
Proposed Subdivision
Hereford Hill - Stage 17
Site Classification

Caputar Way, Lochinvar

NEW20P-0146D-AB
6 January 2025



6 January 2025

KCE Pty Ltd
PO Box 574
East Maitland NSW 2323
callanh@kce.com.au

Attention: Mr Callan Horton

Dear Sir,

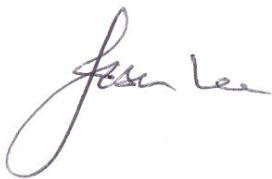
**RE: PROPOSED SUBDIVISION – HEREFORD HILL, STAGE 17
CAPUTAR WAY, LOCHINVAR
SITE CLASSIFICATION (LOTS 1701 TO 1728)**

Please find enclosed our geotechnical report for the proposed residential subdivision of Hereford Hill, Stage 17, to be located at Caputar Way, Lochinvar.

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

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

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



Jason Lee
Principal Geotechnical Engineer

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Attachments:

- Figure AB1: Site Plan & Approximate Test Locations
- Figure AA1: Approximate Extent of Site Re-grade Filling Works
- Appendix A: Results of Field Investigations
- Appendix B: Results of Laboratory Testing
- Appendix C: CSIRO Sheet BTF 18

1.0 Introduction

Qualtest Laboratory NSW Pty Ltd (Qualtest) is pleased to present this geotechnical site classification report to KCE Pty Ltd (KCE), for Stage 17 of the Hereford Hill residential subdivision located at Caputar Way, Lochinvar.

A preliminary Site Classification has previously been provided for Stages 17 to 18, (Qualtest Report Ref: NEW17P-0054E-AB.Rev4, dated 16 October 2024). Based on the brief and drawings provided in an email from McCloy dated 8 November 2022, it is understood the extent of Stage 17 comprises subdivision into 28 residential lots (Lots 1701 to 1728), as shown on Figure AB1 attached.

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 Stage 17 lots following the 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, 'Hereford Hill – Stage 17, Lochinvar', (Report Reference: NEW20P-0146D-AA, dated 3 December 2024);
- Geotechnical Assessment – 'Proposed Subdivision, Hereford Hill DA2 Area - Stage 17 & 18, Lots 2 & 3, DP 1218389, New England Highway, Lochinvar', (Report Reference. NEW17P-0054E-AB.Rev4, dated 16 October 2024);
- Site Classification, 'Proposed Subdivision Hereford Hill – Stage 5, Springfield Drive, Lochinvar', (Report Reference. NEW17P-0054B-AG, dated 10 July 2024);
- Geotechnical Assessment – 'Proposed Subdivision, Hereford Hill DA2 Area - Stage 17 & 18, Lots 2 & 3, DP 1218389, New England Highway, Lochinvar', (Report Reference. NEW17P-0054E-AB, dated 23 September 2021);
- Preliminary Geotechnical Assessment – 'Proposed Subdivision – Hereford Hill DA2 Area Stages 13, 14 & 15, Lots 2 & 3, DP1218389, New England Highway, Lochinvar', (Report Reference: NEW17P-0054D-AB, dated 12 July 2021);
- Geotechnical Assessment – 'Proposed Subdivision, Hereford Hill - Stages 3 to 5, New England Highway, Lochinvar', (Report Reference: NEW17P-0054B-AB, dated 28 October 2020); and
- Preliminary Geotechnical Assessment – 'Proposed Subdivision, Lots 1 to 3, DP 1218389, New England Highway, Lochinvar', (Report Reference: NEW17P-0054-AA.Rev1, dated 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 testing carried out.

3.0 Field Work

The field work investigations were carried out on 19 July 2024 and 20 August 2024, and comprised of:

- DBYD search and visual check of proposed test locations for the presence of underground services with the KCE site personnel;
- Site walkover to make observations of surface features at the property and in the immediate surrounding area;
- Excavation of thirty-one (31 no.) test pits (TP1701 to TP1731) using a 5.5 tonne rubber tracked excavator or a 13 tonne excavator, equipped with a 450mm wide general purpose bucket. Test pits were terminated at depths of between 1.10m and 2.50m;
- Test pits were backfilled with the excavation spoil and compacted using the excavator bucket and tracks.

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

Approximate test pit locations are shown on the attached Figure AB1. Test pits were located in the field with assistance from the client using GPS rover, and relative to existing site features including topographic features, lot boundaries, existing developments and trees.

Engineering logs of the test pits are presented in Appendix A.

Additional sampling was undertaken on 1 November 2024 from the centre of Lots 1706, 1707, 1710, 1711, 1716, 1719 and 1722, following the completion of additional site regrade works completed under Level 1 supervision provided by Qualtest between 8 and 24 October 2024.

4.0 Site Description

4.1 Site Regrade Works

Works Completed:

To comply with the requirements of Maitland City Council, the scope of work has included Level 1 supervision and testing as defined in Clause 8.2 – Section 8 of AS3798-2007 “*Guidelines on Earthworks for Commercial and Residential Developments*” for site re-grading works conducted on site. Compaction testing has been performed as per the Australian Standard AS1289.5.7.1-2006.

Site Re-grade Works – Performed During Stage 13 Bulk Earthworks (Oct 2021):

Following an initial site visit, stripping assessment and recommendations performed on 1 October 2021 (Qualtest ref. NEW20P-0146E-SR01, dated 18/11/21), site re-grading works within Stage 17 were conducted on 6 October 2021, within Lots 1708 to 1710 during adjoining Stage 13 works.

Site Re-grade Works – Performed During Stage 5 Bulk Earthworks (Nov 2023 to Dec 2023):

Following site visits, stripping assessments and recommendations performed on 2 November 2023, 14 November 2023 and 4 December 2023 (Qualtest ref. NEW20P-0146C-SR02, dated 20/11/23, NEW20P-0146C-SR03 dated 20/11/23, and NEW20P-0146C-SR04 dated 04/12/23), site re-grading works were conducted between 8 November 2023 and 15 December 2023.

These re-grade works predominately included filling within all or portions of lots within Stage 17, including the intersection of Dairyman Drive and Caputar Way, Lots 1701, 1706 to 1713, Lots 1722 to 1728 south of Caputar Way, and future Stage 6 lots to the north of Christopher Road and west of adjoining Stage 5 works.

Site Re-grade Works – Performed During Stage 17 Bulk Earthworks (April 2024)

Following further site visits, stripping assessments and recommendations performed on 11 April 2024 (Qualitest ref. NEW20P-0146D-SR01, dated 01/05/24), site re-grading works were conducted between 12 April 2024 and 18 April 2024.

These re-grade works predominately included filling within all or portions of Lots 1714 to 1728. Filling within these areas consisted of the placement of required fill to bring lots to finished design levels.

Site Re-grade Works – Additional Lot Filling for Site Classification (October 2024)

After initial assessment, preliminary advice was provided to the client in emails dated between 8 August 2024 and 11 September 2024, with recommendations to achieve more favourable site classification of lots. Further site re-grading works were conducted between 8 October 2024 and 24 October 2024, on selected lots to target more favourable site classifications.

These additional re-grade works included the removal of previously placed controlled fill, prior to replacement to finished design levels with lower reactive fill material, in order to achieve a target Site Classification of Class 'H2'. These additional works were undertaken within Lots 1706, 1707, 1710, 1711, 1716, 1719 and 1722.

Refer to attached Figure AA1 for the approximate extent of re-grade works for these stages of the development.

Stripping, Preparation and Filling Method Performed:

Prior to filling, re-grade areas were stripped of topsoil and unsuitable material to expose the suitable natural foundation profile. Preparation works were then performed, which consisted of tyning, re-conditioning and re-compaction of the stripped surface, prior to filling with approved site fill to design finish levels.

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

The approximate depth of fill placed (excluding topsoil), generally ranged in the order of 0.3m to about 1.5m, with deeper isolated areas of fill up to approximately 3m predominately within the Dairyman Drive and Caputar Way intersection and surrounding lots.

The approximate range of fill placed was in the order of:

- **0.30m to 1.20m** – October 2021– Works east of Dairyman Drive within Lots 1708 to 1710;
- **0.30m to 3.00m** – November 2023 to December 2023 – Works within the intersection of Dairyman Drive and Caputar Way;
- **0.30m to 1.20m** – November 2023 to December 2023 – Works North of Caputar Way within Lots 1701 and 1706 to 1713;
- **0.80m to 2.10m** – April 2024 – Works south of Caputar Way within Lots 1714 to 1728;
- **0.45m to 0.60m** – October 2024 – Removal and replacement works with lower reactivity material within Lots 1706, 1707, 1710, 1711, 1716, 1719 and 1722.

The fill was generally 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.

Level 1 as per AS3798-2007:

As the geotechnical testing authority engaged for the project, we state that the filling performed on 6 October 2021, between 8 November 2023 to 15 December 2023, 12 April 2024 to 18 April 2024 and 8 October 2024 to 24 October 2024, for the re-grade areas within Stage 17 (as shown on Figure AA1), 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 the understanding that any existing lot re-grade works are limited to the controlled earthworks supervised by Qualtest, placement of the fill material observed to depths of 0.4m or less within the test pits, and placement of low reactivity topsoil material such that total depth of topsoil and uncontrolled fill does not exceed 0.4m. Qualtest should be informed without delay if additional earthworks are known to have been carried out.

At the time of the field investigations, several fill stockpiles were still present on some of the Stage 17 lots. It is understood and expected that the fill stockpiles will be removed prior to development on the lots.

4.2 Surface Conditions

The site comprises of proposed Stage 17 of Hereford Hill subdivision, located off Caputar Way, Lochinvar, as shown on Figure AB1.

The site is bounded by existing Stage 14 to the north, proposed Stage 5 to the east, proposed Stage 18 and vacant grassland to the south, and vacant grassland to the west.

On the day of the field investigation, bulk earthworks had been completed with most interallotment drainage and sewer lines installed. Proposed pavements had been excavated to proposed subgrade level, but not been constructed. Some fill stockpiles existed within lot boundaries on the site.

The majority of the site was judged to be moderately drained by way of surface run off.

The site was judged to have good trafficability by way of 4WD vehicle on the day of the field investigation.

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.

Table 1 presents a summary of the typical soil / rock types encountered at the test pit locations during the field investigation, divided into representative geotechnical units.

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

No groundwater levels or inflows were encountered in the test pits during the limited time that they remained open on the days 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.

TABLE 1 – SUMMARY OF GEOTECHNICAL UNITS AND SOIL TYPES

Unit	Soil Type	Description
1A	FILL – TOPSOIL	CLAY - medium to high plasticity, pale brown to grey-brown, brown to dark grey-brown, with some fine to medium grained sand, root affected in places.
1B	FILL – UNCONTROLLED	Sandy GRAVEL - fine to medium grained, angular to sub-angular, pale grey and grey, fine to coarse grained sand, with some fines of low plasticity. CLAY - medium to high plasticity, pale brown to brown and grey-brown, trace fine to coarse grained sand.
1C	FILL – CONTROLLED	CLAY - medium to high plasticity, brown, dark brown, pale brown and grey-brown, dark grey-brown, with pale grey and pale orange, trace white and orange to red-brown, with some fine to coarse grained sand, trace fine to coarse grained angular to sub-rounded gravel. Trace cobbles in places. Sandy GRAVEL - fine to medium grained, angular to sub-angular, pale grey to grey and brown, fine to coarse grained sand, with some fines of low plasticity, (encountered in TP1714). Additional Site re-grade Lots 1706, 1707, 1710, 1711, 1716, 1719 & 1722. Typically comprised blends of Gravelly Sandy CLAY / Sandy Clayey GRAVEL, low to medium plasticity, fine to coarse grained sand, fine to coarse grained angular gravel, to depths of 0.45m to 0.60m.
2	TOPSOIL	CLAY – medium to high plasticity, dark grey to dark grey-brown, brown to grey-brown, with some fine to medium grained sand, root affected.
3	SLOPEWASH / COLLUVIUM	Not encountered in test locations during current investigation.
3	RESIDUAL SOIL	CLAY - medium to high plasticity, dark grey to dark grey-brown, dark brown, brown, pale brown, grey-brown, with some orange and pale orange to red-brown, grey, pale grey to white, trace fine to coarse grained sand, with some Clayey SAND pockets. Sandy CLAY – low to medium and medium to high plasticity, orange-brown, pale grey to white, pale yellow-brown, and brown to red-brown, fine to coarse grained sand, trace fine grained angular gravel. Clayey SAND / SAND – fine to medium grained, orange-brown and pale grey to white, fines of low plasticity.
4	EXTREMELY WEATHERED (XW) ROCK with soil properties	Andesite; breaks down into Clayey Gravelly SAND, Gravelly Sandy CLAY, Sandy CLAY – fine to coarse grained sand, clay fines of low to medium plasticity, pale grey to grey and brown to pale brown, fine to medium grained angular gravel, with some Highly Weathered Bands.
5	HIGHLY WEATHERED (HW) ROCK	ANDESITE – pale grey to grey, brown and pale brown, trace orange to red-brown, estimated very low to low and medium strength, with some extremely weathered pockets.

TABLE 2 – SUMMARY OF GEOTECHNICAL UNITS ENCOUNTERED AT TEST LOCATIONS

Location	Unit 1A	Unit 1B	Unit 1C	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6
	Fill - Topsoil	Fill - Uncontrolled	Fill - Controlled	Topsoil	Colluvium / Alluvium	Residual Soil	XW Rock	HW Rock
Depth in metres (m)								
Current Investigation								
TP1701	-	0.00 – 0.10	-	-	-	0.10 – 1.60	-	1.60 – 1.70^
TP1702	-	-	-	0.00 – 0.05	-	0.05 – 0.90	-	0.90 – 1.10^
TP1703	0.00 – 0.10	-	0.10 – 0.30	-	-	0.30 – 1.70	-	1.70 – 1.80^
TP1704	-	-	0.00 – 0.80	-	-	0.80 – 2.10	-	2.10 – 2.20^
TP1705	-	0.00 – 0.04	-	-	-	0.04 – 1.10	-	1.10 – 1.30^
TP1706	-	-	-	0.00 – 0.20	-	0.20 – 2.30	-	-
TP1707	-	0.00 – 0.30	0.30 – 1.00	-	-	1.00 – 2.30	-	-
TP1708	-	-	0.00 – 0.80	-	-	0.80 – 2.10	-	2.10 – 2.30
TP1709	-	-	0.00 – 1.00	-	-	1.00 – 1.70	1.70 – 2.00	2.00 – 2.30
TP1710	-	-	0.00 – 0.80	-	-	0.80 – 1.20	1.20 – 2.00	2.00 – 2.30
TP1711	-	-	0.00 – 1.60	-	-	1.60 – 2.30	-	-
TP1712	0.00 – 0.10	-	0.10 – 1.50	-	-	1.50 – 2.30	-	-
TP1713	0.00 – 0.10	-	0.10 – 1.40	-	-	1.40 – 2.30	-	-
TP1714	0.00 – 0.10	-	0.10 – 1.40	-	-	1.40 – 2.30	-	-

Location	Unit 1A Fill - Topsoil	Unit 1B Fill - Uncontrolled	Unit 1C Fill - Controlled	Unit 2 Topsoil	Unit 3 Colluvium / Alluvium	Unit 4 Residual Soil	Unit 5 XW Rock	Unit 6 HW Rock
	Depth in metres (m)							
TP1715	0.00 – 0.10	-	0.10 – 1.70	-	-	1.70 – 2.30	-	-
TP1716	0.00 – 0.10	-	-	-	-	0.10 – 1.35	-	1.35 – 1.40*
TP1717	0.00 – 0.10	-	-	-	-	0.10 – 1.15	1.15 – 1.50	1.50 – 1.55*
TP1718	0.00 – 0.05	-	0.05 – 0.20	-	-	0.20 – 1.40	1.40 – 1.58	1.58 – 1.60*
TP1719	-	-	0.00 – 1.80	-	-	1.80 – 2.50	-	-
TP1720	-	0.00 – 0.10	0.10 – 0.75	-	-	0.75 – 2.00	-	2.00 – 2.05^
TP1721	-	0.00 – 0.05	0.05 – 0.50	-	-	0.50 – 2.10	-	-
TP1722	-	-	0.00 – 1.00	-	-	1.00 – 2.30	-	-
TP1723	-	-	0.00 – 1.20	-	-	1.20 – 1.65	1.65 – 2.00^	-
TP1724	-	-	0.00 – 0.70	-	-	0.70 – 1.00	1.00 – 1.15	1.15 – 1.20*
TP1725	-	-	0.00 – 1.10	-	-	1.10 – 1.90	-	1.90 – 2.00
TP1726	-	-	0.00 – 0.80	-	-	0.80 – 1.40	-	1.40 – 1.50*
TP1727	-	-	0.00 – 1.30	-	-	1.30 – 1.70	-	1.70 – 1.75*
TP1728	-	-	0.00 – 1.50	-	-	1.50 -1.90	1.90 – 2.10^	-
TP1729	0.00 – 0.30	-	0.30 – 1.50	-	-	1.50 – 1.85	1.85 – 1.90	1.90 – 2.00*
TP1730	0.00 – 0.20	-	0.20 – 1.20	-	-	1.20 – 2.30	-	-

Location	Unit 1A Fill - Topsoil	Unit 1B Fill - Uncontrolled	Unit 1C Fill - Controlled	Unit 2 Topsoil	Unit 3 Colluvium / Alluvium	Unit 4 Residual Soil	Unit 5 XW Rock	Unit 6 HW Rock
	Depth in metres (m)							
TP1731	0.00 – 0.10	-	0.10 – 1.60	-	-	1.60 – 2.30	-	-
Previous Geotechnical Investigation (Ref. NEW17P-0054E-AB.Rev4, dated 16/10/2024)								
BHQ13	-	-	-	0.00 - 0.15	-	0.15 - 1.20	1.20 - 1.60*	-
BHQ15	-	-	-	0.00 - 0.10	-	0.10 - 2.10	-	-
BHQ16	-	-	-	0.00 - 0.15	-	0.15 - 2.00	-	-
BHQ17	-	-	-	0.00 - 0.10	-	0.10 - 2.00	-	-
BHQ18	-	-	-	0.00 - 0.15	-	0.15 - 1.20	1.20 - 2.00	-
BHQ19	-	-	-	0.00 - 0.15	-	0.15 - 1.80	1.80 - 2.00	-
BHQ20	-	-	-	0.00 - 0.10	-	0.10 - 1.30	1.30 - 1.50	1.50 - 1.90^
BHQ21	-	-	-	0.00 - 0.15	-	0.15 - 2.00	-	-
BHQ22	-	-	-	0.00 - 0.15	-	0.15 - 1.50	1.50 - 2.00^	-
BHQ23	-	-	-	0.00 - 0.10	-	0.10 - 2.00	-	-
Previous Geotechnical Investigation (Ref. NEW17P-0054B-AG, dated 10/07/2024)								
BH501	0.00 - 0.10	-	0.10 - 0.60	-	-	0.60 - 2.30	-	-
BH506	-	0.00 - 0.05	0.05 - 1.30	-	-	1.30 - 2.30	-	-
BH507	0.00 - 0.10	-	0.10 - 1.90	-	-	1.90 - 2.30		

Location	Unit 1A Fill - Topsoil	Unit 1B Fill - Uncontrolled	Unit 1C Fill - Controlled	Unit 2 Topsoil	Unit 3 Colluvium / Alluvium	Unit 4 Residual Soil	Unit 5 XW Rock	Unit 6 HW Rock
	Depth in metres (m)							
BH508	0.00 - 0.10	-	-	0.10 - 2.30	-	-	-	-
Previous Geotechnical Investigation (Ref. NEW17P-0054B-AB, dated 28/10/2020)								
TP309	-	-	-	0.00 - 0.15	-	0.15 - 1.10	1.10 - 1.40*	1.40*
TP515	-	-	-	0.00 - 0.30	-	0.30 - 1.40	1.40 - 1.80	1.80 - 2.00
TP516	-	-	-	0.00 - 0.20	-	0.20 - 1.35	-	1.35 - 1.40*
TP517	-	-	-	0.00 - 0.15	-	0.15 - 1.40	1.40 - 2.05	2.05 - 2.10
TP518	-	-	-	0.00 - 0.30	-	0.30 - 1.20	1.20 - 2.00	-
TP520	-	0.00 - 0.40	-	-	0.40 - 0.60	0.60 - 2.00	-	-
Previous Geotechnical Investigation (Ref: NEW17P-0054.AA.Rev1, dated: 23/08/2017)								
TP06	-	-	-	0.00 - 0.08	0.08 - 1.30	-	1.30 - 2.10 ^Λ	-
TP07	-	-	-	0.00 - 0.08	0.08 - 0.80	-	0.80 - 2.30	-
Note:	<p>Λ = Slow to very slow progress of 2.7 tonne excavator (previous investigations), 5.5 tonne excavator (17/08/2024 investigation), or 13 tonne excavator (20/08/2024 investigation).</p> <p>* = Refusal or Practical refusal of 2.7 tonne excavator (previous investigations), 5.5 tonne excavator (17/08/2024 investigation), or 13 tonne excavator (20/08/2024 investigation) met on Highly Weathered Rock.</p>							

5.0 Laboratory Testing

Samples collected during the various stages of field investigations were returned to our NATA accredited Newcastle Laboratory for testing which comprised of:

- (79 no.) Shrink / Swell tests; and,
- (4 no.) Atterberg Limits tests.

Results of the laboratory testing are presented in Appendix B, with a summary of the Shrink/Swell and Atterberg Limits test results presented in Tables 3 and 4, respectively.

