense	65 - 85%
VD Very Dense	85 - 100%

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PITS LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Dargel Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP127
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 12-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
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		
E	Not Encountered	U50		0.15m	CL	CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine to coarse grained sand, root affected.	M < w _p	H	HP	450	TOPSOIL		
				0.35m	CI	CI	Sandy CLAY - medium plasticity, dark brown and dark grey, trace orange, fine to medium grained sand.				HP	500	COLLUVIUM	
				0.5m	CH	CH	CLAY - high plasticity, grey-brown.				HP	>600	RESIDUAL SOIL	
				1.0m							HP	>600		
				0.75m	SC	SC	Extremely weathered Andesite with soil properties: breaks down into Clayey Gravelly SAND - fine to coarse grained, pale brown, with some dark grey, fine to medium grained angular to sub-angular gravel, fines of medium plasticity, with clay pockets.				D - M D - VD	HP	>600	EXTREMELY WEATHERED ROCK
				1.05m								HP	390	
1.20m	HP	350	HIGHLY TO MODERATELY WEATHERED ROCK											
1.90m	HP	300												
2.00m	D		ANDESITE - dark grey with some pale grey and brown, fractured, estimated medium to high strength.											
				2.0			Hole Terminated at 2.00 m Practical Refusal							

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₃₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datagel Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP201
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	0.80m				CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M < Wp				TOPSOIL
		U50				CH	Sandy CLAY - medium to high plasticity, dark grey and brown, sand is mostly fine grained, trace fine grained angular to sub-angular gravel.			HP	240	COLLUVIUM
		1.00m				CH	CLAY - medium to high plasticity, brown and grey-brown.		VSt	HP	280	RESIDUAL SOIL
							Pale grey with orange to red-brown.			HP	280	
										HP	410	
										HP	420	
										HP	410	
										HP	400	
							Hole Terminated at 2.00 m					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density		
V Very Loose		Density Index <15%
L Loose		Density Index 15 - 35%
MD Medium Dense		Density Index 35 - 65%
D Dense		Density Index 65 - 85%
VD Very Dense		Density Index 85 - 100%

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datgel.Lab.and.In.Situ.Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP202
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50	1.00m	0.5		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M < Wp				TOPSOIL
		U50	1.15m			CH	CLAY - medium to high plasticity, brown and grey-brown. Red-brown and pale grey.	M > Wp	VSt	HP	280	RESIDUAL SOIL
				1.0						HP	230	
				1.5						HP	230	
				2.0						HP	410	
										HP	420	
										HP	420	
										HP	450	
										HP	420	
							Hole Terminated at 2.00 m					

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₃₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datgel.Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP203
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50	0.70m	0.15m		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M ~ Wp				TOPSOIL
			0.85m			CH	CLAY - medium to high plasticity, brown and grey-brown. Red-brown and pale grey. Pale grey, with red-brown and pale grey.	M > Wp	VSt	HP	220	RESIDUAL SOIL
				1.0					H	HP	>600	
				1.5						HP	550	
				2.0						HP	500	
										HP	490	
										HP	510	
							Hole Terminated at 2.00 m					

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₅₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.0.000 Datgel.Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP204
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered			0.15m		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M ~ Wp				TOPSOIL
				0.35m		CH	CLAY - medium to high plasticity, brown and grey-brown.	M > Wp	St	HP	150	RESIDUAL SOIL
				0.5m			HP			180		
				0.55m			HP			210		
				1.20m		SC	Clayey Gravelly SAND - fine to coarse grained, grey and brown, trace orange, fine grained angular gravel, fines of low plasticity, with clay pockets / bands.	M	D	HP	320	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
				1.5m			HP			420		
				1.90m			Hole Terminated at 1.90 m			HP	550	

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019.10:01.10.0.0.000.Datgel.Lab.and.In.Situ.Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP205
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations					
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				
E	Not Encountered					CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M > W _p	VSt	HP		TOPSOIL				
		0.40m			CH	CLAY - medium to high plasticity, brown and grey-brown.					300	COLLUVIUM / RESIDUAL SOIL				
		U50			CH	CLAY - medium to high plasticity, pale grey-brown and orange to red-brown.									RESIDUAL SOIL	
		0.55m														
		1.00m														
		U50														
1.20m																
						CI	Clayey SAND / Sandy CLAY - medium plasticity, grey and pale brown, trace pale orange, fine sand, with silt.	M < W _p	H							
						SC	Clayey Gravelly SAND - fine to coarse grained, pale brown with some grey, trace dark grey and orange, fine grained angular gravel, fines of low plasticity.	D	D			RESIDUAL SOIL / EXTREMELY WEATHERED ROCK				
				2.0			Hole Terminated at 1.90 m Slow progress									

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density		
V Very Loose		Density Index <15%
L Loose		Density Index 15 - 35%
MD Medium Dense		Density Index 35 - 65%
D Dense		Density Index 65 - 85%
VD Very Dense		Density Index 85 - 100%

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019.10:01.10.0.000. Datgel.Lab.and.in.Situ.Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP206
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	U50		0.40m		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M > W _p	VSt	HP	210	TOPSOIL
			0.70m	CH		CLAY - medium to high plasticity, brown and grey-brown, trace fine grained angular gravel.	HP			210	RESIDUAL SOIL	
						HP	220					
						HP	400					
				1.0	SC	Clayey Gravelly SAND - fine to coarse grained, grey and brown, trace orange, fine grained angular gravel, fines of low plasticity.	M	D	HP	550	RESIDUAL SOIL / EXTREMELY WEATHERED ROCK	
				1.5	GP	Extremely weathered Andesite with soil properties: breaks down into Sandy GRAVEL - fine to coarse grained angular, grey to brown and red-brown, trace orange, fine to coarse grained sand.	D - M					EXTREMELY WEATHERED ROCK
				2.0			Hole Terminated at 1.90 m Slow progress					

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 Gradational or transitional strata
 Definitive or distinct strata change

Notes, Samples and Tests
U₃₀ 50mm Diameter tube sample
CBR Bulk sample for CBR testing
E Environmental sample (Glass jar, sealed and chilled on site)
ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B Bulk Sample
Field Tests
PID Photoionisation detector reading (ppm)
DCP(x-y) Dynamic penetrometer test (test depth interval shown)
HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density	V Very Loose	Density Index <15%
L Loose	MD Medium Dense	Density Index 15 - 35%
D Dense	VD Very Dense	Density Index 35 - 65%
		Density Index 65 - 85%
		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
 PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
 LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: **TP207**
 PAGE: 1 OF 1
 JOB NO: NEW17P-0054A
 LOGGED BY: BE
 DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
E	Not Encountered	0.40m				CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M > W _p	VSt	HP	210	TOPSOIL	
		U50		0.5	CH	CLAY - medium to high plasticity, brown and grey-brown, trace fine grained angular gravel.	HP					200	RESIDUAL SOIL
		0.60m		0.80m	GP	Extremely weathered Andesite with soil properties: breaks down into Sandy GRAVEL - fine to coarse grained angular, brown to grey-brown, trace pale grey and pale orange, fine to coarse grained sand.	HP					220	EXTREMELY WEATHERED ROCK
				1.0			With Sandy GRAVEL pockets.	D - M	D				
				1.5									
				1.70m			Hole Terminated at 1.70 m Slow progress						
				2.0									

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 --- Gradational or transitional strata
 ——— Definitive or distinct strata change

Notes, Samples and Tests
 U₅₀ 50mm Diameter tube sample
 CBR Bulk sample for CBR testing
 E Environmental sample (Glass jar, sealed and chilled on site)
 ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
 B Bulk Sample
Field Tests
 PID Photoionisation detector reading (ppm)
 DCP(x-y) Dynamic penetrometer test (test depth interval shown)
 HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density	V Very Loose	Density Index <15%
L Loose	MD Medium Dense	Density Index 15 - 35%
D Dense	D Very Dense	Density Index 35 - 65%
VD Very Dense		Density Index 65 - 85%
		Density Index 85 - 100%

OT LIB 1.1.GLB Log NON-CORED BOREHOLE - TEST PIT NEW17P-0054A - TEST PITS LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Datgel Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
 PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
 LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: **TP208**
 PAGE: 1 OF 1
 JOB NO: NEW17P-0054A
 LOGGED BY: BE
 DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	0.50m		0.5		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M > W _p	VSt	HP	250	TOPSOIL
		U50				CH	CLAY - medium to high plasticity, brown and grey-brown, trace fine grained angular gravel.			HP	300	RESIDUAL SOIL
		0.70m					HP			250		
							HP			200		
				1.0	GP	Extremely weathered Andesite with soil properties: breaks down into Sandy GRAVEL - fine to coarse grained angular, brown to grey-brown, trace pale grey and pale orange, fine to coarse grained sand, weakly cemented.	D - M	D - VD			EXTREMELY WEATHERED ROCK	
				1.5								
				2.0			Hole Terminated at 1.70 m Very slow progress					

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 --- Gradational or transitional strata
 — Definitive or distinct strata change

Notes, Samples and Tests
 U₃₀ 50mm Diameter tube sample
 CBR Bulk sample for CBR testing
 E Environmental sample (Glass jar, sealed and chilled on site)
 ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
 B Bulk Sample
Field Tests
 PID Photoionisation detector reading (ppm)
 DCP(x-y) Dynamic penetrometer test (test depth interval shown)
 HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		
Density	V Very Loose	Density Index <15%
L Loose	MD Medium Dense	Density Index 15 - 35%
D Dense	VD Very Dense	Density Index 35 - 65%
		Density Index 65 - 85%
		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
 PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
 LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: **TP209**
 PAGE: 1 OF 1
 JOB NO: NEW17P-0054A
 LOGGED BY: BE
 DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM: AHD

Drilling and Sampling				Material description and profile information						Field Test		Structure and additional observations
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	
E	Not Encountered	U50	0.70m	0.15m		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M > Wp	VSt	HP	300	TOPSOIL
		U50	0.90m	0.5		CH	CLAY - medium to high plasticity, brown and grey-brown. Red-brown and brown.			HP	280	RESIDUAL SOIL
				1.0					HP	200		
				1.5					HP	210		
				2.0					HP	260		
									HP	380		
									HP	450		
									HP	>600		
									HP	>600		
					2.00m	Hole Terminated at 2.00 m						

LEGEND:	Notes, Samples and Tests	Consistency	UCS (kPa)	Moisture Condition
Water	U ₃₀ 50mm Diameter tube sample	VS Very Soft	<25	D Dry
Water Level (Date and time shown)	CBR Bulk sample for CBR testing	S Soft	25 - 50	M Moist
Water Inflow	E Environmental sample (Glass jar, sealed and chilled on site)	F Firm	50 - 100	W Wet
Water Outflow	ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)	St Stiff	100 - 200	W _p Plastic Limit
Strata Changes	B Bulk Sample	VSt Very Stiff	200 - 400	W _L Liquid Limit
Gradational or transitional strata	Field Tests	H Hard	>400	
Definitive or distinct strata change	PID Photoionisation detector reading (ppm)	Fb Friable		
	DCP(x-y) Dynamic penetrometer test (test depth interval shown)	Density	V Very Loose	Density Index <15%
	HP Hand Penetrometer test (UCS kPa)	L Loose	L Loose	Density Index 15 - 35%
		MD Medium Dense	MD Medium Dense	Density Index 35 - 65%
		D Dense	D Dense	Density Index 65 - 85%
		VD Very Dense	VD Very Dense	Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: TP210
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m

SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information						Field Test		Structure and additional observations	
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		
E	Not Encountered	U50		0.85m	0.15m	CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M ~ Wp					TOPSOIL
						CH	CLAY - medium to high plasticity, grey and brown.	M > Wp	VSt	HP	230	RESIDUAL SOIL	
										HP	280		
										HP	560		
										HP	580		
HP	500												
			1.20m					H					
			1.50m										
			1.70m										
			1.90m					D - M	D				RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
			2.0				Hole Terminated at 1.90 m Slow progress						

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT_NEW17P-0054A - TEST PIT LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Dargel.Lab and In Situ Tool

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₅₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample	Consistency VS Very Soft <25 S Soft 25 - 50 F Firm 50 - 100 St Stiff 100 - 200 VSt Very Stiff 200 - 400 H Hard >400 Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit	
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%		



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND
 HIGHWAY, LOCHINVAR

TEST PIT NO: TP211
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information				Field Test		Structure and additional observations		
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
E	Not Encountered	CBR / U50	0.60m 0.85m	0.5		CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M ~ Wp				TOPSOIL
						CH	CLAY - medium to high plasticity, brown and grey-brown.			HP	280	RESIDUAL SOIL
							Red-brown, with some brown.			VSt	HP	
			1.0	1.5								
				2.0		SC	Clayey Gravelly SAND - fine to coarse grained, grey and brown, trace orange, fine grained angular gravel, fines of low plasticity.	D - M	D			RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
							Hole Terminated at 2.10 m Slow progress					

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.NEW17P-0054A - TEST.PITS.LOGS.GPJ <<DrawingFile>> 30-10-2019 10:01 10.0.000 Dargel.Lab.and.In.Situ.Tool

LEGEND: Water Water Level (Date and time shown) Water Inflow Water Outflow Strata Changes Gradational or transitional strata Definitive or distinct strata change	Notes, Samples and Tests U ₃₀ 50mm Diameter tube sample CBR Bulk sample for CBR testing E Environmental sample (Glass jar, sealed and chilled on site) ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled) B Bulk Sample	Consistency VS Very Soft S Soft F Firm St Stiff VSt Very Stiff H Hard Fb Friable	UCS (kPa) <25 25 - 50 50 - 100 100 - 200 200 - 400 >400	Moisture Condition D Dry M Moist W Wet W _p Plastic Limit W _L Liquid Limit
	Field Tests PID Photoionisation detector reading (ppm) DCP(x-y) Dynamic penetrometer test (test depth interval shown) HP Hand Penetrometer test (UCS kPa)	Density V Very Loose L Loose MD Medium Dense D Dense VD Very Dense	Density Index <15% Density Index 15 - 35% Density Index 35 - 65% Density Index 65 - 85% Density Index 85 - 100%	



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD
PROJECT: PROPOSED SUBDIVISION - STAGES 1 & 2
LOCATION: LOT 11, DP 1248129, NEW ENGLAND HIGHWAY, LOCHINVAR

TEST PIT NO: TP212
PAGE: 1 OF 1
JOB NO: NEW17P-0054A
LOGGED BY: BE
DATE: 20-9-19

EQUIPMENT TYPE: 2.7 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations			
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		
E	Not Encountered	U50	0.60m 0.85m	0.00	0.20	CL	TOPSOIL: Sandy CLAY - low to medium plasticity, dark brown, fine grained sand, root affected.	M < W _p					TOPSOIL	
				0.20	0.40	CH	CLAY - medium to high plasticity, brown and grey-brown, trace fine to medium grained charcoal fragments.	M > W _p	VSt	HP	250			COLLUVIUM
				0.40	0.50	CH	CLAY - medium to high plasticity, brown and grey-brown, trace red-brown.	M < W _p	H	HP	450			RESIDUAL SOIL
				0.50	HP					550				
				0.60	HP					>600				
				0.85	HP					>600				
				1.00	HP	>600								
				1.50	HP	450								
				1.90	HP	440								
				1.90	HP	420								
1.90	HP	420												
				2.00			Hole Terminated at 1.90 m							

LEGEND:
Water
 Water Level (Date and time shown)
 Water Inflow
 Water Outflow
Strata Changes
 Gradational or transitional strata
 Definitive or distinct strata change

Notes, Samples and Tests
U₅₀ 50mm Diameter tube sample
CBR Bulk sample for CBR testing
E Environmental sample (Glass jar, sealed and chilled on site)
ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
B Bulk Sample
Field Tests
PID Photoionisation detector reading (ppm)
DCP(x-y) Dynamic penetrometer test (test depth interval shown)
HP Hand Penetrometer test (UCS kPa)

Consistency
VS Very Soft
S Soft
F Firm
St Stiff
VSt Very Stiff
H Hard
Fb Friable

UCS (kPa)
<25
25 - 50
50 - 100
100 - 200
200 - 400
>400

Density
V Very Loose
L Loose
MD Medium Dense
D Dense
VD Very Dense

Moisture Condition
D Dry
M Moist
W Wet
W_p Plastic Limit
W_L Liquid Limit

Density Index <15%
Density Index 15 - 35%
Density Index 35 - 65%
Density Index 65 - 85%
Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD

PROJECT: PROPOSED SUBDIVISION

LOCATION: LOT 1 - 3, DP 1218389 LOCHINVAR

TEST PIT NO:

TP02

PAGE:

1 OF 1

JOB NO:

NEW17P-0054

LOGGED BY:

BE

DATE:

19-4-17

EQUIPMENT TYPE: 5t Excavator KUBOTA

SURFACE RL: 41.5 m

TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m

DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations	
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
E	Not Encountered	CBR U50 0.70m	41.0	0.5		CL	Sandy CLAY - low plasticity, dark grey-brown, fine grained sand, trace silt, root affected.	M < Wp				TOPSOIL
						CH	Sandy CLAY - medium to high plasticity, dark grey-brown, fine grained sand.		St	HP 190	COLLUVIUM / POSSIBLE RESIDUAL	
						CI	CLAY - medium plasticity, brown, with some fine grained gravel, sub-rounded. Pockets of dense sand, fine to coarse grained.		HP 160 HP 180	RESIDUAL SOIL		
								VSt	HP 280 HP 200			
			40.5	1.0		SP	Extremely weathered Pebbly SANDSTONE with soil properties: breaks down into SAND - fine to coarse grained, with highly weathered pockets increasing with depth.	D - M	VD		EXTREMELY TO HIGHLY WEATHERED ROCK	
			39.0	2.5			Hole Terminated at 2.40 m					

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition
VS	Very Soft	<25	D Dry
S	Soft	25 - 50	M Moist
F	Firm	50 - 100	W Wet
St	Stiff	100 - 200	W _p Plastic Limit
VSt	Very Stiff	200 - 400	W _L Liquid Limit
H	Hard	>400	
Fb	Friable		
Density			
V	Very Loose		Density Index <15%
L	Loose		Density Index 15 - 35%
MD	Medium Dense		Density Index 35 - 65%
D	Dense		Density Index 65 - 85%
VD	Very Dense		Density Index 85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD

PROJECT: PROPOSED SUBDIVISION

LOCATION: LOT 1 - 3, DP 1218389 LOCHINVAR

TEST PIT NO: **TP03**

PAGE: 1 OF 1

JOB NO: NEW17P-0054

LOGGED BY: BE

DATE: 19-4-17

EQUIPMENT TYPE: 5t Excavator KUBOTA

SURFACE RL: 47.0 m

TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m

DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations					
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				
E	Not Encountered	CBR U50 0.75m	46.5	0.5		SM	0.08m Silty SAND - fine to medium grained, dark grey-brown, root affected.	D - M	VSt	HP	230	TOPSOIL				
						CL	0.25m Sandy CLAY - low to medium plasticity, dark grey-brown, fine grained sand, trace of silt.	M ~ Wp				SLOPE WASH				
						CH	1.50m Sandy CLAY - medium to high plasticity, brown with some grey, fine grained sand.	M > Wp				HP	210	RESIDUAL		
															HP	200
HP	350															
HP	400															
			46.0	1.0		CH	Becoming grey with some orange-brown.	M < Wp	H	HP	510					
			45.5	1.5			1.50m Extremely weathered SANDSTONE with soil properties: excavates as SAND - fine to coarse grained, pale grey-brown.	D - M	VD			EXTREMELY WEATHERED ROCK				
			45.0	2.0			2.30m With some highly weathered rock excavating as fine to coarse grained gravel.									
			44.5	2.5			Hole Terminated at 2.30 m									

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₅₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency	UCS (kPa)	Moisture Condition
VS Very Soft	<25	D Dry
S Soft	25 - 50	M Moist
F Firm	50 - 100	W Wet
St Stiff	100 - 200	W _p Plastic Limit
VSt Very Stiff	200 - 400	W _L Liquid Limit
H Hard	>400	
Fb Friable		

Density		Density Index
V Very Loose		<15%
L Loose		15 - 35%
MD Medium Dense		35 - 65%
D Dense		65 - 85%
VD Very Dense		85 - 100%



ENGINEERING LOG - TEST PIT

CLIENT: McCLOY LOCHINVAR PTY LTD

PROJECT: PROPOSED SUBDIVISION

LOCATION: LOT 1 - 3, DP 1218389 LOCHINVAR

TEST PIT NO:

TP05

PAGE:

1 OF 1

JOB NO:

NEW17P-0054

LOGGED BY:

BE

DATE:

19-4-17

EQUIPMENT TYPE: 4t Excavator

SURFACE RL: 44.9 m

TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m

DATUM: AHD

Drilling and Sampling				Material description and profile information					Field Test		Structure and additional observations		
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	
E	Not Encountered	U50	44.5	0.5		SM	Silty SAND - fine grained, dark grey-brown, trace clay, root affected.	M				200	TOPSOIL
							CLAY - medium to high plasticity, brown, trace fine grained sand.	M > W _p	VSt	HP	210	COLLUVIUM / POSSIBLE RESIDUAL	
										HP	200		
												HP	230
		0.75m	44.0	1.0		CI	Sandy CLAY - medium plasticity, brown, fine to medium grained sand, with fine grained gravel, sub-angular.	M < W _p	H	HP	>600	RESIDUAL SOIL	
		43.5	1.5						HP	>600			
			43.0	2.0		GC	Extremely weathered Pebbly SANDSTONE with soil properties: excavates as Clayey Sandy GRAVEL - fine to coarse grained, with highly weathered pockets.	D - M	VD				EXTREMELY TO HIGHLY WEATHERED ROCK
			42.5	2.40m									
			42.0	2.5			Hole Terminated at 2.40 m						

LEGEND:

Water

- Water Level (Date and time shown)
- Water Inflow
- Water Outflow

Strata Changes

- Gradational or transitional strata
- Definitive or distinct strata change

Notes, Samples and Tests

- U₃₀ 50mm Diameter tube sample
- CBR Bulk sample for CBR testing
- E Environmental sample (Glass jar, sealed and chilled on site)
- ASS Acid Sulfate Soil Sample (Plastic bag, air expelled, chilled)
- B Bulk Sample

Field Tests

- PID Photoionisation detector reading (ppm)
- DCP(x-y) Dynamic penetrometer test (test depth interval shown)
- HP Hand Penetrometer test (UCS kPa)

Consistency		UCS (kPa)	Moisture Condition	
VS	Very Soft	<25	D	Dry
S	Soft	25 - 50	M	Moist
F	Firm	50 - 100	W	Wet
St	Stiff	100 - 200	W _p	Plastic Limit
VSt	Very Stiff	200 - 400	W _L	Liquid Limit
H	Hard	>400		
Fb	Friable			
Density			Density Index <15%	
V	Very Loose		Density Index 15 - 35%	
L	Loose		Density Index 35 - 65%	
MD	Medium Dense		Density Index 65 - 85%	
D	Dense		Density Index 85 - 100%	
VD	Very Dense			

APPENDIX B:

Results of Laboratory Testing

Report No: SSI:NEW21W-0908-S01

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



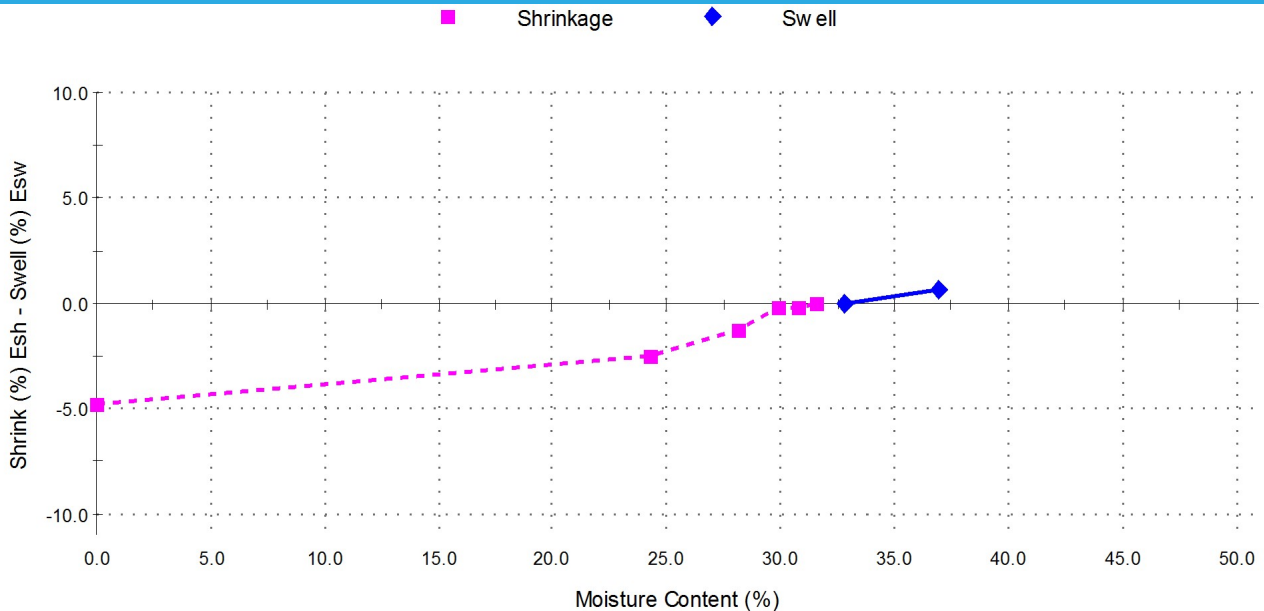
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 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: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH101 - (0.5 - 0.75m)
Date Tested: 23/03/2021
Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

AS 1289.7.1.1	AS 1289.7.1.1
Swell Test	Shrink Test
Swell on Saturation (%): 0.6	Shrink on drying (%): 4.8
Moisture Content before (%): 32.8	Shrinkage Moisture Content (%): 31.5
Moisture Content after (%): 36.9	Est. inert material (%): 1%
Est. Unc. Comp. Strength before (kPa): 310	Crumbling during shrinkage: Nil
Est. Unc. Comp. Strength after (kPa): 170	Cracking during shrinkage: Major

Shrink Swell



Shrink Swell Index - Iss (%): 2.8

Comments

Report No: SSI:NEW21W-0908-S02

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



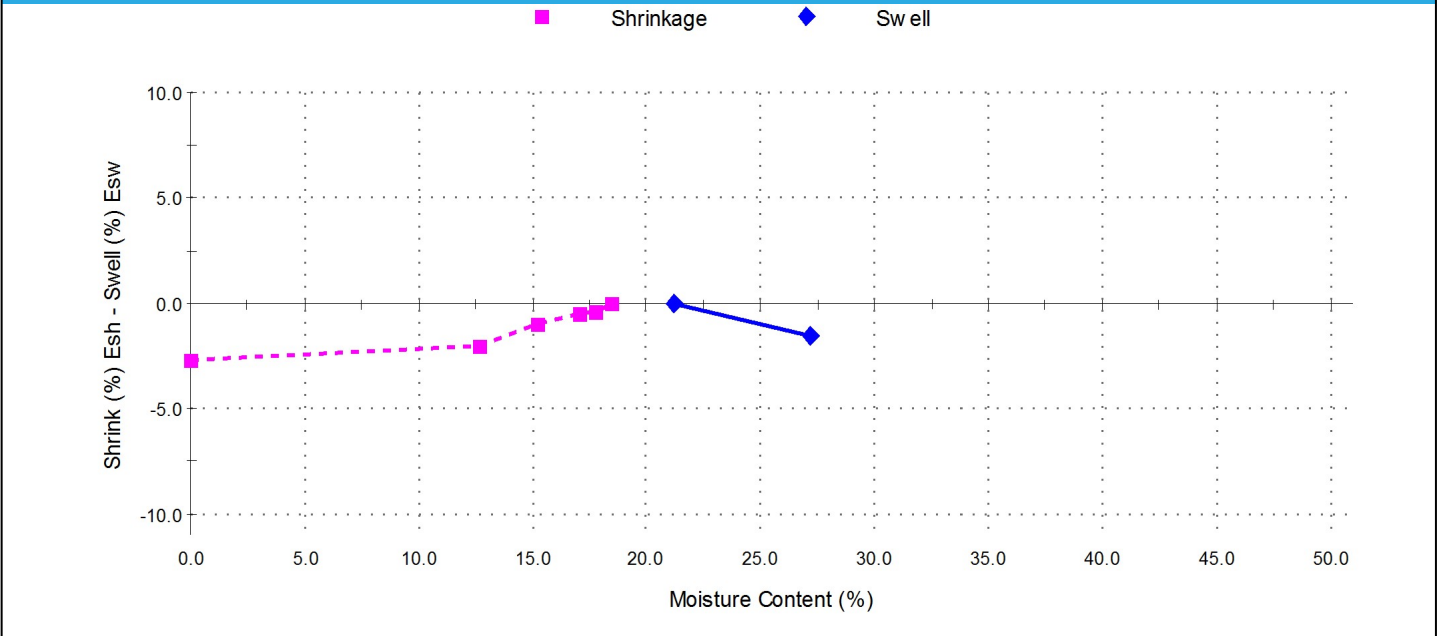
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 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: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH102 - (0.65 - 0.8m)
Date Tested: 23/03/2021
Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-1.6	Shrink on drying (%):	2.7
Moisture Content before (%):	21.2	Shrinkage Moisture Content (%):	18.4
Moisture Content after (%):	27.2	Est. inert material (%):	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



Shrink Swell Index - Iss (%): 1.5

Comments

Report No: SSI:NEW21W-0908-S03

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 29/03/2021

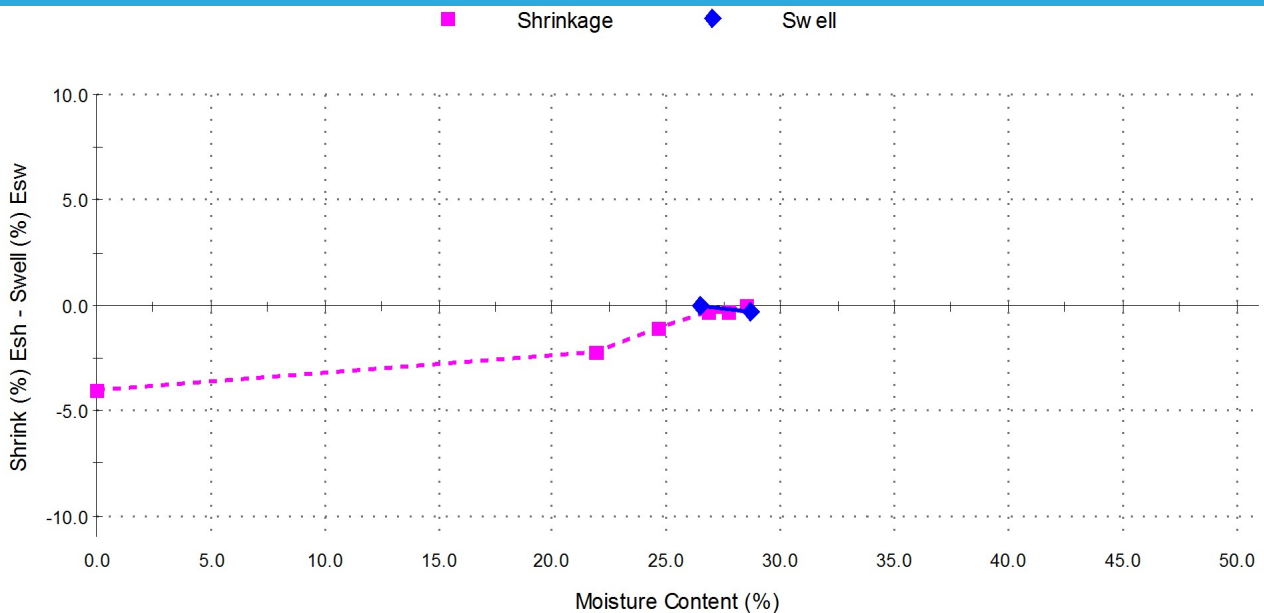
Sample Details

Sample ID: NEW21W-0908-S03
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH103 - (0.7 - 0.9m)
Date Tested: 23/03/2021

Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-0.3	Shrink on drying (%):	4.0
Moisture Content before (%):	26.5	Shrinkage Moisture Content (%):	28.5
Moisture Content after (%):	28.7	Est. inert material (%):	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



Shrink Swell Index - Iss (%): 2.2

Comments

Report No: SSI:NEW21W-0908-S04

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 30/03/2021

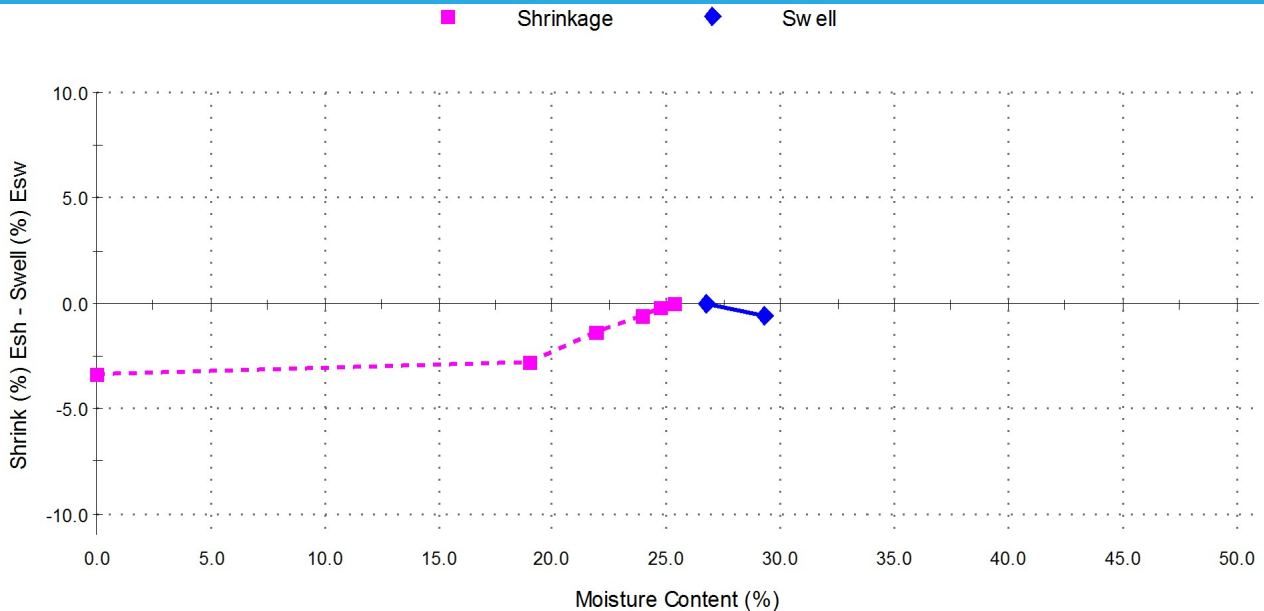
Sample Details

Sample ID: NEW21W-0908-S04
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH104 - (0.5 - 0.65m)
Date Tested: 23/03/2021
Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test		AS 1289.7.1.1
Swell on Saturation (%):	-0.6	
Moisture Content before (%):	26.7	
Moisture Content after (%):	29.3	
Est. Unc. Comp. Strength before (kPa):	>600	
Est. Unc. Comp. Strength after (kPa):	460	