TABLE 3 – SUMMARY OF SHRINK / SWELL TESTING RESULTS

Location	Depth (m)	Material Description	I _{ss} (%)
Current Investigations			
TP1701	0.30 - 0.50	(CH) CLAY	3.7
TP1701	1.00 - 1.15	(CH) CLAY	2.2
TP1702	0.30 - 0.44	(CH) CLAY	2.0
TP1703	0.30 - 0.50	(CH) CLAY	4.4
TP1703	1.00 - 1.20	(CH) CLAY	1.1
TP1704	0.30 - 0.50	FILL: (CH) CLAY	3.8
TP1704	0.90 - 1.10	(CH) CLAY	3.7
TP1705	0.30 - 0.50	(CH) CLAY	3.1
TP1706	0.30 - 0.45	(CH) CLAY	3.4
TP1706	0.90 - 1.10	(CH) CLAY	4.0
TP1707	0.30 - 0.50	FILL: (CH) CLAY	3.1
TP1707	1.00 - 1.20	(CH) CLAY	5.3
TP1708	0.30 - 0.48	FILL: (CH) CLAY	3.0
TP1708	0.90 - 1.10	(CH) CLAY	4.0
TP1709	0.50 - 0.70	FILL: (CH) CLAY	3.1
TP1709	1.10 - 1.28	(CH) CLAY	2.2
TP1710	0.50 - 0.65	FILL: (CH) CLAY	1.7
TP1710	0.90 - 1.20	(CH) CLAY	5.5
TP1711	0.50 - 0.70	FILL: (CH) CLAY	2.7
TP1711	1.00 - 1.15	FILL: (CH) CLAY	2.1
TP1712	0.40 - 0.60	FILL: (CH) CLAY	1.6

Location	Depth (m)	Material Description	I _{ss} (%)
TP1712	1.10 - 1.30	FILL: (CH) CLAY	2.4
TP1713	0.30 - 0.50	FILL: (CH) CLAY	2.3
TP1713	1.00 - 1.20	FILL: (CH) CLAY	-
TP1714	0.40 - 0.60	FILL: (CH) CLAY	3.3
TP1714	1.10 - 1.30	FILL: (CH) CLAY	4.1
TP1715	0.30 - 0.55	FILL: (CH) CLAY	4.1
TP1715	1.00 - 1.20	FILL: (CH) CLAY	3.4
TP1716	0.50 - 0.80	(CH) CLAY	1.2
TP1716	1.20 - 1.32	(CL) Sandy CLAY / Clayey SAND	0.9
TP1717	0.70 - 0.90	(CI) Sandy CLAY	1.0
TP1717	1.20 - 1.45	XW Andesite; (CL) Sandy CLAY	1.1
TP1718	0.60 - 0.85	(CH) CLAY	5.2
TP1718	1.45 - 1.60	XW Andesite; (CL) Sandy CLAY	-
TP1719	0.60 - 0.80	FILL: (CH) CLAY	2.9
TP1719	1.10 - 1.65	FILL: (CH) CLAY	3.4
TP1719	1.50 - 1.70	FILL: (CH) CLAY	2.8
TP1720	0.70 - 1.00	(CH) CLAY	4.5
TP1720	1.30 - 1.60	(CH) CLAY	1.5
TP1721	0.60 - 0.80	FILL: (CH) CLAY	3.0
TP1721	1.50 - 1.80	(CL) Sandy CLAY	-
TP1722	0.70 - 0.90	FILL: (CH) CLAY	4.2
TP1722	1.50 - 1.70	(CH) CLAY	4.8
TP1723	0.65 - 0.85	FILL: (CH) CLAY	3.8
TP1723	1.40 - 1.65	XW Andesite; (CL) Sandy CLAY	2.3
TP1724	0.70 - 0.95	(CH) CLAY	4.9
TP1725	0.20 - 0.45	FILL: (CH) CLAY	1.4
TP1725	1.40 - 1.70	(CL) Sandy CLAY	1.1
TP1726	0.20 - 0.50	FILL: (CH) Sandy CLAY	1.5
TP1726	0.90 - 1.10	(CH) CLAY	2.1
TP1727	0.80 - 1.10	FILL: (CH) CLAY	4.2

Location	Depth (m)	Material Description	I _{ss} (%)
TP1727	1.40 - 1.70	(CH) CLAY	0.9
TP1728	0.70 - 1.05	(CH) CLAY	3.8
TP1728	1.50 - 1.90	(CL) Sandy CLAY	4.1
TP1729	0.70 - 1.00	FILL: (CH) CLAY	3.2
TP1729	1.00 - 1.15	FILL: (CH) CLAY	1.5
TP1729	1.50 - 1.85	(CH) CLAY	4.2
TP1730	0.60 - 0.75	FILL: (CH) CLAY	2.5
TP1730	1.00 - 1.15	FILL: (CH) CLAY	3.4
TP1730	1.50 - 1.90	(CH) Sandy CLAY	2.7
TP1731	0.70 - 1.00	FILL: (CH) CLAY	3.7
TP1731	1.60 - 1.80	(CH) CLAY	3.8
Current Investigation (Stockpile samples; remoulded in laboratory at ~OMC)			
SP1A	-	Stockpiled FILL: (CI) Sandy CLAY	0.7
SP1B	-	Stockpiled FILL: (CH) Sandy CLAY	1.7
SP1C	-	Stockpiled FILL: (CH) CLAY	3.9
SP1D	-	Stockpiled FILL: (CH) CLAY	2.5
SP2A	-	Stockpiled FILL: (CH) Sandy CLAY	2.3
SP2B	-	Stockpiled FILL: (CI) CLAY	1.7
SL1A	-	Stockpiled FILL: (CH) Sandy CLAY	2.3
SL1B	-	Stockpiled FILL: (CH) CLAY	4.7
SL1C	-	Stockpiled FILL: (CH) CLAY	2.6
DBT1A	0.00 – 0.20	Detention Basin FILL: (CI) Sandy CLAY	1.8
Additional Testing – Following Additional Site Regrade on Selected Lots			
Lot 1706	0.10 – 0.40	(CL) Gravelly Sandy CLAY	0.4
Lot 1707	0.10 – 0.40	(CL) Gravelly Sandy CLAY	0.2
Lot 1710	0.10 – 0.30	(CL) Gravelly Sandy CLAY	0.4
Lot 1711	0.10 – 0.30	(CL) Gravelly Sandy CLAY	0.5
Lot 1716	0.15 – 0.30	(CL) Gravelly CLAY	0.6
Lot 1719	0.20 – 0.40	(CL) Gravelly Sandy CLAY	0.7
Lot 1722	0.10 – 0.60	(CL) Gravelly Sandy CLAY	0.8

Location	Depth (m)	Material Description	I _{ss} (%)
Previous Geotechnical Investigation (Ref. NEW17P-0054E-AB.Rev3, dated 17/07/2024)			
BHQ15	0.30 – 0.50	(CH) Sandy CLAY	3.8
BHQ18	0.30 – 0.50	(CH) CLAY	3.7
BHQ21	0.70 – 0.85	(CH) CLAY	3.4
BHQ23	0.40 – 0.60	(CH) CLAY	2.3
Previous Investigation (Ref. NEW17P-0054D-AB, dated 12/07/2021)			
BHQ13	0.50 – 0.70	(CH) CLAY	4.0
Previous Geotechnical Investigation (Ref. NEW17P-0054B-AB, dated 28/10/2020)			
TP309	0.45 – 0.60	(CH) CLAY	3.2
TP515	0.90 – 1.05	(CI) Gravelly Sandy CLAY	1.8
TP516	0.30 – 0.65	(CH) CLAY	4.8
TP517	1.00 – 1.20	(CI) Sandy CLAY	1.1
Previous Geotechnical Investigation (Ref: NEW17P-0054.AA.Rev1, dated: 23/08/2017)			
TP06	0.50 – 0.70	(CH) Sandy CLAY	6.1
TP07	0.50 – 0.75	(CH) Sandy CLAY	4.7

TABLE 4 – SUMMARY OF ATTERBERG LIMITS TESTING RESULTS

Location	Depth (m)	Material Description	Liquid Limit (%)	Plasticity Index (%)	Linear Shrinkage (%)
Current Investigations					
TP1703	0.00 - 0.10	TOPSOIL: (CH) CLAY	65	40	19.0
TP1714	0.00 - 0.10	FILL-TOPSOIL: (CH) CLAY	68	43	19.0
Current Investigation (Stockpile samples; remoulded in laboratory at ~OMC)					
SL2A	-	(CI) CLAY	34	8	4.0
DBT1A	0.20 - 0.40	(CI) CLAY	19	3	2.5

The results of laboratory Shrink / Swell and Atterberg Limits tests indicate that the residual clays at the site are generally highly to extremely reactive.

6.0 Site Classification to AS2870-2011

Based on the results of the site regrade works, field work and laboratory testing, residential lots located within proposed Stage 17 of Hereford Hill residential subdivision located off Caputar Way, Lochinvar, are classified in their current condition, in accordance with AS2870-2011 'Residential Slabs and Footings' as shown in Table 6.

TABLE 6 – SITE CLASSIFICATION TO AS2870-2011

	Lot Numbers	Site Classification
Stage 17	1701 to 1707, 1710, 1711, 1716 to 1719, and 1722 to 1725.	H2
	1708, 1709, 1712 to 1715, 1720, 1721, and 1726 to 1728.	E

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

A characteristic free surface movement of 75mm to 105mm is estimated for lots classified as **Class 'E'** 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.

With engineering input and specific measures utilising approved imported fill or site won fill, it may be possible to achieve a site classification of Class 'H2' on filled lots currently classified as Class 'E' , if suitable fill is placed to an approved depth across the full building envelope/lot. Measures may include placing an upper layer/layers of imported or site won controlled fill of low reactivity and/or providing a sufficiently thick (about 0.3m depth) layer of imported topsoil layer of very low to non-reactive soil.

If measures targeting site classification of Class 'H2' are proposed, then further engineering advice should be sought. Due to anticipated variability in reactivity of site won materials, it is recommended that Shrink/Swell testing of lower layers of controlled fill and the natural soil profile is undertaken during construction so that the suitability and required thickness of the proposed overlying lower reactivity fill can be reassessed.

Final site classification will be dependent on a number of factors, including depth of topsoil, depth of cut / fill, reactivity of the natural soil and any fill material placed, depth to rock, and the level of supervision carried out. Re-classification of lots should be confirmed by the geotechnical authority at the time of construction following any site re-grade works. If measures targeting site classification of Class 'H2' are proposed, then it is recommended that post construction testing is carried out on each lot prior to final classification of lots.

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

This report comprises the results of an investigation carried out for a specific purpose and client as defined in the document. The report should not be used by other parties or for purposes or projects other than those assumed and stated within the report, as it may not contain adequate or appropriate information for applications other than those assumed or advised at the time of its preparation. The contents of the report are for the sole use of the client and no responsibility or liability will be accepted to any third party. The report should not be reproduced either in part or in full, without the express permission of Qualtest.

Geotechnical site investigation is based on data collection, judgment, experience, and opinion. By its nature, it is less exact than other engineering disciplines. 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. Under no circumstances, however, can it be considered that these findings represent the actual state of the site at all points.

The recommended depth and properties of any soil, rock, groundwater, or other material referred to in this report is an engineering estimate based on the information available at the time of its writing. The estimate is influenced and limited by the fieldwork method and testing carried out in the site investigation, and other relevant information as has been made available.

In cases where information has been provided to Qualtest for the purposes of preparing this report, it has been assumed that the information is accurate and appropriate for such use. No responsibility is accepted by Qualtest for inaccuracies within any data supplied by others.

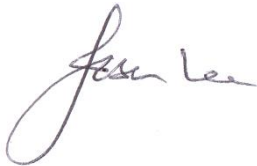
The extent of testing associated with this assessment is limited to discrete test locations. It should be noted that subsurface conditions between and away from the test locations may be different to those observed during the field work and used as the basis of the recommendations contained in this report.

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

This report alone should not be used by contractors as the basis for preparation of tender documents or project estimates. Contractors using this report as a basis for preparation of tender documents should avail themselves of all relevant background information regarding the site before deciding on selection of construction materials and equipment.

If you have any further questions regarding this report, please do not hesitate to contact Ben Bunting, 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'.

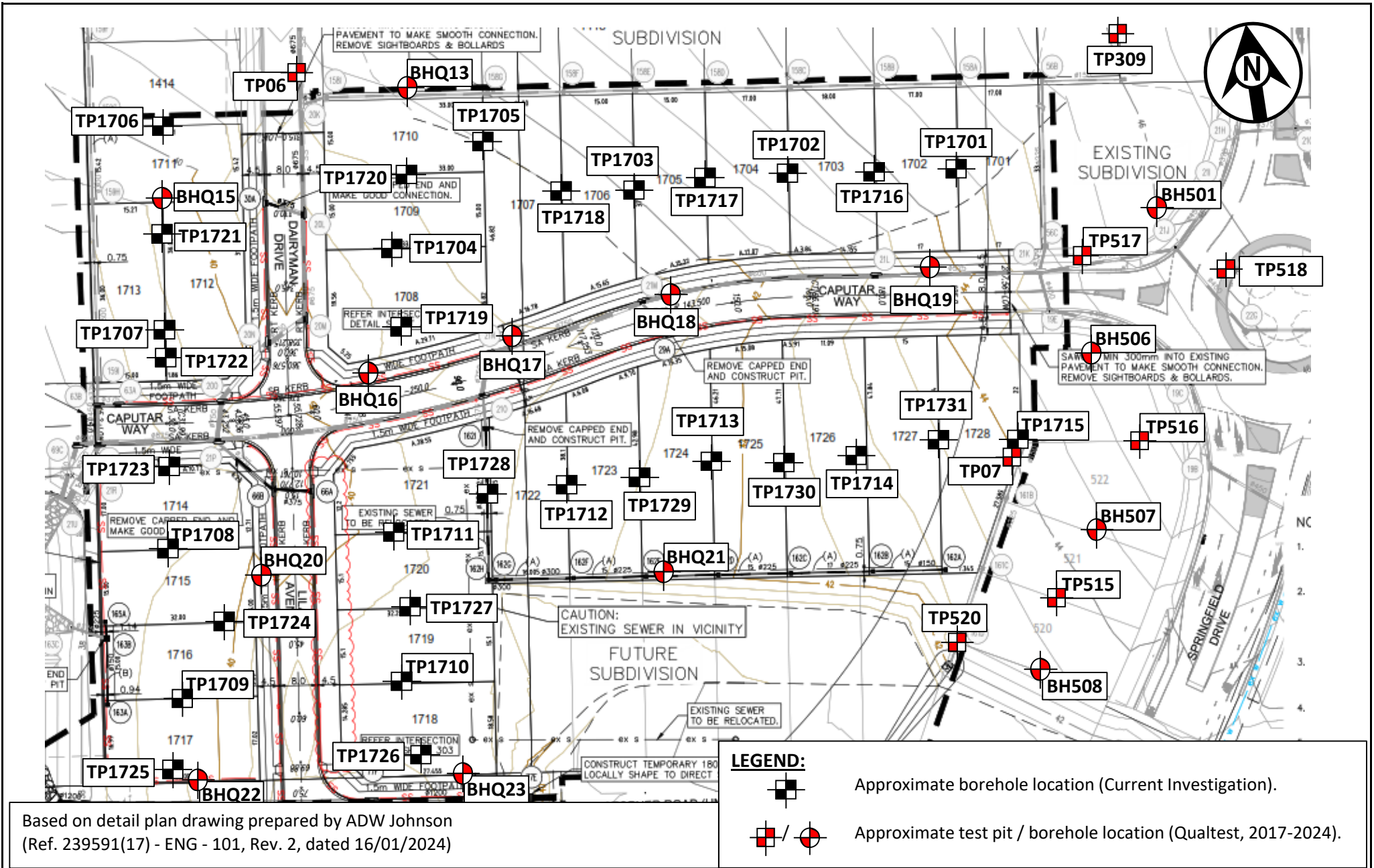
Jason Lee
Principal Geotechnical Engineer

Figure AB1

Site Plan and Approximate Test Locations

Figure AA1

**Approximate Extent of Site Re-grade Filling
Works**



Based on detail plan drawing prepared by ADW Johnson
 (Ref. 239591(17) - ENG - 101, Rev. 2, dated 16/01/2024)



Client:	KCE PTY LTD	Drawing No:	FIGURE AB1
Project:	PROPOSED RESIDENTIAL SUBDIVISION	Project No:	NEW20P-0146D
Location:	HEREFORD HILL - STAGE 17	Scale:	NOT TO SCALE
Title:	SITE PLAN AND APPROXIMATE TEST LOCATIONS	Date:	29/11/2024

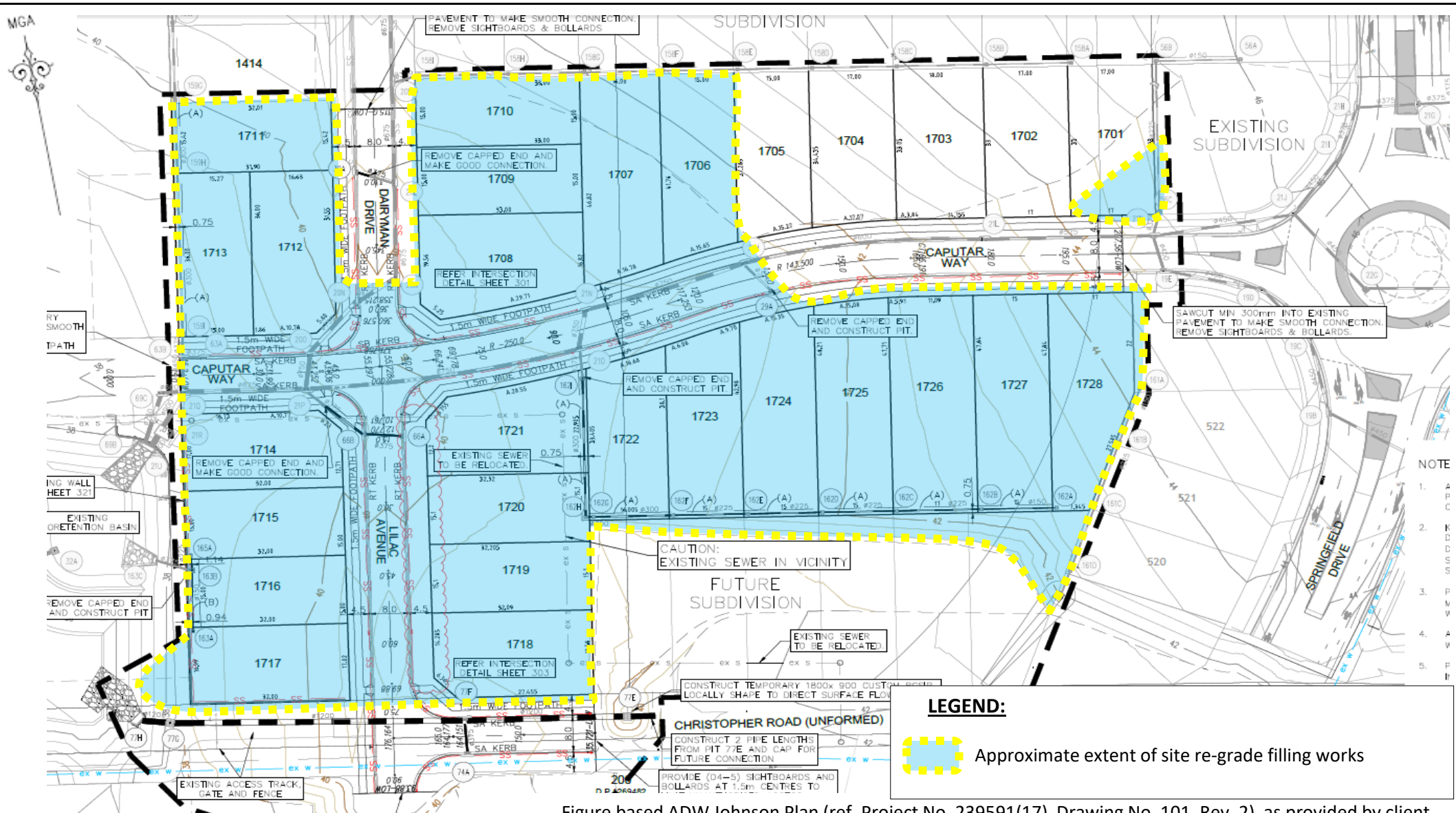


Figure based ADW Johnson Plan (ref. Project No. 239591(17), Drawing No. 101, Rev. 2), as provided by client.