Shrink Test		AS 1289.7.1.1
Shrink on drying (%):	3.4	
Shrinkage Moisture Content (%):	25.3	
Est. inert material (%):	7%	
Crumbling during shrinkage:	Nil	
Cracking during shrinkage:	Major	

Shrink Swell



Shrink Swell Index - Iss (%): 1.9

Comments

Report No: SSI:NEW21W-0908-S05

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



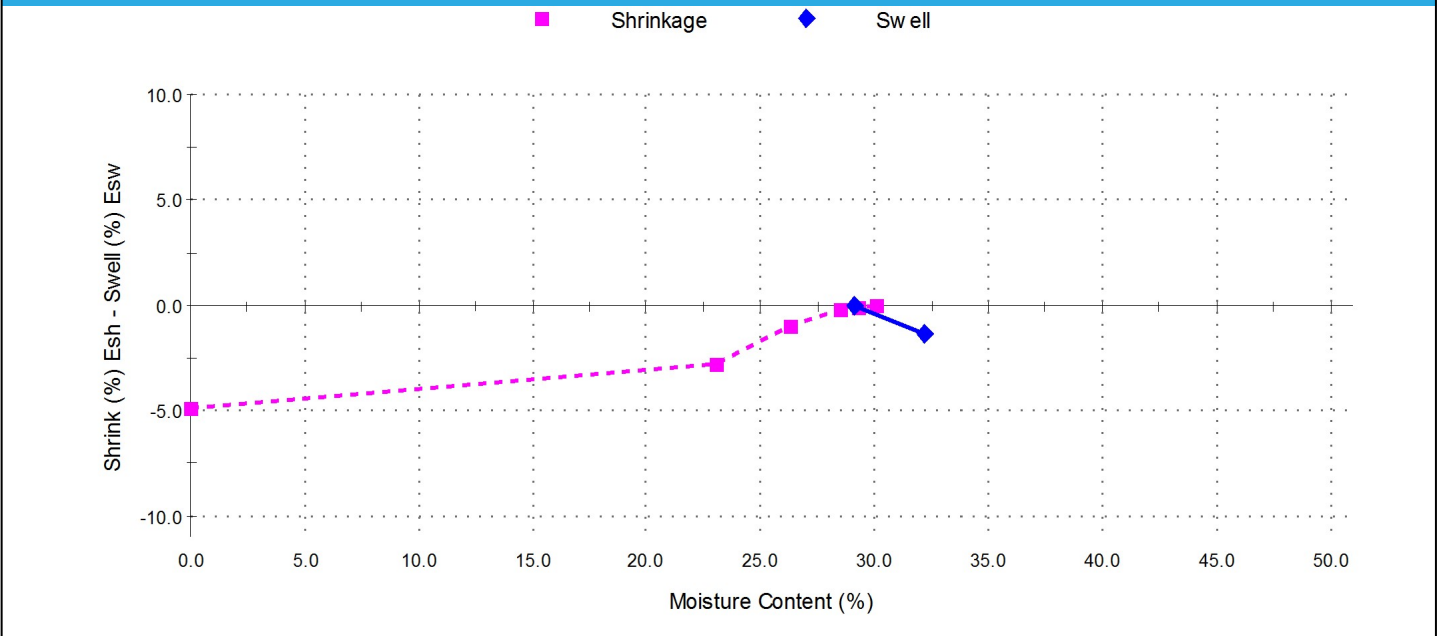
Accredited for compliance with ISO/IEC 17025-Testing.
 The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 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: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH105 - (0.9 - 1.05m)
Date Tested: 23/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-1.4	Shrink on drying (%):	4.9
Moisture Content before (%):	29.1	Shrinkage Moisture Content (%):	30.1
Moisture Content after (%):	32.1	Est. inert material (%):	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



Shrink Swell Index - Iss (%): 2.7

Comments

Report No: SSI:NEW21W-0908-S06

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



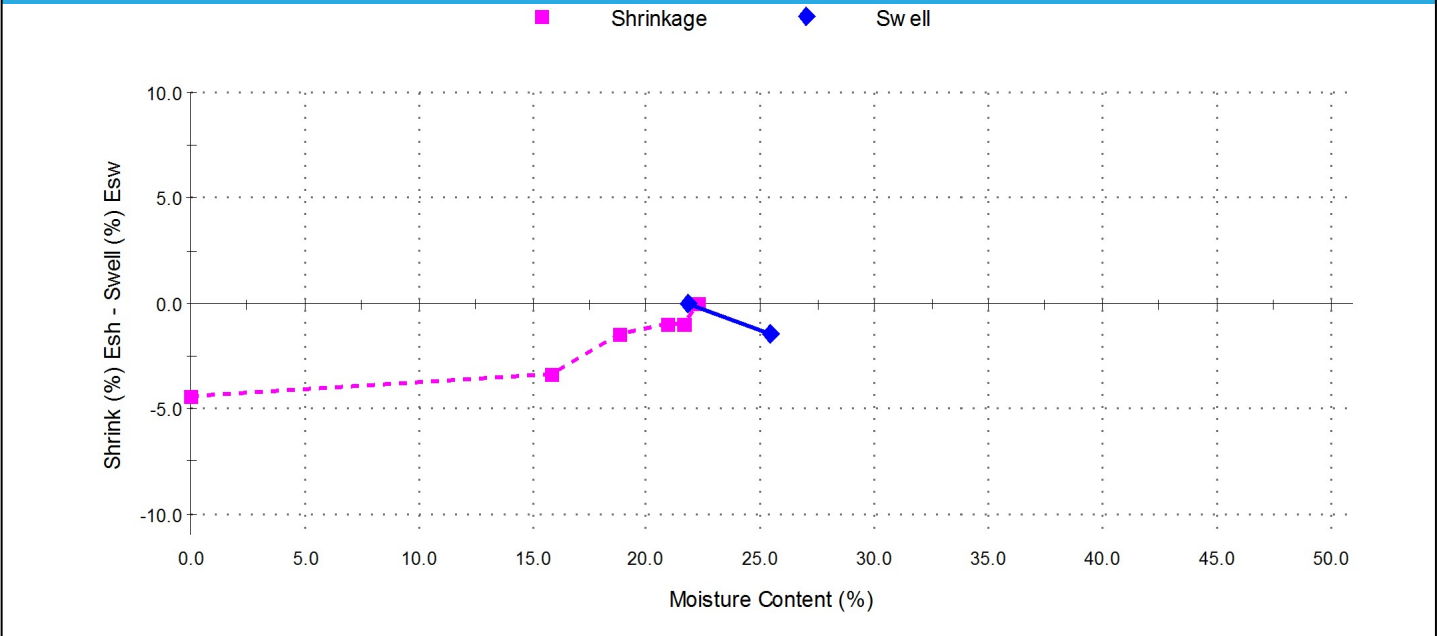
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 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: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH106 - (0.6 - 0.8m)
Date Tested: 23/03/2021
Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-1.4	Shrink on drying (%):	4.4
Moisture Content before (%):	21.8	Shrinkage Moisture Content (%):	22.3
Moisture Content after (%):	25.4	Est. inert material (%):	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



Shrink Swell Index - Iss (%): 2.5

Comments

Report No: SSI:NEW21W-0908-S07

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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.

[Signature]
 Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 7/04/2021

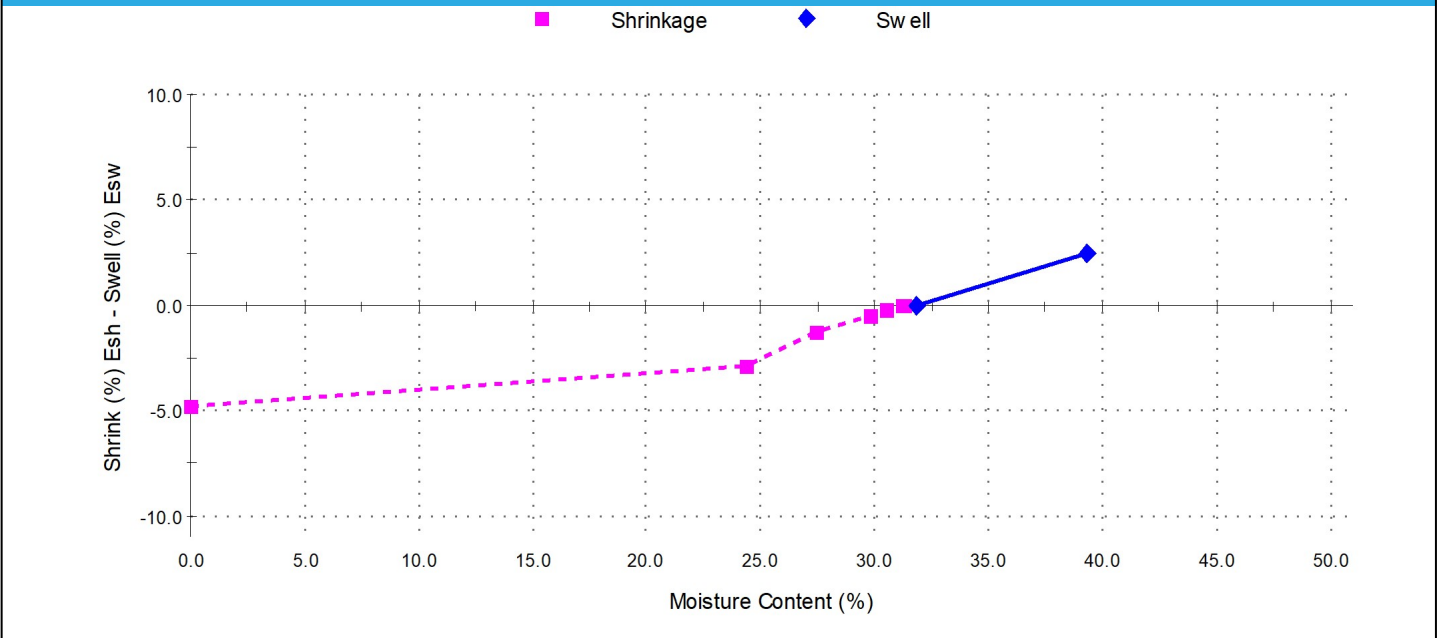
Sample Details

Sample ID: NEW21W-0908-S07
Sampling Method: The results outlined below apply to the sample as received
Material: Sandy Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH107 - (1.0 - 1.2m)
Borehole/Pit Number: BH107
Borehole/Pit Depth (m): 1.0 - 1.2
Date Tested: 23/03/2021

Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	2.4	Shrink on drying (%):	4.8
Moisture Content before (%):	31.9	Shrinkage Moisture Content (%):	31.3
Moisture Content after (%):	39.3	Est. inert material (%):	1%
Est. Unc. Comp. Strength before (kPa):	410	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	140	Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 3.4

Comments

Report No: SSI:NEW21W-0908-S08


Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



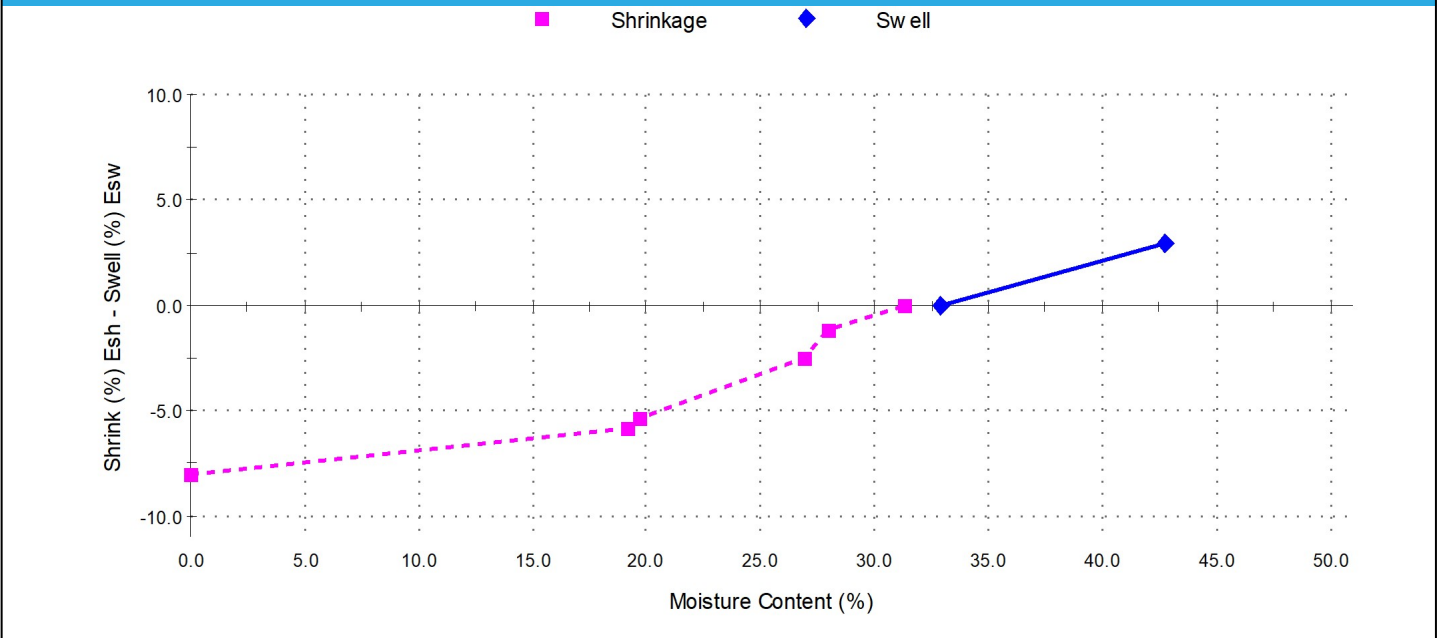
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.

 Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 7/04/2021

Sample Details

Sample ID: NEW21W-0908-S08
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH108 - (0.5 - 0.75m)
Borehole/Pit Number: BH108
Borehole/Pit Depth (m): 0.5 - 0.75
Date Tested: 25/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	2.9	Shrink on drying (%):	8.0
Moisture Content before (%):	32.9	Shrinkage Moisture Content (%):	31.3
Moisture Content after (%):	42.8	Est. inert material (%):	1%
Est. Unc. Comp. Strength before (kPa):	250	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	80	Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 5.3

Comments

Report No: SSI:NEW21W-0908-S09

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



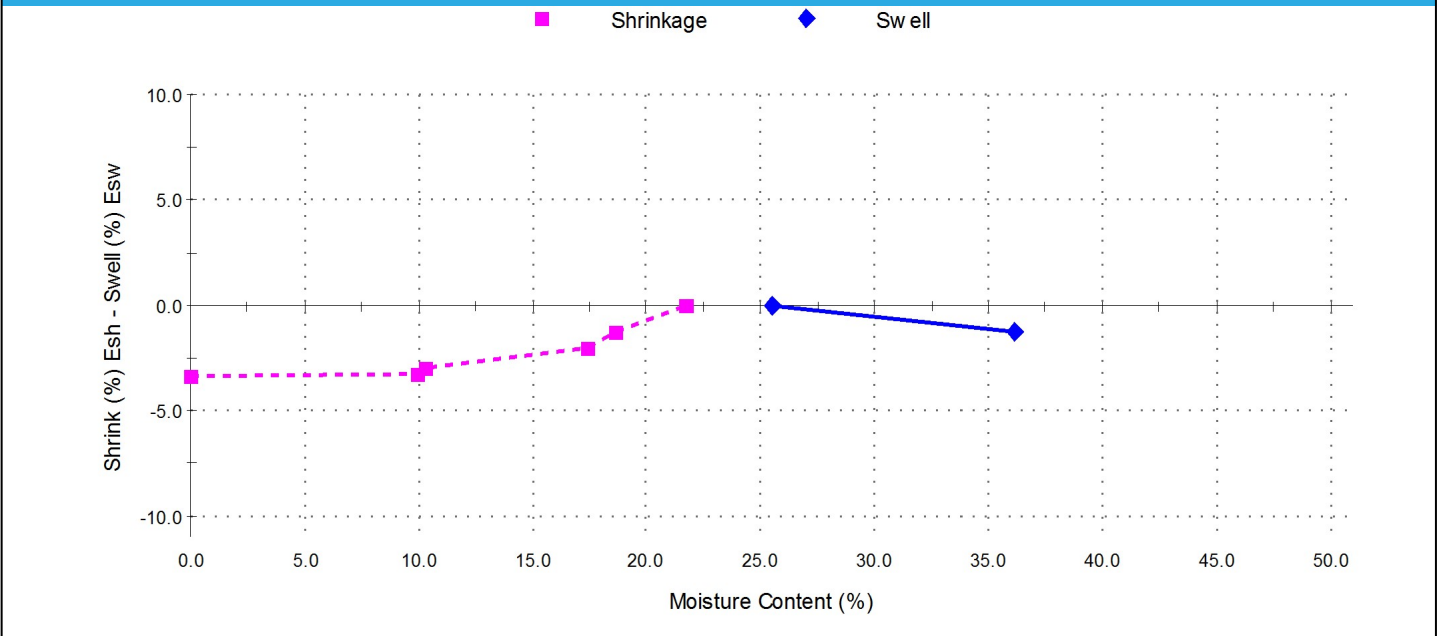
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 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: Sandy Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH109 - (0.3 - 0.45m)
Date Tested: 25/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-1.3	Shrink on drying (%):	3.4
Moisture Content before (%):	25.5	Shrinkage Moisture Content (%):	21.7
Moisture Content after (%):	36.1	Est. inert material (%):	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



Shrink Swell Index - Iss (%): 1.9

Comments

Report No: SSI:NEW21W-0908-S10

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 31/03/2021

Sample Details

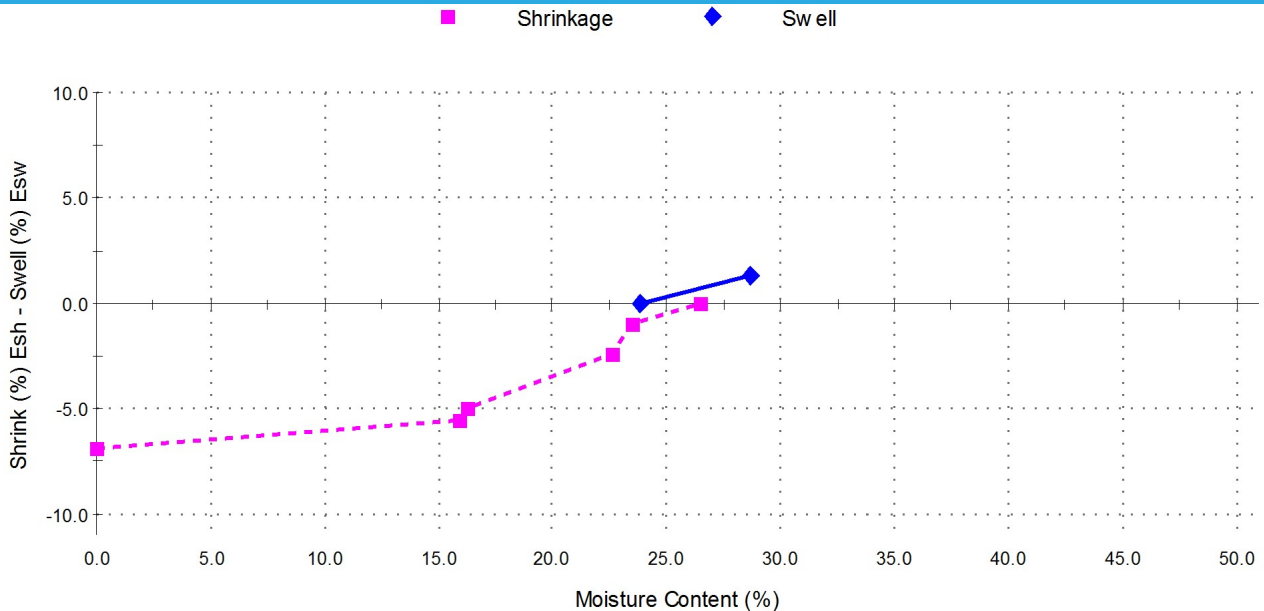
Sample ID: NEW21W-0908-S10
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH109 - (0.6 - 0.75m)
Date Tested: 25/03/2021

Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test	AS 1289.7.1.1
Swell on Saturation (%):	1.3
Moisture Content before (%):	23.9
Moisture Content after (%):	28.6
Est. Unc. Comp. Strength before (kPa):	360
Est. Unc. Comp. Strength after (kPa):	160

Shrink Test	AS 1289.7.1.1
Shrink on drying (%):	6.9
Shrinkage Moisture Content (%):	26.5
Est. inert material (%):	5%
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 4.2

Comments

Report No: SSI:NEW21W-0908-S11


Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



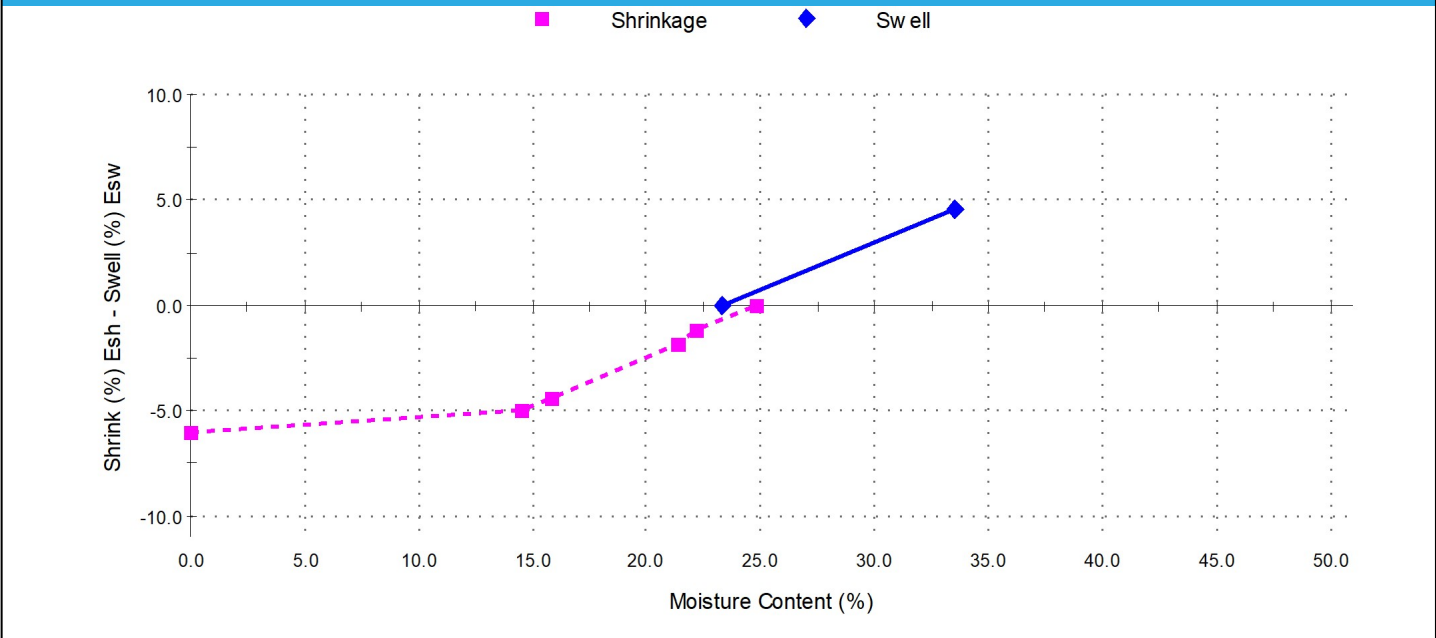
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.

 Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 7/04/2021

Sample Details

Sample ID: NEW21W-0908-S11
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH110 - (0.4 - 0.55m)
Borehole/Pit Number: BH110
Borehole/Pit Depth (m): 0.4 - 0.55
Date Tested: 25/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	4.6	Shrink on drying (%):	6.0
Moisture Content before (%):	23.3	Shrinkage Moisture Content (%):	24.8
Moisture Content after (%):	33.5	Est. inert material (%):	6
Est. Unc. Comp. Strength before (kPa):	480	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	90	Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 4.6

Comments

Comments area is currently blank.

Report No: SSI:NEW21W-0908-S12


Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



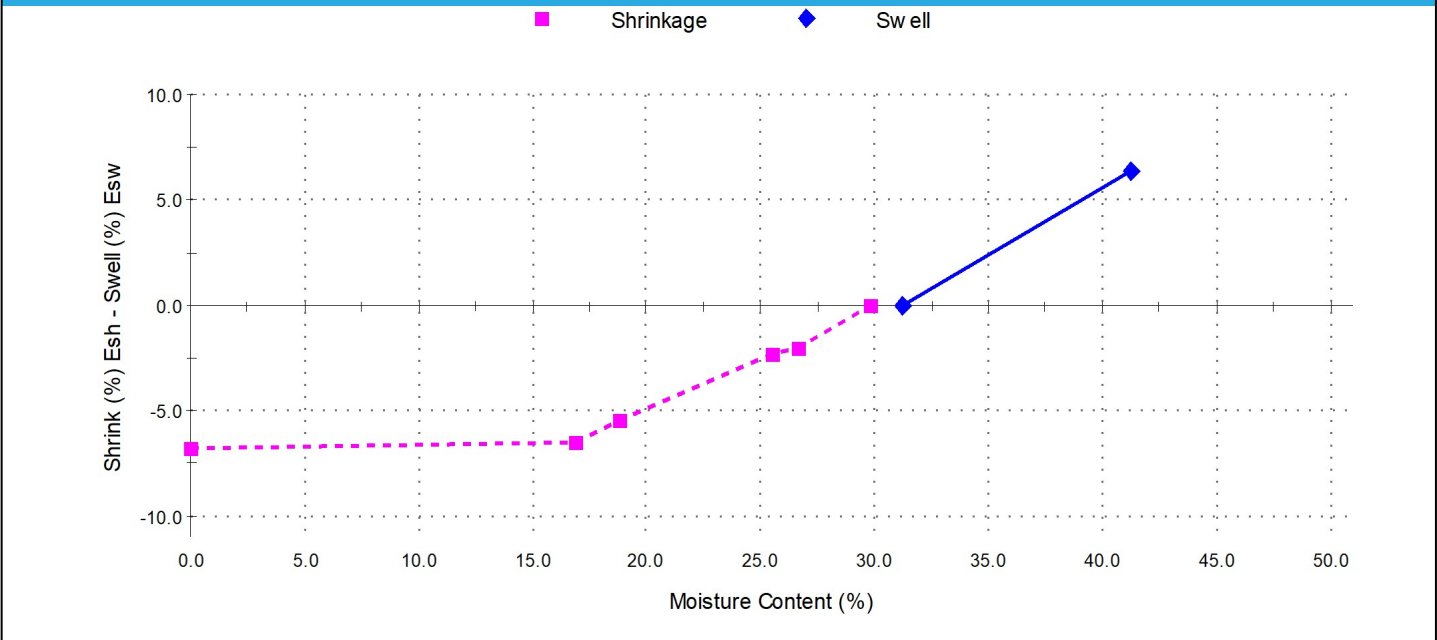
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.

 Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 7/04/2021

Sample Details

Sample ID: NEW21W-0908-S12
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH111 - (1.0 - 1.25m)
Borehole/Pit Number: BH111
Borehole/Pit Depth (m): 1.0 - 1.25
Date Tested: 25/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	6.4	Shrink on drying (%):	6.8
Moisture Content before (%):	31.3	Shrinkage Moisture Content (%):	29.8
Moisture Content after (%):	41.2	Est. inert material (%):	3%
Est. Unc. Comp. Strength before (kPa):	450	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	60	Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 5.6

Comments

Report No: SSI:NEW21W-0908-S13

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 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: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH112 - (0.5 - 0.65m)
Date Tested: 19/03/2021

Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

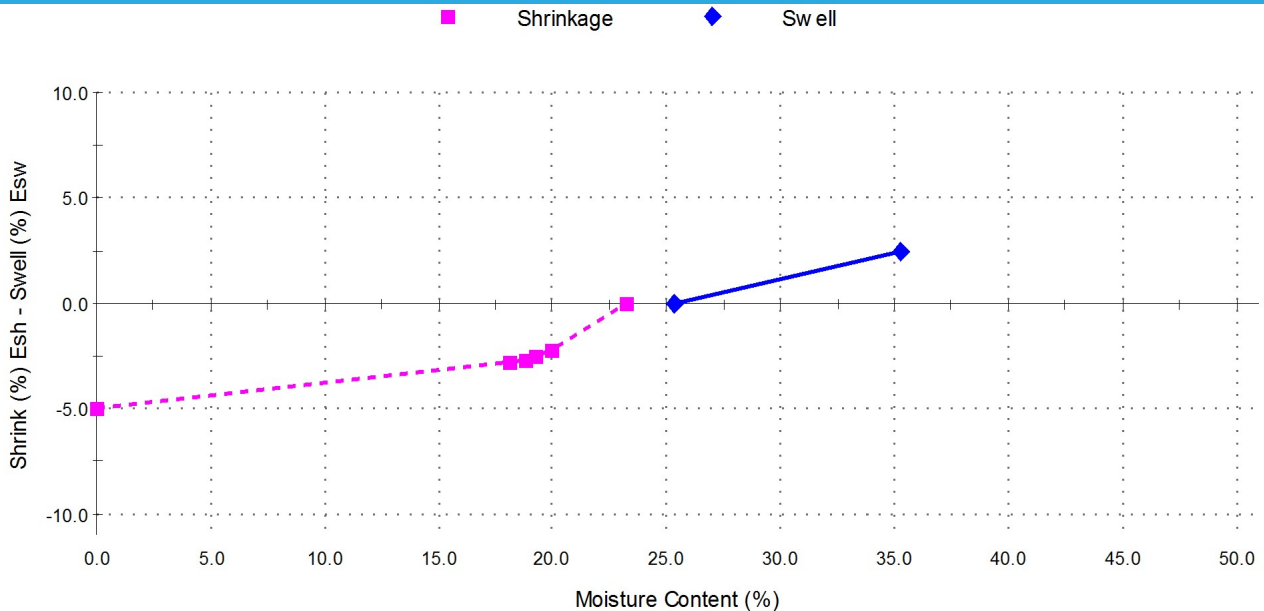
Swell Test AS 1289.7.1.1

Swell on Saturation (%): 2.5
Moisture Content before (%): 25.4
Moisture Content after (%): 35.2
Est. Unc. Comp. Strength before (kPa): 300
Est. Unc. Comp. Strength after (kPa): 150

Shrink Test AS 1289.7.1.1

Shrink on drying (%): 5.0
Shrinkage Moisture Content (%): 23.2
Est. inert material (%): 3%
Crumbling during shrinkage: Nil
Cracking during shrinkage: Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 3.5

Comments

Report No: SSI:NEW21W-0908-S14

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



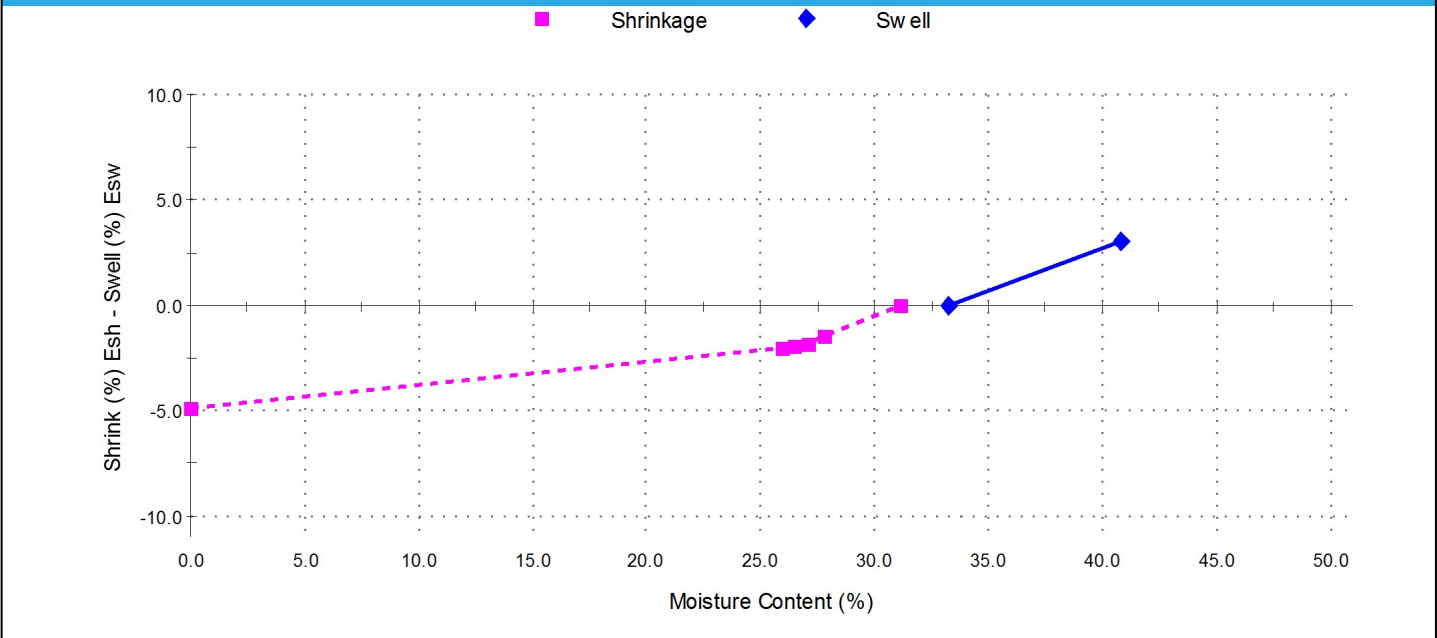
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 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: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH113 - (0.5 - 0.7m)
Date Tested: 19/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	3.0	Shrink on drying (%):	4.9
Moisture Content before (%):	33.2	Shrinkage Moisture Content (%):	31.1
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



Shrink Swell Index - Iss (%): 3.6

Comments

Report No: SSI:NEW21W-0908-S15

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



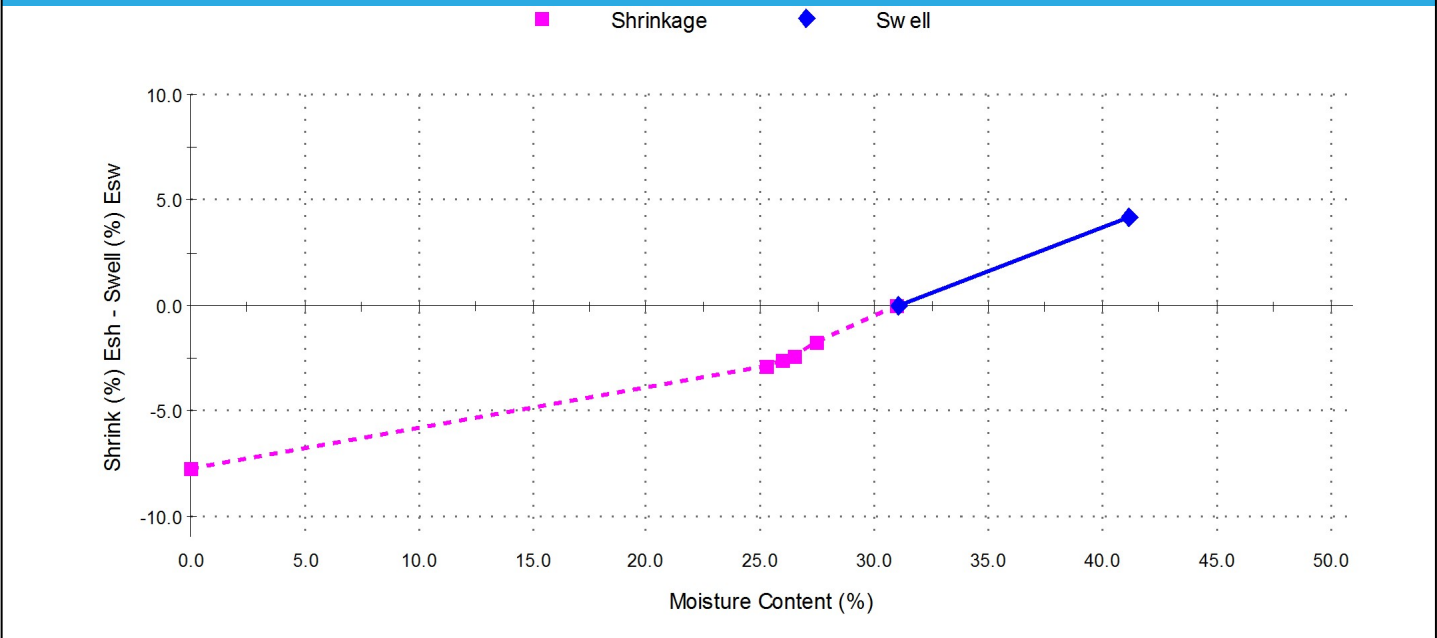
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 1/04/2021

Sample Details

Sample ID: NEW21W-0908-S15
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH114 - (1.0 - 1.2.m)
Date Tested: 19/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	4.2	Shrink on drying (%):	7.8
Moisture Content before (%):	31.1	Shrinkage Moisture Content (%):	31.0
Moisture Content after (%):	41.1	Est. inert material (%):	2%
Est. Unc. Comp. Strength before (kPa):	300	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	80	Cracking during shrinkage:	Major

Shrink Swell



Shrink Swell Index - Iss (%): 5.5

Comments

Report No: SSI:NEW21W-0908-S16

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



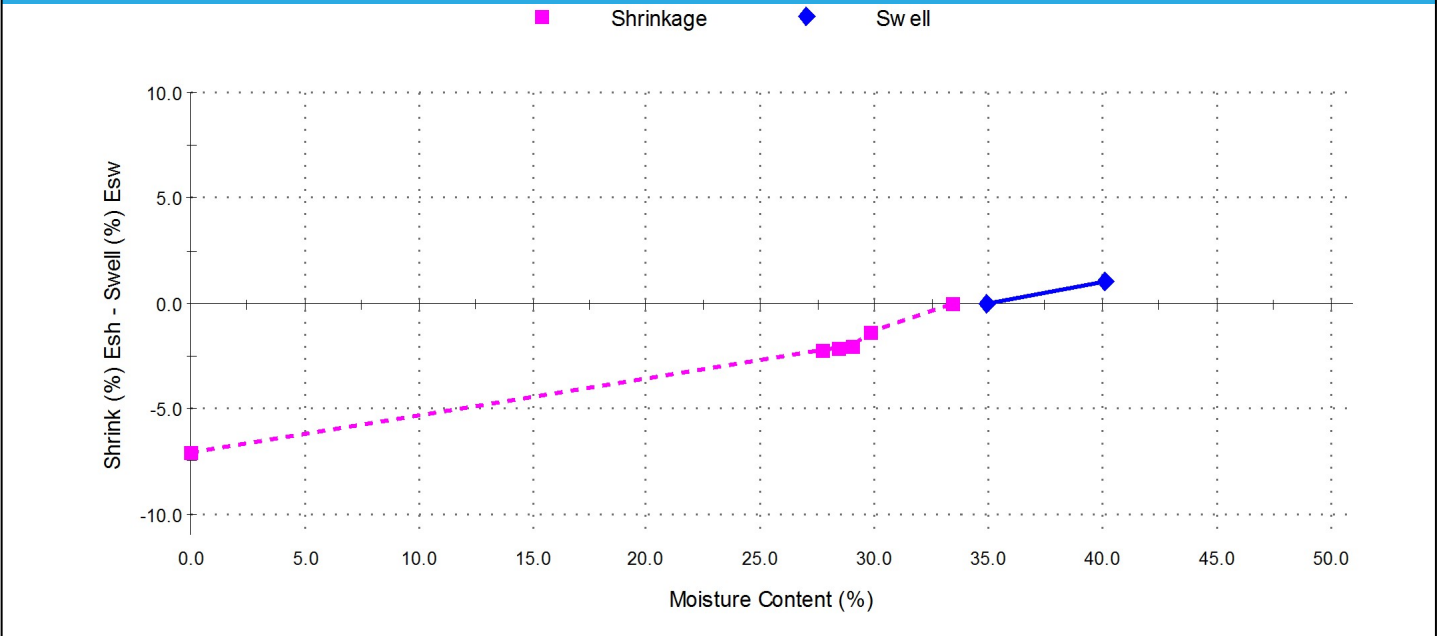
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 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: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH115 - (0.9 - 1.05m)
Date Tested: 19/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	1.0	Shrink on drying (%):	7.1
Moisture Content before (%):	34.9	Shrinkage Moisture Content (%):	33.4
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):	160	Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 4.2

Comments

Report No: SSI:NEW21W-0908-S17

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 26/03/2021

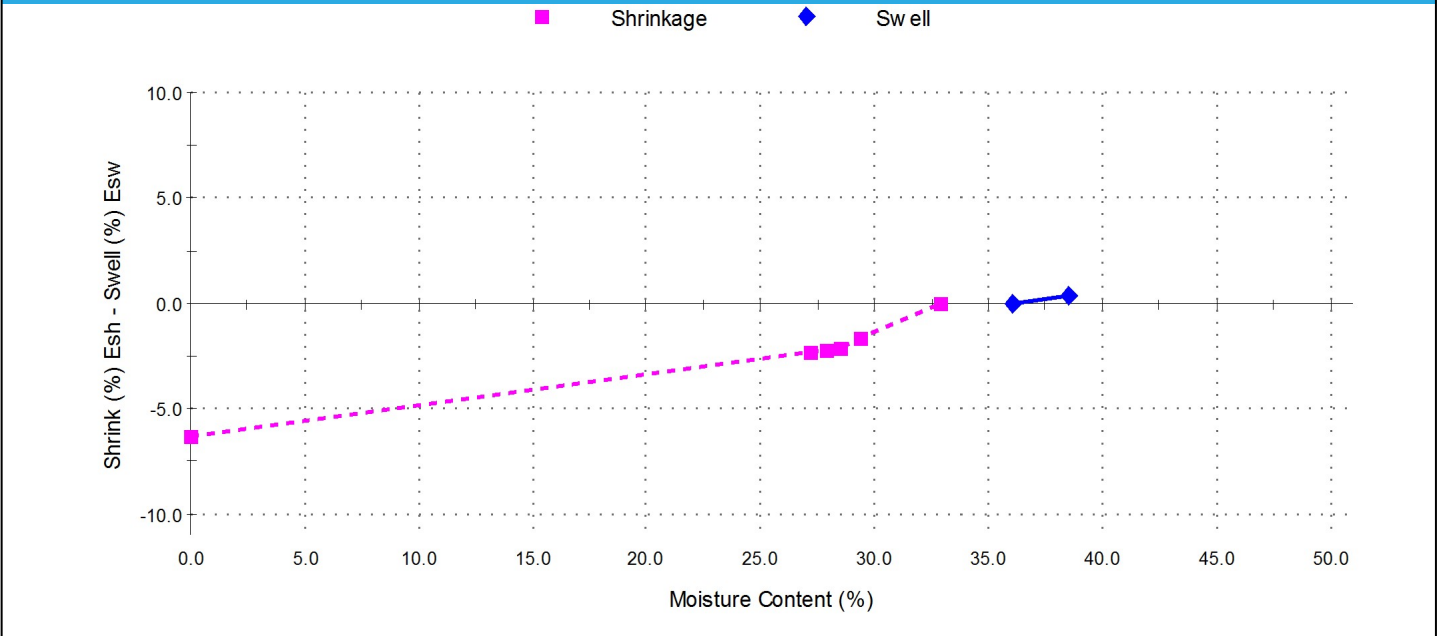
Sample Details

Sample ID: NEW21W-0908-S17
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH116 - (0.6 - 0.8m)
Date Tested: 19/03/2021
Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test		AS 1289.7.1.1
Swell on Saturation (%):	0.4	
Moisture Content before (%):	36.1	
Moisture Content after (%):	38.5	
Est. Unc. Comp. Strength before (kPa):	200	
Est. Unc. Comp. Strength after (kPa):	150	

Shrink Test		AS 1289.7.1.1
Shrink on drying (%):	6.3	
Shrinkage Moisture Content (%):	32.9	
Est. inert material (%):	1%	
Crumbling during shrinkage:	Nil	
Cracking during shrinkage:	Major	

Shrink Swell



Shrink Swell Index - Iss (%): 3.6

Comments

Report No: SSI:NEW21W-0908-S18

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



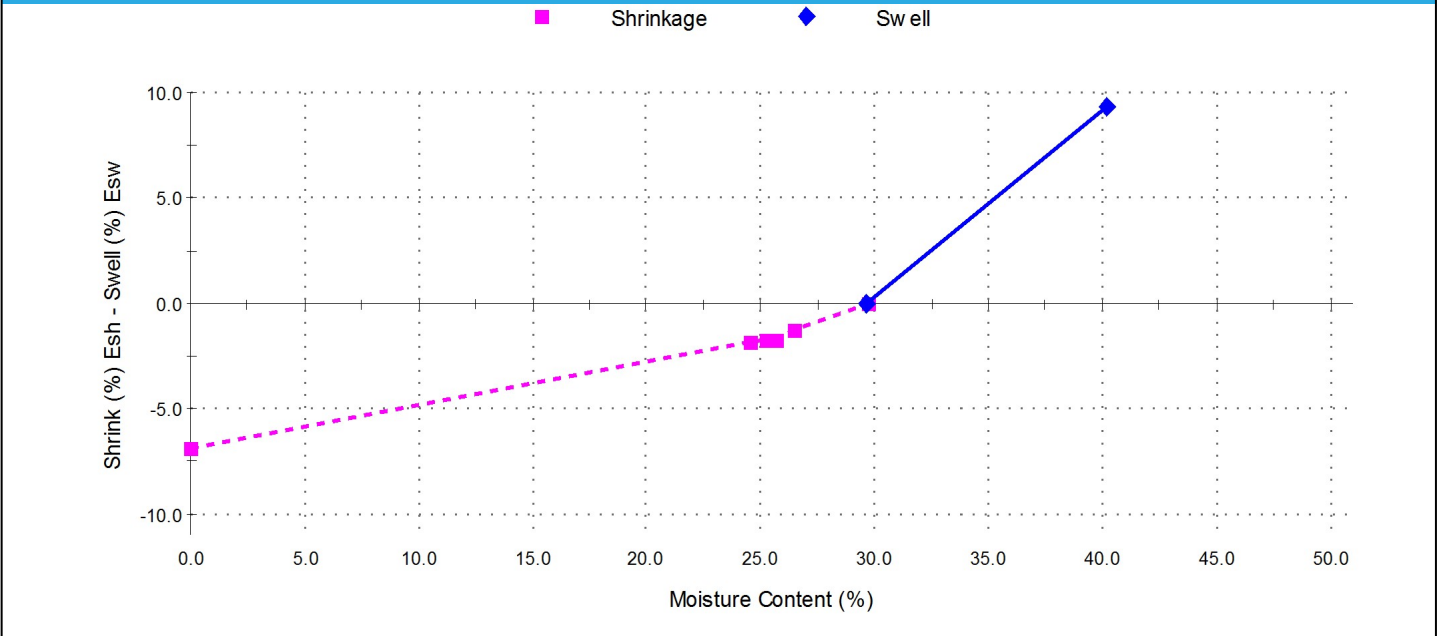
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 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: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH117 - (0.95 - 1.15m)
Date Tested: 19/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	9.4	Shrink on drying (%):	6.9
Moisture Content before (%):	29.7	Shrinkage Moisture Content (%):	29.7
Moisture Content after (%):	40.2	Est. inert material (%):	3
Est. Unc. Comp. Strength before (kPa):	400	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	70	Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 6.4

Comments

Report No: SSI:NEW21W-0908-S19

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 26/03/2021

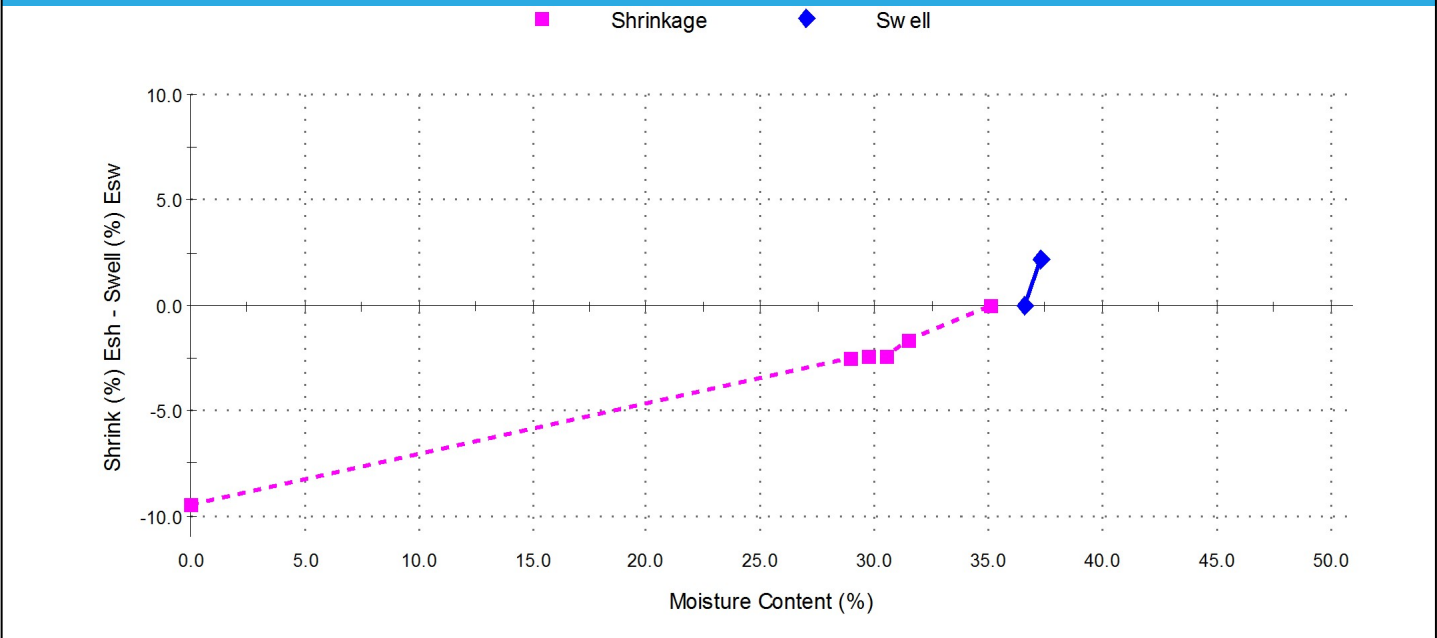
Sample Details

Sample ID: NEW21W-0908-S19
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH201 - (1.1 - 1.3m)
Date Tested: 19/03/2021

Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	2.2	Shrink on drying (%):	9.5
Moisture Content before (%):	36.6	Shrinkage Moisture Content (%):	35.1
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



Shrink Swell Index - Iss (%): 5.9

Comments

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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.

B. Cullen

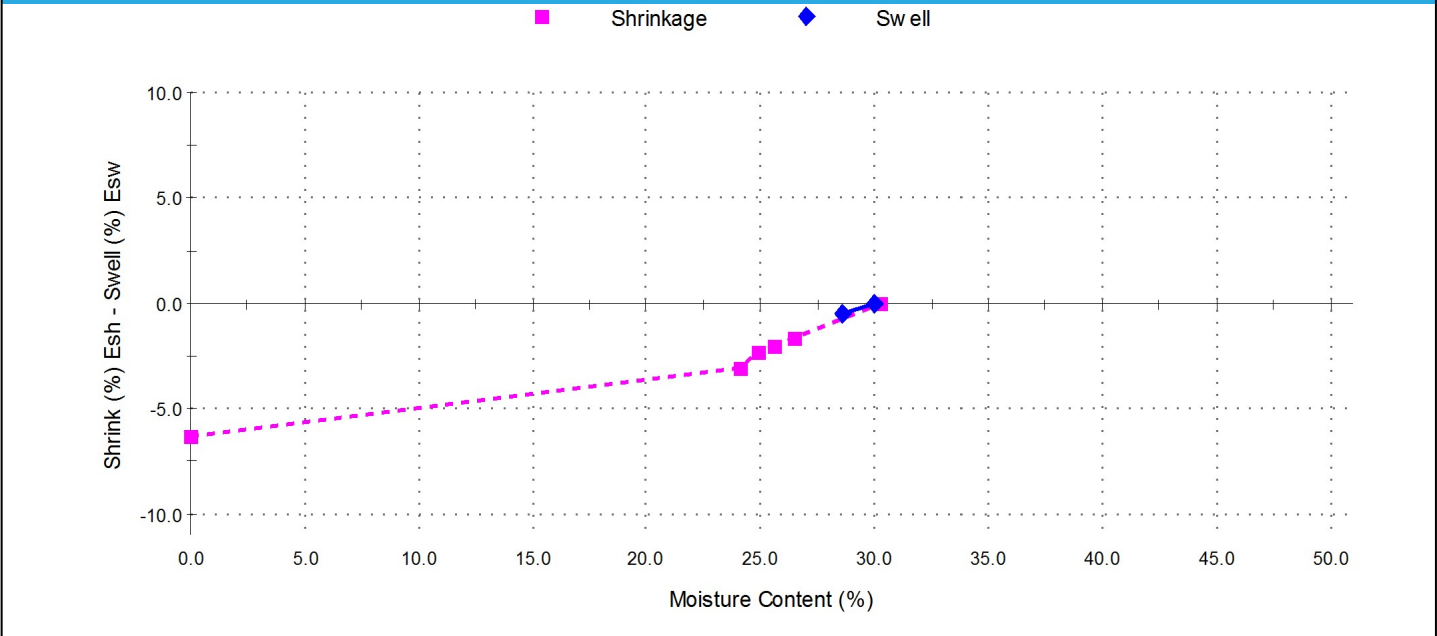
Approved Signatory: Brent Cullen
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 26/03/2021

Sample Details

Sample ID: NEW21W-0908-S20
Sampling Method: The results outlined below apply to the sample as received
Material: Sandy Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH202 - (0.5 - 0.65m)
Date Tested: 19/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-0.5	Shrink on drying (%):	6.3
Moisture Content before (%):	30.0	Shrinkage Moisture Content (%):	30.2
Moisture Content after (%):	28.6	Est. inert material (%):	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



Shrink Swell Index - Iss (%): 3.5

Comments

Report No: SSI:NEW21W-0908-S21


Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



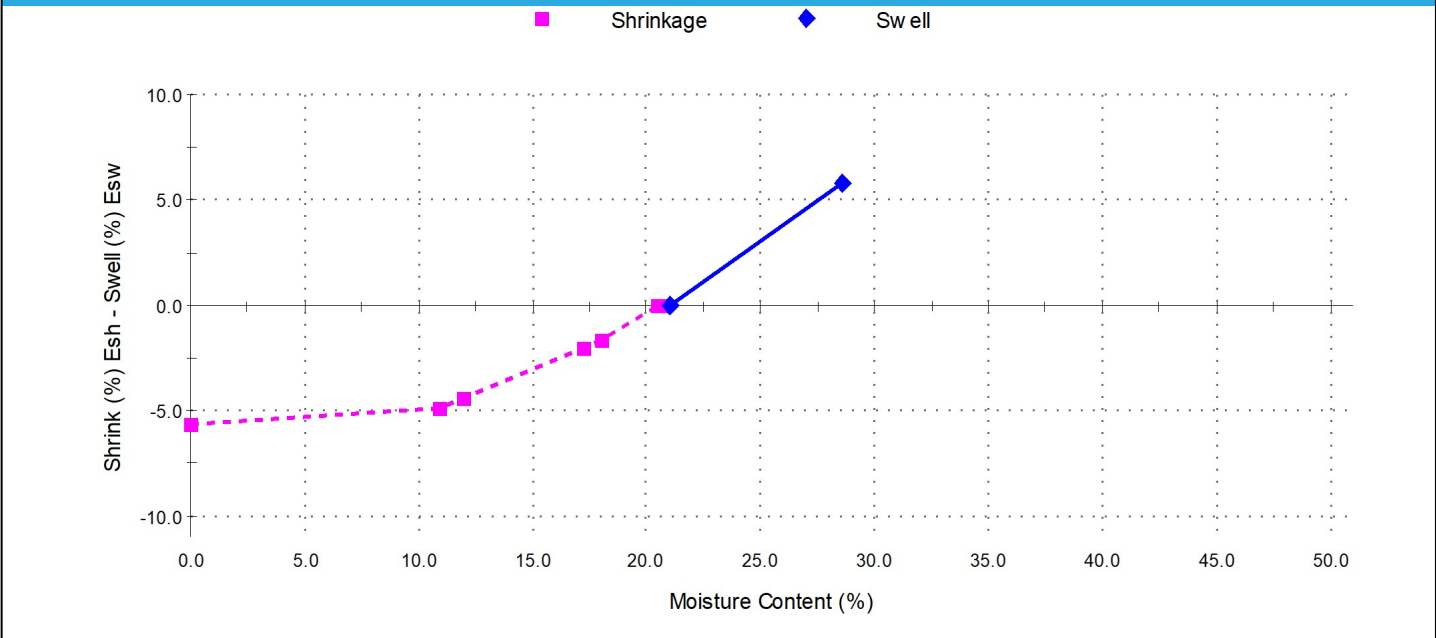
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.

 Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 7/04/2021

Sample Details

Sample ID: NEW21W-0908-S21
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH203 - (0.9 - 1.15m)
Borehole/Pit Number: BH203
Borehole/Pit Depth (m): 0.9 - 1.15
Date Tested: 25/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	5.8	Shrink on drying (%):	5.7
Moisture Content before (%):	21.0	Shrinkage Moisture Content (%):	20.5
Moisture Content after (%):	28.6	Est. inert material (%):	2
Est. Unc. Comp. Strength before (kPa):	600	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	100	Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 4.8

Comments

Report No: SSI:NEW21W-0908-S22


Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



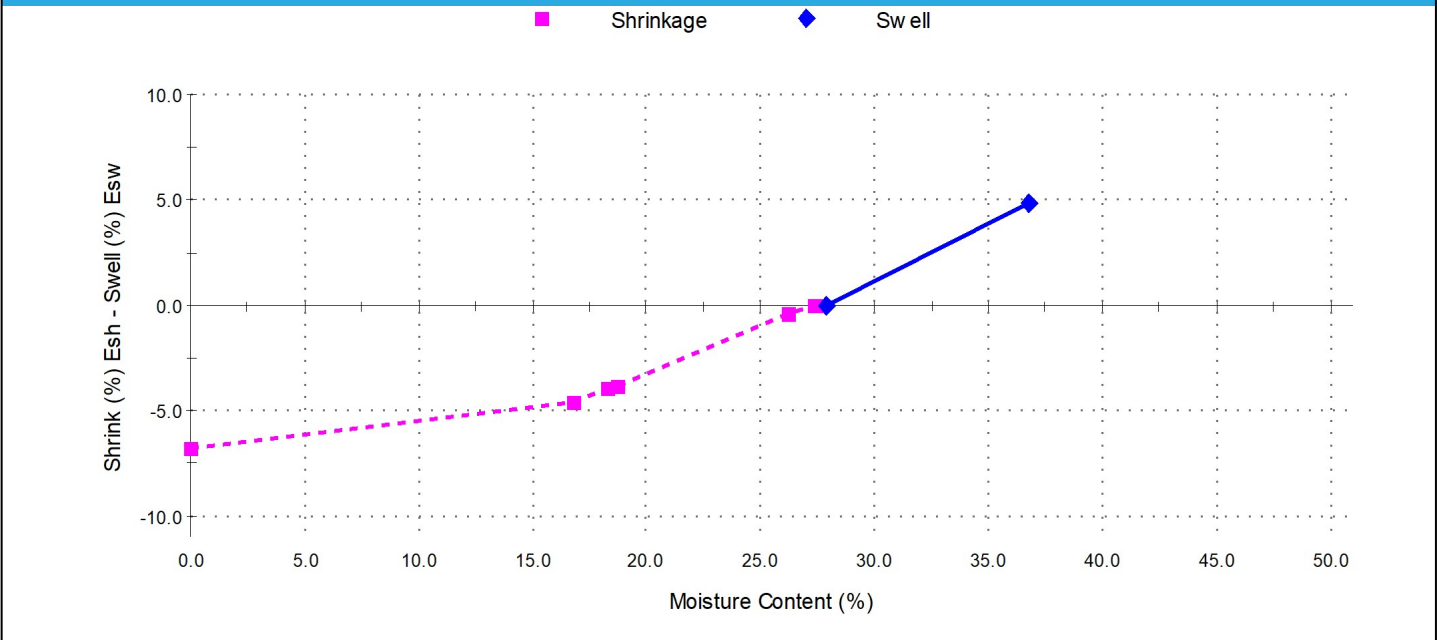
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.

 Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 7/04/2021

Sample Details

Sample ID: NEW21W-0908-S22
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH204 - (0.5 - 0.65m)
Borehole/Pit Number: BH204
Borehole/Pit Depth (m): 0.5 - 0.65
Date Tested: 26/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	4.8	Shrink on drying (%):	6.8
Moisture Content before (%):	27.8	Shrinkage Moisture Content (%):	27.4
Moisture Content after (%):	36.7	Est. inert material (%):	1
Est. Unc. Comp. Strength before (kPa):	380	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	150	Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 5.1

Comments

Report No: SSI:NEW21W-0908-S23


Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



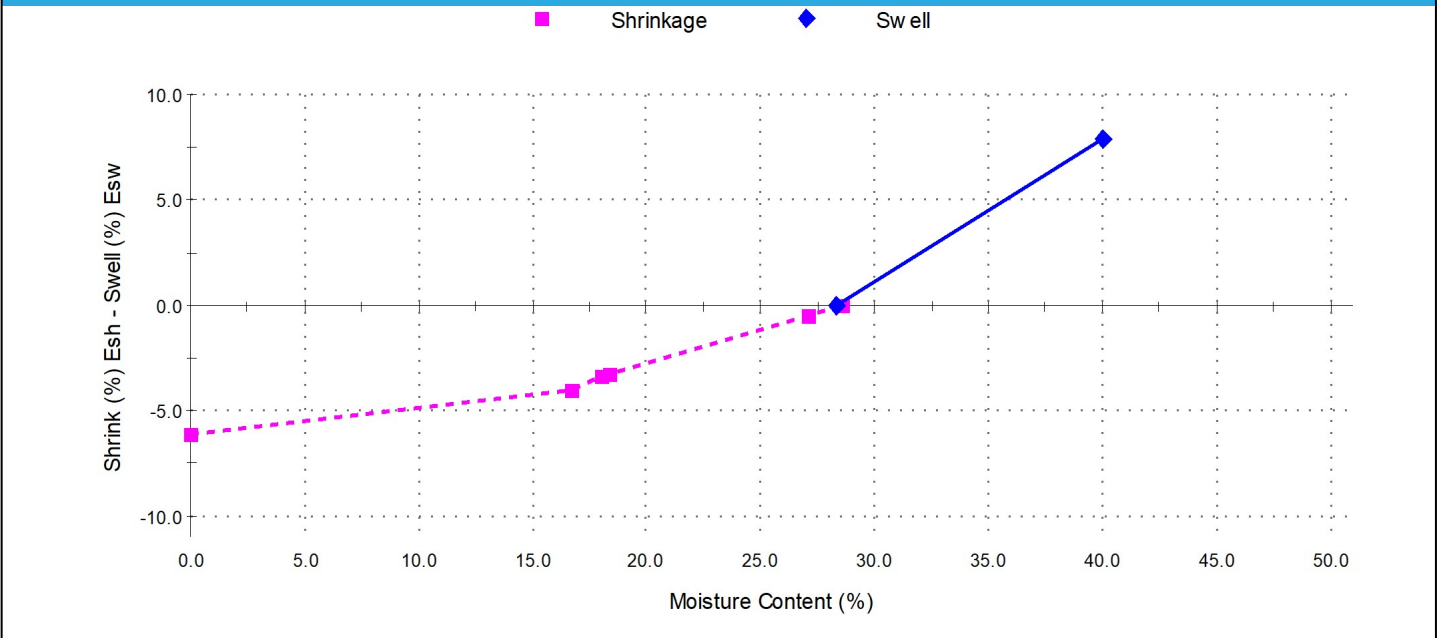
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.

 Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 7/04/2021

Sample Details

Sample ID: NEW21W-0908-S23
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH204 - (1.0 - 1.1m)
Borehole/Pit Number: BH204
Borehole/Pit Depth (m): 1.00 - 1.1
Date Tested: 26/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	7.9	Shrink on drying (%):	6.1
Moisture Content before (%):	28.3	Shrinkage Moisture Content (%):	28.6
Moisture Content after (%):	40.0	Est. inert material (%):	1
Est. Unc. Comp. Strength before (kPa):	600	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	80	Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 5.6

Comments

Report No: SSI:NEW21W-0908-S24

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 1/04/2021

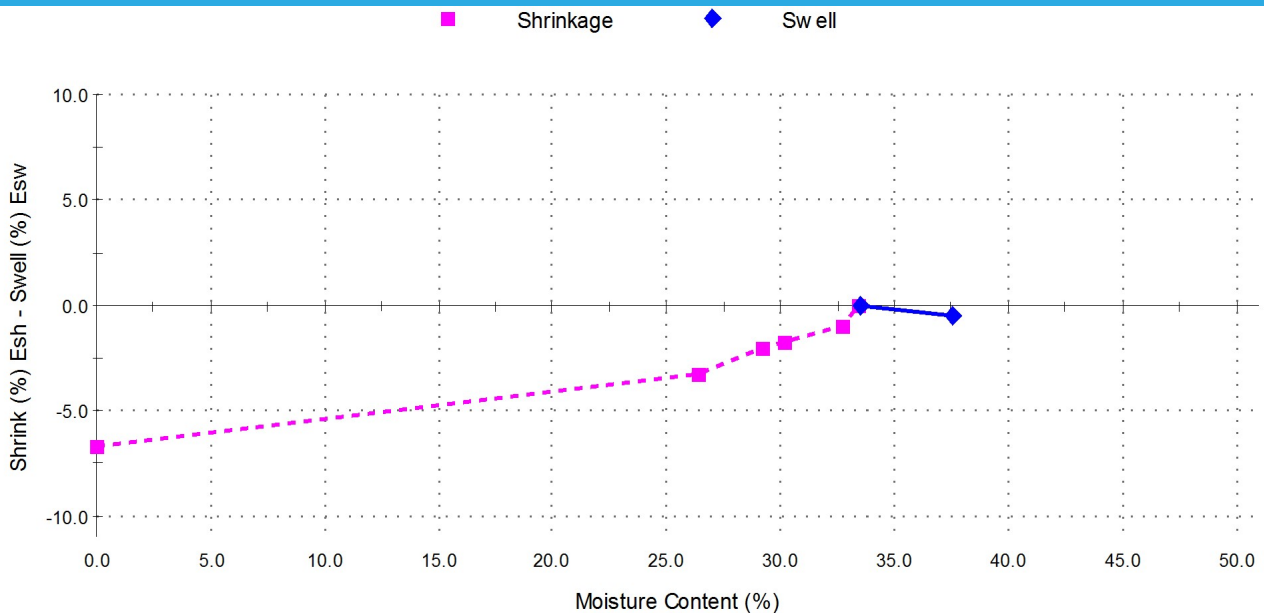
Sample Details

Sample ID: NEW21W-0908-S24
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH205 - (0.5 - 0.7m)
Date Tested: 29/03/2021

Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-0.5	Shrink on drying (%):	6.7
Moisture Content before (%):	33.5	Shrinkage Moisture Content (%):	33.4
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



Shrink Swell Index - Iss (%): 3.7

Comments

Report No: SSI:NEW21W-0908-S25

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



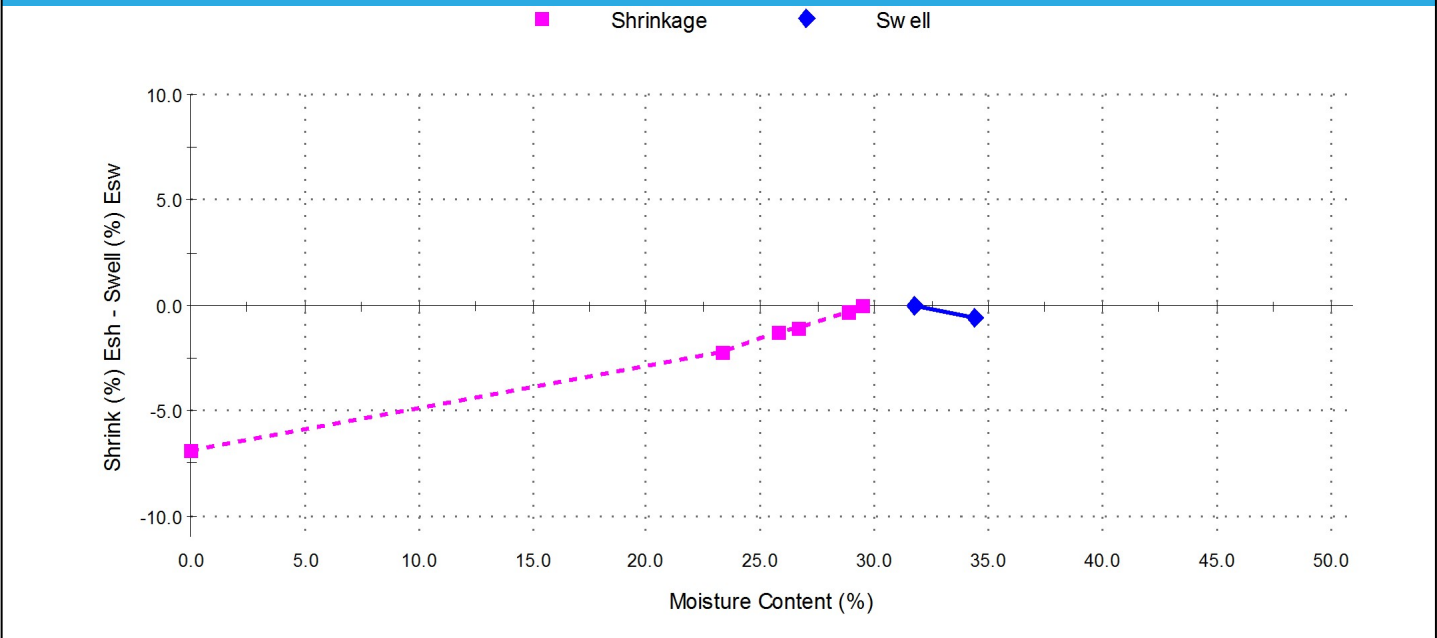
Accredited for compliance with ISO/IEC 17025-Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.
 Results provided relate only to the items tested or sampled.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 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: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH206 - (0.6 - 0.8m)
Date Tested: 29/03/2021
Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-0.6	Shrink on drying (%):	6.9
Moisture Content before (%):	31.8	Shrinkage Moisture Content (%):	29.5
Moisture Content after (%):	34.3	Est. inert material (%):	1%
Est. Unc. Comp. Strength before (kPa):	310	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	170	Cracking during shrinkage:	Major

Shrink Swell



Shrink Swell Index - Iss (%): 3.8

Comments

Report No: SSI:NEW21W-0908-S26

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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.
B. Cullen
 Approved Signatory: Brent Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 1/04/2021

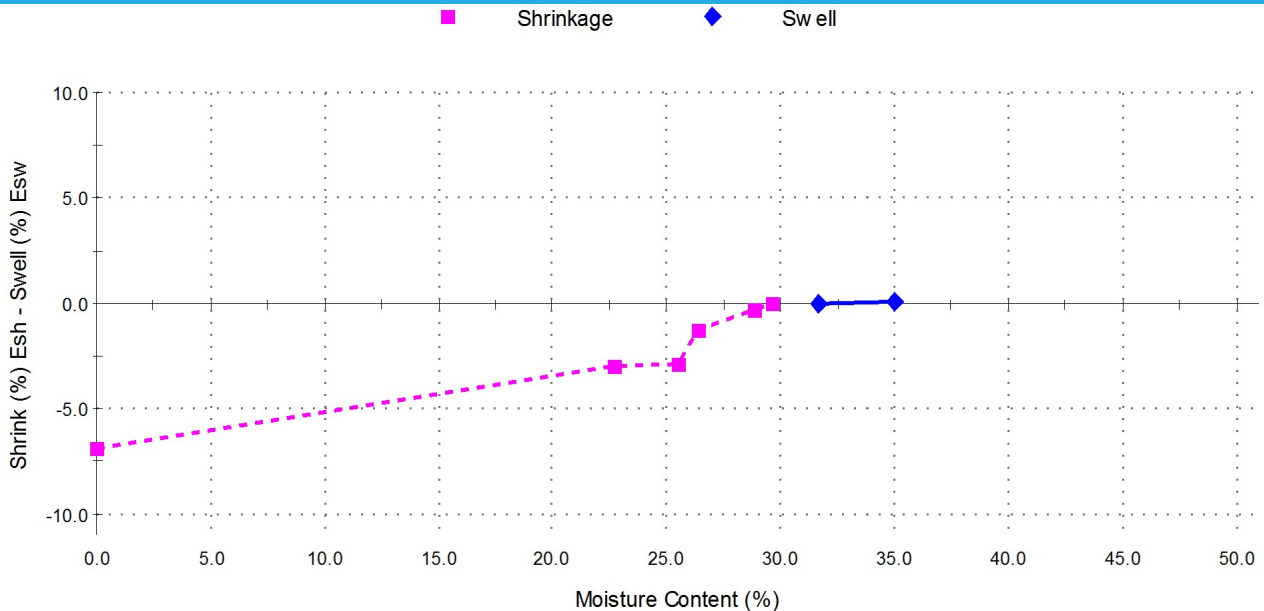
Sample Details

Sample ID: NEW21W-0908-S26
Sampling Method: The results outlined below apply to the sample as received
Material: Clay
Source: On-Site Insitu
Specification: No Specification
Project Location: New England Highway, Lochinvar
Sample Location: BH207 - (0.5 - 0.7m)
Date Tested: 29/03/2021
Date Sampled: 11/03/2021
Date Submitted: 12/03/2021

Swell Test		AS 1289.7.1.1
Swell on Saturation (%):	0.1	
Moisture Content before (%):	31.7	
Moisture Content after (%):	35.0	
Est. Unc. Comp. Strength before (kPa):	420	
Est. Unc. Comp. Strength after (kPa):	140	

Shrink Test		AS 1289.7.1.1
Shrink on drying (%):	6.9	
Shrinkage Moisture Content (%):	29.6	
Est. inert material (%):	1%	
Crumbling during shrinkage:	Nil	
Cracking during shrinkage:	Nil	

Shrink Swell




Shrink Swell Index - Iss (%): 3.8

Comments

California Bearing Ratio Test Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



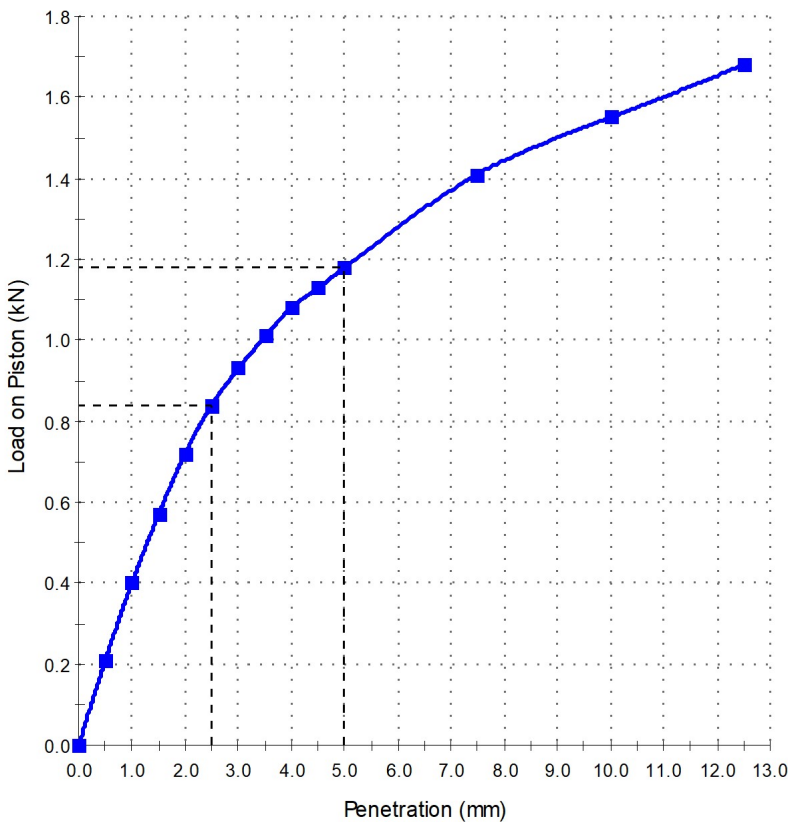
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Dane Cullen
 Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 30/09/2019

Sample Details

Sample ID: NEW19W-3213--S01 **Date Sampled:** 13/09/2019
Sampling Method: Sampled by Engineering Department
Specification: No Specification **Source:** On Site
Location: TP101 - (1.60 - 1.90m) **Material:** Sandy Clay
Project Location: New England Highway, Lochinvar

Load vs Penetration



Test Results

AS 1289.6.1.1 - 2014

CBR At 2.5mm (%): **6**

Maximum Dry Density (t/m³): 1.39
 Optimum Moisture Content (%): 32.5
 Dry Density before Soaking (t/m³): 1.39
 Density Ratio before Soaking (%): 100.5
 Moisture Content before Soaking (%): 32.2
 Moisture Ratio before Soaking (%): 98.0
 Dry Density after Soaking (t/m³): 1.37
 Density Ratio after Soaking (%): 98.5
 Swell (%): 2.0
 Moisture Content of Top 30mm (%): 41.2
 Moisture Content of Remaining Depth (%): 36.0
 Compactive Effort: Standard
 AS 1289.5.1.1
 Surcharge Mass (kg): 9.00
 Period of Soaking (Days): 4
 Oversize Material (%): 0
 CBR Moisture Content Method: AS 1289.2.1.1

Field Moisture Content (%): 26.9
 Curing Time (hrs): 48

Comments

Method of establishing plasticity level: Visual Assessment

California Bearing Ratio Test Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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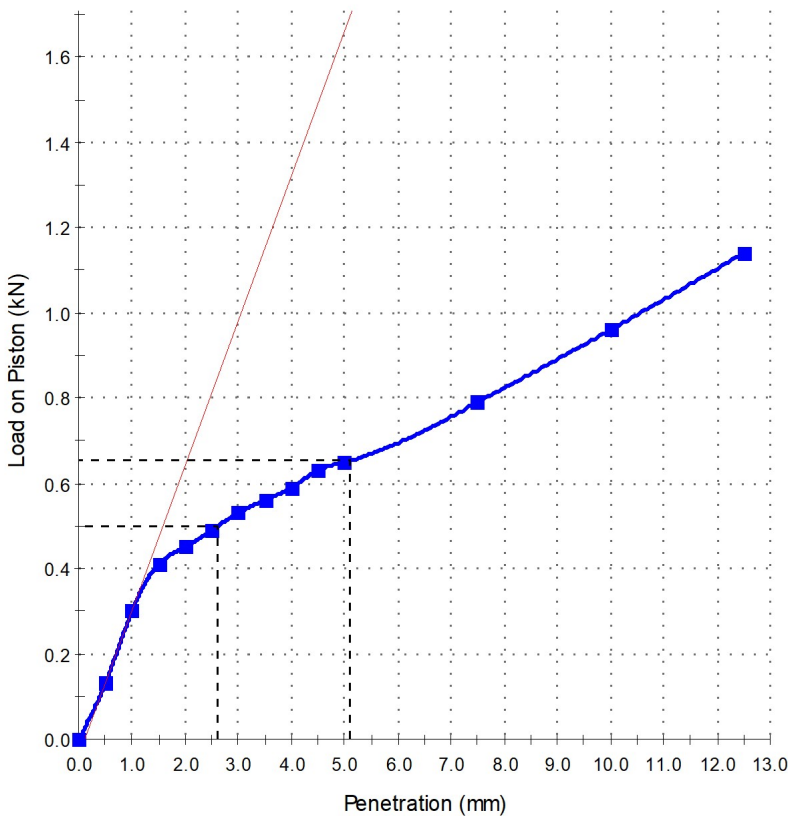


Approved Signatory: Dane Cullen
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 30/09/2019

Sample Details

Sample ID:	NEW19W-3213--S02	Date Sampled:	13/09/2019
Sampling Method:	Sampled by Engineering Department		
Specification:	No Specification	Source:	On Site
Location:	TP111 - (0.8 - 1.0m)	Material:	Clay
Project Location:	New England Highway, Lochinvar		

Load vs Penetration



Test Results

AS 1289.6.1.1 - 2014

CBR At 2.5mm (%):	4.0
Maximum Dry Density (t/m ³):	1.31
Optimum Moisture Content (%):	36.0
Dry Density before Soaking (t/m ³):	1.32
Density Ratio before Soaking (%):	101.0
Moisture Content before Soaking (%):	36.5
Moisture Ratio before Soaking (%):	100.5
Dry Density after Soaking (t/m ³):	1.29
Density Ratio after Soaking (%):	99.0
Swell (%):	2.0
Moisture Content of Top 30mm (%):	47.9
Moisture Content of Remaining Depth (%):	38.8
Compactive Effort:	Standard
	AS 1289.5.1.1
Surcharge Mass (kg):	9.00
Period of Soaking (Days):	4
Oversize Material (%):	0
CBR Moisture Content Method:	AS 1289.2.1.1
Field Moisture Content (%):	36.7
Curing Time (hrs) :	48

Comments

Method of establishing plasticity level: Visual Assessment

California Bearing Ratio Test Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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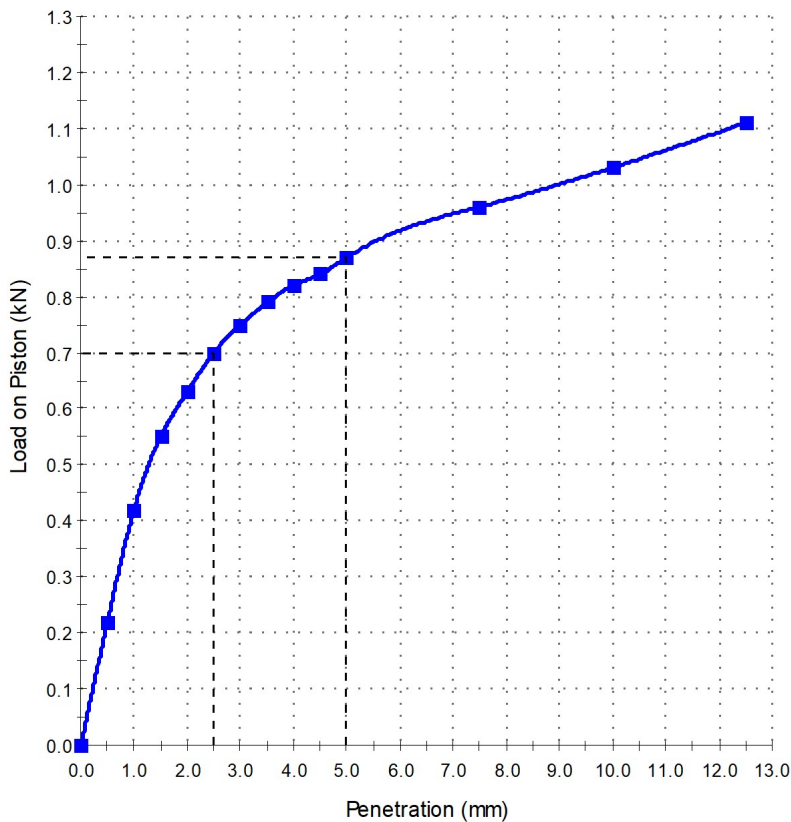


Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 30/09/2019

Sample Details

Sample ID:	NEW19W-3213--S03	Date Sampled:	13/09/2019
Sampling Method:	Sampled by Engineering Department		
Specification:	No Specification	Source:	On Site
Location:	TP115 - (0.6 - 0.8m)	Material:	Clay
Project Location:	New England Highway, Lochinvar		

Load vs Penetration



Test Results

AS 1289.6.1.1 - 2014

CBR At 2.5mm (%):	5
Maximum Dry Density (t/m ³):	1.60
Optimum Moisture Content (%):	23.5
Dry Density before Soaking (t/m ³):	1.61
Density Ratio before Soaking (%):	100.5
Moisture Content before Soaking (%):	23.0
Moisture Ratio before Soaking (%):	98.5
Dry Density after Soaking (t/m ³):	1.58
Density Ratio after Soaking (%):	98.5
Swell (%):	1.5
Moisture Content of Top 30mm (%):	27.1
Moisture Content of Remaining Depth (%):	24.8
Compactive Effort:	Standard
	AS 1289.5.1.1
Surcharge Mass (kg):	9.00
Period of Soaking (Days):	4
Oversize Material (%):	0
CBR Moisture Content Method:	AS 1289.2.1.1
Field Moisture Content (%):	21.3
Curing Time (hrs) :	48


Comments

Method of establishing plasticity level: Visual Assessment

California Bearing Ratio Test Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



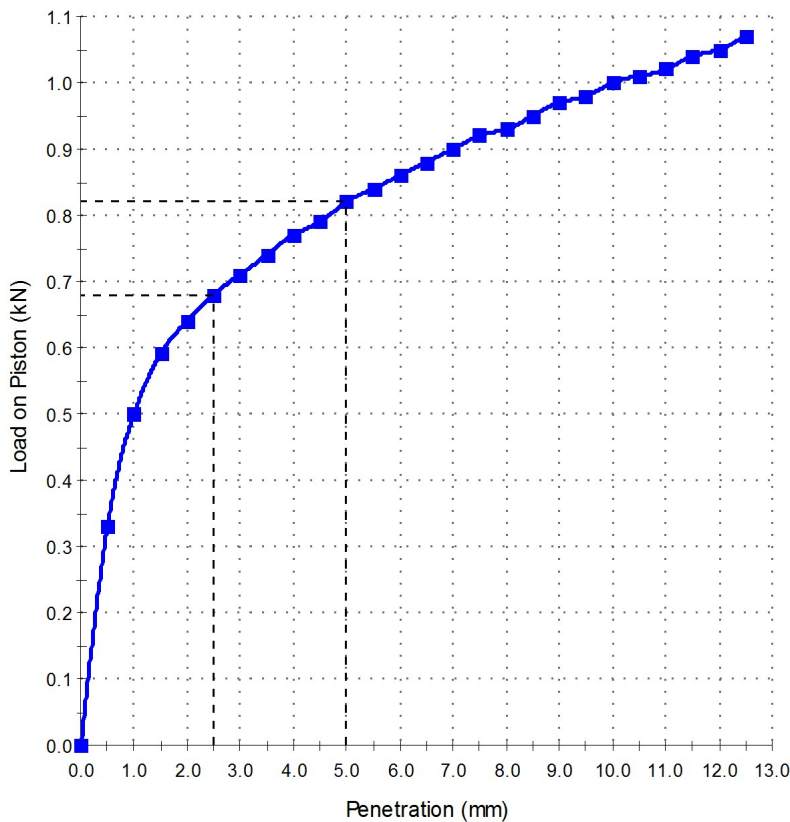
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(Signature)
 Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 25/09/2019

Sample Details

Sample ID: NEW19W-3213--S04 **Date Sampled:** 13/09/2019
Sampling Method: Sampled by Engineering Department
Specification: No Specification **Source:** On Site
Location: TP119 - (0.5 - 0.8m) **Material:** Clay
Project Location: New England Highway, Lochinvar

Load vs Penetration



Test Results

AS 1289.6.1.1 - 2014

CBR At 2.5mm (%): **5**

Maximum Dry Density (t/m³): 1.53
 Optimum Moisture Content (%): 26.0
 Dry Density before Soaking (t/m³): 1.53
 Density Ratio before Soaking (%): 100.0
 Moisture Content before Soaking (%): 26.5
 Moisture Ratio before Soaking (%): 101.0
 Dry Density after Soaking (t/m³): 1.52
 Density Ratio after Soaking (%): 99.0
 Swell (%): 1.0
 Moisture Content of Top 30mm (%): 32.5
 Moisture Content of Remaining Depth (%): 27.1
 Compactive Effort: Standard
 AS 1289.5.1.1
 Surcharge Mass (kg): 9.00
 Period of Soaking (Days): 4
 Oversize Material (%): 0
 CBR Moisture Content Method: AS 1289.2.1.1

Sample Moisture Content AS 1289.2.1.1
 Field Moisture Content (%): 26.3
 Curing Time (hrs) : 48

Comments

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


Report No: CBR:NEW19W-3266--S01

Issue No: 1

California Bearing Ratio Test Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



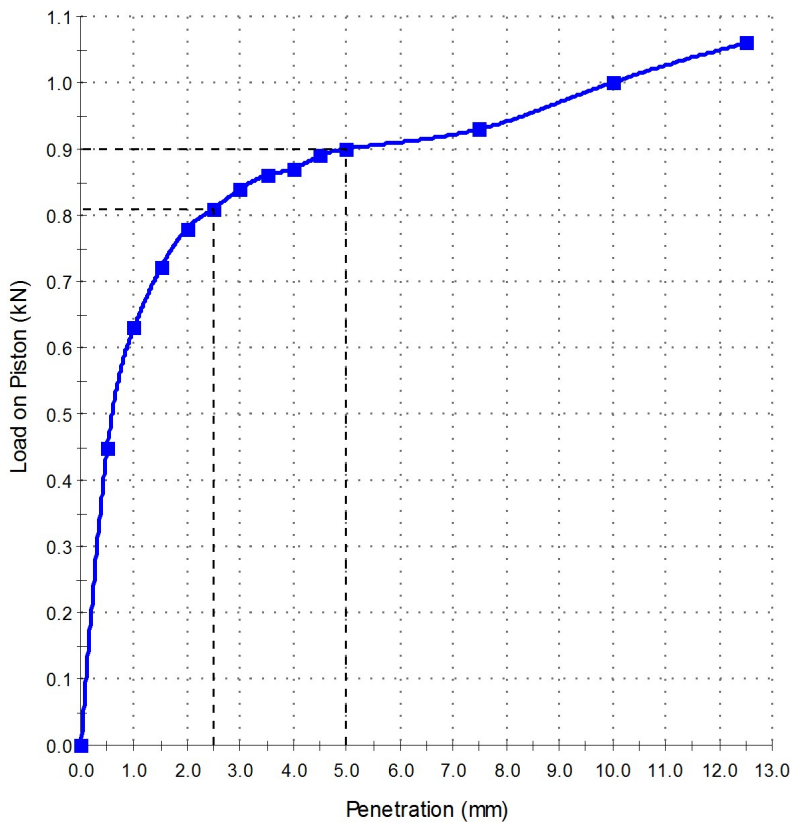
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(Signature)
 Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 2/10/2019

Sample Details

Sample ID: NEW19W-3266--S01 **Date Sampled:** 20/09/2019
Sampling Method: Sampled by Engineering Department
Specification: No Specification **Source:** On-Site
Location: TP204 - 0.35 to 0.55m **Material:** CLAY
Project Location: New England Highway, Lochinvar

Load vs Penetration



Test Results

AS 1289.6.1.1 - 2014

CBR At 2.5mm (%): **6**

Maximum Dry Density (t/m³): 1.43
 Optimum Moisture Content (%): 30.5
 Dry Density before Soaking (t/m³): 1.44
 Density Ratio before Soaking (%): 101.0
 Moisture Content before Soaking (%): 31.0
 Moisture Ratio before Soaking (%): 101.0
 Dry Density after Soaking (t/m³): 1.43
 Density Ratio after Soaking (%): 100.0
 Swell (%): 1.0
 Moisture Content of Top 30mm (%): 37.8
 Moisture Content of Remaining Depth (%): 31.6
 Compactive Effort: Standard
 AS 1289.5.1.1
 Surcharge Mass (kg): 9.00
 Period of Soaking (Days): 4
 Oversize Material (%): 0
 CBR Moisture Content Method: AS 1289.2.1.1

Sample Moisture Content AS 1289.2.1.1
 Field Moisture Content (%): 31.7
 Curing Time (hrs) : 90


Comments

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

California Bearing Ratio Test Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



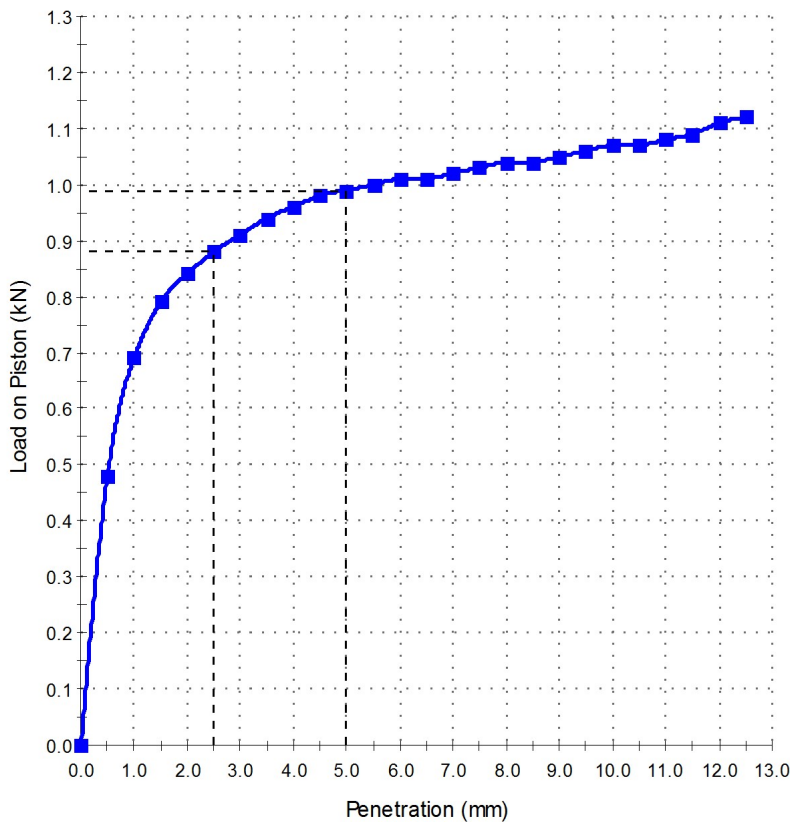
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(Signature)
 Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 10/10/2019

Sample Details

Sample ID: NEW19W-3266--S02 **Date Sampled:** 20/09/2019
Sampling Method: Sampled by Engineering Department
Specification: No Specification **Source:** On-Site
Location: TP211 - 0.60 to 0.85m **Material:** CLAY
Project Location: New England Highway, Lochinvar

Load vs Penetration



Test Results

AS 1289.6.1.1 - 2014

CBR At 2.5mm (%): 7

Maximum Dry Density (t/m³): 1.41
 Optimum Moisture Content (%): 31.5
 Dry Density before Soaking (t/m³): 1.42
 Density Ratio before Soaking (%): 100.5
 Moisture Content before Soaking (%): 31.6
 Moisture Ratio before Soaking (%): 101.0
 Dry Density after Soaking (t/m³): 1.40
 Density Ratio after Soaking (%): 99.0
 Swell (%): 1.5
 Moisture Content of Top 30mm (%): 39.6
 Moisture Content of Remaining Depth (%): 32.7
 Compactive Effort: Standard
 AS 1289.5.1.1
 Surcharge Mass (kg): 9.00
 Period of Soaking (Days): 4
 Oversize Material (%): 0
 CBR Moisture Content Method: AS 1289.2.1.1

Sample Moisture Content AS 1289.2.1.1
 Field Moisture Content (%): 30.5
 Curing Time (hrs) : 120

Comments

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

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 30/09/2019

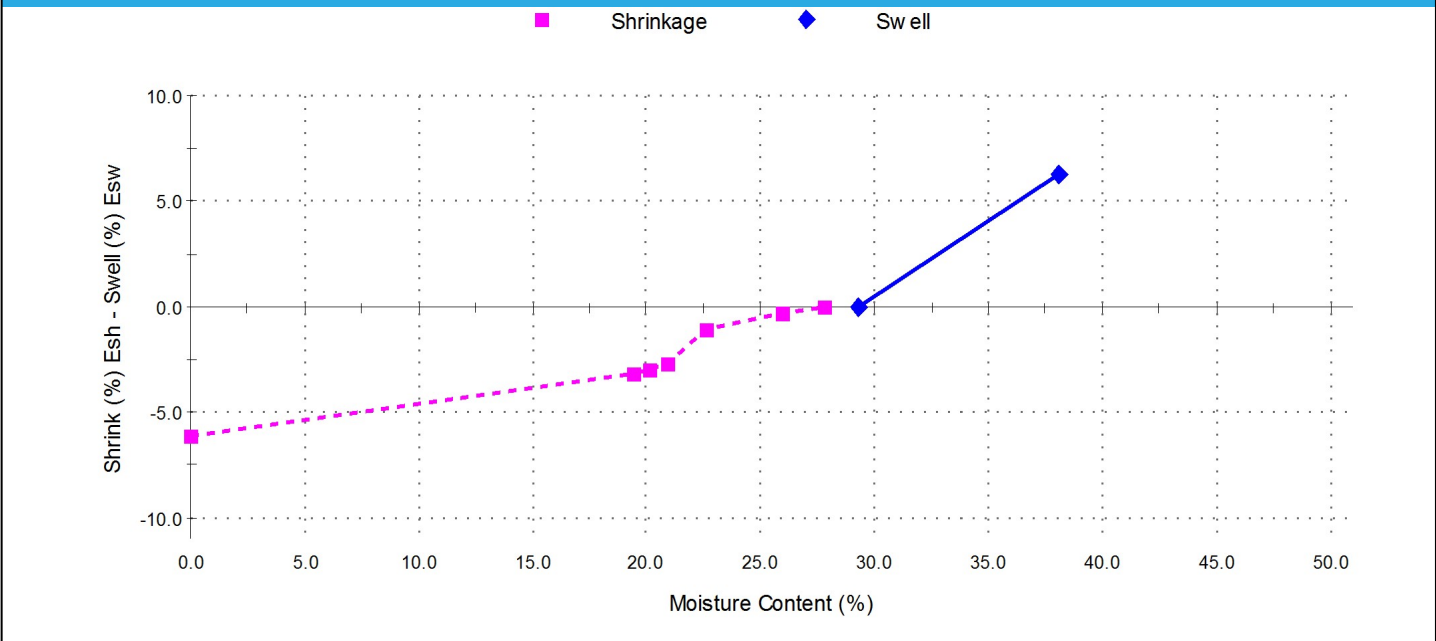
Sample Details

Sample ID:	NEW19W-3223--S01	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar, NSW		
Sample Location:	TP102 - (0.6 - 0.75m)		
Borehole Number:	TP102		
Borehole Depth (m):	0.6 - 0.75		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	6.2
Moisture Content before (%):	29.3
Moisture Content after (%):	38.1
Est. Unc. Comp. Strength before (kPa):	520
Est. Unc. Comp. Strength after (kPa):	200

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	6.1
Shrinkage Moisture Content (%):	27.8
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 5.1

Comments

The results outlined above apply to the sample as received


Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:

Project No.: NEW17P-0054A

Project Name: Proposed Subdivision - Stage 1 & 2



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NATA Accredited Laboratory Number: 18686
Date of Issue: 25/09/2019

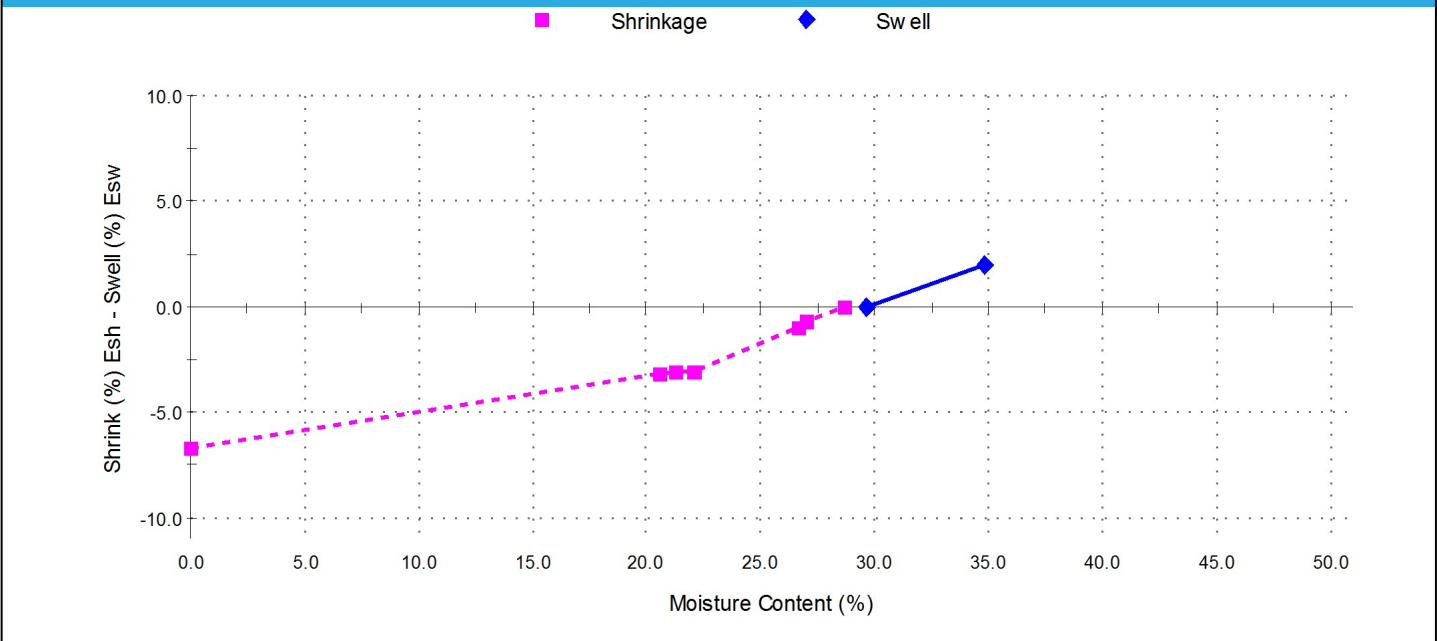
Sample Details

Sample ID:	NEW19W-3223--S02	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar, NSW		
Sample Location:	TP103 - (0.6 - 0.75m)		
Borehole Number:	TP103		
Borehole Depth (m):	0.6 - 0.75		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	2.0
Moisture Content before (%):	29.7
Moisture Content after (%):	34.9
Est. Unc. Comp. Strength before (kPa):	210
Est. Unc. Comp. Strength after (kPa):	90