Client:	KCE PTY LTD	Drawing No:	FIGURE AA1
Project:	HEREFORD HILL STAGE 17 (KCE NO. 21071)	Project No:	NEW20P-0146D
Location:	855 NEW ENGLAND HWY, LOCHINVAR, NSW	Scale:	NOT TO SCALE
Title:	APPROXIMATE EXTENT OF SITE RE-GRADE FILLING WORKS	Date:	3 DECEMBER 2024

APPENDIX A:

Results of Field Investigations



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1701**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m SURFACE RL: DATUM:

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					GP	FILL: Sandy GRAVEL - fine to medium grained angular, pale grey to grey, fine to coarse grained sand, with fines of low plasticity.	M				FILL	
		U50		0.30m			CLAY - medium to high plasticity, dark grey to dark grey-brown, trace fine grained sand.			HP	340	RESIDUAL SOIL	
		U50		0.50m	0.5					HP	300		
		U50		1.00m	1.0			Brown, with pale brown, with Clayey SAND pockets.	M > Wp	VSt	HP	280	
		U50		1.15m	1.5		CH				HP	300	
							ANDESITE - pale grey to grey, with pale brown, trace orange to red-brown, estimated low to medium strength, trace extremely weathered pockets.	D				HIGHLY WEATHERED ROCK	
							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		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 - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1702**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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	0.30m		0.5		CH	0.05m TOPSOIL: CLAY - medium to high plasticity, dark grey to dark grey-brown, with fine to medium grained sand.	M > W _p	VSt	HP	300	TOPSOIL	
		U50 0.44m											RESIDUAL SOIL
				1.0			0.90m ANDESITE - pale grey to grey, with pale brown, trace orange to red-brown, estimated low to medium strength, trace extremely weathered pockets.	D		HP	380	HIGHLY WEATHERED ROCK	
				1.10m			Hole Terminated at 1.10 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 - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1703**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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	0.30m	[Cross-hatched pattern]	CH	FILL: CLAY - medium to high plasticity, pale brown to grey-brown, with fine to medium grained sand.	M > W _p	VSt	HP	280	FILL-TOPSOIL
				0.50m	[Cross-hatched pattern]	CH	FILL: CLAY - medium to high plasticity, brown to dark brown, with pale brown, with fine to coarse grained sand, trace fine to medium grained angular gravel, trace rubber mat pieces.				280	CONTROLLED FILL
				0.50m	[Diagonal lines pattern]	CH	CLAY - medium to high plasticity, brown to dark brown, trace fine to medium grained sand.				300	RESIDUAL SOIL
				1.00m	[Diagonal lines pattern]	CH	Trace tree roots.				280	
				1.20m	[Diagonal lines pattern]	CH						
				1.30m	[Dotted pattern]	SC	Clayey SAND / SAND - fine to medium grained, orange-brown and pale grey to white, fines of low plasticity.					
				1.50m	[Dotted pattern]	SC		M	D			
				1.70m	[Cross-hatched pattern]		ANDESITE - pale grey to grey, with pale brown, trace orange to red-brown, estimated low to medium strength, trace extremely weathered pockets.	D				HIGHLY WEATHERED ROCK
				1.80m	[Cross-hatched pattern]		Hole Terminated at 1.80 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	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 - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1704**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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	0.30m	0.5		CH	FILL: CLAY - medium to high plasticity, pale brown to grey-brown, trace fine to coarse grained sand, trace fine grained angular gravel.	M > W _p	St	HP	150	CONTROLLED FILL
		U50	0.50m							HP	150	
E	Not Encountered	U50	0.90m	1.0		CH	CLAY - medium to high plasticity, dark grey to dark grey-brown.	M < W _p	H	HP	>600	RESIDUAL SOIL
		U50	1.10m				Brown to grey-brown.			HP	>600	
							With pale brown, with Clayey SAND pockets.			HP	280	
										HP	210	
				1.5						HP	220	
				2.0								
							ANDESITE - pale grey to grey, with pale brown, trace orange to red-brown, estimated low to medium strength, trace extremely weathered pockets.					HIGHLY WEATHERED ROCK
							Hole Terminated at 2.20 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%

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ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1705**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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		0.30m		GP	0.04m FILL: Sandy GRAVEL - fine to medium grained angular, pale grey and grey, fine to coarse grained sand, trace fines of low plasticity. CLAY - medium to high plasticity, dark brown.	M	VSt	HP	230	FILL RESIDUAL SOIL
				0.50m		CH				HP	250	
										HP	280	
										HP	330	
				1.10m			ANDESITE - pale grey to grey, with pale brown, trace orange to red-brown, estimated low to medium strength, trace extremely weathered pockets.	D				HIGHLY WEATHERED ROCK
				1.30m			Hole Terminated at 1.30 m Slow progress					
				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 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%	

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT 00-TEMPLATE LOGS SHEET.GPJ <<DrawingFile>> 06/01/2025 14:17 10.03.00.09 Datgel Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1706**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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	0.30m		0.30		CH	TOPSOIL: CLAY - medium to high plasticity, grey-brown, with fine to medium grained sand.	M > W _p	St	HP	100	TOPSOIL		
		U50 0.45m		0.45		CH	CLAY - medium to high plasticity, pale brown, with some pale orange and red-brown, with some fine grained sand.					HP	110	RESIDUAL SOIL
		0.90m		0.90		CH						HP	120	
		U50 1.10m		1.10		SC	Clayey SAND / SAND - fine to medium grained, orange-brown and pale grey to white, fines of low plasticity.					M	D	
				2.30			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

- 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.00-TEMPLATE LOGS SHEET.GPJ <<DrawingFile>> 06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1707**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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	0.30m	0.30m	[Cross-hatched pattern]	CH	FILL: CLAY - medium to high plasticity, pale brown to brown and grey-brown, trace fine to coarse grained sand.	M > W _p	St - VSt	HP	200	FILL - UNCONTROLLED
		U50	0.50m	0.50m		CH	FILL: CLAY - medium to high plasticity, pale brown, with pale grey and pale orange, trace fine to coarse grained sand, trace fine to medium grained angular gravel.			St	HP	150
E	Not Encountered	U50	1.00m	1.00m	[Diagonal hatching]	CH	CLAY - medium to high plasticity, dark brown.	M < W _p	VSt	HP	250	RESIDUAL SOIL
		U50	1.20m	1.50m		CH	With pale brown, with Clayey SAND pockets.			HP	280	
				2.30m			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

- 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 00-TEMPLATE LOGS SHEET.GPJ <-DrawingFile> 06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1708**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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		0.30m	[Cross-hatched pattern]	CH	FILL: CLAY - medium to high plasticity, pale brown, with grey-brown.	M > w _p	St	HP	180	CONTROLLED FILL		
		U50		0.48m			0.5			Dark brown and grey-brown.	HP		180	
										Pale brown, with grey-brown, trace pale grey and white.	HP		140	
				0.90m			0.80m			CLAY - medium to high plasticity, dark brown.	HP		250	RESIDUAL SOIL
		U50		1.10m			1.0			With pale brown, with Clayey SAND pockets.	HP		220	
							1.5			With grey and red-brown.	HP		380	
				2.0	With extremely weathered rock pockets.									
				2.10m	[Dotted pattern]		ANDESITE - pale grey to grey, with pale brown, trace orange to red-brown, estimated very low to low strength, trace extremely weathered pockets.	D - M				HIGHLY WEATHERED ROCK		
				2.30m	[Dotted pattern]		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
 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: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1709**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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	[Cross-hatched pattern]	CH	FILL: CLAY - medium to high plasticity, dark brown to dark grey-brown.	M > Wp	VSt	HP	230	CONTROLLED FILL	
		U50	0.70m	0.7						HP	280		
		U50	1.00m	1.0	[Diagonal hatched pattern]	CH	CLAY - medium to high plasticity, dark brown, trace fine to coarse grained sand. With pale brown, with Clayey SAND pockets.	D - VD	D - M	HP	350		RESIDUAL SOIL
		U50	1.28m	1.5						HP	350		
				1.70m						HP	280		
			2.0	[Dotted pattern]	SC	Extremely weathered Andesite with soil properties: breaks down into Gravelly Clayey SAND - fine to coarse grained, pale grey to grey and pale brown, fines of low plasticity, fine grained angular gravel.					EXTREMELY WEATHERED ROCK		
				2.30m	[Cross-hatched pattern]		ANDESITE - pale grey to grey, with pale brown, trace orange to red-brown, estimated very low to low strength, trace extremely weathered pockets.					HIGHLY WEATHERED ROCK	
							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

- 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%

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ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1710**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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	[Cross-hatched pattern]	CH	FILL: CLAY - medium to high plasticity, brown to grey-brown, trace fine to coarse grained sand.	M > w _p	VSt	HP	200	CONTROLLED FILL	
		U50 0.65m								HP	230		
				0.90m			0.80m	CLAY - medium to high plasticity, dark brown, trace fine to coarse grained sand.	H	HP	250		RESIDUAL SOIL
		U50 1.20m		1.0	CH	HP	280						
						1.5	[Dotted pattern]	SC	Extremely weathered Andesite with soil properties: breaks down into Gravelly Clayey SAND - fine to coarse grained, pale grey to grey and pale brown, fines of low plasticity, fine grained angular gravel.	M < w _p	D - VD		
				2.0									
							ANDESITE - pale grey to grey, with pale brown, trace orange to red-brown, estimated very low to low strength, trace extremely weathered pockets.		D - M			HIGHLY WEATHERED ROCK	
							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	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%



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1711**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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	 CH	FILL: CLAY - medium to high plasticity, dark brown, with dark grey-brown and pale brown, trace white.	M > W _p			HP	180	CONTROLLED FILL
		U50								HP	150	
		0.70m								HP	150	
		1.00m								HP	180	
		U50								HP	190	
		1.15m								HP	200	
										HP	250	
										HP	250	
										HP	250	
										HP	250	
				1.60m	 CH	CLAY - medium to high plasticity, dark brown, with dark grey-brown.			VSt		RESIDUAL SOIL	
			HP	250								
				2.0								
				2.30m								
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
 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 <25
 S Soft 25 - 50
 F Firm 50 - 100
 St Stiff 100 - 200
 VSt Very Stiff 200 - 400
 H Hard >400
 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%

OT.LIB.1.1.GLB.Log.NON-CORED.BOREHOLE - TEST.PIT.00-TEMPLATE.LOGS.SHEET.GPJ <-DrawingFile> 06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1712**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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		0.5	[Cross-hatched pattern]	CH	FILL-TOPSOIL: CLAY - medium to high plasticity, brown to dark grey-brown, with fine grained sand, root affected.	M > w _p	F - St	HP	80 - 150	FILL-TOPSOIL
		U50										
		0.60m				CH	FILL: CLAY - medium to high plasticity, brown to dark grey-brown, trace orange to red-brown, trace fine to coarse grained sand.			HP	100	
										HP	150	
		1.10m								HP	150	
		U50								St		
		1.30m								HP	180	
										HP	250 - 320	
										HP	280 - 320	
				1.5			CLAY - medium to high plasticity, brown to dark grey-brown, trace orange to red-brown, trace fine to coarse grained sand.			VSt		RESIDUAL SOIL
							With dark brown.			HP	280 - 350	
				2.0						HP	220	
				2.30m			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 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 00-TEMPLATE LOGS SHEET.GPJ <<DrawingFile>> 06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: KCE
PROJECT: HERFORD HILL - STAGE 17
LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: TP1713
PAGE: 1 OF 1
JOB NO: NEW20P-0146D
LOGGED BY: BE
DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m **WIDTH:** 0.6 m
SURFACE RL:
DATUM:

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			0.30m		CH	FILL-TOPSOIL: CLAY - medium to high plasticity, brown to dark grey-brown, with fine grained sand, root affected.	M > W _p			HP	150	FILL-TOPSOIL
		U50	0.50m	CH		FILL: CLAY - medium to high plasticity, dark brown to dark grey-brown, with some pale brown.	HP					150	CONTROLLED FILL
			1.00m	CH		Pale brown, with fine grained sand,	St					HP	150
		U50	1.20m	CH		With Sandy CLAY pockets.	HP					180	
			1.40m	CH		CLAY - medium to high plasticity, dark brown, with dark grey-brown, with pale brown, with Clayey SAND pockets.	HP					200	RESIDUAL SOIL
			2.00m	CH		HP	250						
				2.30m			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	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: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1714**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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		CH	FILL-TOPSOIL: CLAY - medium to high plasticity, brown to dark grey-brown, with fine grained sand, root affected.	M > W _p	St	HP	180	FILL-TOPSOIL CONTROLLED FILL RESIDUAL SOIL
				0.60m		CH	FILL: CLAY - medium to high plasticity, brown to dark grey-brown, trace orange to red-brown, trace fine to coarse grained sand.				150	
				0.80m		CH	FILL: CLAY - medium to high plasticity, brown to dark grey-brown, trace orange to red-brown, trace fine to coarse grained sand.				140	
				1.10m		GP	FILL: Sandy GRAVEL - fine to medium grained angular to sub-angular, grey and brown, fine to coarse grained sand, with fines of low plasticity.	M	D			
				1.30m		CH	FILL: CLAY - medium to high plasticity, brown to dark grey-brown, trace orange to red-brown, trace fine to coarse grained sand.	M > W _p	HP	220 - 380		
				1.40m		CH	CLAY - medium to high plasticity, brown to dark grey-brown, trace orange to red-brown and pale grey, trace fine to coarse grained sand.			VSt	HP	
2.00m	CH		M ~ W _p	HP	350 - 420							
2.30m	CH				HP	380 - 420						
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 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 00-TEMPLATE LOGS SHEET.GPJ <-DrawingFile> 06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1715**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BE
 DATE: 19/7/24

EQUIPMENT TYPE: 5.5 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.6 m DATUM:

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					CH	FILL-TOPSOIL: CLAY - medium to high plasticity, brown to dark grey-brown, with fine grained sand, root affected.	M > W _p	St	HP	150	FILL-TOPSOIL	
		0.30m	U50			0.10m	FILL: CLAY - medium to high plasticity, brown to dark grey-brown, trace orange to red-brown, trace fine to coarse grained sand.				150	CONTROLLED FILL	
		0.55m					Trace pale grey.				180		
		1.00m									170		
		1.20m									180		
											190		
				1.5									
				1.70m		CH	Trace fine to coarse grained angular gravel.			HP	150		
				2.0		CH	CLAY - medium to high plasticity, brown to dark grey-brown, trace orange to red-brown and pale grey, trace fine to coarse grained sand.			HP	180	RESIDUAL SOIL / POSSIBLE CONTROLLED FILL	
				2.30m			Hole Terminated at 2.30 m			HP	150		
										HP	180		

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.00-TEMPLATE.LOGS.SHEET.GPJ <<DrawingFile>> 06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: KCE
PROJECT: HEREFORD HILL - STAGE 17
LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1716**
PAGE: 1 OF 1
JOB NO: NEW20P-0146D
LOGGED BY: BB
DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR
TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m

SURFACE RL:
DATUM:

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		CH	FILL-TOPSOIL: CLAY - medium to high plasticity, pale brown to grey-brown, with some fine to medium grained sand.	M ~ w _p				FILL - TOPSOIL				
						CH	CLAY - medium to high plasticity, dark grey to dark grey-brown / brown, trace fine grained sand.	M > w _p	VSt	HP	350	RESIDUAL SOIL				
										HP	340					
										HP	320					
						U50	0.80m	1.0		CL	Sandy CLAY - low to medium plasticity, orange-brown and pale grey to white, fine to medium grained sand.	M < w _p	H	HP	>600	
											Grading into Extremely Weathered rock.					
		U50	1.20m	1.5		ANDESITE - pale grey to grey with pale brown, trace orange to red-brown, estimated low to medium strength, trace Extremely Weathered bands.	D				HIGHLY WEATHERED ROCK					
		1.32m				Hole Terminated at 1.40 m Practical Refusal										
				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

- 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 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: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1717**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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	0.00	[Cross-hatched pattern]	CH	FILL-TOPSOIL: CLAY - medium to high plasticity, pale brown to grey-brown, with some fine to medium grained sand.	M < W _p	VS _t	HP	350	FILL - TOPSOIL
				0.10		CH	CLAY - medium to high plasticity, dark grey to dark grey-brown / brown, trace fine grained sand.	M > W _p				RESIDUAL SOIL
				0.50	[Diagonal hatched pattern]	CI	Sandy CLAY - medium plasticity, grey-brown, fine to coarse grained sand.	M < W _p	H	HP	>600	EXTREMELY WEATHERED ROCK
				0.70		CL	Sandy CLAY - low to medium plasticity, orange-brown and pale grey to white, fine to medium grained sand.	M	H / Fb	HP	>600	
				1.20		CL	Extremely Weathered Andesite with soil properties; breaks down into Sandy CLAY - low to medium plasticity, pale grey to grey and pale brown, fine to medium grained sand.	M < W _p	D	HP	>600	
				1.45			ANDESITE - pale grey to grey with pale brown, trace orange to red-brown, estimated low to medium strength, trace Extremely Weathered bands.	D			HP	
1.50	1.55	ANDESITE - pale grey to grey with pale brown, trace orange to red-brown, estimated low to medium strength, trace Extremely Weathered bands.	D	HP	>600							
1.55	1.55	Hole Terminated at 1.55 m Practical Refusal			D	HP	>600					
2.00	2.00		D	HP			>600					

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 00-TEMPLATE LOGS SHEET.GPJ <<DrawingFile>> 06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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	0.05m	[Cross-hatched pattern]	CH	FILL-TOPSOIL: CLAY - medium to high plasticity, pale brown to grey-brown, with some fine to medium grained sand.	M ~ Wp		HP	330	FILL - TOPSOIL
				0.20m		CH	FILL: CLAY - medium to high plasticity, dark brown to brown trace fine to medium grained sand.					FILL - CONTROLLED
				0.85m	[Diagonal lines pattern]	CH	CLAY - medium to high plasticity, dark grey to dark grey-brown / brown, trace fine grained sand.	M > Wp	VSt	HP	350	RESIDUAL SOIL
							0.80m					
				1.45m	[Dotted pattern]	CH	Sandy CLAY - medium to high plasticity, orange-brown and pale grey to white, fine to medium grained sand.	M < Wp	H / Fb	HP	>600	
1.60m	CL	Extremely Weathered Andesite with soil properties; breaks down into Gravelly Sandy CLAY - low plasticity, pale grey to grey and pale brown, fine to coarse grained sand, fine grained angular gravel.	EXTREMELY WEATHERED ROCK									
				1.58m			ANDESITE - pale grey to grey with pale brown, trace orange to red-brown, estimated low to medium strength, trace Extremely Weathered bands.					HIGHLY WEATHERED ROCK
				1.60m			Hole Terminated at 1.60 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 <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: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1719**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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		CH	FILL: CLAY - medium to high plasticity, pale brown to brown, with some fine to coarse grained sand, trace fine to medium grained angular gravel.	M > w _p	VSt	HP	310	FILL - CONTROLLED
		U50	0.80m	HP			250					
			1.10m									
		U50	1.35m	HP			280					
			1.50m									
		U50	1.70m	HP			200					
				1.80m			Sandy CLAY - medium to high plasticity, dark grey, fine to medium grained (mostly fine grained) sand.			HP	380	
		2.10m	CLAY - medium to high plasticity, dark grey to dark grey-brown / brown, trace fine grained sand.	HP	480							
		2.30m	CLAY - high plasticity, red-brown to brown.	HP	500							
			2.50m									

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 Hole Terminated at 2.50 m
 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: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1720**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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	1.00m	1.00	CH	FILL: Sandy GRAVEL - fine to medium grained, angular to sub-angular, pale grey to grey, fine to coarse grained sand, with some fines of low plasticity. FILL: CLAY - medium to high plasticity, dark brown to dark grey-brown, fine to medium grained sand.	M < w _p	VS	HP	300	FILL	
												FILL - CONTROLLED	
												RESIDUAL SOIL	
												U50	1.30m
U50	1.60m	2.00m	1.60	CL	Sandy CLAY - low to medium plasticity, pale orange-brown to pale yellow-brown, fine to medium grained sand, pockets of relict rock.	M ~ w _p	VS	HP	350				
				2.00		CL	Sandy CLAY - low to medium plasticity, pale orange-brown to pale yellow-brown, fine to medium grained sand, pockets of relict rock.			HP	380		
				2.05			ANDESITE - pale grey to grey with pale brown, trace orange to red-brown, estimated low to medium strength, trace Extremely Weathered bands. Hole Terminated at 2.05 m Very slow progress	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
 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 00-TEMPLATE LOGS SHEET.GPJ <<DrawingFile>>_06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1721**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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	0.05m	GP	0.05m	FILL: Sandy GRAVEL - fine to medium grained, angular to sub-angular, pale grey to grey, fine to coarse grained sand, with some fines of low plasticity.	D				FILL
				0.50m	CH	0.50m	FILL: CLAY - medium to high plasticity, dark brown to brown, trace fine to medium grained sand.	M > W _p	VSt	HP	300	FILL - CONTROLLED
				0.80m	CH	0.80m	CLAY - medium to high plasticity, dark grey to dark grey-brown / brown, trace fine grained sand.	M > W _p	VSt	HP	280	RESIDUAL SOIL
				1.50m	CH	1.50m	Sandy CLAY - medium to high plasticity, dark grey to dark grey-brown / brown, trace fine grained sand.	M < W _p	H / Fb	HP	350	
				1.80m	CL	1.80m	Sandy CLAY - low to medium plasticity, orange-brown and pale grey to white, fine to medium grained sand.	M < W _p	H / Fb	HP	360	
				2.10m	CH	2.10m	Sandy CLAY - medium to high plasticity, pale grey-brown to pale yellow-brown, trace red-brown, fine to coarse grained sand, trace fine grained angular gravel.	M > W _p	VSt	HP	350	
				2.10m			Hole Terminated at 2.10 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 00-TEMPLATE LOGS SHEET.GPJ <<DrawingFile>>_06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1722**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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				0.5	CH	FILL: CLAY - medium to high plasticity, pale brown to brown and grey-brown, trace fine to coarse grained sand.	M > W _p	VSt	HP	310	FILL - CONTROLLED
					0.60m	CH	FILL: CLAY - medium to high plasticity, dark brown to dark grey-brown, trace fine to medium grained sand.			HP	350	
		0.70m			0.90m	U50				HP	340	
		1.50m			1.70m	U50				HP	250	
		2.0			2.30m					HP	300	
							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

- 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 00-TEMPLATE LOGS SHEET.GPJ <<DrawingFile>>_06/01/2025 14:18 10.03.00.09 Datgel Lab and In Situ Tool



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1723**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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						FILL: CLAY - medium to high plasticity, dark brown to brown, trace fine to medium grained sand.	M ~ W _p	VSt	HP	330	FILL - CONTROLLED
		0.65m		0.5	CH	Dark grey.						
		U50					Dark brown.	M > W _p	HP	350		
		0.85m		1.0								
		1.40m		1.20m	CL	Sandy CLAY - low to medium plasticity, orange-brown and pale grey to white, fine to medium grained sand.	M ~ W _p	H / Fb	HP	>600	RESIDUAL SOIL	
	U50	1.65m	1.5	CL	Extremely Weathered Andesite with soil properties; breaks down into Gravelly Sandy CLAY / Gravelly Clayey SAND - low plasticity, pale grey to grey and pale brown, fine to coarse grained sand, fine grained angular gravel.	M < W _p						
			2.00m	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	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: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1724**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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		CH	FILL: CLAY - medium to high plasticity, dark brown to dark grey-brown, trace fine to medium grained sand.	M > W _p	VSt	HP	350	FILL - CONTROLLED	
				0.95m		U50						CH	CLAY - medium to high plasticity, dark brown, trace fine grained sand.
					1.00m			SC	Extremely Weathered Andesite with soil properties; breaks down into Gravelly Clayey SAND - fine to coarse grained, pale grey to grey and pale brown, fines of low plasticity, fine grained angular gravel.	D	VD		
					1.20m				ANDESITE - pale grey to grey with pale brown, trace orange to red-brown, estimated low to medium strength, trace Extremely Weathered bands. Hole Terminated at 1.20 m Practical Refusal	D			

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 - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1725**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m
 SURFACE RL: DATUM:

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	0.20m		0.5		CH	FILL: CLAY - medium to high plasticity, dark brown to pale brown, with some fine to coarse grained sand, with some fine to coarse grained angular to sub-rounded gravel, trace cobbles.	M > w _p	VSt	HP	320	FILL - CONTROLLED
		U50										
		0.45m										
		1.40m										
		1.70m										
		1.10m		1.40m	CH	CLAY - medium to high plasticity, dark brown, trace fine grained sand.			HP	280	RESIDUAL SOIL	
		U50		1.5	SC	Clayey SAND - fine to medium grained, orange-brown and pale grey to white, fines of low plasticity.	D	VD				RESIDUAL SOIL / EXTREMELY WEATHERED ROCK
				1.90m		ANDESITE - pale grey to grey with pale brown, trace orange to red-brown, estimated low to medium strength, trace Extremely Weathered bands.	D					HIGHLY WEATHERED ROCK
				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 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.00-TEMPLATE LOGS SHEET.GPJ <-DrawingFile> 06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool

ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1726**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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	0.20m		0.5		CH	FILL: Sandy CLAY - medium to high plasticity, dark brown, fine to coarse grained sand.	M > W _p	VSt	HP	350	FILL - CONTROLLED		
		U50												
		0.50m												
		0.90m												
		1.10m												
				1.0		CH	CLAY - medium to high plasticity, dark brown, trace fine grained sand.			HP	290	RESIDUAL SOIL		
				1.10m		SC	Clayey SAND - fine to medium grained, orange-brown and pale grey to white, fines of low plasticity.	D	VD			RESIDUAL SOIL / EXTREMELY WEATHERED ROCK		
				1.40m			ANDESITE - pale grey to grey with pale brown, trace orange to red-brown, estimated low to medium strength, trace Extremely Weathered bands.	D				HIGHLY WEATHERED ROCK		
				1.50m			Hole Terminated at 1.50 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%	



ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1727**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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	0.80m	0.5	[Cross-hatched pattern]	CH	FILL: CLAY - medium to high plasticity, dark brown to brown, trace fine to medium grained sand.	M > W _p	VSt	HP	230	FILL - CONTROLLED	
		U50	1.10m	1.0						HP	300		
		U50	1.40m	1.5						HP	250		RESIDUAL SOIL
		U50	1.70m	1.75						D	HIGHLY WEATHERED ROCK		
				2.0			ANDESITE - pale grey to grey with pale brown, trace orange to red-brown, estimated low to medium strength, trace Extremely Weathered bands. Hole Terminated at 1.75 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

- 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 - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1728**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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	0.5	[Cross-hatched pattern]	CH	FILL: CLAY - medium to high plasticity, pale brown to brown, with some fine to coarse grained sand. Grey to dark grey. Pale brown.	M > w _p	VSt	HP	250	FILL - CONTROLLED
		U50	1.05m	1.0			HP			300		
		U50	1.50m	1.5			HP			320		
		U50	1.90m	1.90m			HP			350		
					[Diagonal hatched pattern]	CL	Sandy CLAY / Clayey SAND - low plasticity, orange-brown and pale grey to white, fine to medium grained sand.	M < w _p	H / Fb			RESIDUAL SOIL
					[Stippled pattern]	SC	Extremely Weathered Andesite with soil properties; breaks down into Gravelly Clayey SAND - fine to coarse grained, pale grey to grey and pale brown, fines of low plasticity, fine grained angular gravel.	D	VD			EXTREMELY WEATHERED ROCK
							Hole Terminated at 2.10 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
 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%

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ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1729**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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					CH	FILL-TOPSOIL: CLAY - medium to high plasticity, pale brown to grey-brown, with some fine to medium grained sand.	M < w _p				FILL - TOPSOIL	
			0.70m				FILL: CLAY - medium to high plasticity, pale brown and pale grey, trace fine to medium grained sand.			HP	210	FILL - CONTROLLED	
		U50	1.00m			CH				HP	330		
		U50	1.15m						M > w _p	VSt	HP	350	
			1.50m								HP	380	
		U50	1.85m			CH	CLAY - medium to high plasticity, dark grey to dark grey-brown / brown, trace fine grained sand.			HP	380	RESIDUAL SOIL	
						SC	Extremely Weathered Andesite with soil properties; breaks down into Gravelly Clayey SAND - fine to coarse grained, pale grey to grey and pale brown, fines of low plasticity, fine grained angular gravel.					EXTREMELY WEATHERED ROCK	
							ANDESITE - pale grey to grey with pale brown, trace orange to red-brown, estimated low to medium strength, trace Extremely Weathered bands.	D				HIGHLY WEATHERED ROCK	
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%

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ENGINEERING LOG - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1730**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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			0.20m	[Cross-hatched pattern]	CH	FILL-TOPSOIL: CLAY - medium to high plasticity, pale brown to grey-brown, with some fine to medium grained sand.	M < Wp				FILL - TOPSOIL		
		0.60m											FILL - CONTROLLED	
		U50 0.75m									HP	260		
		1.00m									HP	280		
		U50 1.15m		1.20m	[Diagonal hatched pattern]	CH	FILL: CLAY - medium to high plasticity, pale grey-brown with some pale brown, trace fine to medium grained sand, trace cobbles.	M > Wp	VSt					
1.50m														
U50 1.90m														
1.50m												HP	300	
				1.50m	[Diagonal hatched pattern]	CH	CLAY - medium to high plasticity, grey to dark grey-brown / brown, trace fine grained sand.							
		U50		1.90m										
				2.0m	[Diagonal hatched pattern]	CH	Sandy CLAY - medium to high plasticity, brown to red-brown, fine to coarse grained sand.							
				2.30m										
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

- 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 - TEST PIT

CLIENT: KCE
 PROJECT: HEREFORD HILL - STAGE 17
 LOCATION: CAPUTAR WAY, LOCHINVAR

TEST PIT NO: **TP1731**
 PAGE: 1 OF 1
 JOB NO: NEW20P-0146D
 LOGGED BY: BB
 DATE: 20/8/24

EQUIPMENT TYPE: 13 TONNE EXCAVATOR SURFACE RL:
 TEST PIT LENGTH: 2.0 m WIDTH: 0.5 m DATUM:

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			0.0		CH	FILL-TOPSOIL: CLAY - medium to high plasticity, pale brown to grey-brown, with some fine to medium grained sand.	M < W _p				FILL - TOPSOIL
				0.70		CH	FILL: CLAY - medium to high plasticity, dark brown to brown, trace fine to medium grained sand.	M > W _p	VSt	HP	300	FILL - CONTROLLED
			U50	1.00		CH	Dark brown.			HP	480	
				1.60		CH	CLAY - medium to high plasticity, dark grey to dark grey-brown / brown, trace fine grained sand.	M ~ W _p	H	HP	500	
		U50		1.80		CH				HP	350	
				2.20			Hole Terminated at 2.20 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
 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

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%

OT.LIB.1.1.GLB.Log_NON-CORED BOREHOLE - TEST PIT 00-TEMPLATE LOGS SHEET.GPJ <-DrawingFile> 06/01/2025 14:18 10.03.00.09 Datgel Lab and in Situ Tool

APPENDIX B:

Results of Laboratory Testing

Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205A
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 23/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1701 - (0.30 - 0.50m)
Material: Clay
Material Source: On-Site Insitu



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 Email: brentcullen@qualtest.com.au

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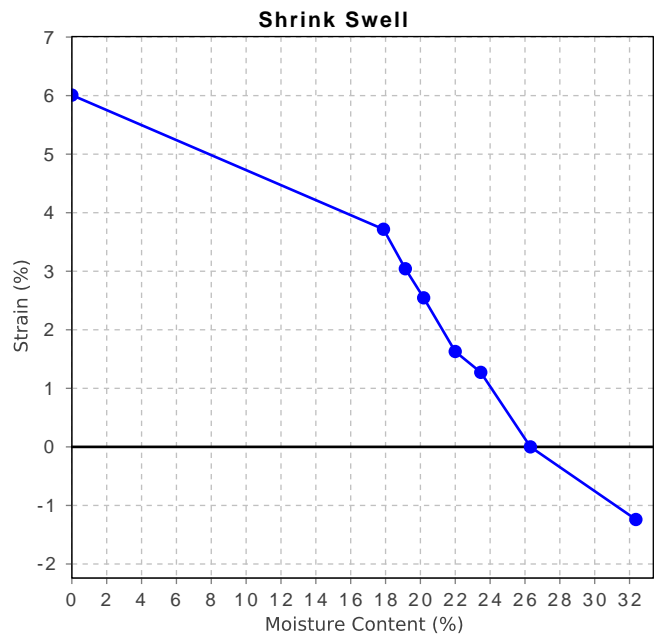
Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.7
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	6.0
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	26.3

Swell Test	
Initial Pocket Penetrometer (kPa)	350
Final Pocket Penetrometer (kPa)	180
Initial Moisture Content (%)	25.8
Final Moisture Content (%)	32.4
Swell (%)	1.2
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205B
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 25/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1701 - (1.00 -1.15m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	2.2
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

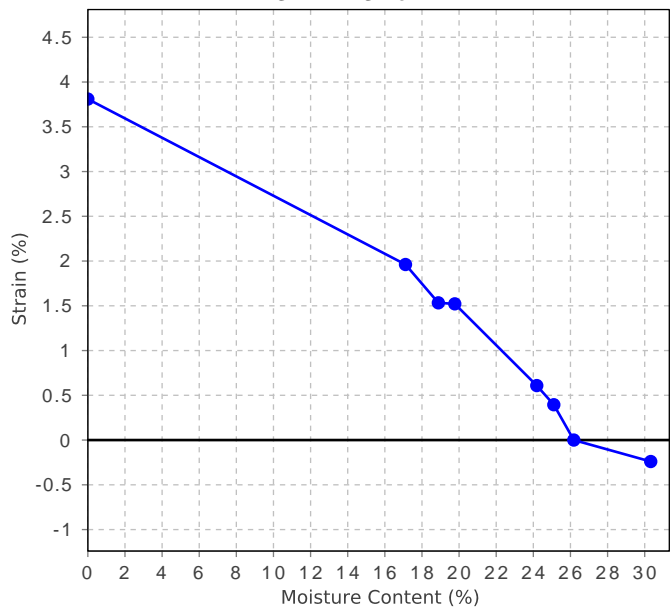
Shrinkage Strain - Oven Dried (%)	3.8
Estimated % by volume of significant inert inclusions	1
Cracking	Moderately Cracked
Crumbling	No
Moisture Content (%)	26.2

Swell Test

Initial Pocket Penetrometer (kPa)	480
Final Pocket Penetrometer (kPa)	220
Initial Moisture Content (%)	25.3
Final Moisture Content (%)	30.3
Swell (%)	0.2

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205C
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 25/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1702 - (0.30 - 0.44m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	2.0
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

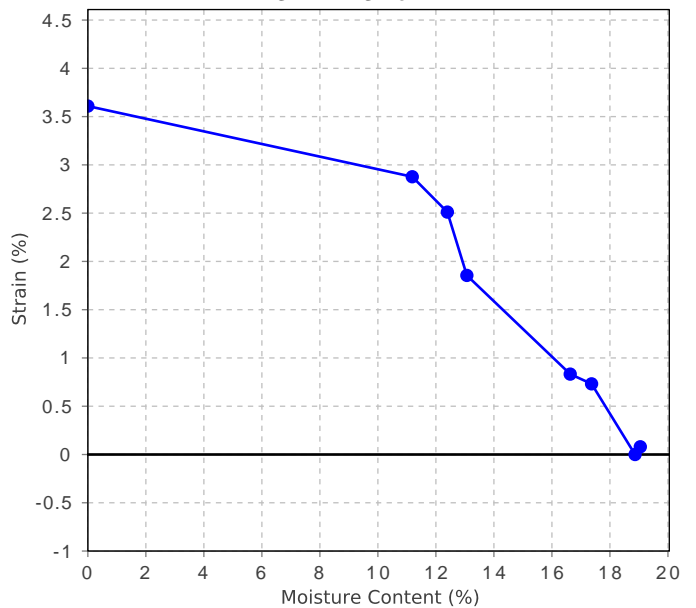
Shrinkage Strain - Oven Dried (%)	3.6
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	18.9

Swell Test

Initial Pocket Penetrometer (kPa)	240
Final Pocket Penetrometer (kPa)	420
Initial Moisture Content (%)	18.0
Final Moisture Content (%)	19.0
Swell (%)	-0.1

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Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205D
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 26/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1703 - (0.30 - 0.50m)
Material: Clay
Material Source: On-Site Insitu



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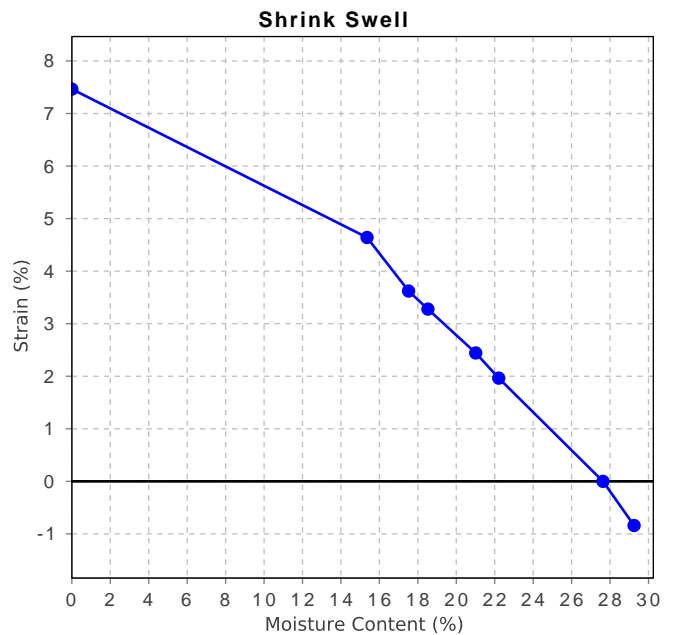
Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	4.4
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	7.5
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	27.6

Swell Test	
Initial Pocket Penetrometer (kPa)	430
Final Pocket Penetrometer (kPa)	280
Initial Moisture Content (%)	26.5
Final Moisture Content (%)	29.3
Swell (%)	0.8
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205E
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 26/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1703 - (1.00 - 1.20m)
Material: Clay
Material Source: On-Site Insitu



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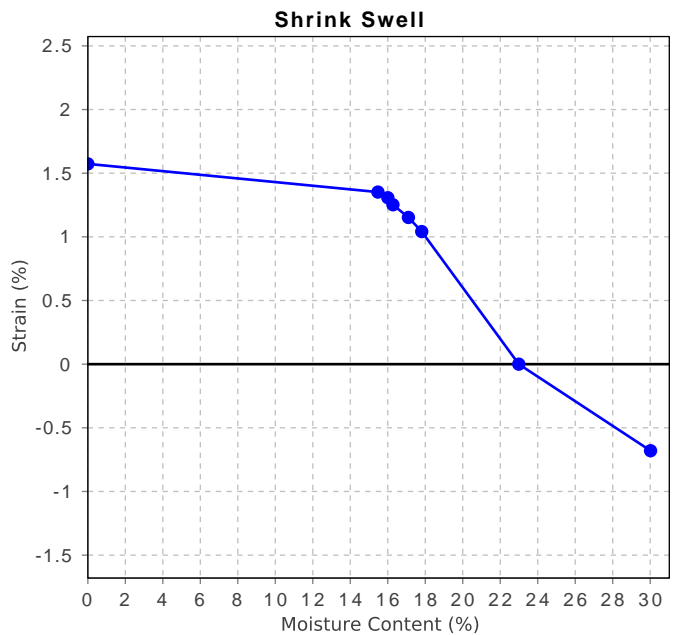


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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	1.1
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.6
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	23.0

Swell Test	
Initial Pocket Penetrometer (kPa)	280
Final Pocket Penetrometer (kPa)	260
Initial Moisture Content (%)	26.7
Final Moisture Content (%)	30.0
Swell (%)	0.7
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205F
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 26/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1704 - (0.30 - 0.50m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

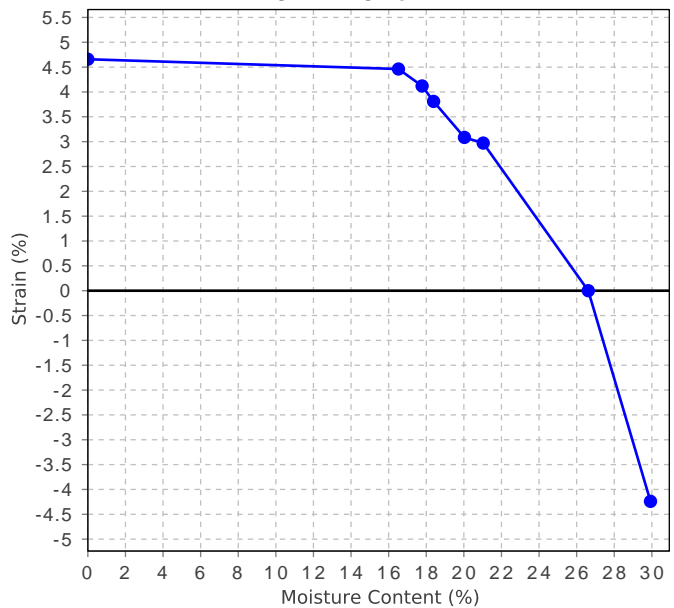
B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.8
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.7
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	26.6

Swell Test	
Initial Pocket Penetrometer (kPa)	580
Final Pocket Penetrometer (kPa)	140
Initial Moisture Content (%)	26.7
Final Moisture Content (%)	29.9
Swell (%)	4.2
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205G
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 26/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1704 - (0.90 - 1.10m)
Material: Clay
Material Source: On-Site Insitu



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Engineering Geologist

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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	3.7
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

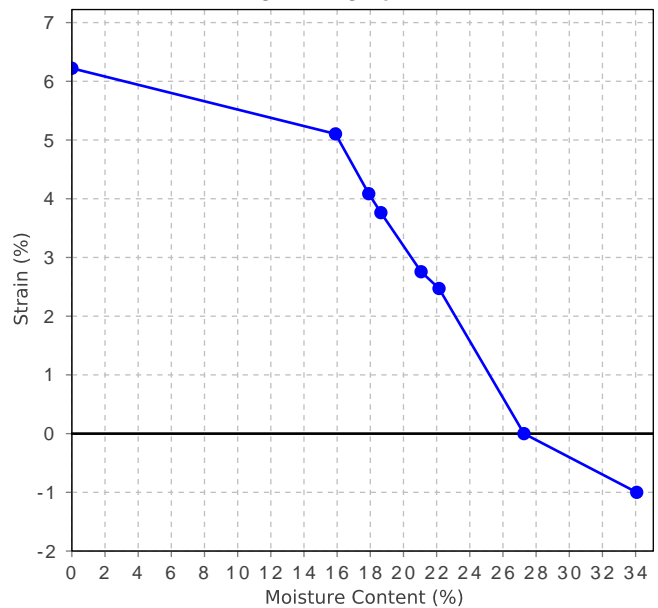
Shrinkage Strain - Oven Dried (%)	6.2
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	27.3

Swell Test

Initial Pocket Penetrometer (kPa)	360
Final Pocket Penetrometer (kPa)	250
Initial Moisture Content (%)	27.8
Final Moisture Content (%)	34.1
Swell (%)	1.0

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Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205H
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 26/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1705 - (0.30 - 0.50m)
Material: Clay
Material Source: On-Site Insitu



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Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	3.1
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

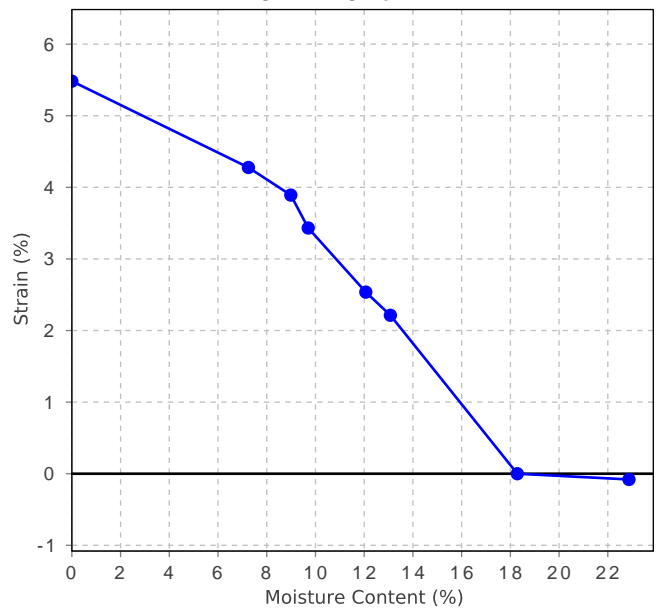
Shrinkage Strain - Oven Dried (%)	5.5
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	18.3