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	6.7
Shrinkage Moisture Content (%):	28.7
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 4.3

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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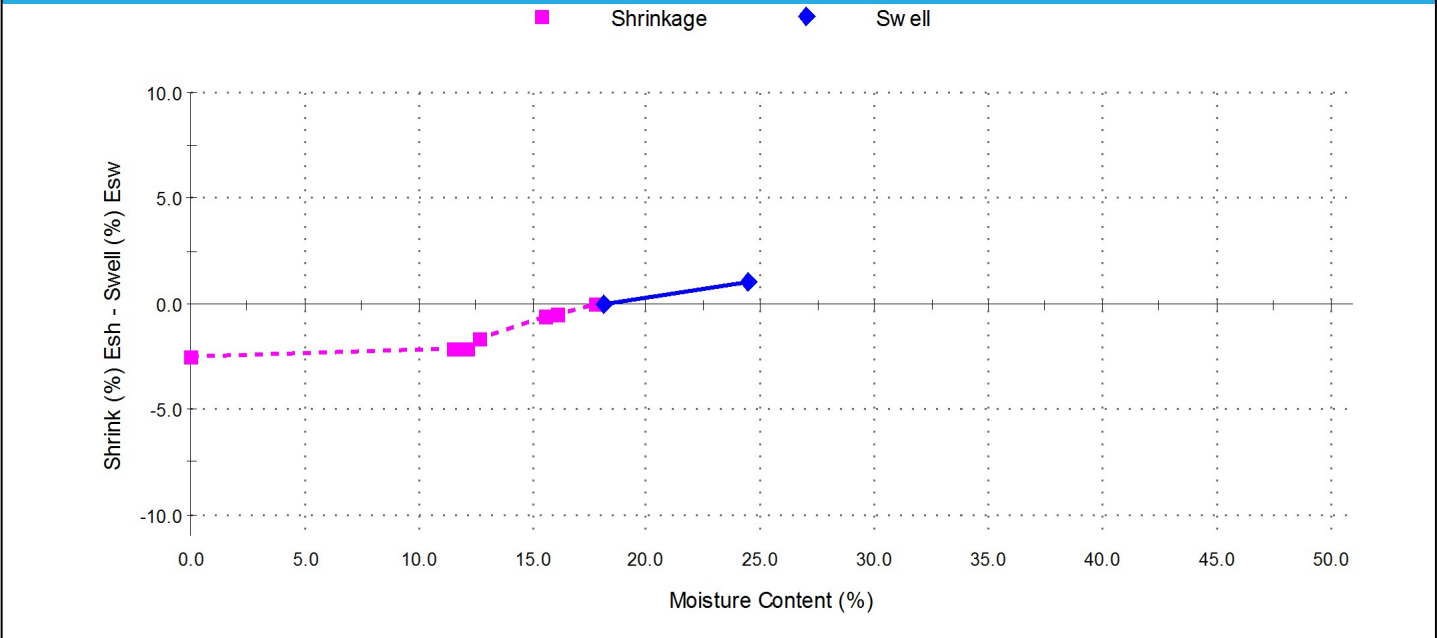
Sample Details

Sample ID:	NEW19W-3223--S03	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar, NSW		
Sample Location:	TP104 - (0.7 - 0.85m)		
Borehole Number:	TP104		
Borehole Depth (m):	0.7 - 0.85		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	1.0
Moisture Content before (%):	18.2
Moisture Content after (%):	24.4
Est. Unc. Comp. Strength before (kPa):	> 600
Est. Unc. Comp. Strength after (kPa):	> 600

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



Shrink Swell Index - Iss (%): 1.7

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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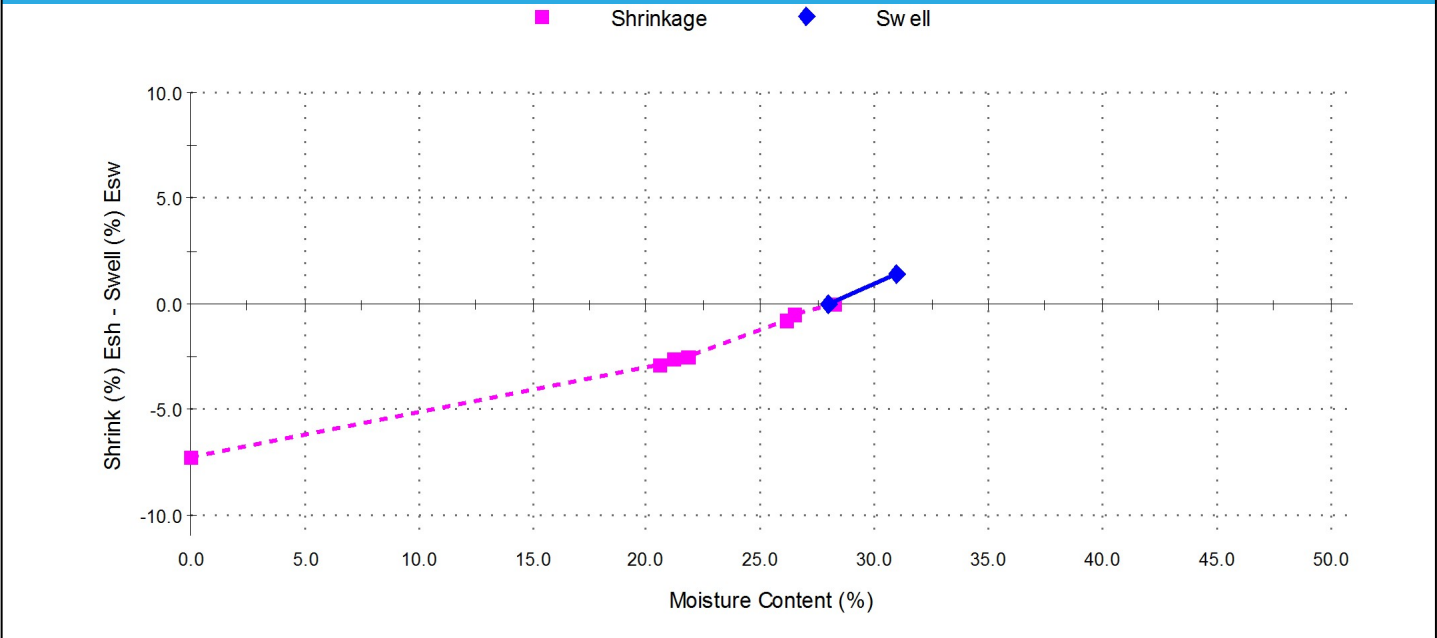
Sample Details

Sample ID:	NEW19W-3223--S04	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar, NSW		
Sample Location:	TP105 - (0.5 - 0.8m)		
Borehole Number:	TP105		
Borehole Depth (m):	0.5 - 0.8		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	1.5
Moisture Content before (%):	28.0
Moisture Content after (%):	31.0
Est. Unc. Comp. Strength before (kPa):	580
Est. Unc. Comp. Strength after (kPa):	200

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	7.3
Shrinkage Moisture Content (%):	28.2
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 4.5

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:

Project No.: NEW17P-0054A

Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
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NATA Accredited Laboratory Number: 18686
Date of Issue: 25/09/2019

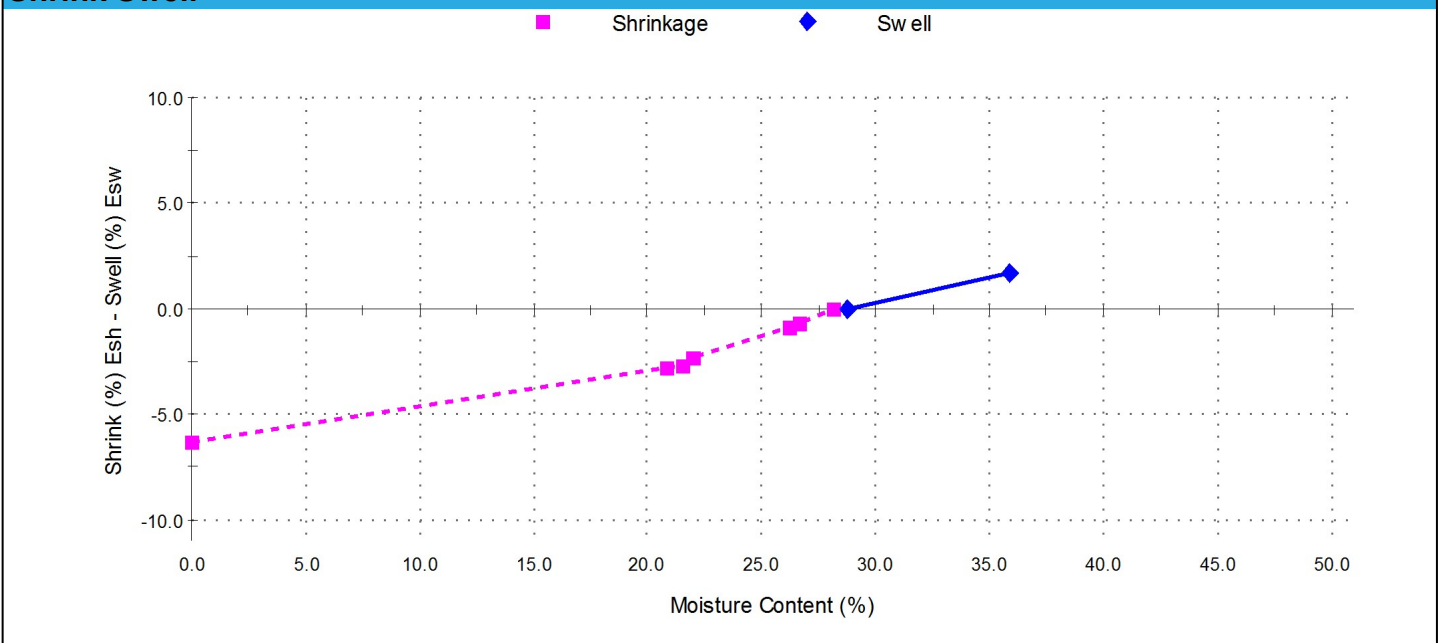
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	1.7
Moisture Content before (%):	28.8
Moisture Content after (%):	35.9
Est. Unc. Comp. Strength before (kPa):	500
Est. Unc. Comp. Strength after (kPa):	250

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	6.3
Shrinkage Moisture Content (%):	28.1
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 4.0

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

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PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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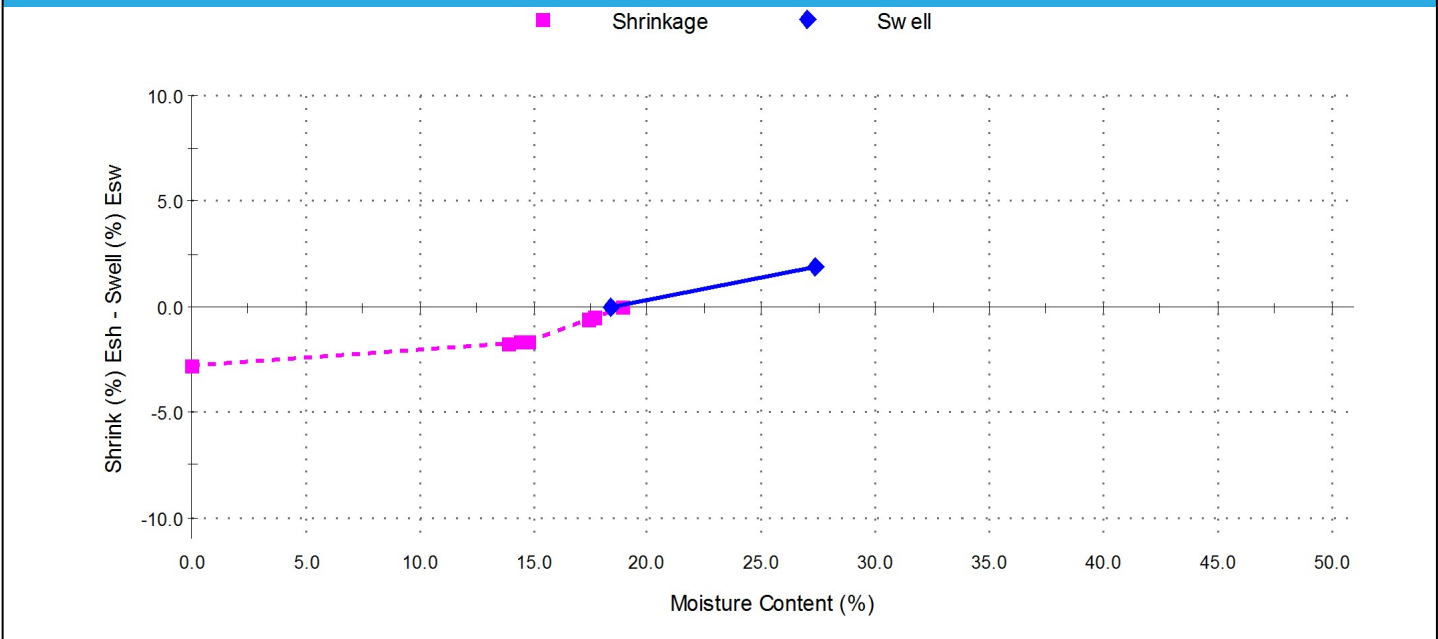
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	1.9
Moisture Content before (%):	18.4
Moisture Content after (%):	27.3
Est. Unc. Comp. Strength before (kPa):	> 600
Est. Unc. Comp. Strength after (kPa):	400

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	2.8
Shrinkage Moisture Content (%):	18.9
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 2.1

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

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PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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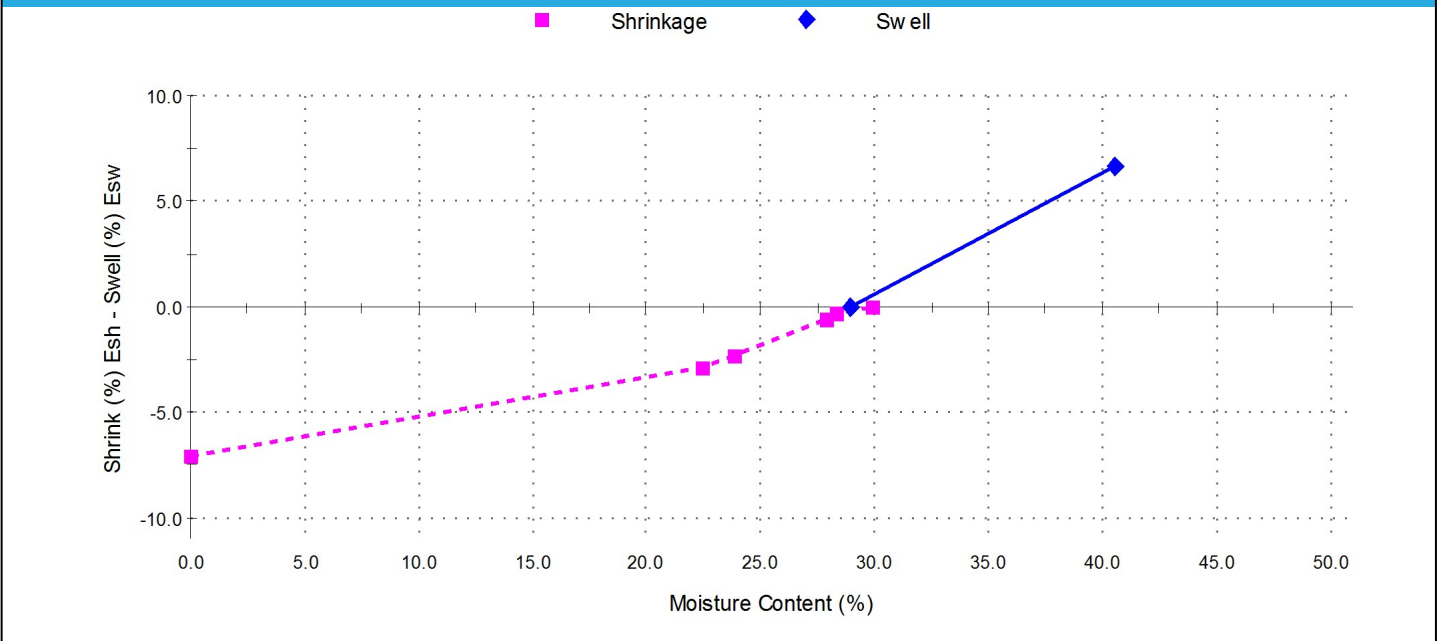
Sample Details

Sample ID:	NEW19W-3223--S07	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar, NSW		
Sample Location:	TP108 - (0.7 - 1.10m)		
Borehole Number:	TP108		
Borehole Depth (m):	0.7 - 1.10		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	6.7
Moisture Content before (%):	28.9
Moisture Content after (%):	40.5
Est. Unc. Comp. Strength before (kPa):	390
Est. Unc. Comp. Strength after (kPa):	110

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	7.1
Shrinkage Moisture Content (%):	29.9
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 5.8

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Date of Issue: 25/09/2019

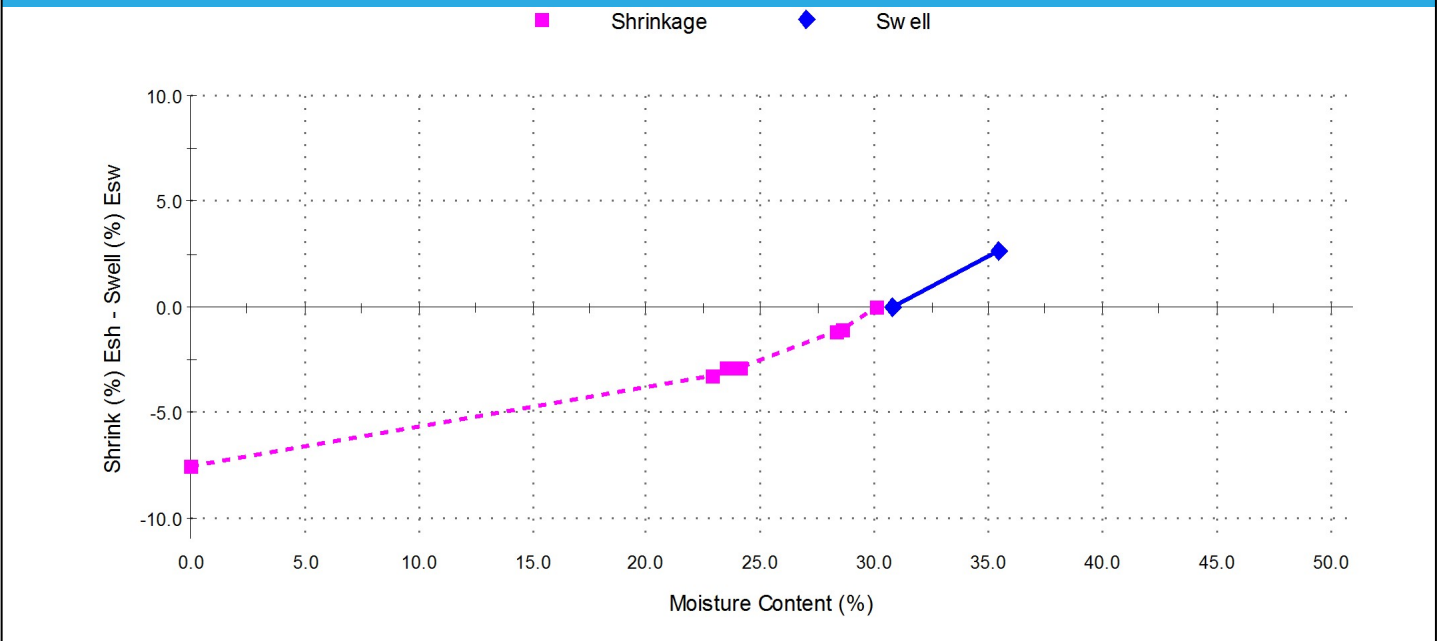
Sample Details

Sample ID:	NEW19W-3223--S08	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar, NSW		
Sample Location:	TP109 - (1.0 - 1.3m)		
Borehole Number:	TP109		
Borehole Depth (m):	1.0 - 1.3		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	2.6
Moisture Content before (%):	30.7
Moisture Content after (%):	35.4
Est. Unc. Comp. Strength before (kPa):	350
Est. Unc. Comp. Strength after (kPa):	160

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	7.6
Shrinkage Moisture Content (%):	30.1
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Major

Shrink Swell



Shrink Swell Index - Iss (%): 5.0

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3223--S09

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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 (Senior Geotechnician)
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 Date of Issue: 30/09/2019

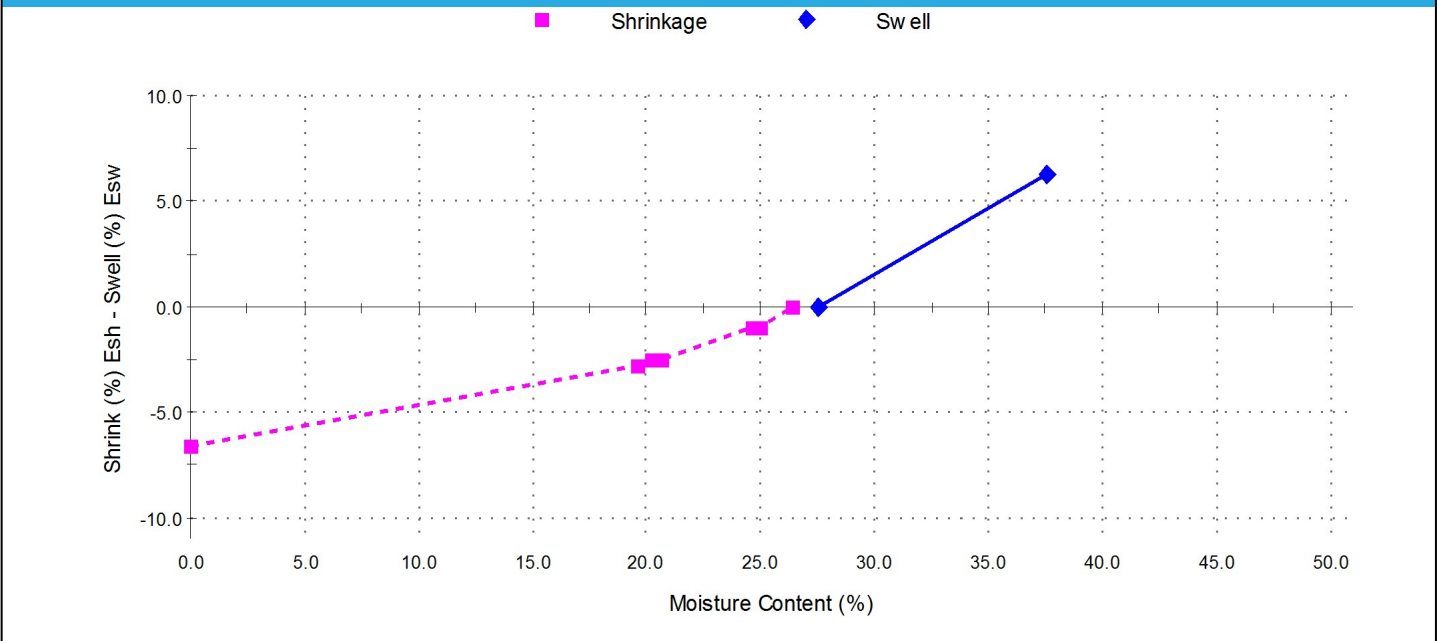
Sample Details

Sample ID:	NEW19W-3223--S09	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar, NSW		
Sample Location:	TP110 - (0.5 - 0.9m)		
Borehole Number:	TP110		
Borehole Depth (m):	0.5 - 0.9		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	6.3
Moisture Content before (%):	27.5
Moisture Content after (%):	37.5
Est. Unc. Comp. Strength before (kPa):	510
Est. Unc. Comp. Strength after (kPa):	100

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	6.6
Shrinkage Moisture Content (%):	26.4
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 5.4

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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NATA Accredited Laboratory Number: 18686
Date of Issue: 25/09/2019

Sample Details

Sample ID:	NEW19W-3223--S10	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar, NSW		
Sample Location:	TP112 - (0.9 - 1.20m)		
Borehole Number:	TP112		
Borehole Depth (m):	0.9 - 1.20		

Swell Test

AS 1289.7.1.1

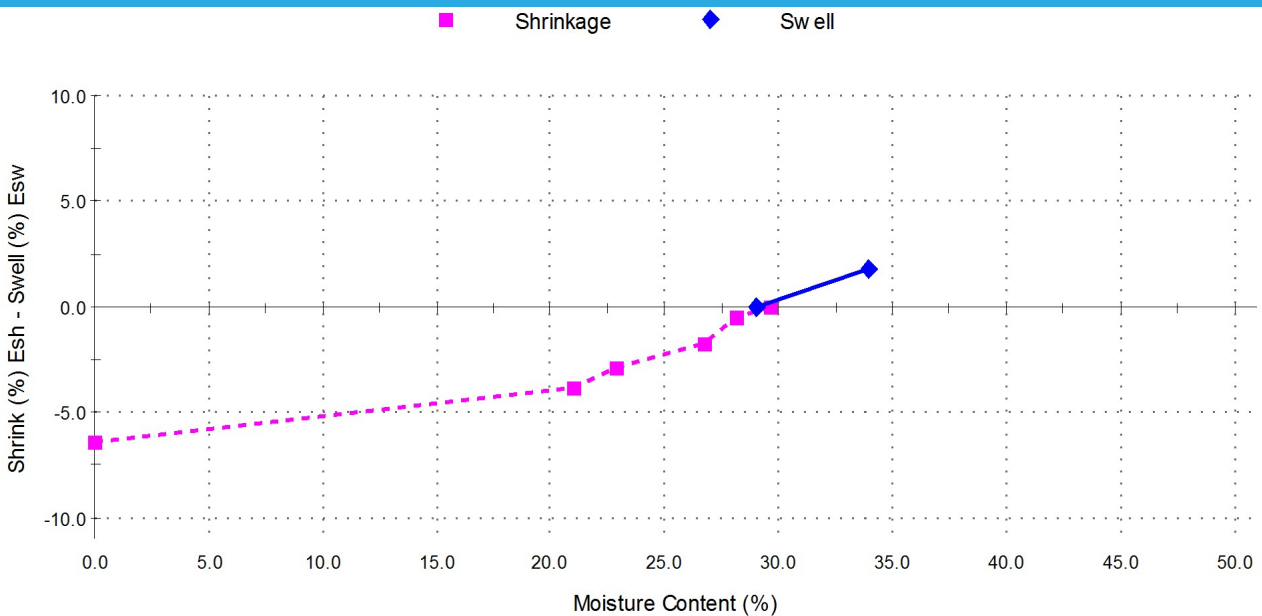
Swell on Saturation (%):	1.8
Moisture Content before (%):	29.0
Moisture Content after (%):	33.9
Est. Unc. Comp. Strength before (kPa):	300
Est. Unc. Comp. Strength after (kPa):	210

Shrink Test

AS 1289.7.1.1

Shrink on drying (%):	6.4
Shrinkage Moisture Content (%):	29.6
Est. inert material (%):	5.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 4.0

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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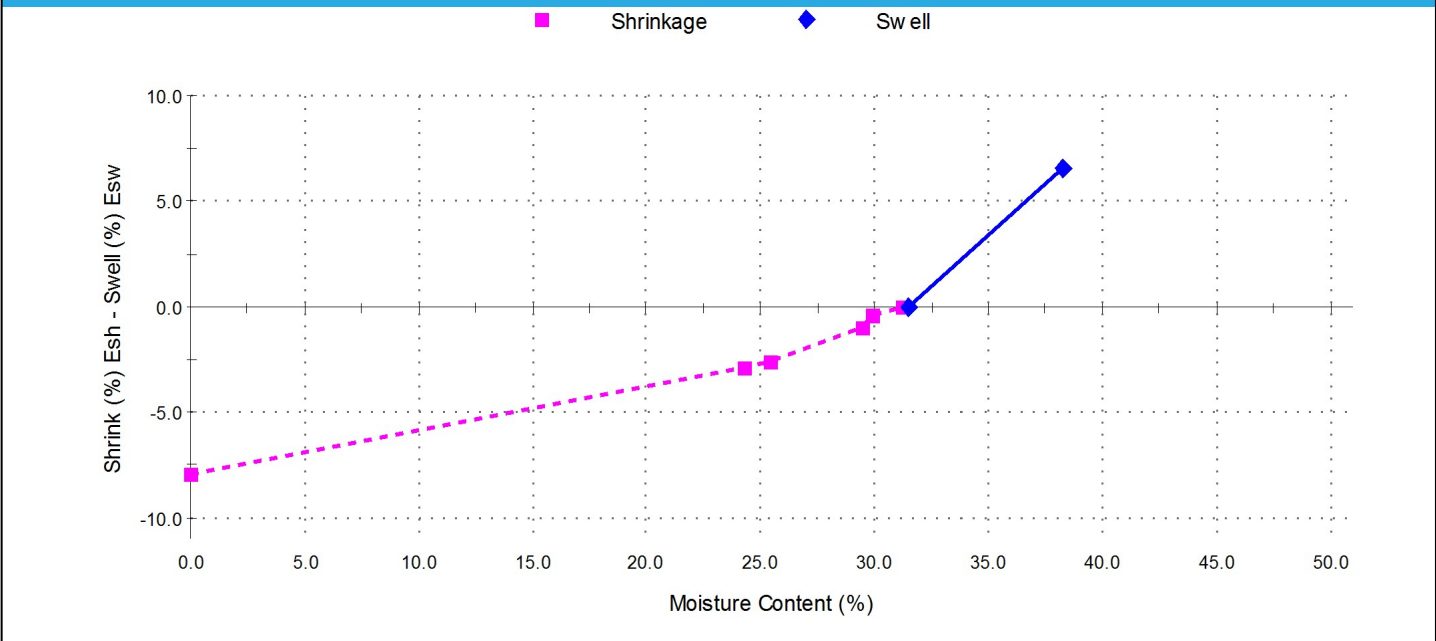
Sample Details

Sample ID:	NEW19W-3223--S11	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar, NSW		
Sample Location:	TP113 - (0.55 - 0.9m)		
Borehole Number:	TP113		
Borehole Depth (m):	0.55 - 0.9		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	6.6
Moisture Content before (%):	31.5
Moisture Content after (%):	38.2
Est. Unc. Comp. Strength before (kPa):	360
Est. Unc. Comp. Strength after (kPa):	100

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	7.9
Shrinkage Moisture Content (%):	31.3
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 6.2

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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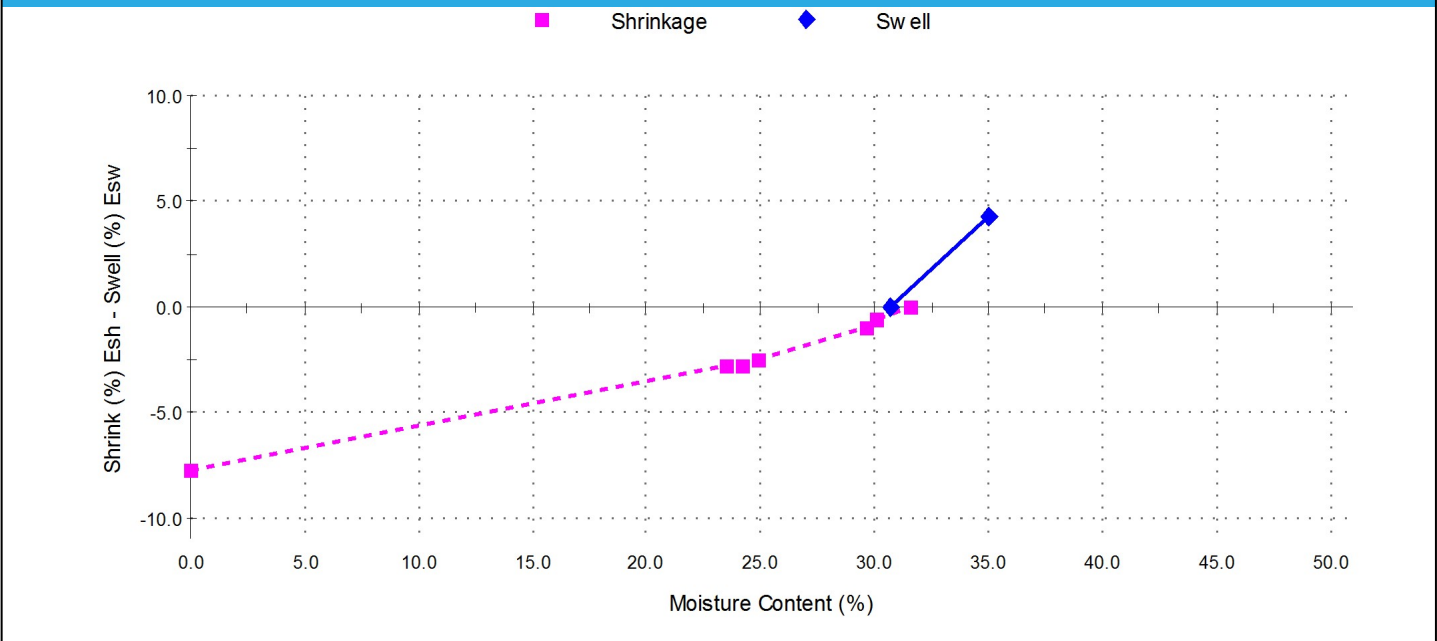
Sample Details