Swell Test

Initial Pocket Penetrometer (kPa)	480
Final Pocket Penetrometer (kPa)	>600
Initial Moisture Content (%)	17.8
Final Moisture Content (%)	22.9
Swell (%)	0.1

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205I
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 29/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1706 - (0.30 - 0.45m)
Material: Clay
Material Source: On-Site Insitu



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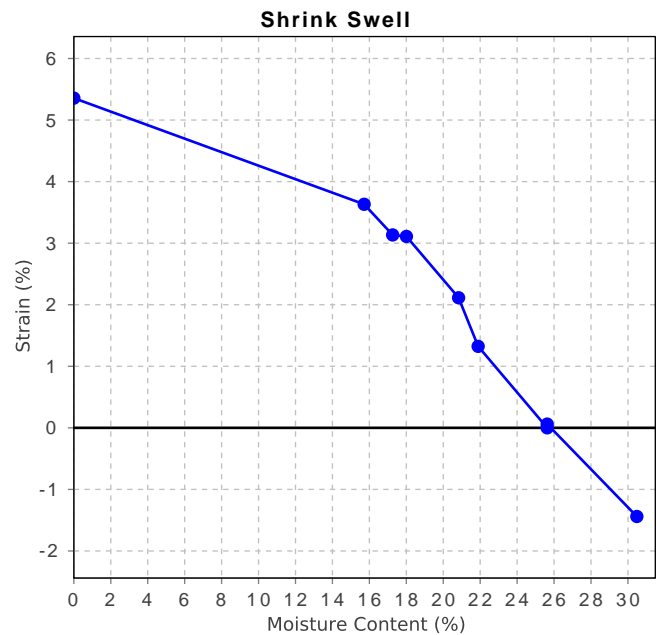
Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.4
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	5.4
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	25.6

Swell Test	
Initial Pocket Penetrometer (kPa)	160
Final Pocket Penetrometer (kPa)	120
Initial Moisture Content (%)	26.4
Final Moisture Content (%)	30.5
Swell (%)	1.4
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205J
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 29/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1706 - (0.90 - 1.10m)
Material: Clay
Material Source: On-Site Insitu



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Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	4.0
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

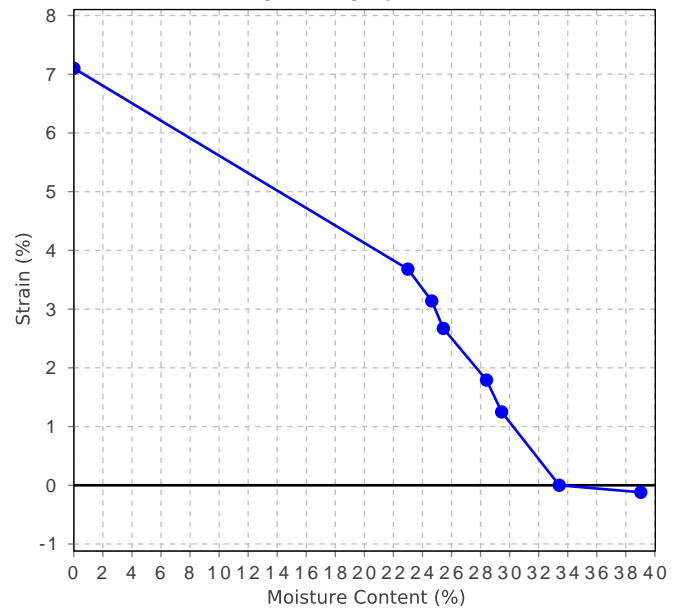
Shrinkage Strain - Oven Dried (%)	7.1
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	33.4

Swell Test

Initial Pocket Penetrometer (kPa)	220
Final Pocket Penetrometer (kPa)	140
Initial Moisture Content (%)	32.7
Final Moisture Content (%)	39.0
Swell (%)	0.1

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Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205K
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 23/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1707 - (0.30 - 0.50m)
Material: Clay
Material Source: On-Site Insitu



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Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	3.1
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

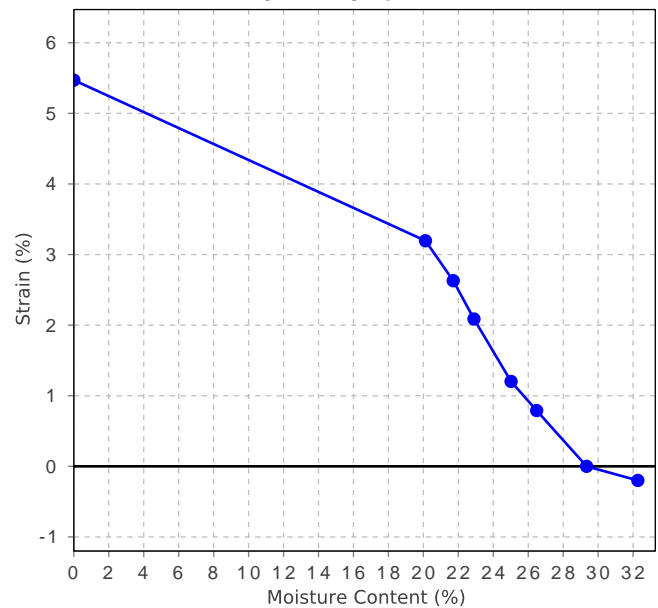
Shrinkage Strain - Oven Dried (%)	5.5
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	29.3

Swell Test

Initial Pocket Penetrometer (kPa)	220
Final Pocket Penetrometer (kPa)	190
Initial Moisture Content (%)	29.9
Final Moisture Content (%)	32.3
Swell (%)	0.2

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Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205L
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 23/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1707 - (1.00 - 1.20m)
Material: Clay
Material Source: On-Site Insitu



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Engineering Geologist

NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	5.3
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

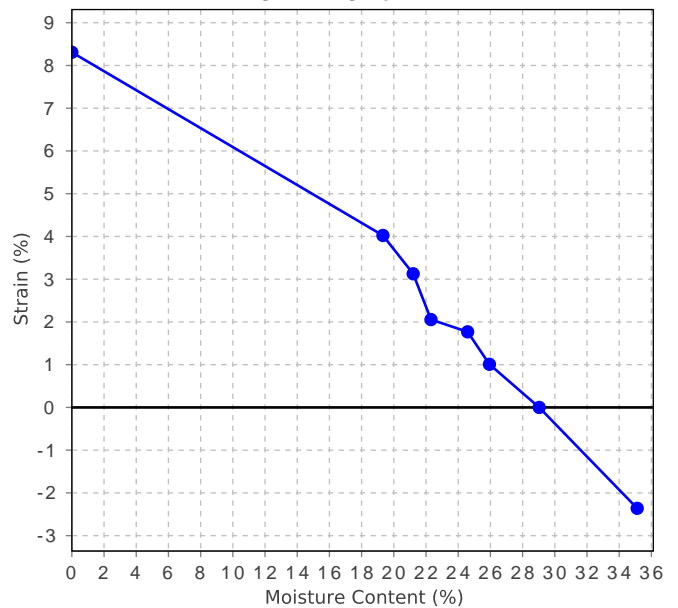
Shrinkage Strain - Oven Dried (%)	8.3
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	29.0

Swell Test

Initial Pocket Penetrometer (kPa)	320
Final Pocket Penetrometer (kPa)	180
Initial Moisture Content (%)	29.5
Final Moisture Content (%)	35.1
Swell (%)	2.4

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Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205M
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 23/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1708 - (0.30 - 0.48m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	3.0
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

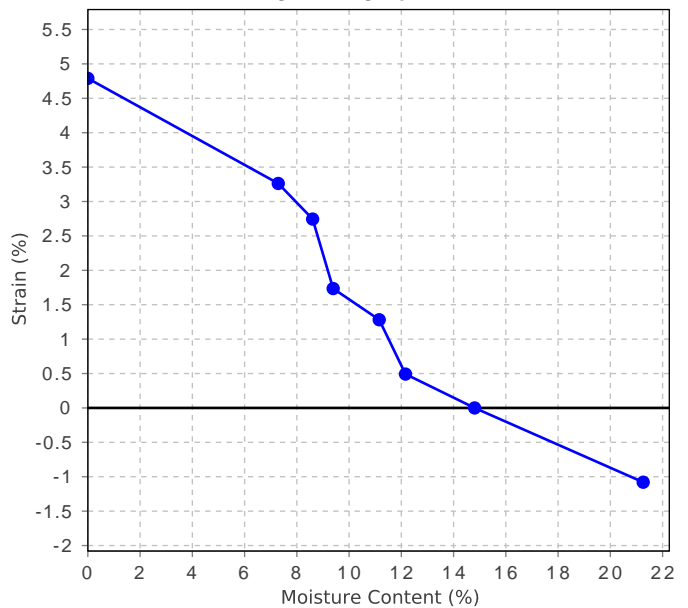
Shrinkage Strain - Oven Dried (%)	4.8
Estimated % by volume of significant inert inclusions	6
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	14.8

Swell Test

Initial Pocket Penetrometer (kPa)	500
Final Pocket Penetrometer (kPa)	260
Initial Moisture Content (%)	14.3
Final Moisture Content (%)	21.3
Swell (%)	1.1

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Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205N
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 23/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1708 - (0.90 - 1.10m)
Material: Clay
Material Source: On-Site Insitu



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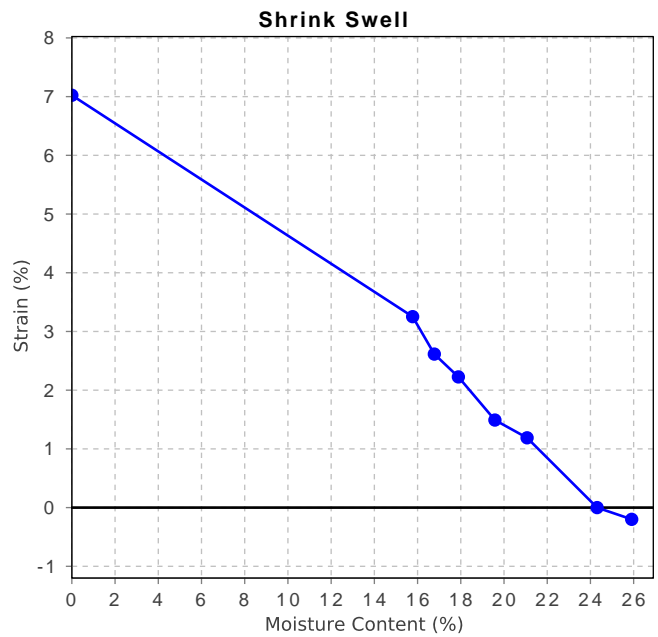
Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	4.0
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	7.0
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	24.3

Swell Test	
Initial Pocket Penetrometer (kPa)	360
Final Pocket Penetrometer (kPa)	310
Initial Moisture Content (%)	22.3
Final Moisture Content (%)	25.9
Swell (%)	0.2
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205O
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 23/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1709 - (0.50 - 0.70m)
Material: Clay
Material Source: On-Site Insitu



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Approved Signatory: Brent Cullen

Engineering Geologist

NATA Accredited Laboratory Number: 18686

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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	3.1
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

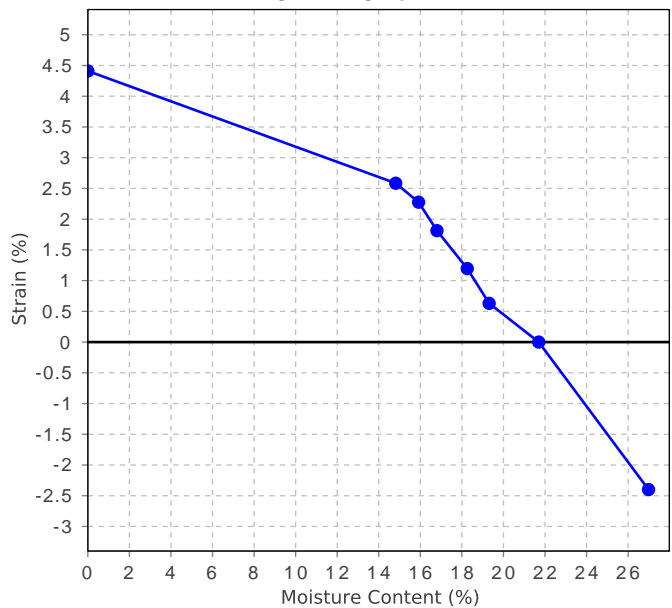
Shrinkage Strain - Oven Dried (%)	4.4
Estimated % by volume of significant inert inclusions	3
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	21.7

Swell Test

Initial Pocket Penetrometer (kPa)	500
Final Pocket Penetrometer (kPa)	280
Initial Moisture Content (%)	20.5
Final Moisture Content (%)	27.0
Swell (%)	2.4

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205P
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 24/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1709 - (1.10 - 1.28m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	2.2
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

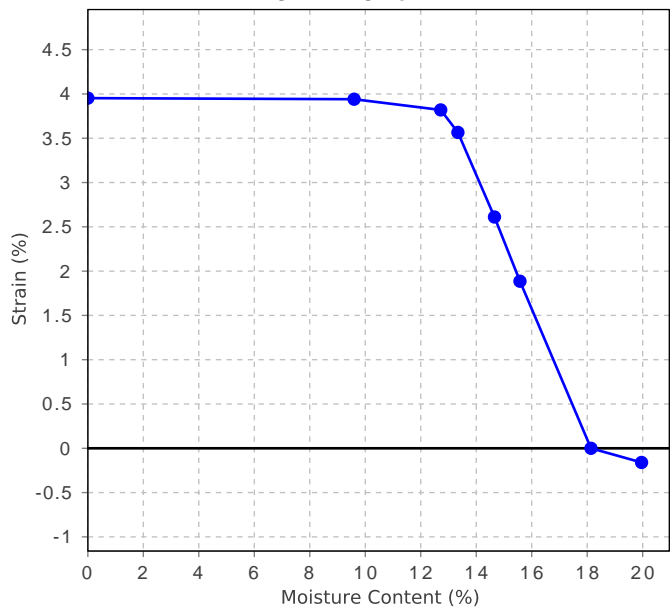
Shrinkage Strain - Oven Dried (%)	4.0
Estimated % by volume of significant inert inclusions	3
Cracking	Moderately Cracked
Crumbling	No
Moisture Content (%)	18.1

Swell Test

Initial Pocket Penetrometer (kPa)	260
Final Pocket Penetrometer (kPa)	160
Initial Moisture Content (%)	15.1
Final Moisture Content (%)	20.0
Swell (%)	0.2

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205Q
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 24/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1710 - (0.50 - 0.65m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	1.7
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

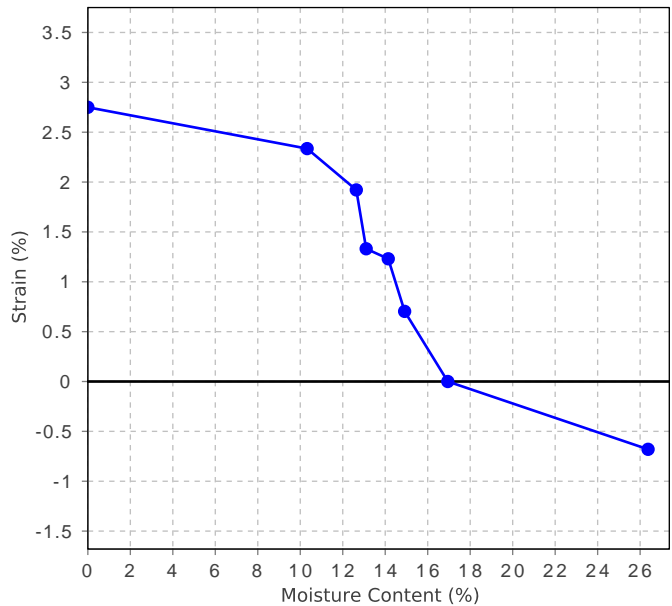
Shrinkage Strain - Oven Dried (%)	2.7
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	16.9

Swell Test

Initial Pocket Penetrometer (kPa)	350
Final Pocket Penetrometer (kPa)	240
Initial Moisture Content (%)	16.0
Final Moisture Content (%)	26.4
Swell (%)	0.7

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report



Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205R
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 24/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1710 - (0.90 - 1.20m)
Material: Clay
Material Source: On-Site Insitu

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Approved Signatory: Brent Cullen

Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	5.5
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

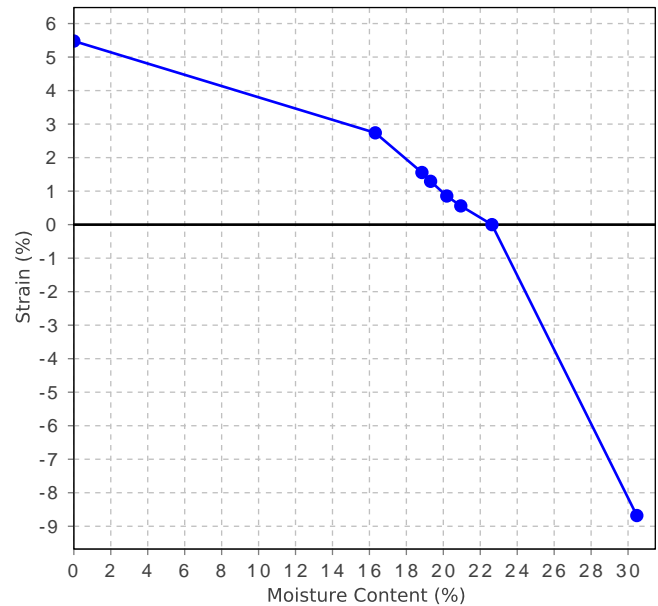
Shrinkage Strain - Oven Dried (%)	5.5
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	22.6

Swell Test

Initial Pocket Penetrometer (kPa)	>600
Final Pocket Penetrometer (kPa)	300
Initial Moisture Content (%)	22.5
Final Moisture Content (%)	30.5
Swell (%)	8.7

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205S
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 24/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1711 - (0.50 - 0.70m)
Material: Clay
Material Source: On-Site Insitu



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 NATA Accredited Laboratory Number: 18686

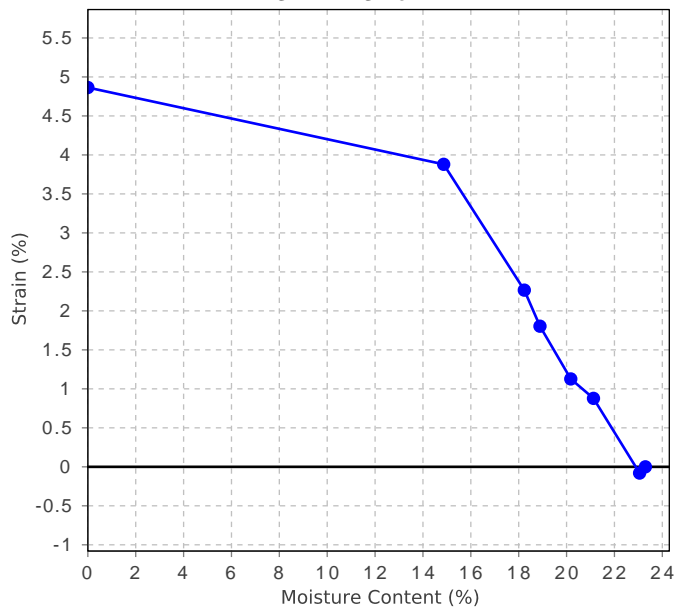
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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.7
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.9
Estimated % by volume of significant inert inclusions	4
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	23.3

Swell Test	
Initial Pocket Penetrometer (kPa)	400
Final Pocket Penetrometer (kPa)	280
Initial Moisture Content (%)	23.8
Final Moisture Content (%)	23.1
Swell (%)	0.1
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report



Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205T
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 24/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1711 - (1.00 - 1.15m)
Material: Clay
Material Source: On-Site Insitu

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Engineering Geologist

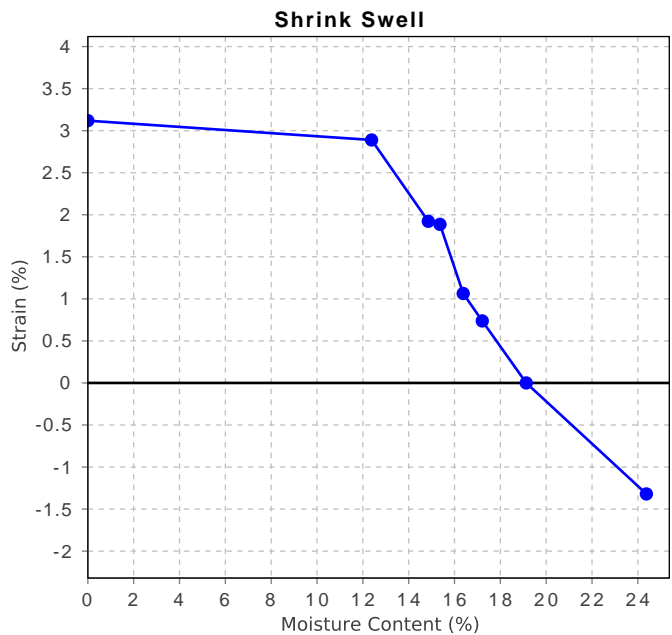
NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.1
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	3.1
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	19.1

Swell Test	
Initial Pocket Penetrometer (kPa)	550
Final Pocket Penetrometer (kPa)	260
Initial Moisture Content (%)	18.8
Final Moisture Content (%)	24.4
Swell (%)	1.3

* NATA Accreditation does not cover the performance of pocket penetrometer readings.



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205U
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 24/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1712 - (0.40 - 0.60m)
Material: Clay
Material Source: On-Site Insitu



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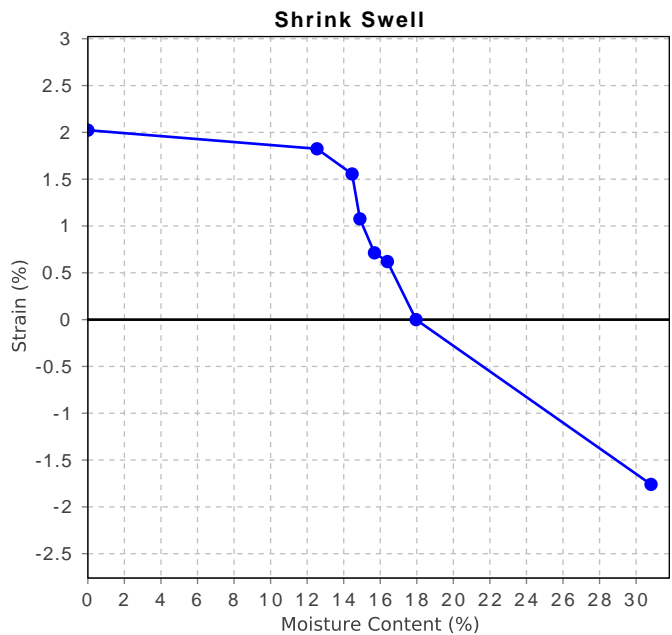
Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	1.6
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	2.0
Estimated % by volume of significant inert inclusions	5
Cracking	Highly Cracked
Crumbling	No
Moisture Content (%)	18.0

Swell Test	
Initial Pocket Penetrometer (kPa)	220
Final Pocket Penetrometer (kPa)	120
Initial Moisture Content (%)	19.5
Final Moisture Content (%)	30.8
Swell (%)	1.8

* NATA Accreditation does not cover the performance of pocket penetrometer readings.



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205V
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 24/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1712 - (1.10 - 1.30m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

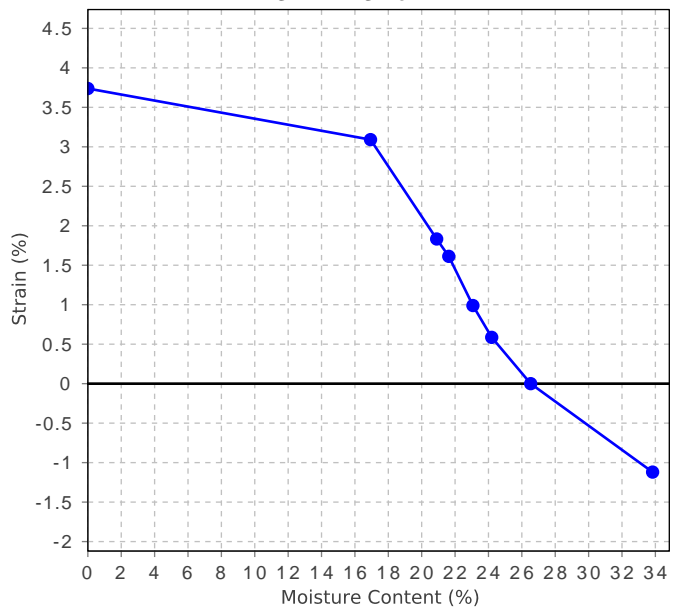
Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.4
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	3.7
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	26.5

Swell Test	
Initial Pocket Penetrometer (kPa)	170
Final Pocket Penetrometer (kPa)	140
Initial Moisture Content (%)	26.6
Final Moisture Content (%)	33.8
Swell (%)	1.1

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205W
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 24/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1713 - (0.30 - 0.50m)
Material: Clay
Material Source: On-Site Insitu



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 NATA Accredited Laboratory Number: 18686

B. Cullen

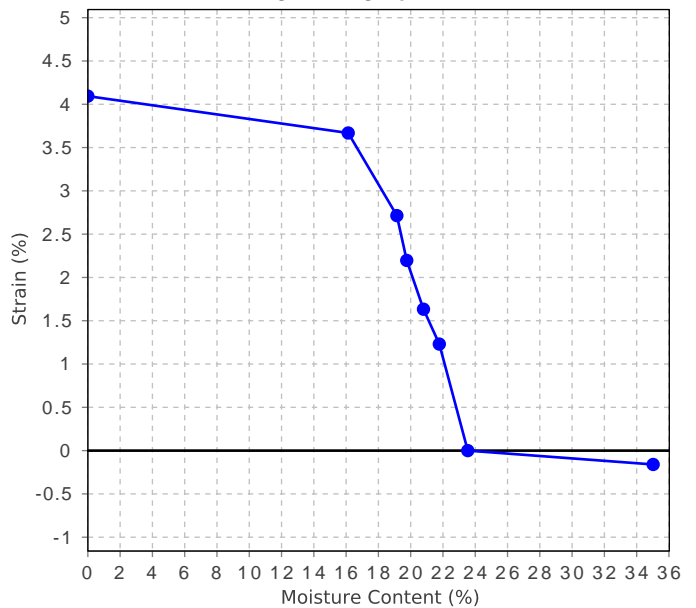
Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.3
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.1
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	23.5

Swell Test	
Initial Pocket Penetrometer (kPa)	200
Final Pocket Penetrometer (kPa)	200
Initial Moisture Content (%)	28.3
Final Moisture Content (%)	35.0
Swell (%)	0.2

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205X
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 25/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1713 - (1.00 - 1.20m)
Material: Clay
Material Source: On-Site Insitu



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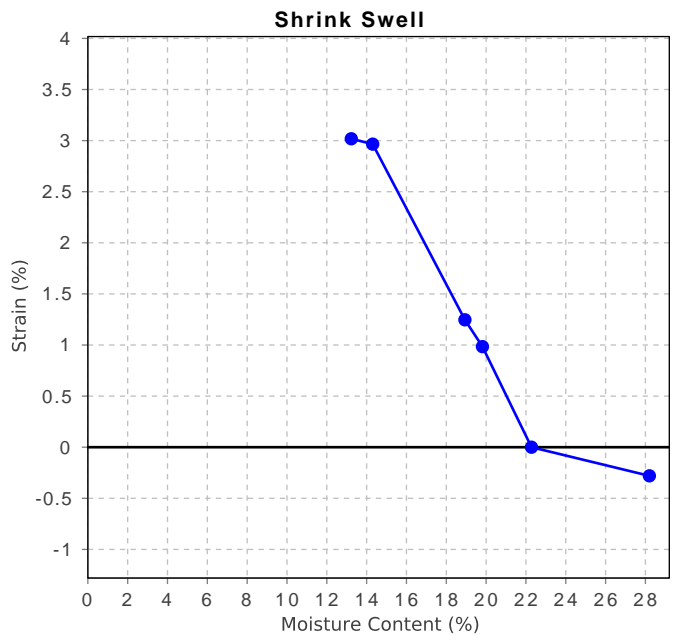
Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	
Estimated % by volume of significant inert inclusions	1
Cracking	Fragmented
Crumbling	No
Moisture Content (%)	22.3

Swell Test	
Initial Pocket Penetrometer (kPa)	>600
Final Pocket Penetrometer (kPa)	220
Initial Moisture Content (%)	21.8
Final Moisture Content (%)	28.2
Swell (%)	0.3
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205Y
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 25/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1714 - (0.40 - 0.60m)
Material: Clay
Material Source: On-Site Insitu



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Engineering Geologist

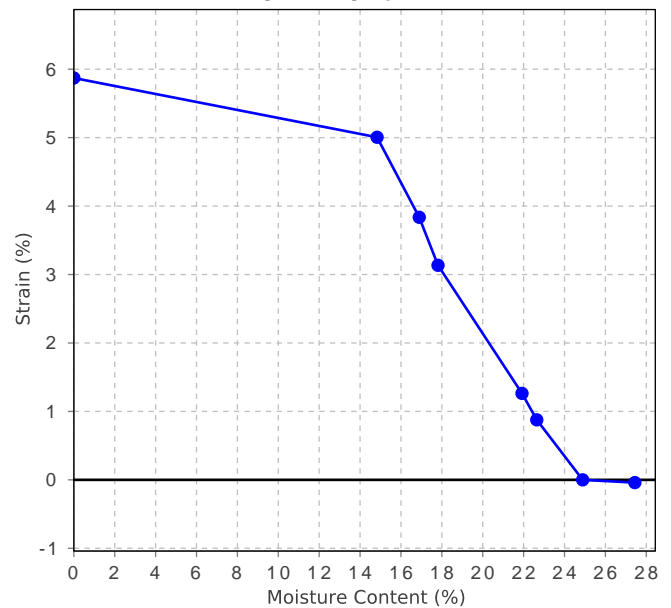
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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.3
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	5.9
Estimated % by volume of significant inert inclusions	3
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	24.9

Swell Test	
Initial Pocket Penetrometer (kPa)	170
Final Pocket Penetrometer (kPa)	170
Initial Moisture Content (%)	25.2
Final Moisture Content (%)	27.4
Swell (%)	0.0
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205Z
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 25/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1714 - (1.10 - 1.30m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	4.1
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

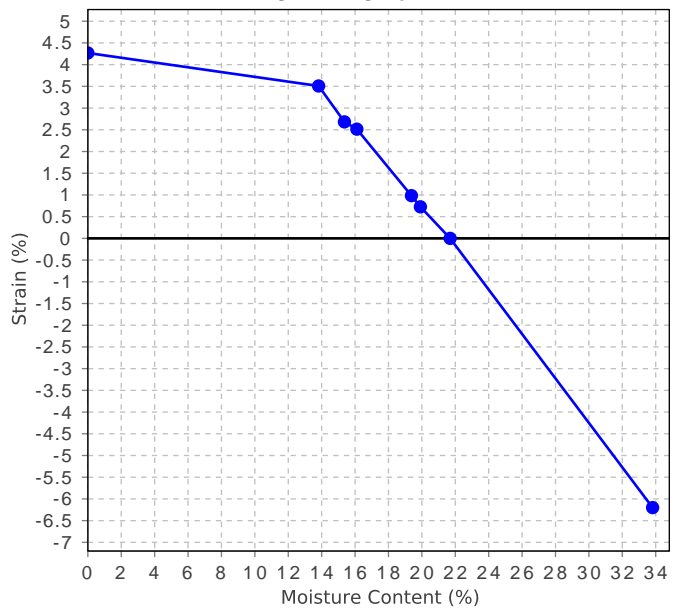
Shrinkage Strain - Oven Dried (%)	4.3
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	21.7

Swell Test

Initial Pocket Penetrometer (kPa)	550
Final Pocket Penetrometer (kPa)	180
Initial Moisture Content (%)	21.8
Final Moisture Content (%)	33.8
Swell (%)	6.2

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205AA
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 25/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1715 - (0.30 - 0.55m)
Material: Clay
Material Source: On-Site Insitu



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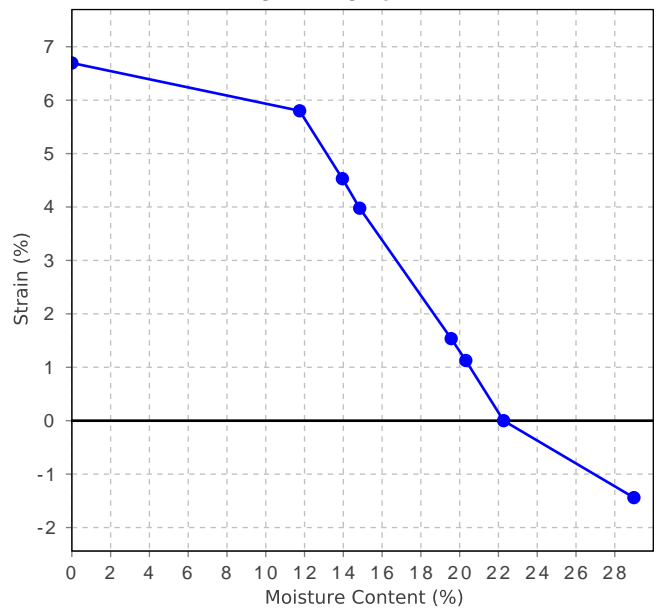
Approved Signatory: Brent Cullen
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 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	4.1
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	6.7
Estimated % by volume of significant inert inclusions	2
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	22.3

Swell Test	
Initial Pocket Penetrometer (kPa)	450
Final Pocket Penetrometer (kPa)	220
Initial Moisture Content (%)	20.8
Final Moisture Content (%)	29.0
Swell (%)	1.4
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205AB
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 25/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1715 - (1.00 - 1.20m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	3.4
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

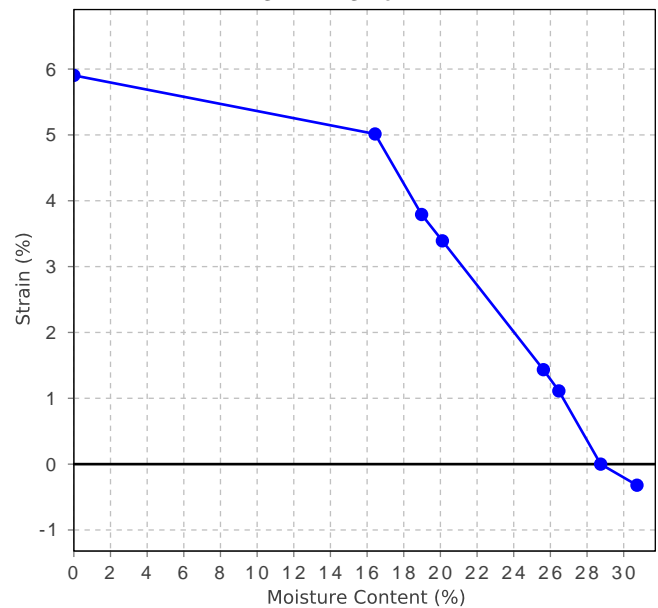
Shrinkage Strain - Oven Dried (%)	5.9
Estimated % by volume of significant inert inclusions	1
Cracking	Moderately Cracked
Crumbling	No
Moisture Content (%)	28.7

Swell Test

Initial Pocket Penetrometer (kPa)	170
Final Pocket Penetrometer (kPa)	130
Initial Moisture Content (%)	28.0
Final Moisture Content (%)	30.7
Swell (%)	0.3

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205AC
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 30/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1703 - (0.00 - 0.10m)
Material: Clay
Material Source: On-Site Insitu



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Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	65		
Plastic Limit (%)	25		
Plasticity Index (%)	40		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	19.0		
Cracking Crumbling Curling	Cracking & Curling		

Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Sample Number: NEW24S-5205AD
Date Sampled: 23/07/2024
Dates Tested: 23/07/2024 - 30/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1714 - (0.00 - 0.10m)
Material: Clay
Material Source: On-Site Insitu



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 NATA Accredited Laboratory Number: 18686

Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	68		
Plastic Limit (%)	25		
Plasticity Index (%)	43		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	19.0		
Cracking Crumbling Curling	Curling		

Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Dates Tested: 23/07/2024 - 29/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received



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Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5205A	NEW24S-5205B	NEW24S-5205C	NEW24S-5205D	NEW24S-5205E
Date Sampled	23/07/2024	23/07/2024	23/07/2024	23/07/2024	23/07/2024
Date Tested	23/07/2024	25/07/2024	25/07/2024	26/07/2024	26/07/2024
Material Source	On-Site Insitu	On-Site	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1701 - (0.30 - 0.50m)	TP1701 - (1.00 - 1.15m)	TP1702 - (0.30 - 0.44m)	TP1703 - (0.30 - 0.50m)	TP1703 - (1.00 - 1.20m)
Inert Material Estimate (%)	1	1	2	1	1
Pocket Penetrometer before (kPa)	350	480	240	430	280
Pocket Penetrometer after (kPa)	180	220	420	280	260
Shrinkage Moisture Content (%)	26.3	26.2	18.9	27.6	23.0
Shrinkage (%)	6.0	3.8	3.6	7.5	1.6
Swell Moisture Content Before (%)	25.8	25.3	18.0	26.5	26.7
Swell Moisture Content After (%)	32.4	30.3	19.0	29.3	30.0
Swell (%)	1.2	0.2	-0.1	0.8	0.7
Shrink Swell Index Iss (%)	3.7	2.2	2.0	4.4	1.1
Visual Description	Clay	Clay	Clay	Clay	Clay
Cracking	SC	MC	SC	UC	SC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Dates Tested: 23/07/2024 - 29/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received



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Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5205F	NEW24S-5205G	NEW24S-5205H	NEW24S-5205I	NEW24S-5205J
Date Sampled	23/07/2024	23/07/2024	23/07/2024	23/07/2024	23/07/2024
Date Tested	26/07/2024	26/07/2024	26/07/2024	29/07/2024	29/07/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1704 - (0.30 - 0.50m)	TP1704 - (0.90 - 1.10m)	TP1705 - (0.30 - 0.50m)	TP1706 - (0.30 - 0.45m)	TP1706 - (0.90 - 1.10m)
Inert Material Estimate (%)	1	1	1	1	1
Pocket Penetrometer before (kPa)	580	360	480	160	220
Pocket Penetrometer after (kPa)	140	250	>600	120	140
Shrinkage Moisture Content (%)	26.6	27.3	18.3	25.6	33.4
Shrinkage (%)	4.7	6.2	5.5	5.4	7.1
Swell Moisture Content Before (%)	26.7	27.8	17.8	26.4	32.7
Swell Moisture Content After (%)	29.9	34.1	22.9	30.5	39.0
Swell (%)	4.2	1.0	0.1	1.4	0.1
Shrink Swell Index Iss (%)	3.8	3.7	3.1	3.4	4.0
Visual Description	Clay	Clay	Clay	Clay	Clay
Cracking	SC	UC	SC	UC	UC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

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Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Dates Tested: 23/07/2024 - 29/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received



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Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5205K	NEW24S-5205L	NEW24S-5205M	NEW24S-5205N	NEW24S-5205O
Date Sampled	23/07/2024	23/07/2024	23/07/2024	23/07/2024	23/07/2024
Date Tested	23/07/2024	23/07/2024	23/07/2024	23/07/2024	23/07/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1707 - (0.30 - 0.50m)	TP1707 - (1.00 - 1.20m)	TP1708 - (0.30 - 0.48m)	TP1708 - (0.90 - 1.10m)	TP1709 - (0.50 - 0.70m)
Inert Material Estimate (%)	1	1	6	1	3
Pocket Penetrometer before (kPa)	220	320	500	360	500
Pocket Penetrometer after (kPa)	190	180	260	310	280
Shrinkage Moisture Content (%)	29.3	29.0	14.8	24.3	21.7
Shrinkage (%)	5.5	8.3	4.8	7.0	4.4
Swell Moisture Content Before (%)	29.9	29.5	14.3	22.3	20.5
Swell Moisture Content After (%)	32.3	35.1	21.3	25.9	27.0
Swell (%)	0.2	2.4	1.1	0.2	2.4
Shrink Swell Index Iss (%)	3.1	5.3	3.0	4.0	3.1
Visual Description	Clay	Clay	Clay	Clay	Clay
Cracking	SC	SC	SC	SC	UC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

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Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Dates Tested: 23/07/2024 - 29/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received



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 Engineering Geologist
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Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5205P	NEW24S-5205Q	NEW24S-5205R	NEW24S-5205S	NEW24S-5205T
Date Sampled	23/07/2024	23/07/2024	23/07/2024	23/07/2024	23/07/2024
Date Tested	24/07/2024	24/07/2024	24/07/2024	24/07/2024	24/07/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1709 - (1.10 - 1.28m)	TP1710 - (0.50 - 0.65m)	TP1710 - (0.90 - 1.20m)	TP1711 - (0.50 - 0.70m)	TP1711 - (1.00 - 1.15m)
Inert Material Estimate (%)	3	1	1	4	2
Pocket Penetrometer before (kPa)	260	350	>600	400	550
Pocket Penetrometer after (kPa)	160	240	300	280	260
Shrinkage Moisture Content (%)	18.1	16.9	22.6	23.3	19.1
Shrinkage (%)	4.0	2.7	5.5	4.9	3.1
Swell Moisture Content Before (%)	15.1	16.0	22.5	23.8	18.8
Swell Moisture Content After (%)	20.0	26.4	30.5	23.1	24.4
Swell (%)	0.2	0.7	8.7	0.1	1.3
Shrink Swell Index Iss (%)	2.2	1.7	5.5	2.7	2.1
Visual Description	Clay	Clay	Clay	Clay	Clay
Cracking	MC	SC	UC	UC	SC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

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Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Dates Tested: 23/07/2024 - 29/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received



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Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5205U	NEW24S-5205V	NEW24S-5205W	NEW24S-5205X	NEW24S-5205Y
Date Sampled	23/07/2024	23/07/2024	23/07/2024	23/07/2024	23/07/2024
Date Tested	24/07/2024	24/07/2024	24/07/2024	25/07/2024	25/07/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1712 - (0.40 - 0.60m)	TP1712 - (1.10 - 1.30m)	TP1713 - (0.30 - 0.50m)	TP1713 - (1.00 - 1.20m)	TP1714 - (0.40 - 0.60m)
Inert Material Estimate (%)	5	2	1	1	3
Pocket Penetrometer before (kPa)	220	170	200	>600	170
Pocket Penetrometer after (kPa)	120	140	200	220	170
Shrinkage Moisture Content (%)	18.0	26.5	23.5	22.3	24.9
Shrinkage (%)	2.0	3.7	4.1	**	5.9
Swell Moisture Content Before (%)	19.5	26.6	28.3	21.8	25.2
Swell Moisture Content After (%)	30.8	33.8	35.0	28.2	27.4
Swell (%)	1.8	1.1	0.2	0.3	0.0
Shrink Swell Index Iss (%)	1.6	2.4	2.3	**	3.3
Visual Description	Clay	Clay	Clay	Clay	Clay
Cracking	HC	SC	SC	FR	UC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report