Sample ID:	NEW19W-3223--S12	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar, NSW		
Sample Location:	TP114 - (0.5 - 0.8m)		
Borehole Number:	TP114		
Borehole Depth (m):	0.5 - 0.8		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	4.3
Moisture Content before (%):	30.7
Moisture Content after (%):	35.0
Est. Unc. Comp. Strength before (kPa):	350
Est. Unc. Comp. Strength after (kPa):	140

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	7.8
Shrinkage Moisture Content (%):	31.6
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 5.5

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3224--S01

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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 Date of Issue: 30/09/2019

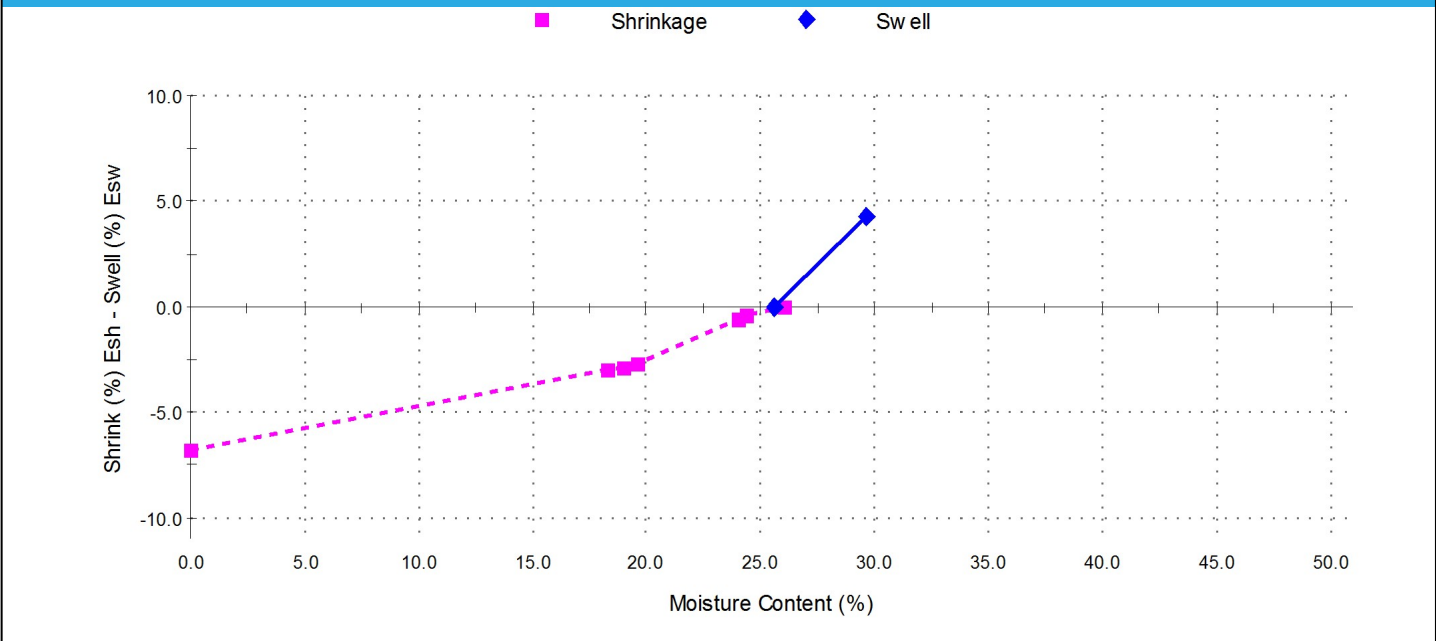
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	4.2
Moisture Content before (%):	25.6
Moisture Content after (%):	29.6
Est. Unc. Comp. Strength before (kPa):	590
Est. Unc. Comp. Strength after (kPa):	180

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	6.8
Shrinkage Moisture Content (%):	26.0
Est. inert material (%):	2.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 4.9

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3224--S02

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 30/09/2019

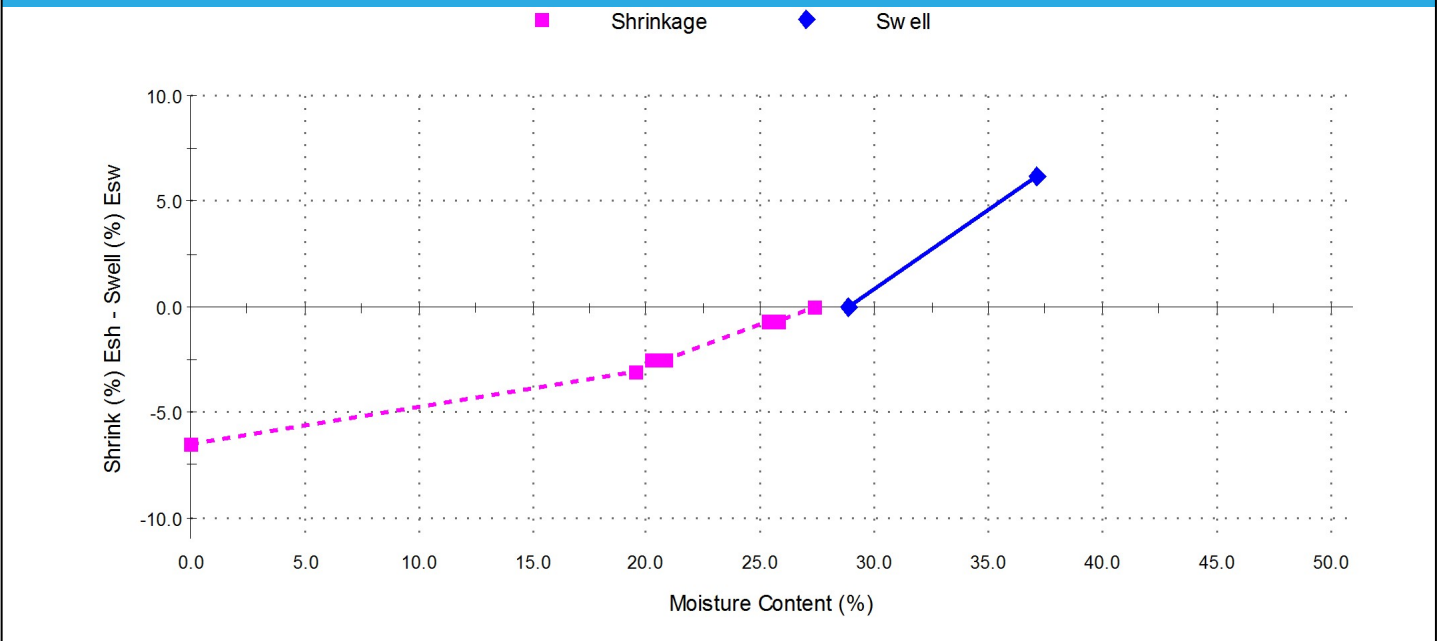
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	6.2
Moisture Content before (%):	28.8
Moisture Content after (%):	37.1
Est. Unc. Comp. Strength before (kPa):	450
Est. Unc. Comp. Strength after (kPa):	130

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	6.5
Shrinkage Moisture Content (%):	27.3
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 5.3

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3224--S03

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 25/09/2019

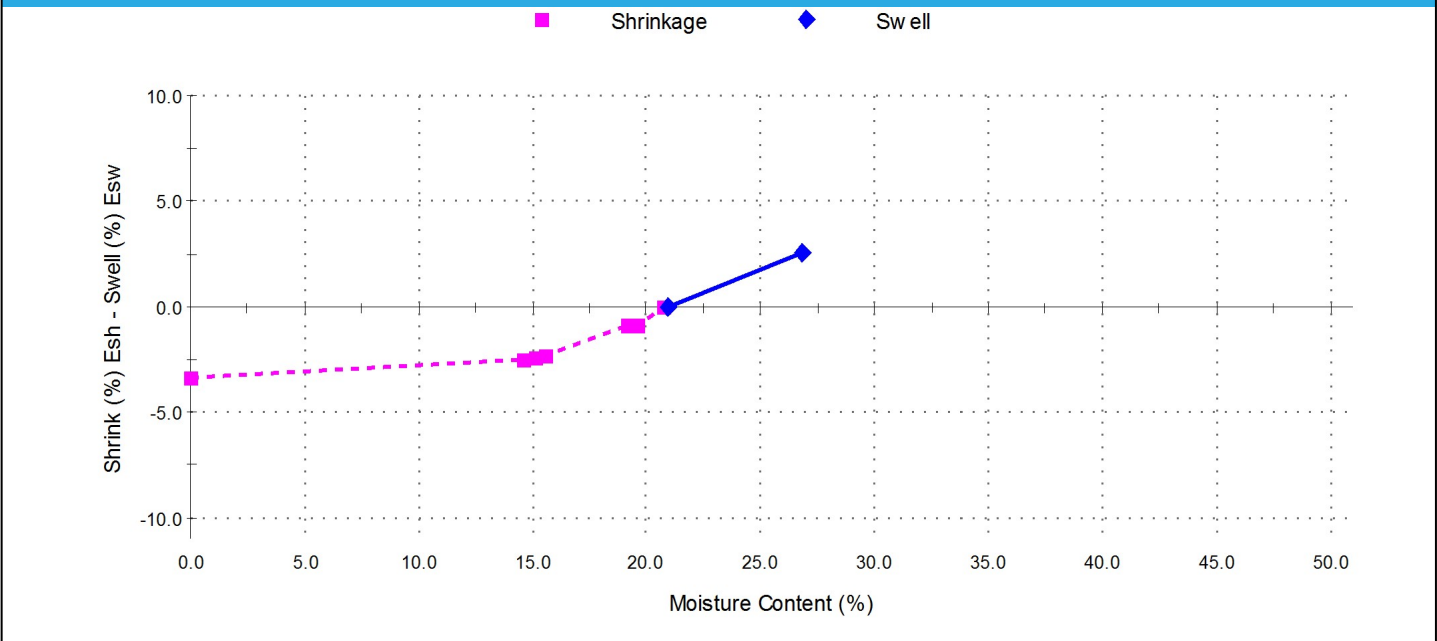
Sample Details

Sample ID:	NEW19W-3224--S03	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar		
Sample Location:	TP118 - (1.2 - 1.45m)		
Borehole Number:	TP118		
Borehole Depth (m):	1.2 - 1.45		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	2.6
Moisture Content before (%):	20.9
Moisture Content after (%):	26.8
Est. Unc. Comp. Strength before (kPa):	500
Est. Unc. Comp. Strength after (kPa):	250

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	3.4
Shrinkage Moisture Content (%):	20.8
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 2.6

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 3/10/2019

Sample Details

Sample ID:	NEW19W-3224--S04	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar		
Sample Location:	TP120 - (0.5 - 0.65m)		
Borehole Number:	TP120		
Borehole Depth (m):	0.5 - 0.65		

Swell Test

AS 1289.7.1.1

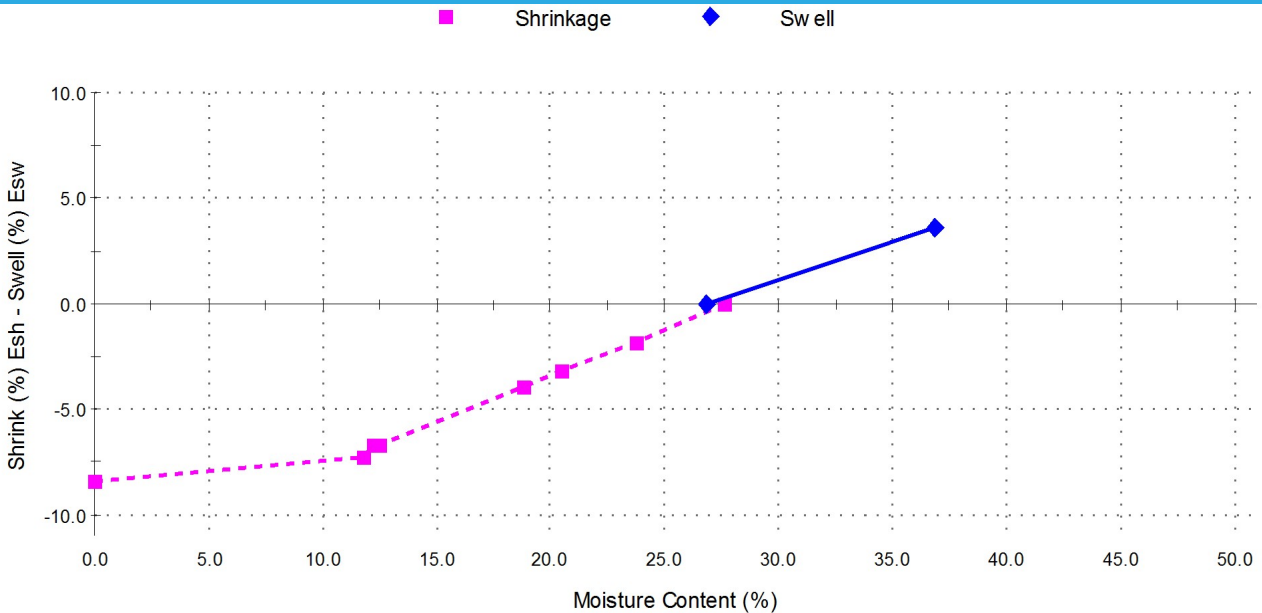
Swell on Saturation (%):	3.6
Moisture Content before (%):	26.8
Moisture Content after (%):	36.9
Est. Unc. Comp. Strength before (kPa):	290
Est. Unc. Comp. Strength after (kPa):	130

Shrink Test

AS 1289.7.1.1

Shrink on drying (%):	8.4
Shrinkage Moisture Content (%):	27.6
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 5.7

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:

Project No.: NEW17P-0054A

Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(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:	On Site	Date Submitted:	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		

Swell Test

AS 1289.7.1.1

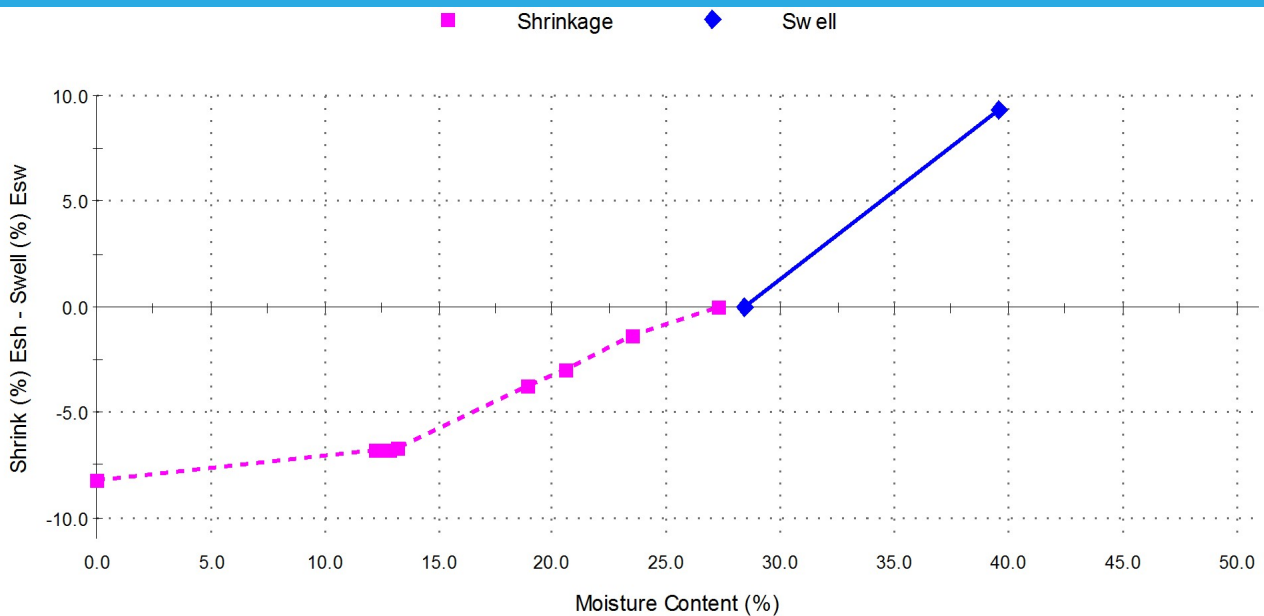
Swell on Saturation (%):	9.4
Moisture Content before (%):	28.4
Moisture Content after (%):	39.6
Est. Unc. Comp. Strength before (kPa):	370
Est. Unc. Comp. Strength after (kPa):	80

Shrink Test

AS 1289.7.1.1

Shrink on drying (%):	8.2
Shrinkage Moisture Content (%):	27.2
Est. inert material (%):	2.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 7.2

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3224--S06

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 3/10/2019

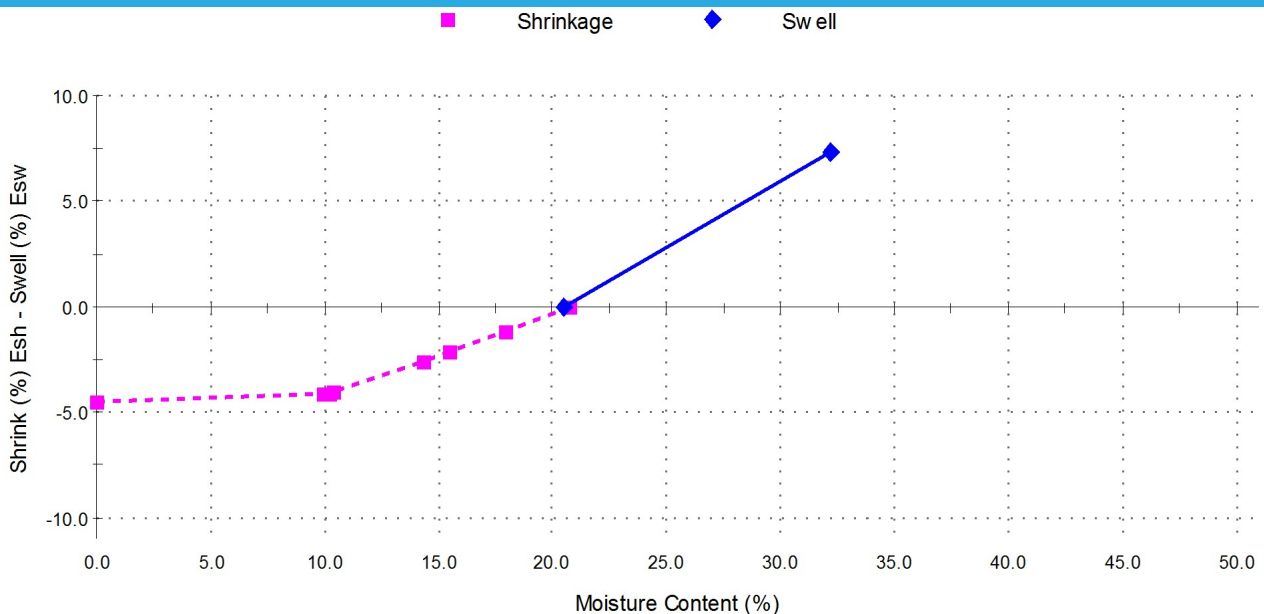
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	7.3
Moisture Content before (%):	20.5
Moisture Content after (%):	32.2
Est. Unc. Comp. Strength before (kPa):	> 600
Est. Unc. Comp. Strength after (kPa):	190

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	4.5
Shrinkage Moisture Content (%):	20.8
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 4.5

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 8/10/2019

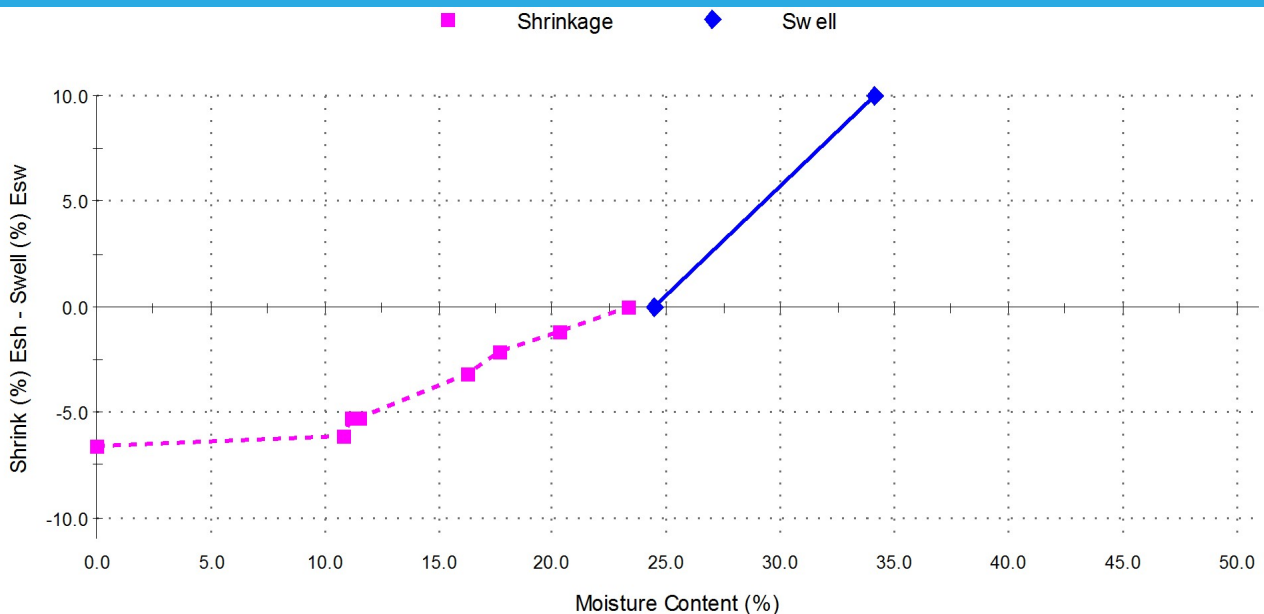
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	10.0
Moisture Content before (%):	24.5
Moisture Content after (%):	34.2
Est. Unc. Comp. Strength before (kPa):	550
Est. Unc. Comp. Strength after (kPa):	100

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	6.6
Shrinkage Moisture Content (%):	23.3
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 6.4

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 3/10/2019

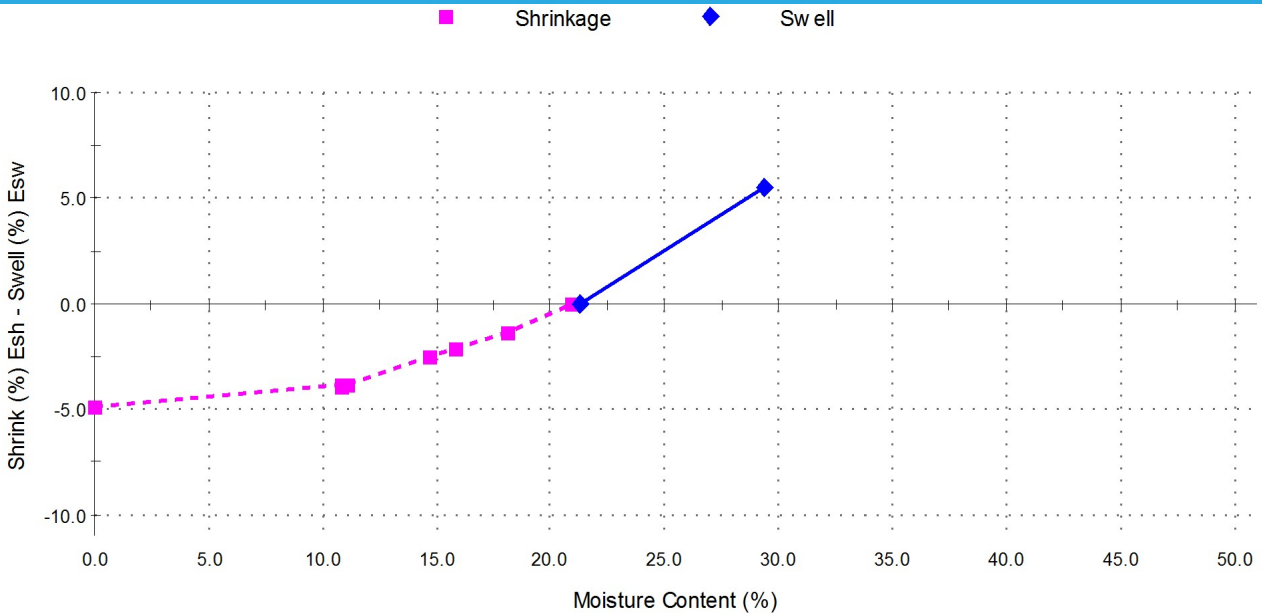
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	5.5
Moisture Content before (%):	21.3
Moisture Content after (%):	29.4
Est. Unc. Comp. Strength before (kPa):	>600
Est. Unc. Comp. Strength after (kPa):	370

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	4.9
Shrinkage Moisture Content (%):	21.0
Est. inert material (%):	5.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 4.3

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 3/10/2019

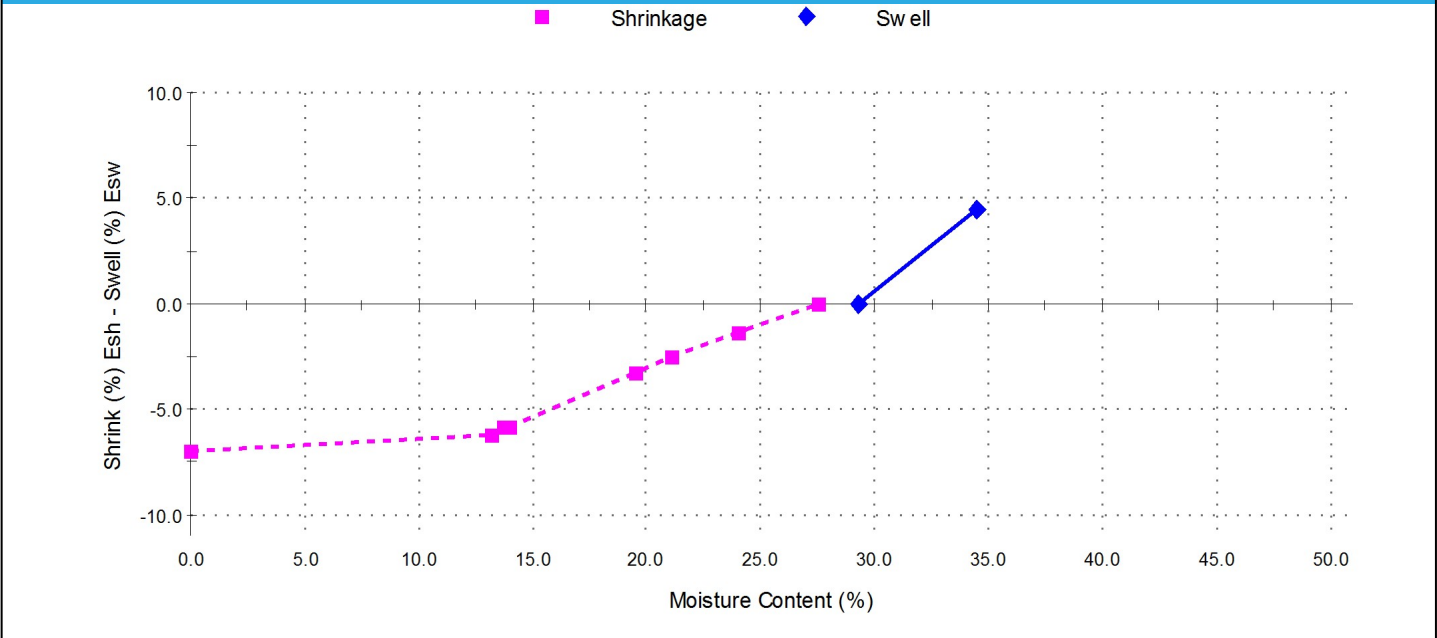
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	4.4
Moisture Content before (%):	29.3
Moisture Content after (%):	34.5
Est. Unc. Comp. Strength before (kPa):	>600
Est. Unc. Comp. Strength after (kPa):	170

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	7.0
Shrinkage Moisture Content (%):	27.5
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 5.1

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3224--S10

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 4/10/2019

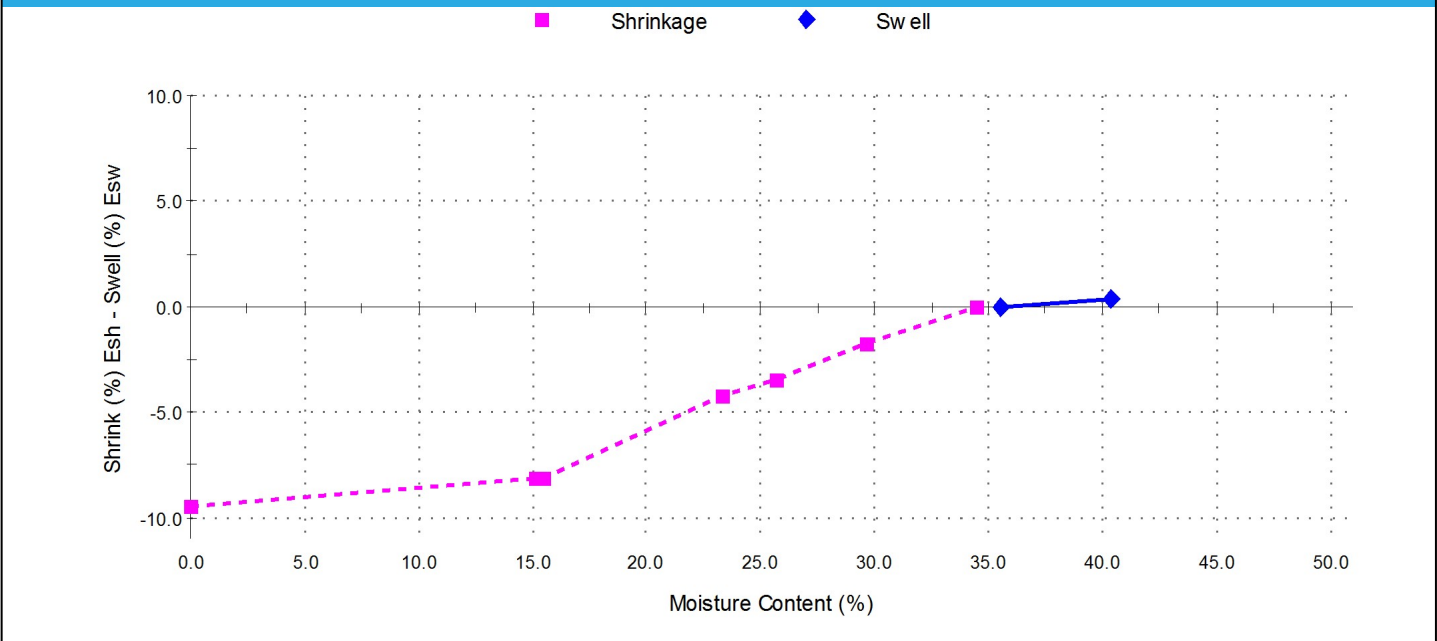
Sample Details

Sample ID:	NEW19W-3224--S10	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	13/09/2019
Source:	On Site	Date Submitted:	18/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar		
Sample Location:	TP126 - (0.5 - 0.75m)		
Borehole Number:	TP126		
Borehole Depth (m):	0.5 - 0.75		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	0.4
Moisture Content before (%):	35.5
Moisture Content after (%):	40.4
Est. Unc. Comp. Strength before (kPa):	200
Est. Unc. Comp. Strength after (kPa):	120

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	9.5
Shrinkage Moisture Content (%):	34.5
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 5.4

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3224--S11
Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:

Project No.: NEW17P-0054A

Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer

(Senior Geotechnician)

NATA Accredited Laboratory Number: 18686

Date of Issue: 4/10/2019

Sample Details

Sample ID: NEW19W-3224--S11

Client Sample ID: -

Test Request No.: -

Sampling Method: Sampled by Engineering Department

Material: Clay

Date Sampled: 13/09/2019

Source: On Site

Date Submitted: 18/09/2019

Specification: No Specification

Project Location: New England Highway, Lochinvar

Sample Location: TP127 - (0.75 - 1.05m)

Borehole Number: TP127

Borehole Depth (m): 0.75 - 1.05

Swell Test

AS 1289.7.1.1

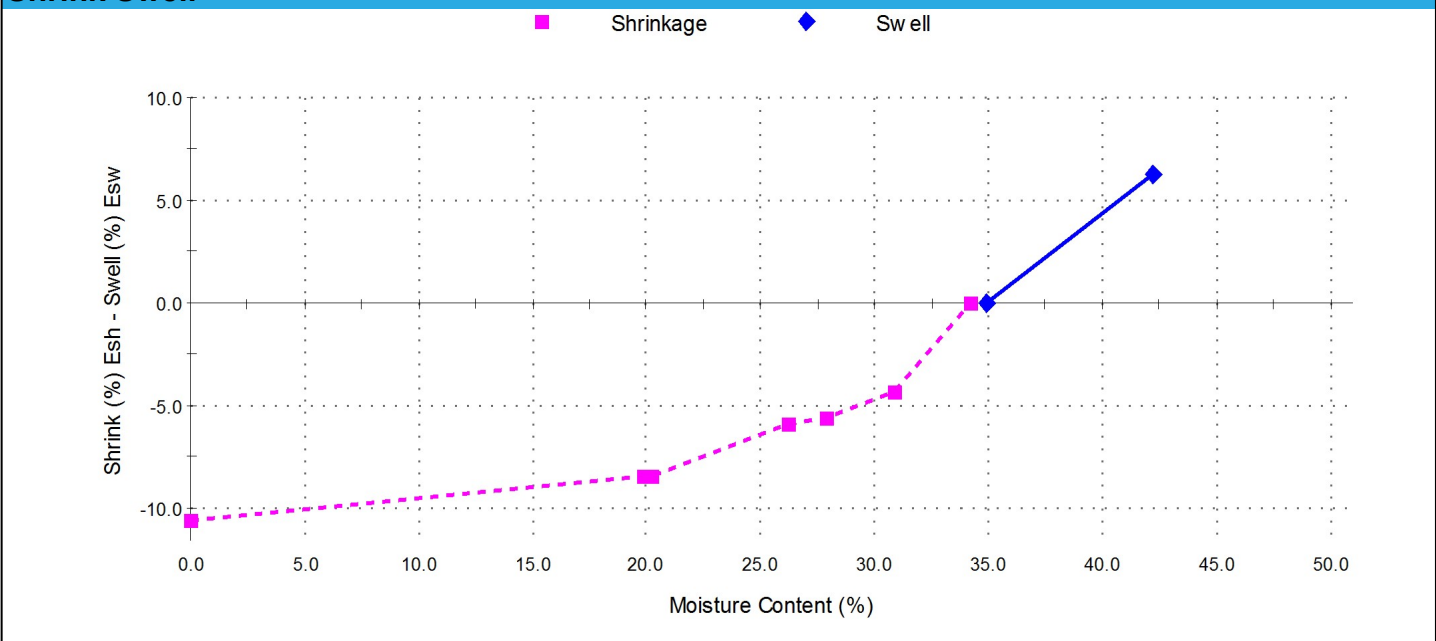
Swell on Saturation (%): 6.2
Moisture Content before (%): 34.9
Moisture Content after (%): 42.2
Est. Unc. Comp. Strength before (kPa): 350
Est. Unc. Comp. Strength after (kPa): 90