Report Number: NEW20P-0146D-6
Issue Number: 1
Date Issued: 07/08/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5205
Dates Tested: 23/07/2024 - 29/07/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received



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Approved Signatory: Brent Cullen

Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5205Z	NEW24S-5205AA	NEW24S-5205AB		
Date Sampled	23/07/2024	23/07/2024	23/07/2024		
Date Tested	25/07/2024	25/07/2024	25/07/2024		
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu		
Sample Location	TP1714 - (1.10 - 1.30m)	TP1715 - (0.30 - 0.55m)	TP1715 - (1.00 - 1.20m)		
Inert Material Estimate (%)	1	2	1		
Pocket Penetrometer before (kPa)	550	450	170		
Pocket Penetrometer after (kPa)	180	220	130		
Shrinkage Moisture Content (%)	21.7	22.3	28.7		
Shrinkage (%)	4.3	6.7	5.9		
Swell Moisture Content Before (%)	21.8	20.8	28.0		
Swell Moisture Content After (%)	33.8	29.0	30.7		
Swell (%)	6.2	1.4	0.3		
Shrink Swell Index Iss (%)	4.1	4.1	3.4		
Visual Description	Clay	Clay	Clay		
Cracking	SC	UC	MC		
Crumbling	No	No	No		
Remarks	**	**	**		

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758A
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1716 - (0.50 - 0.80m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	1.2
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

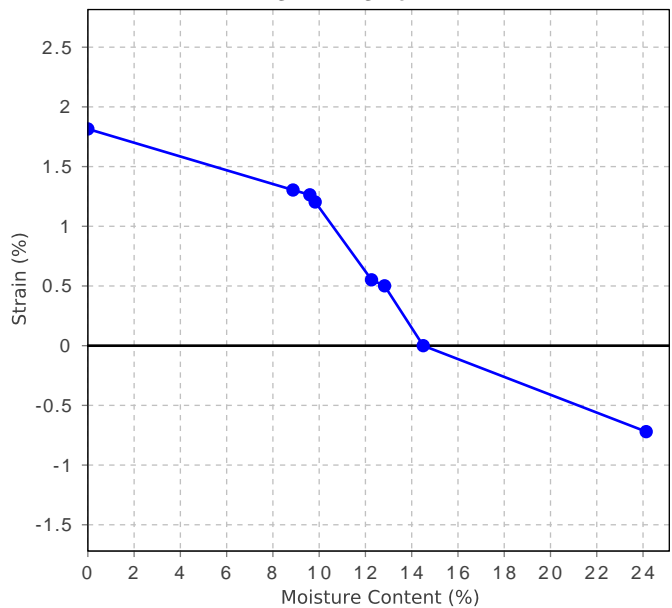
Shrinkage Strain - Oven Dried (%)	1.8
Estimated % by volume of significant inert inclusions	3
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	14.5

Swell Test

Initial Pocket Penetrometer (kPa)	350
Final Pocket Penetrometer (kPa)	270
Initial Moisture Content (%)	15.0
Final Moisture Content (%)	24.1
Swell (%)	0.7

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758B
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1716 - (1.20 - 1.32m)
Material: Sandy Clay
Material Source: On-Site Insitu



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Engineering Geologist

NATA Accredited Laboratory Number: 18686

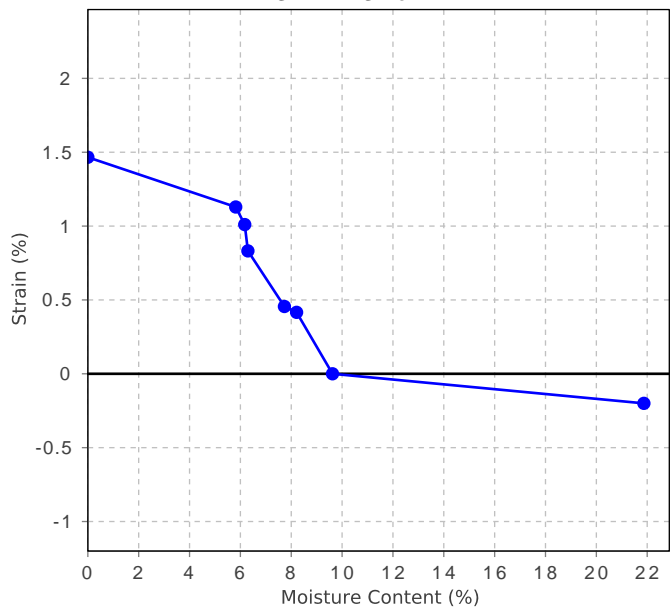
Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
I_{ss} (%)	0.9
Visual Description	Sandy Clay
* Shrink Swell Index (I _{ss}) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.5
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	Yes
Moisture Content (%)	9.6

Swell Test	
Initial Pocket Penetrometer (kPa)	240
Final Pocket Penetrometer (kPa)	150
Initial Moisture Content (%)	9.8
Final Moisture Content (%)	21.9
Swell (%)	0.2

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758C
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1717 - (0.70 - 0.90m)
Material: Sandy Clay
Material Source: On-Site Insitu



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 Phone: (02) 4968 4468

Email: brentcullen@qualtest.com.au

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Approved Signatory: Brent Cullen

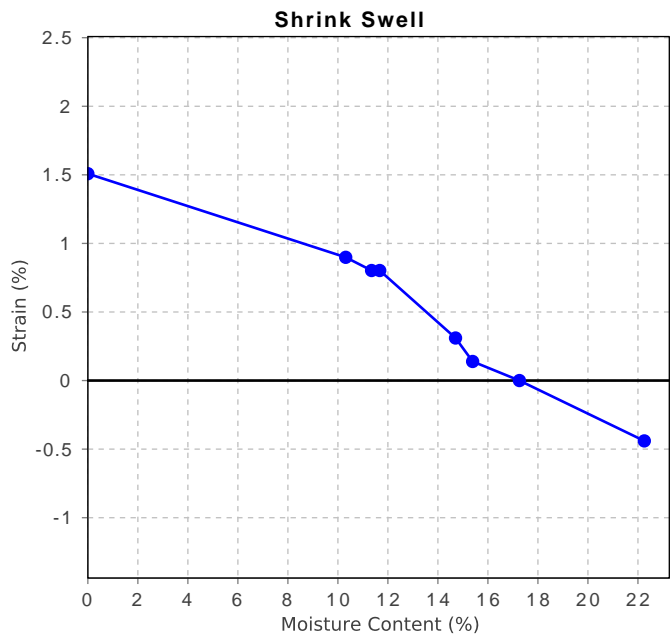
Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
I_{ss} (%)	1.0
Visual Description	Sandy Clay
* Shrink Swell Index (I _{ss}) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.5
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	Yes
Moisture Content (%)	17.3

Swell Test	
Initial Pocket Penetrometer (kPa)	440
Final Pocket Penetrometer (kPa)	320
Initial Moisture Content (%)	17.2
Final Moisture Content (%)	22.3
Swell (%)	0.4
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758D
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1717 - (1.20 - 1.45m)
Material: Sandy Clay
Material Source: On-Site Insitu



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Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	1.1
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

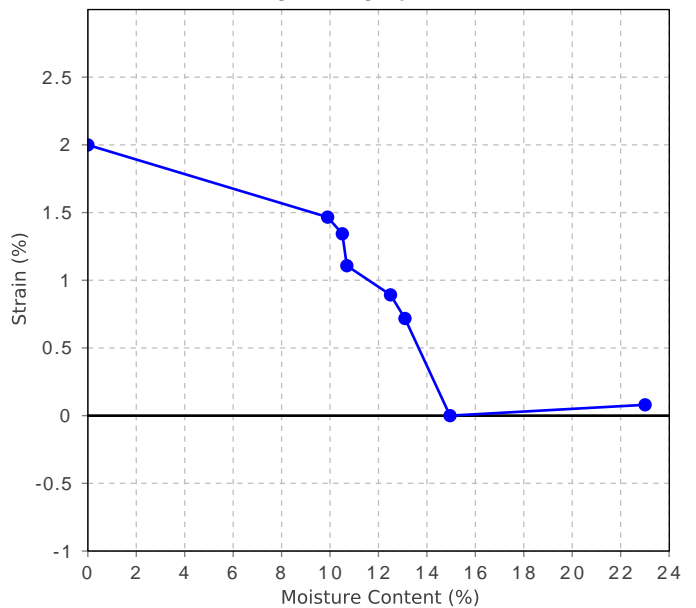
Shrinkage Strain - Oven Dried (%)	2.0
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	Yes
Moisture Content (%)	15.0

Swell Test

Initial Pocket Penetrometer (kPa)	550
Final Pocket Penetrometer (kPa)	280
Initial Moisture Content (%)	14.8
Final Moisture Content (%)	23.0
Swell (%)	-0.1

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758E
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1718 - (0.60 - 0.85m)
Material: Clay
Material Source: On-Site Insitu



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Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	5.2
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

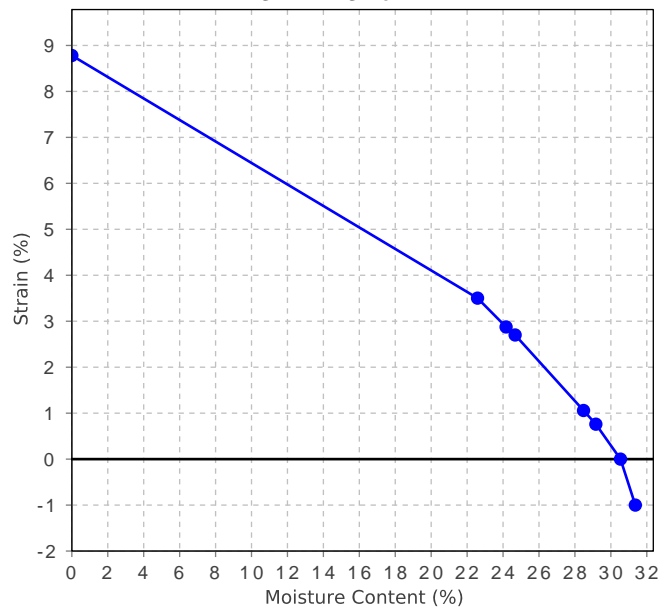
Shrinkage Strain - Oven Dried (%)	8.8
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	30.5

Swell Test

Initial Pocket Penetrometer (kPa)	200
Final Pocket Penetrometer (kPa)	180
Initial Moisture Content (%)	30.1
Final Moisture Content (%)	31.4
Swell (%)	1.0

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758F
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1718 - (1.45 - 1.60m)
Material: Sandy Clay
Material Source: On-Site Insitu



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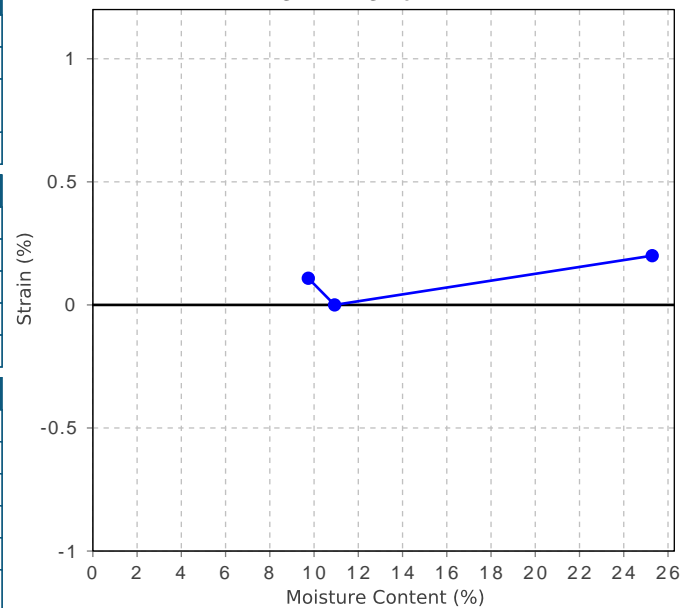


Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Unable to achieve Iss result due to shrinkage specimen fragmenting.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	
Estimated % by volume of significant inert inclusions	1
Cracking	Fragmented
Crumbling	Yes
Moisture Content (%)	10.9
Swell Test	
Initial Pocket Penetrometer (kPa)	200
Final Pocket Penetrometer (kPa)	30
Initial Moisture Content (%)	10.2
Final Moisture Content (%)	25.3
Swell (%)	-0.2
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758G
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1719 - (0.60 - 0.80m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

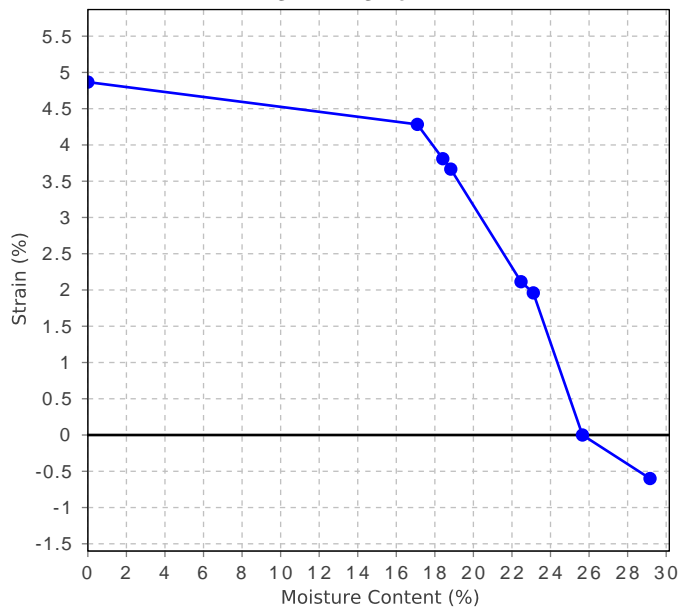
B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.9
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.9
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	25.7

Swell Test	
Initial Pocket Penetrometer (kPa)	300
Final Pocket Penetrometer (kPa)	240
Initial Moisture Content (%)	25.8
Final Moisture Content (%)	29.2
Swell (%)	0.6
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758H
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1719 - (1.10 - 1.65m)
Material: Clay
Material Source: On-Site Insitu



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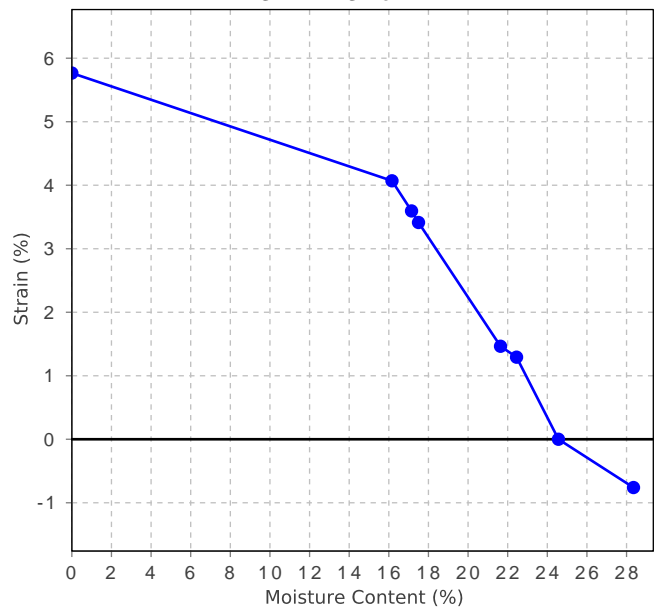


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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.4
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	5.8
Estimated % by volume of significant inert inclusions	3
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	24.6
Swell Test	
Initial Pocket Penetrometer (kPa)	250
Final Pocket Penetrometer (kPa)	210
Initial Moisture Content (%)	24.8
Final Moisture Content (%)	28.4
Swell (%)	0.8
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758I
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1719 - (1.50 - 1.70m)
Material: Clay
Material Source: On-Site Insitu



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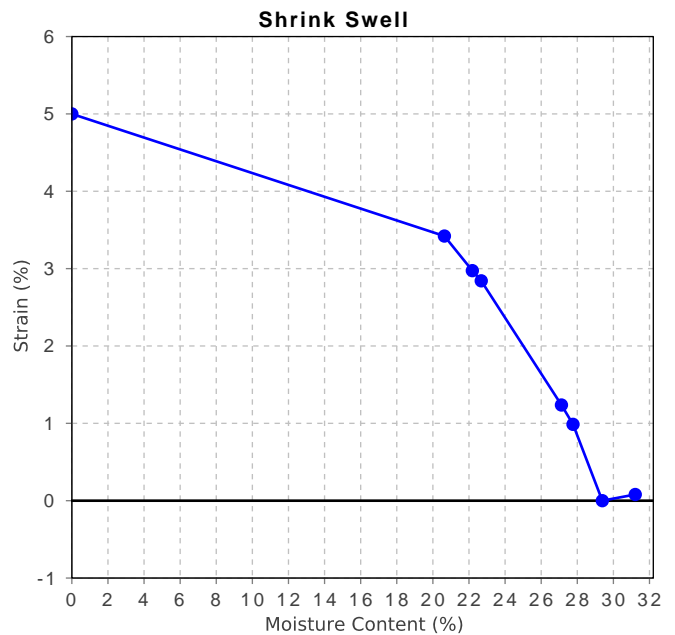
B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.8
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	5.0
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	29.4

Swell Test	
Initial Pocket Penetrometer (kPa)	250
Final Pocket Penetrometer (kPa)	110
Initial Moisture Content (%)	30.4
Final Moisture Content (%)	31.2
Swell (%)	-0.1

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Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758J
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1720 - (0.70 - 1.00m)
Material: Clay
Material Source: On-Site Insitu



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 NATA Accredited Laboratory Number: 18686

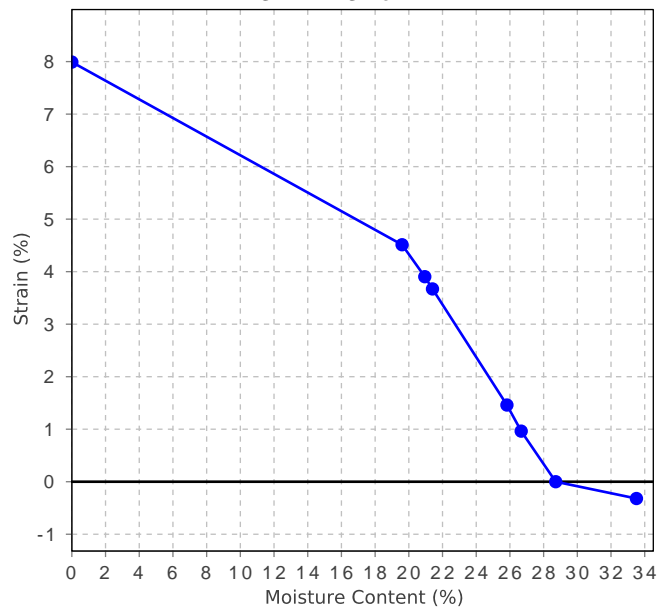
B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	4.5
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	8.0
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	28.7

Swell Test	
Initial Pocket Penetrometer (kPa)	160
Final Pocket Penetrometer (kPa)	130
Initial Moisture Content (%)	28.5
Final Moisture Content (%)	33.5
Swell (%)	0.3
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758K
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1720 - (1.30 - 1.60m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	1.5
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

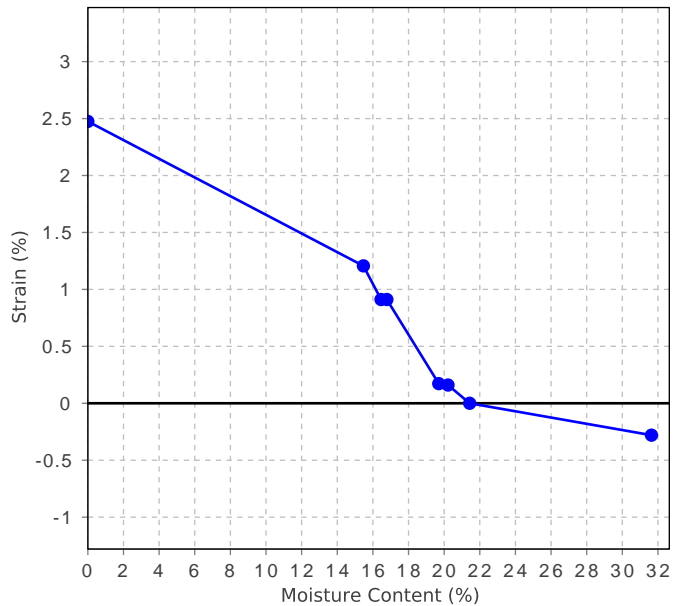
Shrinkage Strain - Oven Dried (%)	2.5
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	21.4

Swell Test

Initial Pocket Penetrometer (kPa)	420
Final Pocket Penetrometer (kPa)	>600
Initial Moisture Content (%)	21.5
Final Moisture Content (%)	31.6
Swell (%)	0.3

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758L
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1721 - (0.60 - 0.80m)
Material: Clay
Material Source: On-Site Insitu



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 NATA Accredited Laboratory Number: 18686