Shrink Test

AS 1289.7.1.1

Shrink on drying (%): 10.6
Shrinkage Moisture Content (%): 34.2
Est. inert material (%): 1.0
Crumbling during shrinkage: Nil
Cracking during shrinkage: Minor

Shrink Swell



Shrink Swell Index - Iss (%): 7.6

Comments

The results outlined above apply to the sample as received


Report No: SSI:NEW19W-3284--S01
Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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(Signature)
 Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 3/10/2019

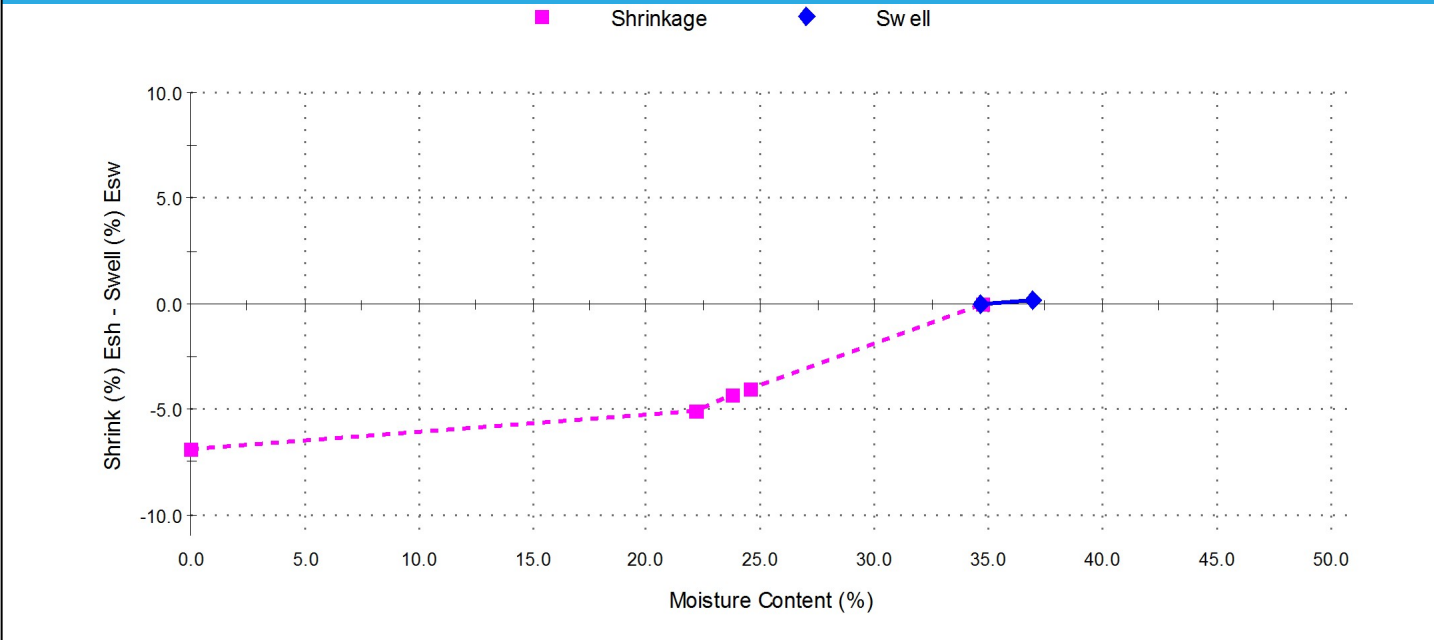
Sample Details

Sample ID:	NEW19W-3284--S01	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	20/09/2019
Source:	On Site	Date Submitted:	26/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar		
Sample Location:	TP201 - (0.8 - 1.0m)		
Borehole Number:	TP201		
Borehole Depth (m):	0.8 - 1.0		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	0.2
Moisture Content before (%):	34.7
Moisture Content after (%):	36.9
Est. Unc. Comp. Strength before (kPa):	210
Est. Unc. Comp. Strength after (kPa):	120

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	6.9
Shrinkage Moisture Content (%):	34.7
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Major

Shrink Swell



Shrink Swell Index - Iss (%): 3.9

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3284--S02

Issue No: 1


Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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 Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 3/10/2019

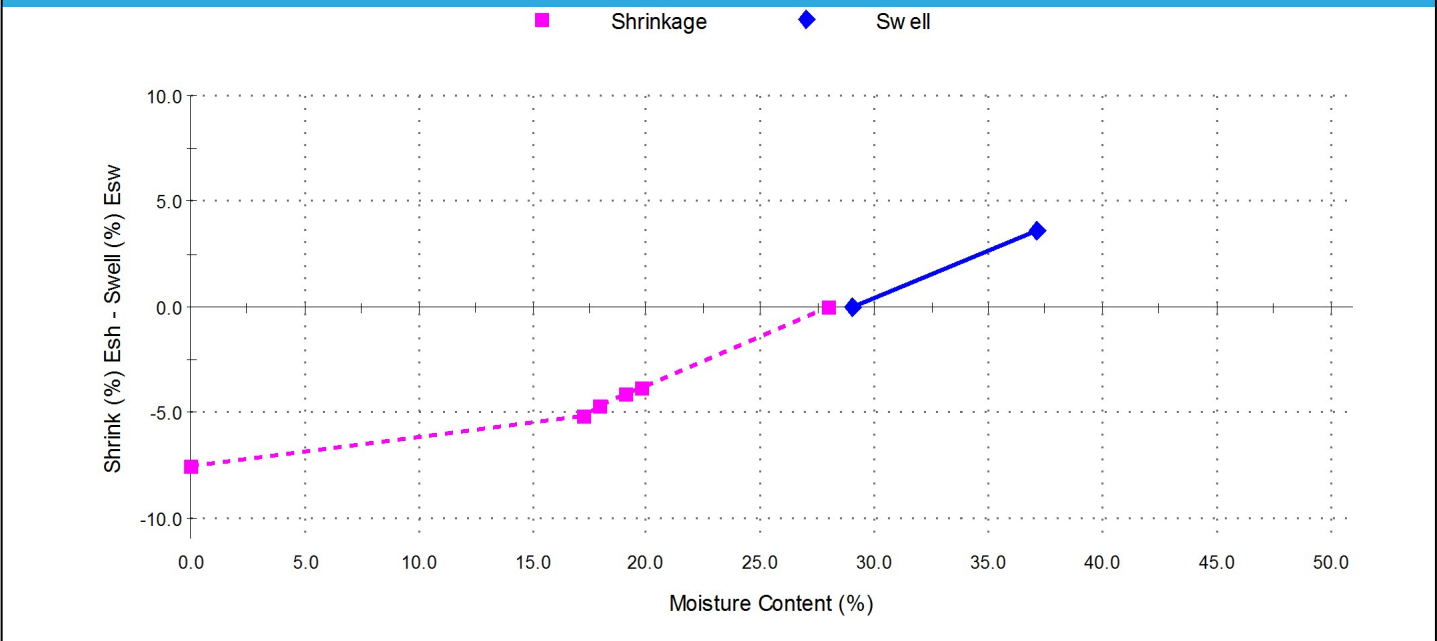
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	3.6
Moisture Content before (%):	29.0
Moisture Content after (%):	37.1
Est. Unc. Comp. Strength before (kPa):	410
Est. Unc. Comp. Strength after (kPa):	130

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	7.6
Shrinkage Moisture Content (%):	28.0
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 5.2

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3284--S03

Issue No: 1


Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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 Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 8/10/2019

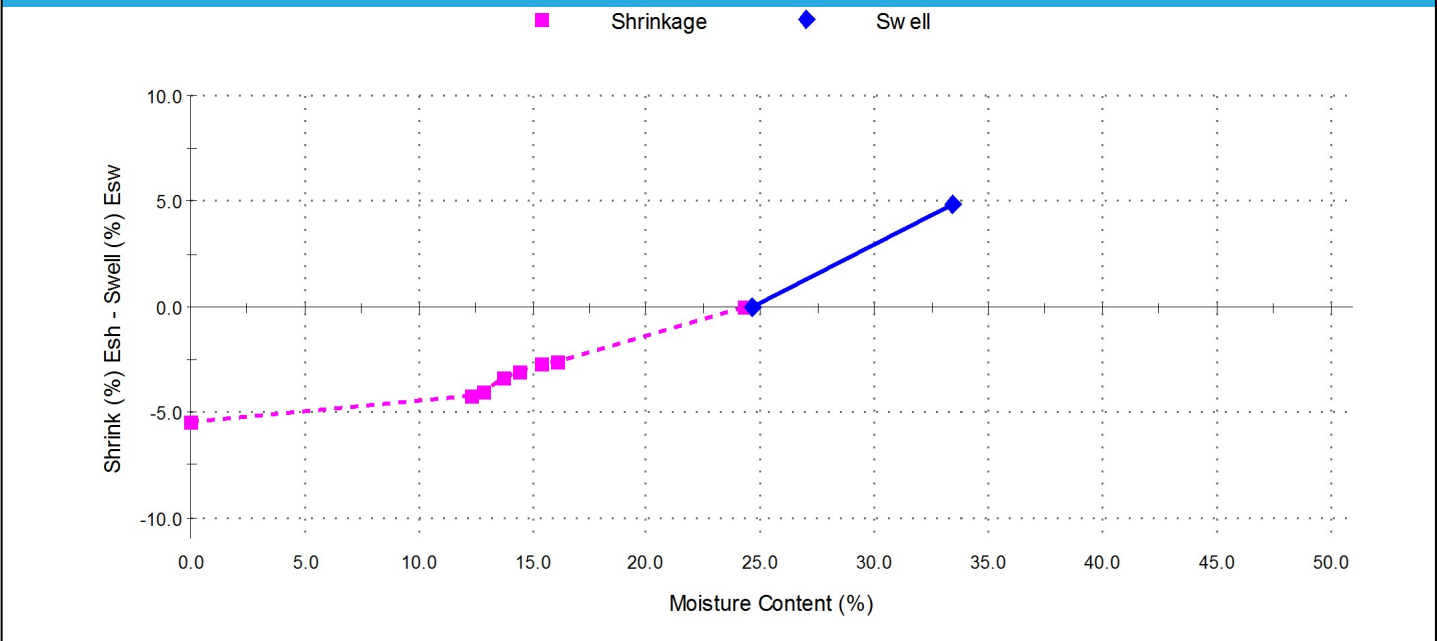
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	4.8
Moisture Content before (%):	24.6
Moisture Content after (%):	33.4
Est. Unc. Comp. Strength before (kPa):	> 600
Est. Unc. Comp. Strength after (kPa):	140

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	5.5
Shrinkage Moisture Content (%):	24.3
Est. inert material (%):	2.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 4.4

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 3/10/2019

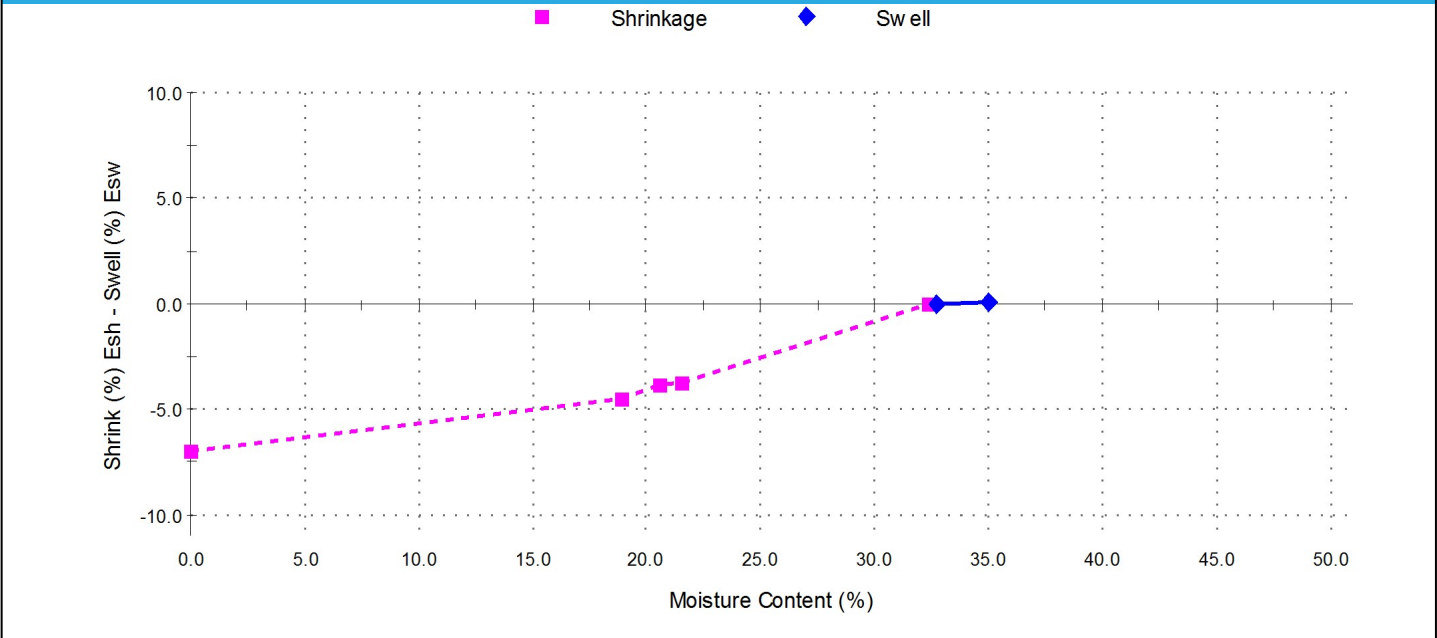
Sample Details

Sample ID:	NEW19W-3284--S04	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	20/09/2019
Source:	On Site	Date Submitted:	26/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar		
Sample Location:	TP204 - (0.35 - 0.5m)		
Borehole Number:	TP204		
Borehole Depth (m):	0.35 - 0.5		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	0.1
Moisture Content before (%):	32.7
Moisture Content after (%):	35.0
Est. Unc. Comp. Strength before (kPa):	360
Est. Unc. Comp. Strength after (kPa):	190

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	7.0
Shrinkage Moisture Content (%):	32.4
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Major

Shrink Swell



Shrink Swell Index - Iss (%): 3.9

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3284--S05

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 8/10/2019

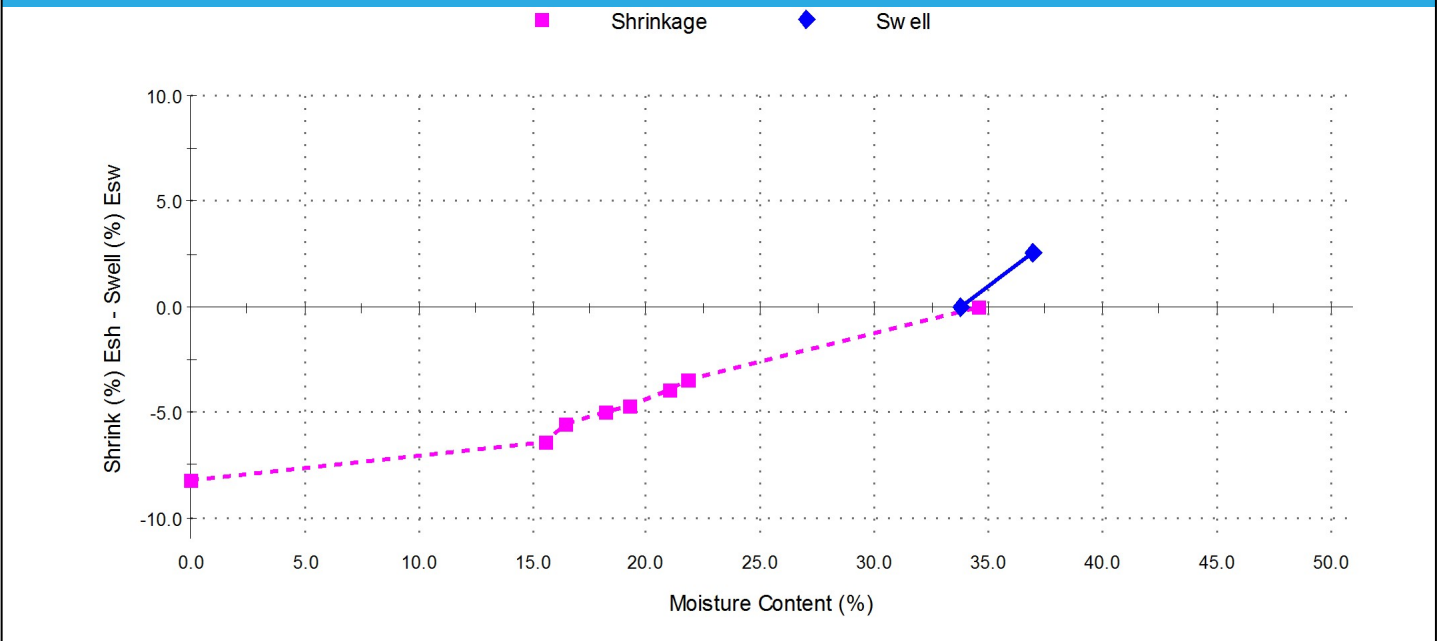
Sample Details

Sample ID:	NEW19W-3284--S05	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	20/09/2019
Source:	On Site	Date Submitted:	26/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar		
Sample Location:	TP205 - (0.4 - 0.55m)		
Borehole Number:	TP205		
Borehole Depth (m):	0.4 - 0.55		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	2.6
Moisture Content before (%):	33.8
Moisture Content after (%):	36.9
Est. Unc. Comp. Strength before (kPa):	230
Est. Unc. Comp. Strength after (kPa):	140

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	8.2
Shrinkage Moisture Content (%):	34.6
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 5.3

Comments

The results outlined above apply to the sample as received


Report No: SSI:NEW19W-3284--S06
Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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(Signature)
 Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 14/10/2019

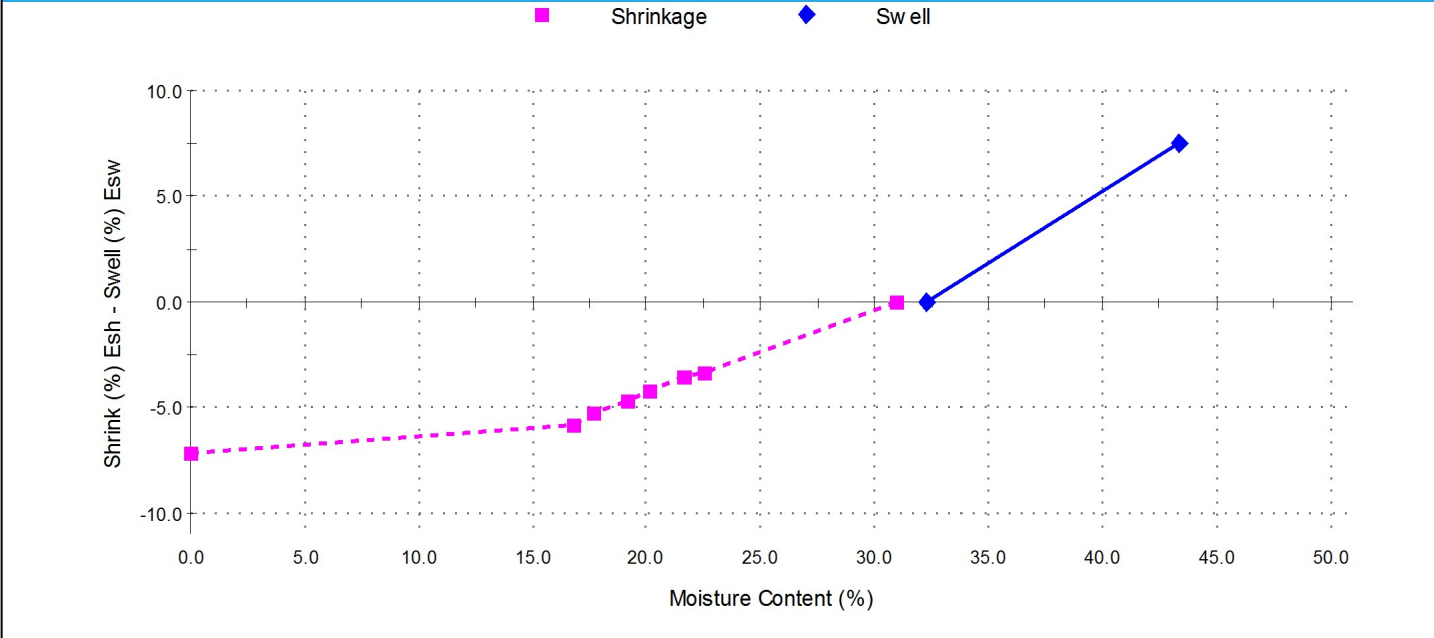
Sample Details

Sample ID:	NEW19W-3284--S06	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	20/09/2019
Source:	On Site	Date Submitted:	26/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar		
Sample Location:	TP205 - (1.0 - 1.2m)		
Borehole Number:	TP205		
Borehole Depth (m):	1.0 - 1.2		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	7.5
Moisture Content before (%):	32.3
Moisture Content after (%):	43.4
Est. Unc. Comp. Strength before (kPa):	330
Est. Unc. Comp. Strength after (kPa):	90

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	7.2
Shrinkage Moisture Content (%):	31.0
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 6.1

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 3/10/2019

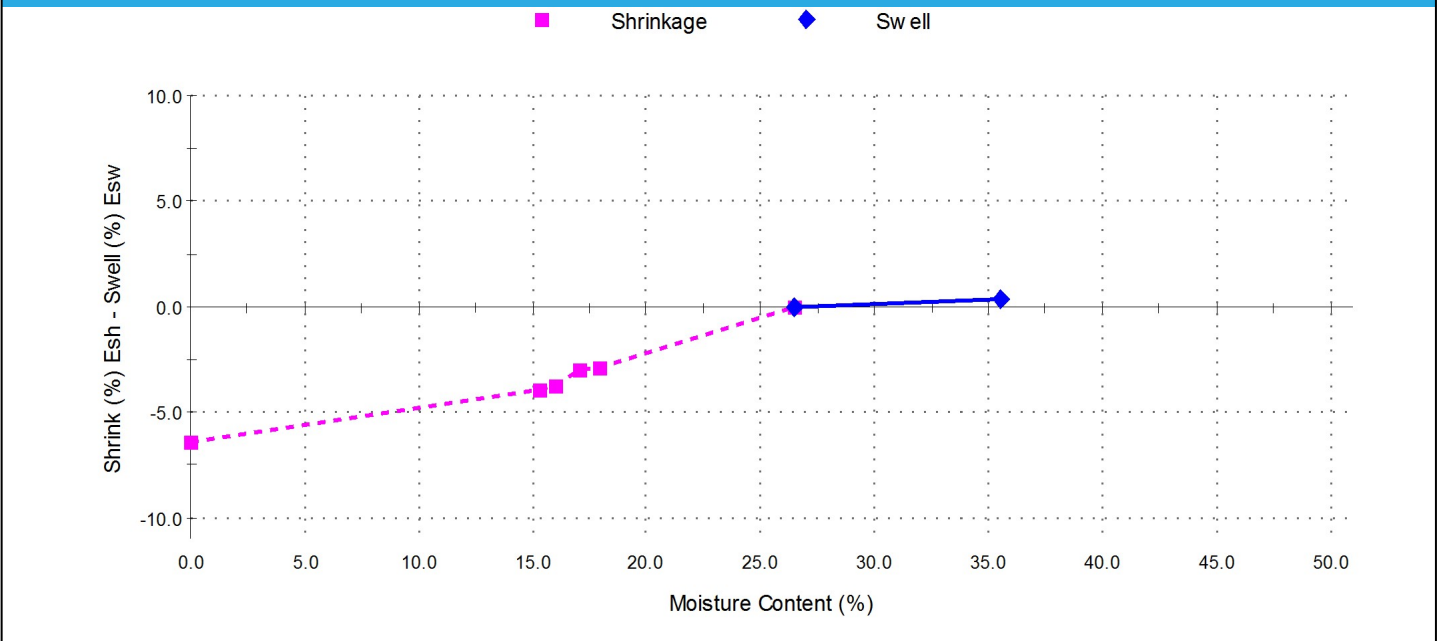
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	0.4
Moisture Content before (%):	26.5
Moisture Content after (%):	35.6
Est. Unc. Comp. Strength before (kPa):	> 600
Est. Unc. Comp. Strength after (kPa):	200

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	6.4
Shrinkage Moisture Content (%):	26.5
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Major

Shrink Swell



Shrink Swell Index - Iss (%): 3.7

Comments

The results outlined above apply to the sample as received


Report No: SSI:NEW19W-3284--S08
Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:

Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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(Signature)
 Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 8/10/2019

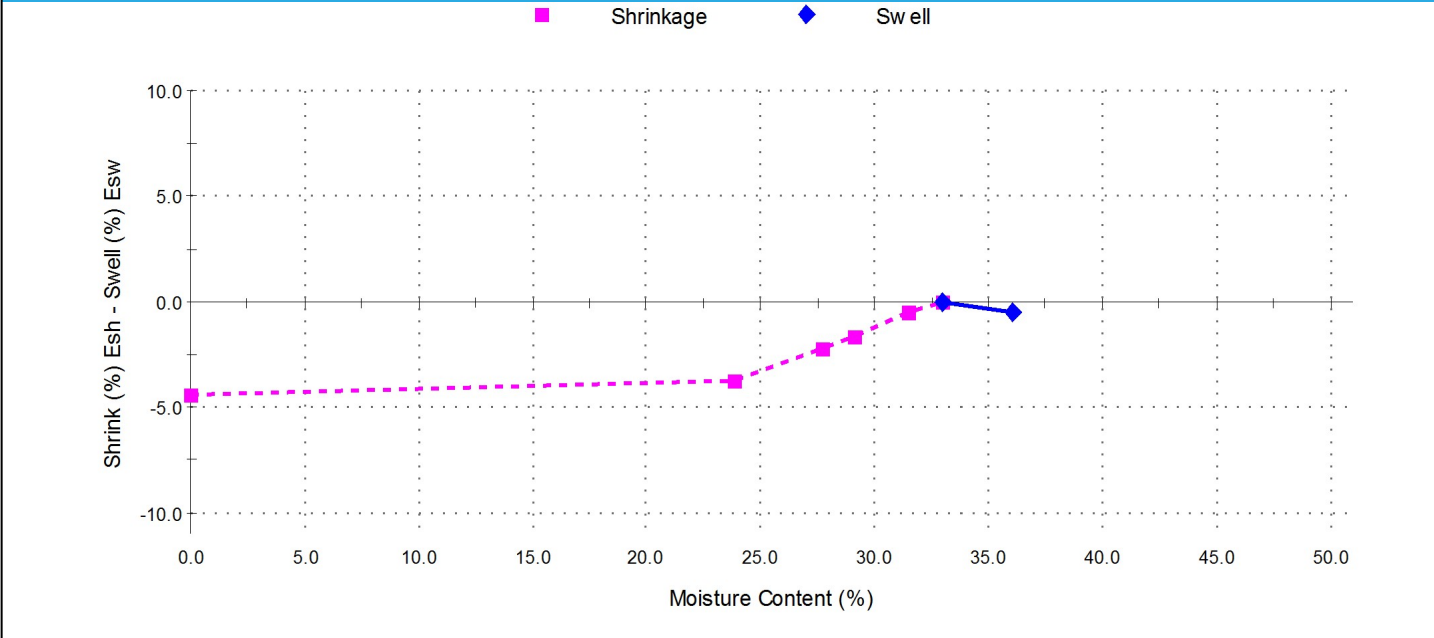
Sample Details

Sample ID:	NEW19W-3284--S08	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	20/09/2019
Source:	On Site	Date Submitted:	26/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar		
Sample Location:	TP207 - (0.4 - 0.6m)		
Borehole Number:	TP207		
Borehole Depth (m):	0.4 - 0.6		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	-0.5
Moisture Content before (%):	33.0
Moisture Content after (%):	36.0
Est. Unc. Comp. Strength before (kPa):	280
Est. Unc. Comp. Strength after (kPa):	200

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	4.4
Shrinkage Moisture Content (%):	33.0
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Major

Shrink Swell



Shrink Swell Index - Iss (%): 2.4

Comments

The results outlined above apply to the sample as received

Report No: SSI:NEW19W-3284--S09

Issue No: 1

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
 PO Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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(Signature)
 Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 14/10/2019

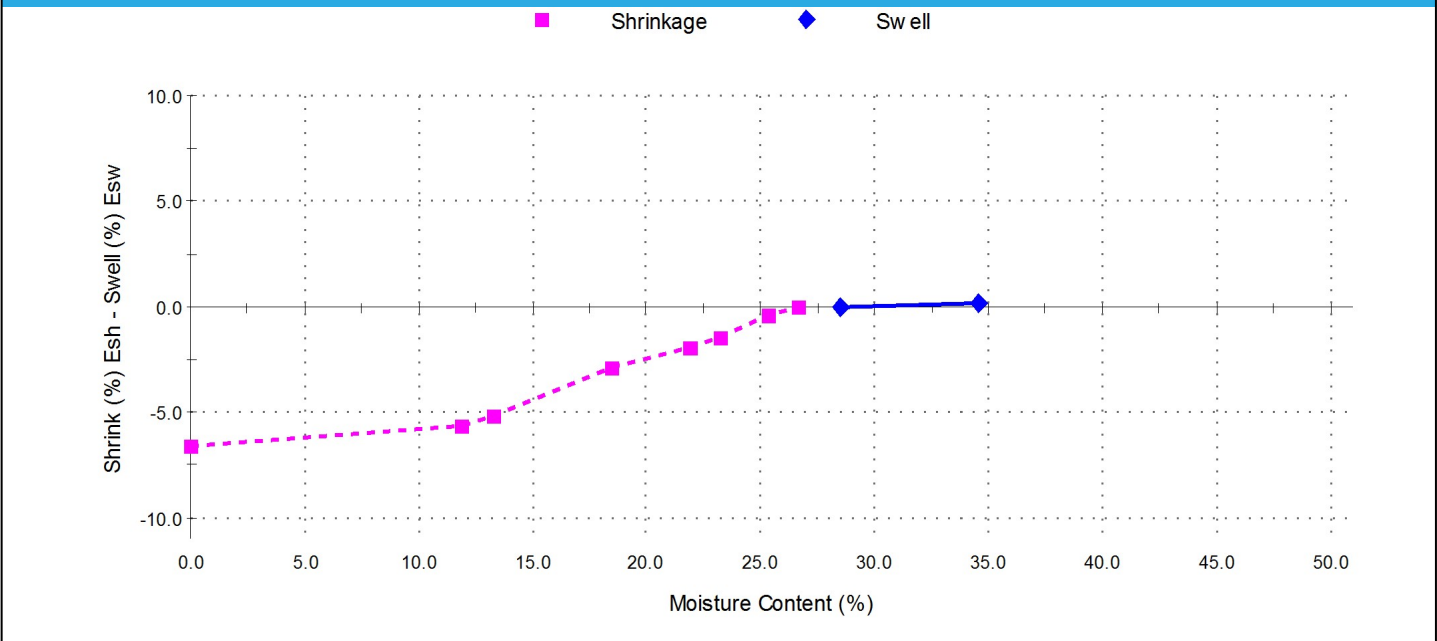
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	0.2
Moisture Content before (%):	28.5
Moisture Content after (%):	34.5
Est. Unc. Comp. Strength before (kPa):	500
Est. Unc. Comp. Strength after (kPa):	320

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	6.6
Shrinkage Moisture Content (%):	26.7
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 3.7

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 10/10/2019

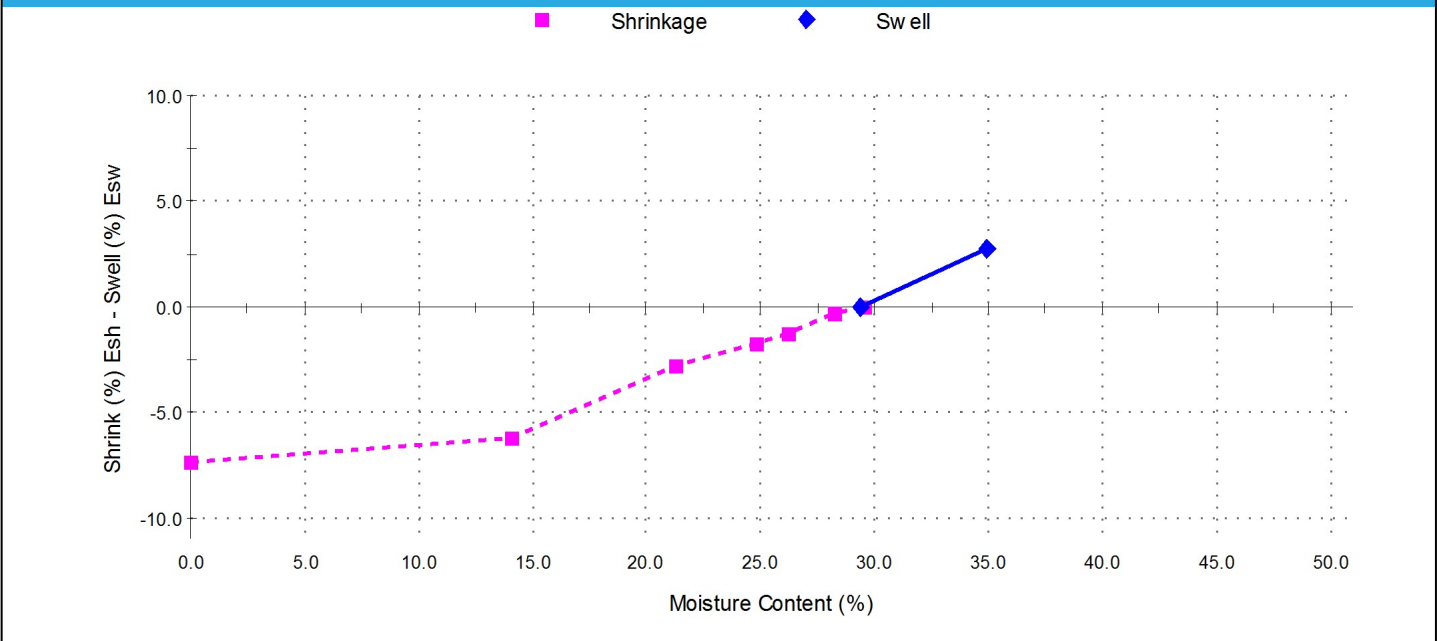
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	2.8
Moisture Content before (%):	29.4
Moisture Content after (%):	34.9
Est. Unc. Comp. Strength before (kPa):	470
Est. Unc. Comp. Strength after (kPa):	180

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	7.4
Shrinkage Moisture Content (%):	29.5
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Major

Shrink Swell



Shrink Swell Index - Iss (%): 4.9

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 10/10/2019

Sample Details

Sample ID:	NEW19W-3284--S11	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	20/09/2019
Source:	On Site	Date Submitted:	26/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar		
Sample Location:	TP210 - (0.85 - 1.2m)		
Borehole Number:	TP210		
Borehole Depth (m):	0.85 - 1.2		

Swell Test

AS 1289.7.1.1

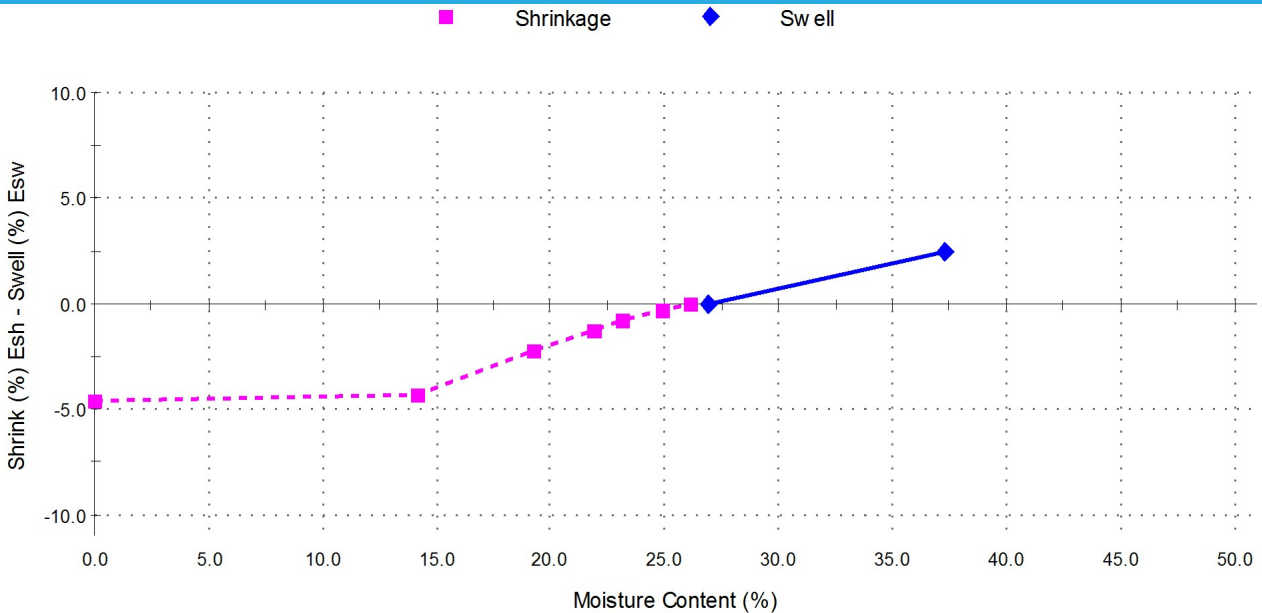
Swell on Saturation (%):	2.5
Moisture Content before (%):	26.9
Moisture Content after (%):	37.3
Est. Unc. Comp. Strength before (kPa):	> 600
Est. Unc. Comp. Strength after (kPa):	160

Shrink Test

AS 1289.7.1.1

Shrink on drying (%):	4.6
Shrinkage Moisture Content (%):	26.1
Est. inert material (%):	3.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Major

Shrink Swell



Shrink Swell Index - Iss (%): 3.2

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 10/10/2019

Sample Details

Sample ID:	NEW19W-3284--S12	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	Sampled by Engineering Department
Material:	Clay	Date Sampled:	20/09/2019
Source:	On Site	Date Submitted:	26/09/2019
Specification:	No Specification		
Project Location:	New England Highway, Lochinvar		
Sample Location:	TP211 - (0.6 - 0.85m)		
Borehole Number:	TP211		
Borehole Depth (m):	0.6 - 0.85		

Swell Test

AS 1289.7.1.1

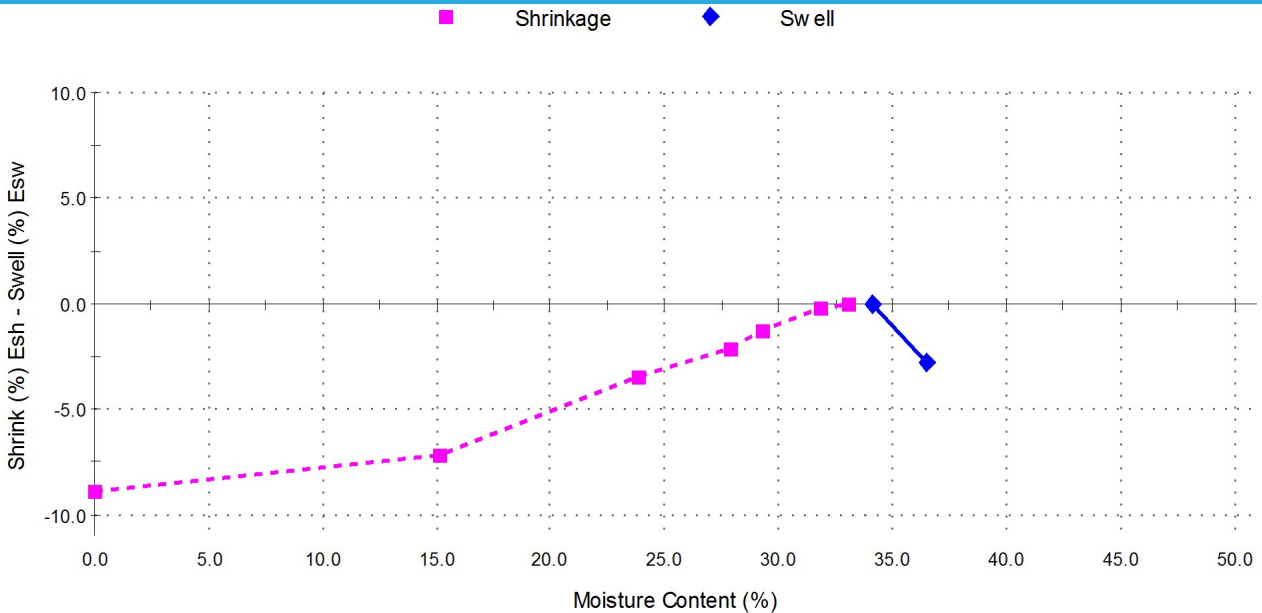
Swell on Saturation (%):	-2.8
Moisture Content before (%):	34.1
Moisture Content after (%):	36.5
Est. Unc. Comp. Strength before (kPa):	290
Est. Unc. Comp. Strength after (kPa):	160

Shrink Test

AS 1289.7.1.1

Shrink on drying (%):	8.9
Shrinkage Moisture Content (%):	33.0
Est. inert material (%):	1.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 5.0

Comments

The results outlined above apply to the sample as received

Shrink Swell Index Report

Client: McCloy Project Management Pty Ltd
PO Box 2214
Dangar NSW 2309

Principal:
Project No.: NEW17P-0054A
Project Name: Proposed Subdivision - Stage 1 & 2



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Approved Signatory: Adam Dwyer
(Senior Geotechnician)
NATA Accredited Laboratory Number: 18686
Date of Issue: 10/10/2019

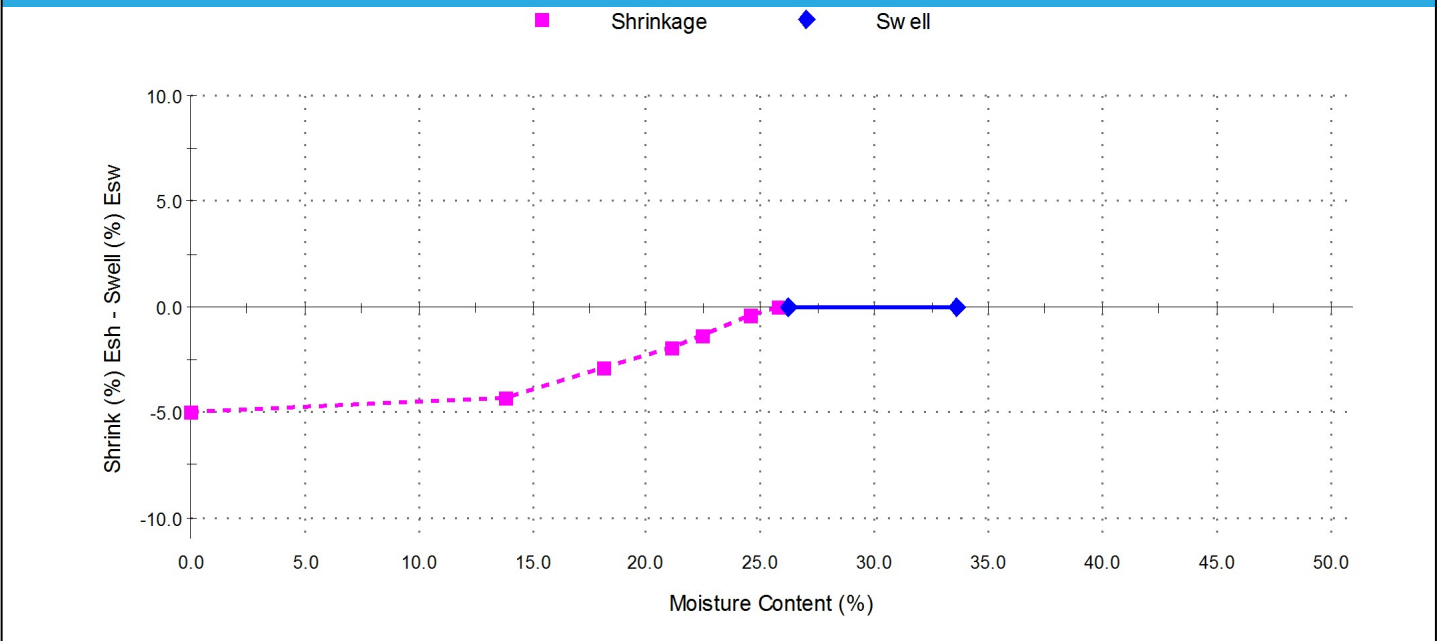
Sample Details

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:	On Site	Date Submitted:	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		

Swell Test AS 1289.7.1.1	
Swell on Saturation (%):	0.0
Moisture Content before (%):	26.2
Moisture Content after (%):	33.6
Est. Unc. Comp. Strength before (kPa):	> 600
Est. Unc. Comp. Strength after (kPa):	290

Shrink Test AS 1289.7.1.1	
Shrink on drying (%):	5.0
Shrinkage Moisture Content (%):	25.8
Est. inert material (%):	2.0
Crumbling during shrinkage:	Nil
Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 2.8

Comments

The results outlined above apply to the sample as received


California Bearing Ratio Test Report

Client: McCloy Lochinvar Pty Ltd
 Po Box 2214
 Dangar NSW 2309

Principal:

Project No.: NEW17P-0054
 Project Name: Proposed Subdivision

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 to Australian/national standards



WORLD RECOGNISED
 ACCREDITATION

Dane Cullen
 Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 8/05/2017

Sample Details

Sample ID: NEW17W-1491--S01 Date Sampled: 19/04/2017

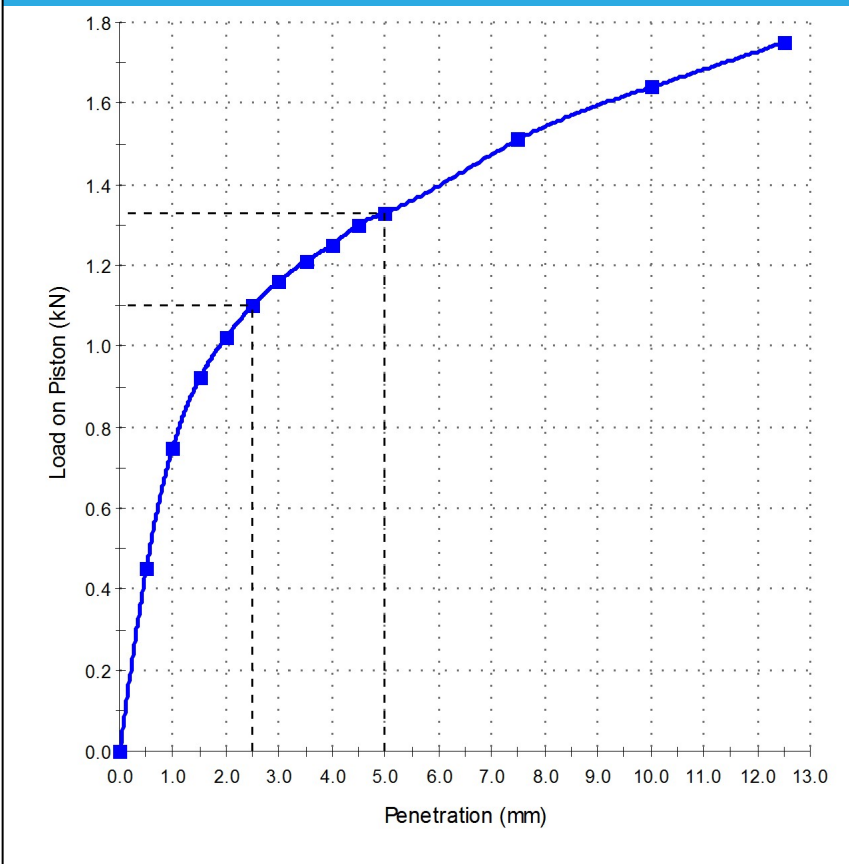
Sampling Method: AS1289.1.2.1 cl 6.5

Specification: No Specification Source: On-Site

Location: TP02 - (0.5 - 0.7m) Material: Sandy Clay

Project Location: Lochinvar, NSW

Load vs Penetration



Test Results

AS 1289.6.1.1

CBR At 2.5mm (%):	8
Maximum Dry Density (t/m ³):	1.55
Optimum Moisture Content (%):	24.3
Dry Density before Soaking (t/m ³):	1.56
Density Ratio before Soaking (%):	101
Moisture Content before Soaking (%):	24.8
Moisture Ratio before Soaking (%):	102
Dry Density after Soaking (t/m ³):	1.54
Density Ratio after Soaking (%):	100
Swell (%):	1.5
Moisture Content of Top 30mm (%):	33.5
Moisture Content of Remaining Depth (%):	26.8
Compactive Effort:	Standard
Surcharge Mass (kg):	9.00
Period of Soaking (Days):	4
Oversize Material (%):	0.0
Moisture Content	
Field Moisture Content (%):	23.5

Comments

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


California Bearing Ratio Test Report

Client: McCloy Lochinvar Pty Ltd
 Po Box 2214
 Dangar NSW 2309

Principal:

Project No.: NEW17P-0054
 Project Name: Proposed Subdivision

Accredited for compliance with ISO/IEC 17025
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WORLD RECOGNISED
 ACCREDITATION

Dane Cullen
 Approved Signatory: Dane Cullen
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 8/05/2017

Sample Details

Sample ID: NEW17W-1491--S02 Date Sampled: 19/04/2017

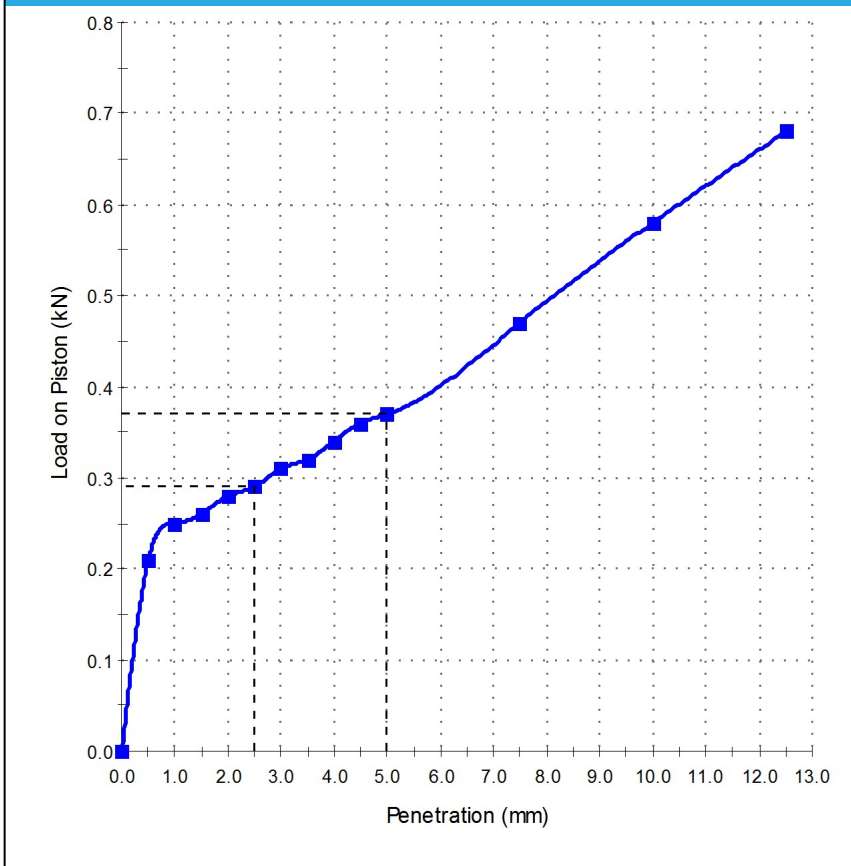
Sampling Method: AS1289.1.2.1 cl 6.5

Specification: No Specification Source: On-Site

Location: TP03 - (0.5 - 0.75m) Material: Sandy Clay

Project Location: Lochinvar, NSW

Load vs Penetration



Test Results

AS 1289.6.1.1

CBR At 2.5mm (%):	2.0
Maximum Dry Density (t/m ³):	1.45
Optimum Moisture Content (%):	27.9
Dry Density before Soaking (t/m ³):	1.45
Density Ratio before Soaking (%):	99
Moisture Content before Soaking (%):	28.4
Moisture Ratio before Soaking (%):	102
Dry Density after Soaking (t/m ³):	1.40
Density Ratio after Soaking (%):	96
Swell (%):	3.5
Moisture Content of Top 30mm (%):	48.7
Moisture Content of Remaining Depth (%):	30.6
Compactive Effort:	Standard
Surcharge Mass (kg):	9.00
Period of Soaking (Days):	4
Oversize Material (%):	0.0
Moisture Content	
Field Moisture Content (%):	32.6


Comments

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

Shrink Swell Index Report

Client: McCloy Lochinvar Pty Ltd
 Po Box 2214
 Dangar NSW 2309

Principal:
 Project No.: NEW17P-0054
 Project Name: Proposed Subdivision



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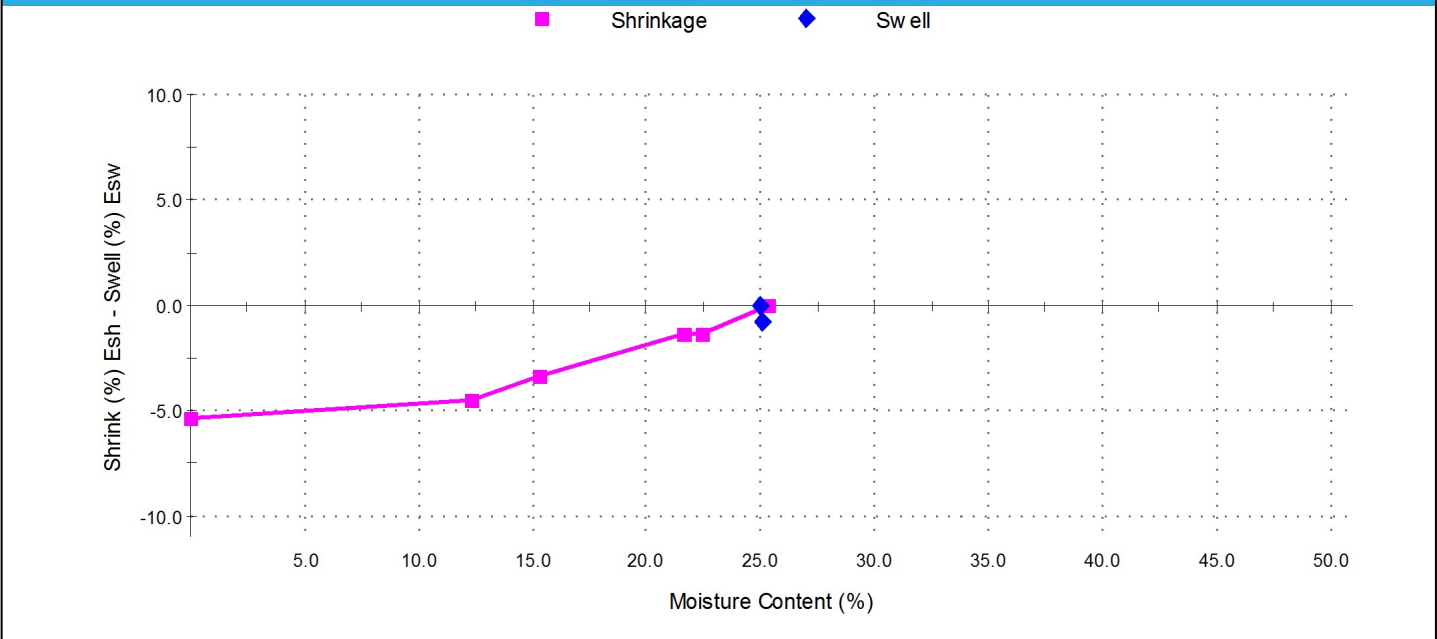
Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 1/05/2017

Sample Details

Sample ID:	NEW17W-1493--S02	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	AS1289.1.2.1 cl 6.5
Material:	Sandy Clay	Date Sampled:	19/04/2017
Source:	On-Site	Date Submitted:	20/04/2017
Specification:	No Specification		
Project Location:	Lochinvar, NSW		
Sample Location:	TP02 - (0.5 - 0.7m)		
Borehole Number:	TP02		
Borehole Depth (m):	0.5 - 0.7		

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	-0.8	Shrink on drying (%):	5.4
Moisture Content before (%):	25.0	Shrinkage Moisture Content (%):	25.4
Moisture Content after (%):	25.1	Est. inert material (%):	5.0
Est. Unc. Comp. Strength before (kPa):	400	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	330	Cracking during shrinkage:	Minor

Shrink Swell



Shrink Swell Index - Iss (%): 3.0


Comments

Shrink Swell Index Report

Client: McCloy Lochinvar Pty Ltd
 Po Box 2214
 Dangar NSW 2309

Principal:
 Project No.: NEW17P-0054
 Project Name: Proposed Subdivision

Accredited for compliance with ISO/IEC 17025
 The results of the tests, calibrations and/or
 measurements included in this document are traceable
 to Australian/national standards



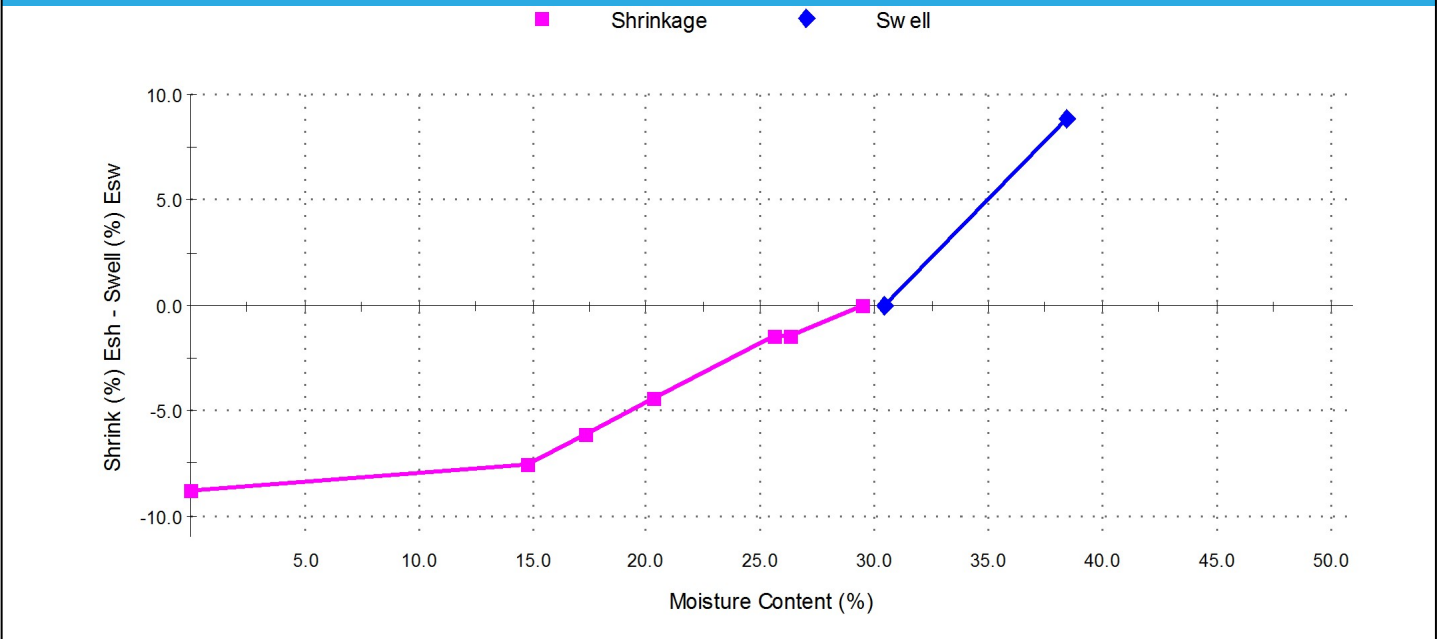
Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 3/05/2017

Sample Details

Sample ID:	NEW17W-1493--S03	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	AS1289.1.2.1 cl 6.5
Material:	Sandy Clay	Date Sampled:	19/04/2017
Source:	On-Site	Date Submitted:	20/04/2017
Specification:	No Specification		
Project Location:	Lochinvar, NSW		
Sample Location:	TP03 - (0.5 - 0.75m)		
Borehole Number:	TP03		
Borehole Depth (m):	0.5 - 0.75		

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	8.8	Shrink on drying (%):	8.8
Moisture Content before (%):	30.5	Shrinkage Moisture Content (%):	29.4
Moisture Content after (%):	38.4	Est. inert material (%):	5.0
Est. Unc. Comp. Strength before (kPa):	550	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	120	Cracking during shrinkage:	Moderate

Shrink Swell



Shrink Swell Index - Iss (%): 7.4


Comments

Report No: SSI:NEW17W-1493--S05
Issue No: 1

Shrink Swell Index Report

Client: McCloy Lochinvar Pty Ltd
 Po Box 2214
 Dangar NSW 2309

Principal:
Project No.: NEW17P-0054
Project Name: Proposed Subdivision



Accredited for compliance with ISO/IEC 17025
 The results of the tests, calibrations and/or
 measurements included in this document are traceable
 to Australian/national standards

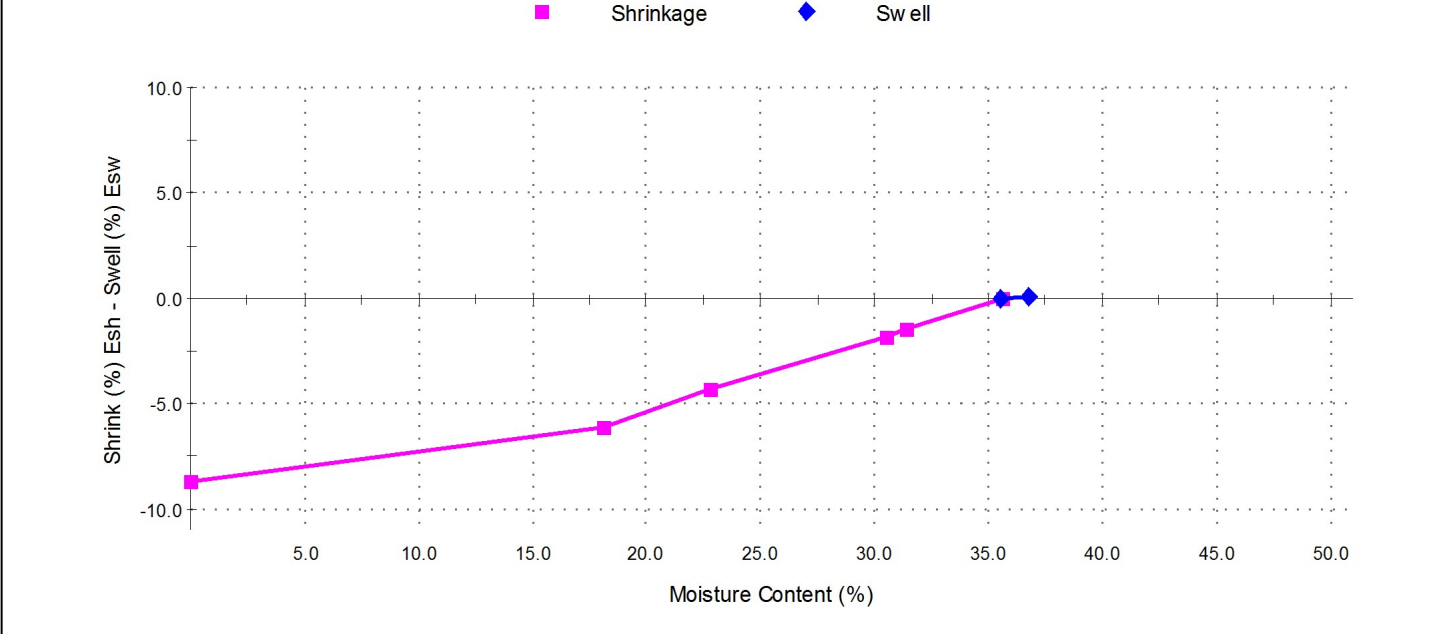
(Signature)
 Approved Signatory: Adam Dwyer
 (Senior Geotechnician)
 NATA Accredited Laboratory Number: 18686
 Date of Issue: 1/05/2017

Sample Details

Sample ID:	NEW17W-1493--S05	Client Sample ID:	-
Test Request No.:	-	Sampling Method:	AS1289.1.2.1 cl 6.5
Material:	Sandy Clay	Date Sampled:	19/04/2017
Source:	On-Site	Date Submitted:	20/04/2017
Specification:	No Specification		
Project Location:	Lochinvar, NSW		
Sample Location:	TP05 - (0.5 - 0.75m)		
Borehole Number:	TP05		
Borehole Depth (m):	0.5 - 0.75		

Swell Test AS 1289.7.1.1		Shrink Test AS 1289.7.1.1	
Swell on Saturation (%):	0.1	Shrink on drying (%):	8.7
Moisture Content before (%):	35.6	Shrinkage Moisture Content (%):	35.6
Moisture Content after (%):	36.8	Est. inert material (%):	5.0
Est. Unc. Comp. Strength before (kPa):	400	Crumbling during shrinkage:	Nil
Est. Unc. Comp. Strength after (kPa):	180	Cracking during shrinkage:	Nil

Shrink Swell



Shrink Swell Index - Iss (%): 4.9

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



CSIRO

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 bog-like 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
A	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
M	Moderately reactive clay or silt sites, which can experience moderate ground movement from moisture changes
H	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
P	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 perpend).

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.

Trees can cause shrinkage and damage



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.

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.

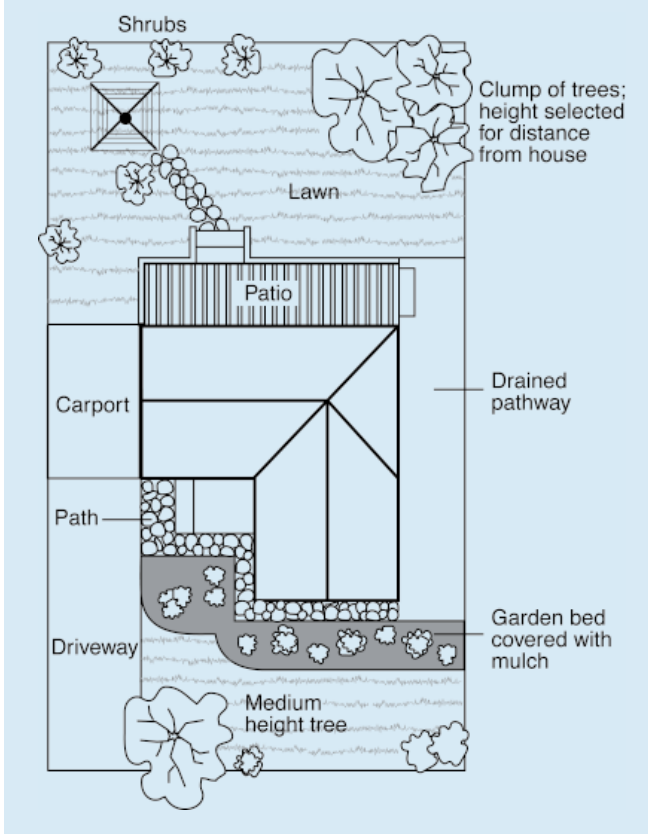
Protection of the building perimeter

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



- 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.

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:

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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