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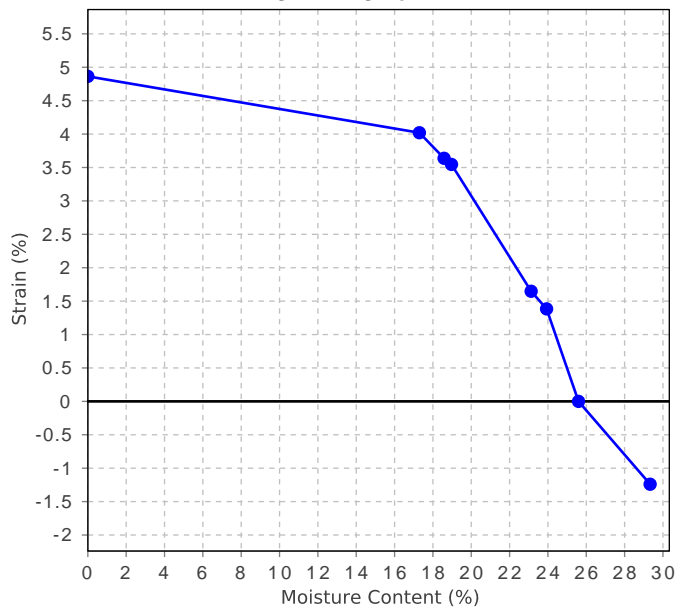
Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.0
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.9
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	25.6

Swell Test	
Initial Pocket Penetrometer (kPa)	400
Final Pocket Penetrometer (kPa)	170
Initial Moisture Content (%)	25.7
Final Moisture Content (%)	29.3
Swell (%)	1.2

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758M
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1721 - (1.50 - 1.80m)
Material: Sandy Clay
Material Source: On-Site Insitu



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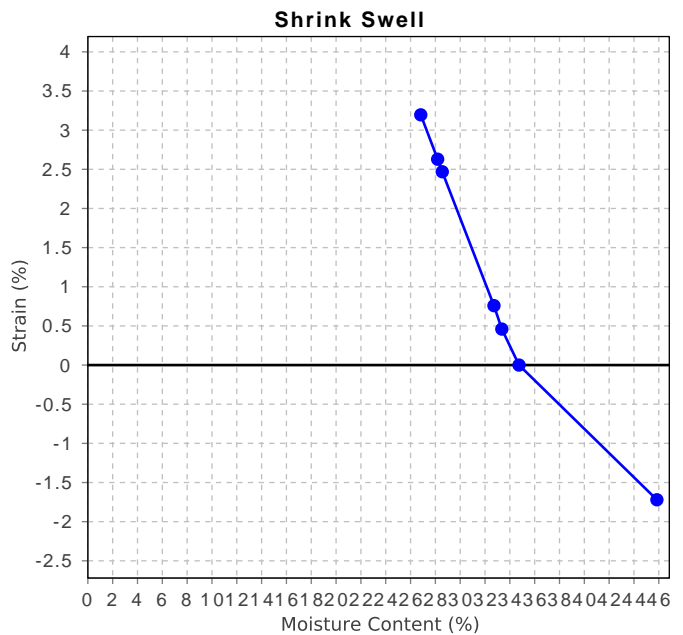
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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Unable to achieve Iss result due to shrinkage specimen fragmenting.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	
Estimated % by volume of significant inert inclusions	1
Cracking	Fragmented
Crumbling	No
Moisture Content (%)	34.7
Swell Test	
Initial Pocket Penetrometer (kPa)	260
Final Pocket Penetrometer (kPa)	140
Initial Moisture Content (%)	35.3
Final Moisture Content (%)	45.8
Swell (%)	1.7
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758N
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1722 - (0.70 - 0.90m)
Material: Clay
Material Source: On-Site Insitu



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Approved Signatory: Brent Cullen

Engineering Geologist

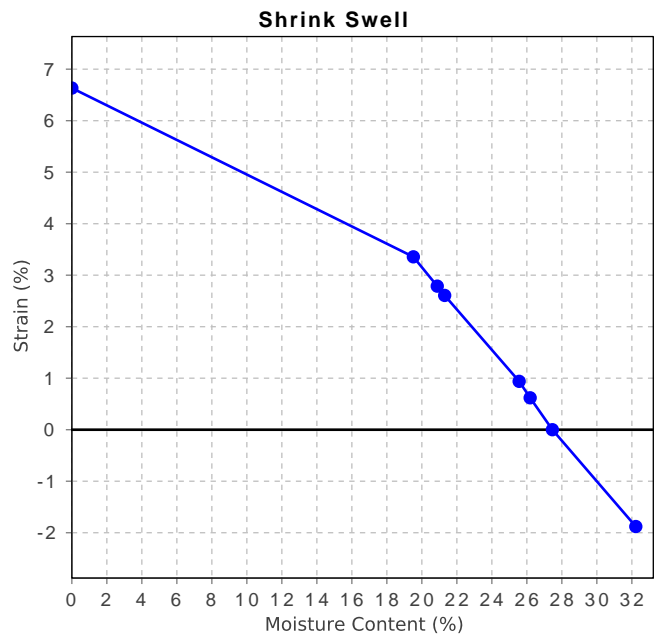
NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	4.2
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	6.6
Estimated % by volume of significant inert inclusions	1
Cracking	Moderately Cracked
Crumbling	No
Moisture Content (%)	27.5

Swell Test	
Initial Pocket Penetrometer (kPa)	320
Final Pocket Penetrometer (kPa)	170
Initial Moisture Content (%)	27.0
Final Moisture Content (%)	32.2
Swell (%)	1.9
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758O
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1722 - (1.50 - 1.70m)
Material: Clay
Material Source: On-Site Insitu



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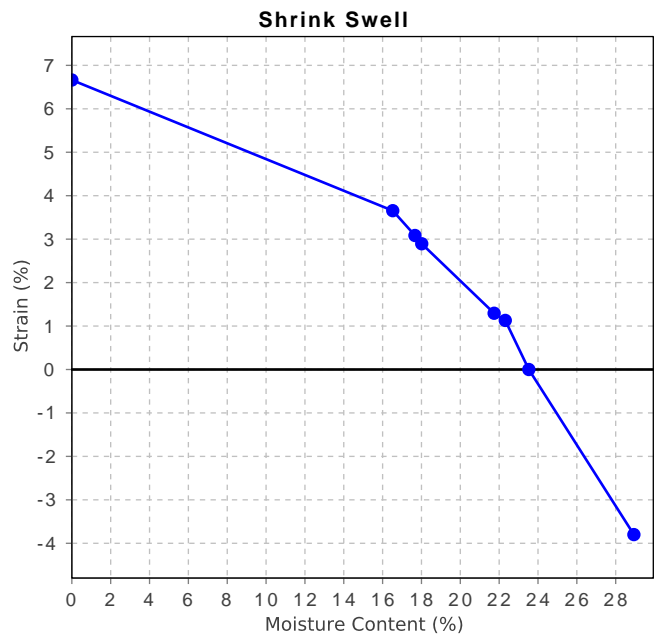
Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	4.8
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	6.7
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	23.5

Swell Test	
Initial Pocket Penetrometer (kPa)	400
Final Pocket Penetrometer (kPa)	220
Initial Moisture Content (%)	23.8
Final Moisture Content (%)	28.9
Swell (%)	3.8
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758P
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 22/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1723 - (0.65 - 0.85m)
Material: Clay
Material Source: On-Site Insitu



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 2 Murray Dwyer Circuit Mayfield West NSW 2304
 Phone: (02) 4968 4468
 Email: brentcullen@qualtest.com.au

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Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	3.8
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

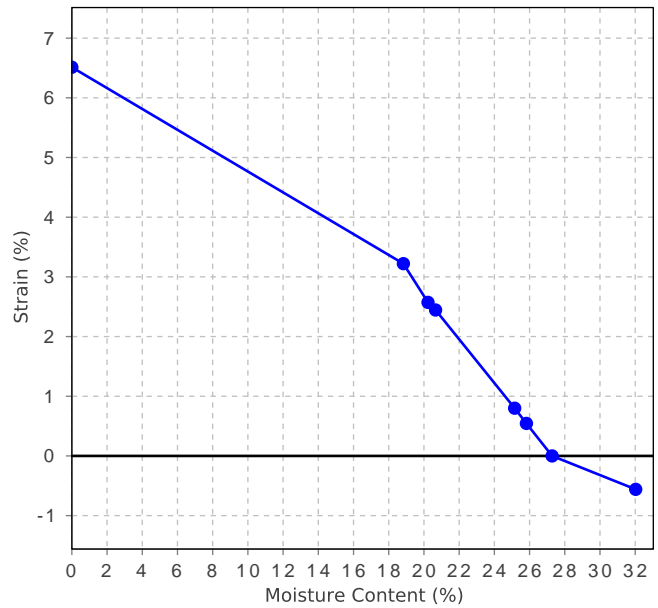
Shrinkage Strain - Oven Dried (%)	6.5
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	27.3

Swell Test

Initial Pocket Penetrometer (kPa)	300
Final Pocket Penetrometer (kPa)	200
Initial Moisture Content (%)	27.7
Final Moisture Content (%)	32.0
Swell (%)	0.6

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758Q
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 23/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1723 - (1.40 - 1.65m)
Material: Sandy Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

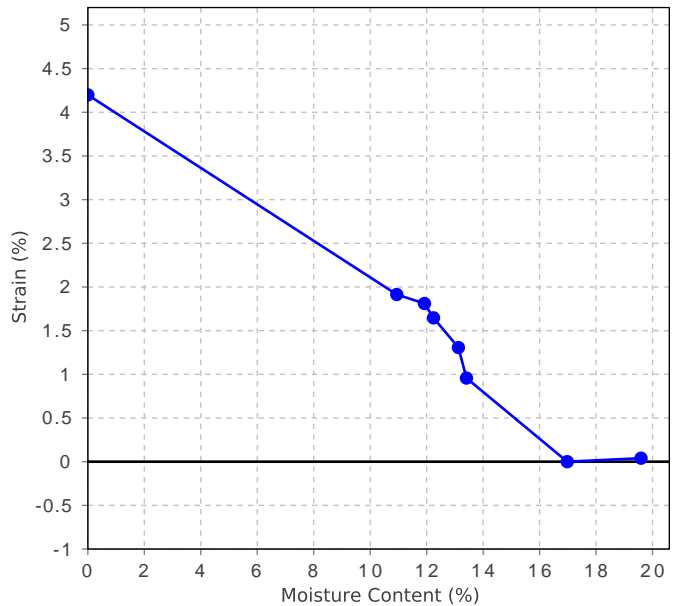
B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.3
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.2
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	17.0

Swell Test	
Initial Pocket Penetrometer (kPa)	250
Final Pocket Penetrometer (kPa)	>600
Initial Moisture Content (%)	16.5
Final Moisture Content (%)	19.6
Swell (%)	-0.0
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758R
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 23/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1724 - (0.70 - 0.95m)
Material: Clay
Material Source: On-Site Insitu



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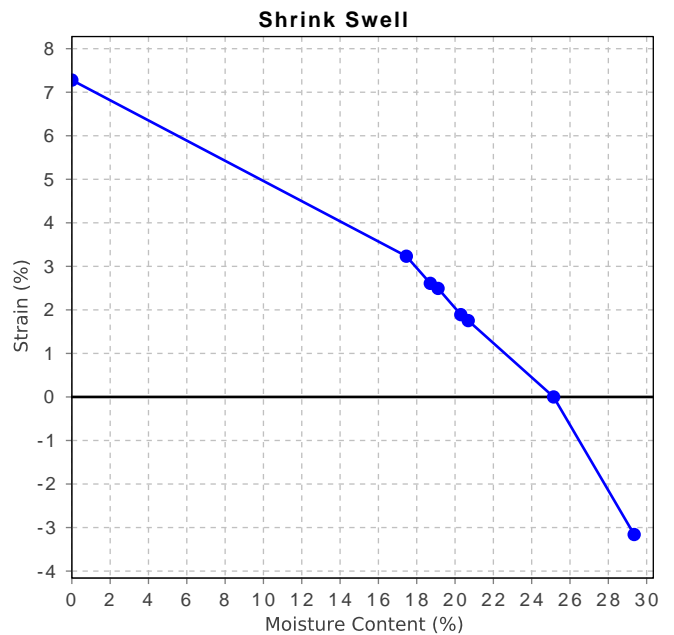
B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	4.9
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	7.3
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	25.1

Swell Test	
Initial Pocket Penetrometer (kPa)	580
Final Pocket Penetrometer (kPa)	300
Initial Moisture Content (%)	25.2
Final Moisture Content (%)	29.3
Swell (%)	3.2

* NATA Accreditation does not cover the performance of pocket penetrometer readings.



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758S
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 26/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1725 - (0.20 - 0.45m)
Material: Clay
Material Source: On-Site Insitu



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 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	1.4
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

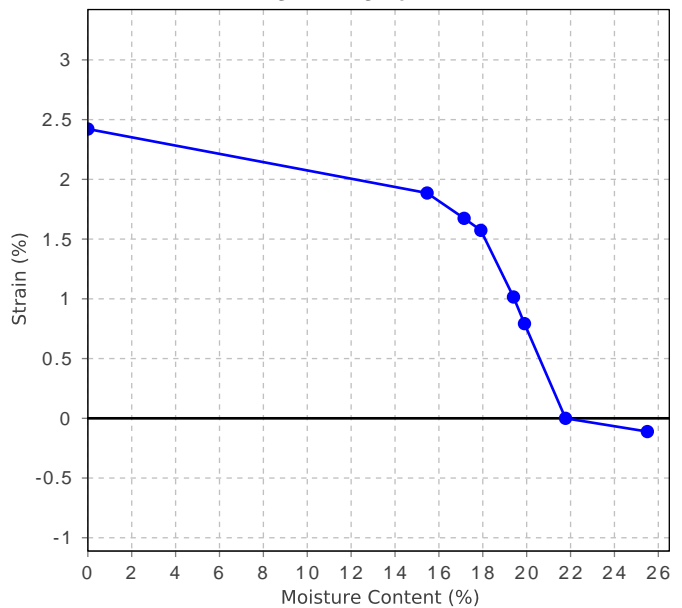
Shrinkage Strain - Oven Dried (%)	2.4
Estimated % by volume of significant inert inclusions	2
Cracking	Moderately Cracked
Crumbling	No
Moisture Content (%)	21.8

Swell Test

Initial Pocket Penetrometer (kPa)	500
Final Pocket Penetrometer (kPa)	260
Initial Moisture Content (%)	22.6
Final Moisture Content (%)	25.5
Swell (%)	0.1

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758T
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 28/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1725 - (1.40 - 1.70m)
Material: Sandy Clay
Material Source: On-Site Insitu



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 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	1.1
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

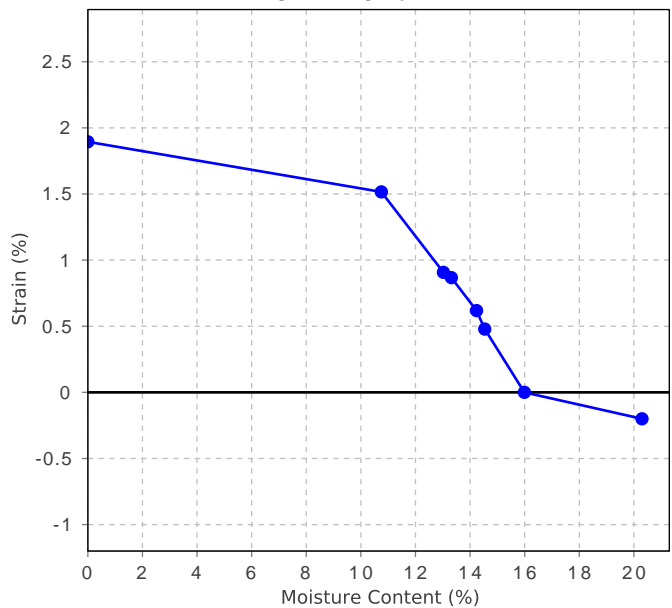
Shrinkage Strain - Oven Dried (%)	1.9
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	16.0

Swell Test

Initial Pocket Penetrometer (kPa)	420
Final Pocket Penetrometer (kPa)	500
Initial Moisture Content (%)	16.4
Final Moisture Content (%)	20.3
Swell (%)	0.2

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758U
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 28/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1726 - (0.20 - 0.50m)
Material: Sandy Clay
Material Source: On-Site Insitu



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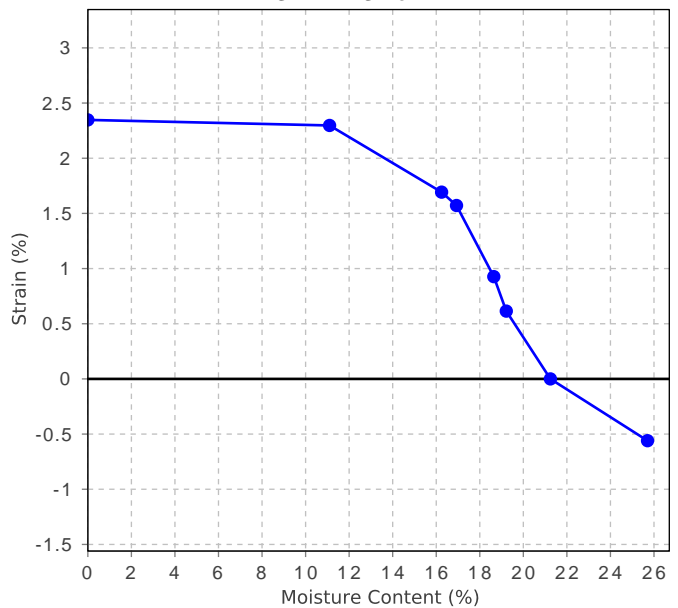
Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	1.5
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	2.3
Estimated % by volume of significant inert inclusions	1
Cracking	Moderately Cracked
Crumbling	No
Moisture Content (%)	21.2

Swell Test	
Initial Pocket Penetrometer (kPa)	300
Final Pocket Penetrometer (kPa)	300
Initial Moisture Content (%)	21.7
Final Moisture Content (%)	25.7
Swell (%)	0.6
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758V
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 28/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1726 - (0.90 - 1.10m)
Material: Clay
Material Source: On-Site Insitu



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 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	2.1
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

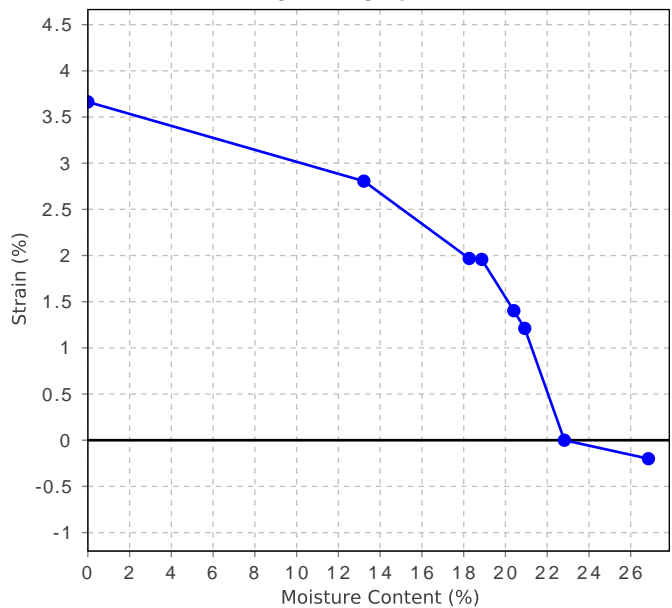
Shrinkage Strain - Oven Dried (%)	3.7
Estimated % by volume of significant inert inclusions	3
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	22.8

Swell Test

Initial Pocket Penetrometer (kPa)	>600
Final Pocket Penetrometer (kPa)	600
Initial Moisture Content (%)	23.9
Final Moisture Content (%)	26.8
Swell (%)	0.2

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758W
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 29/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1727 - (0.80 - 1.10m)
Material: Clay
Material Source: On-Site Insitu



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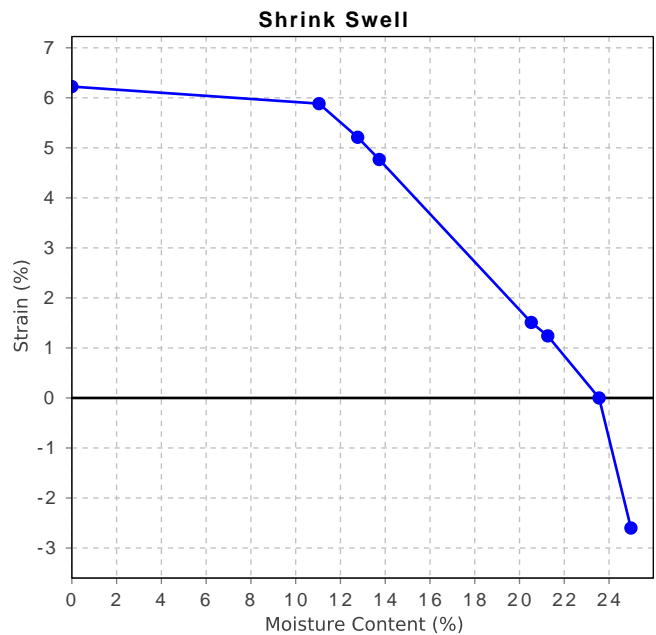
Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	4.2
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	6.2
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	23.6

Swell Test	
Initial Pocket Penetrometer (kPa)	230
Final Pocket Penetrometer (kPa)	140
Initial Moisture Content (%)	22.4
Final Moisture Content (%)	25.0
Swell (%)	2.6
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758X
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 03/09/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1727 - (1.40 - 1.70m)
Material: Clay
Material Source: On-Site Insitu



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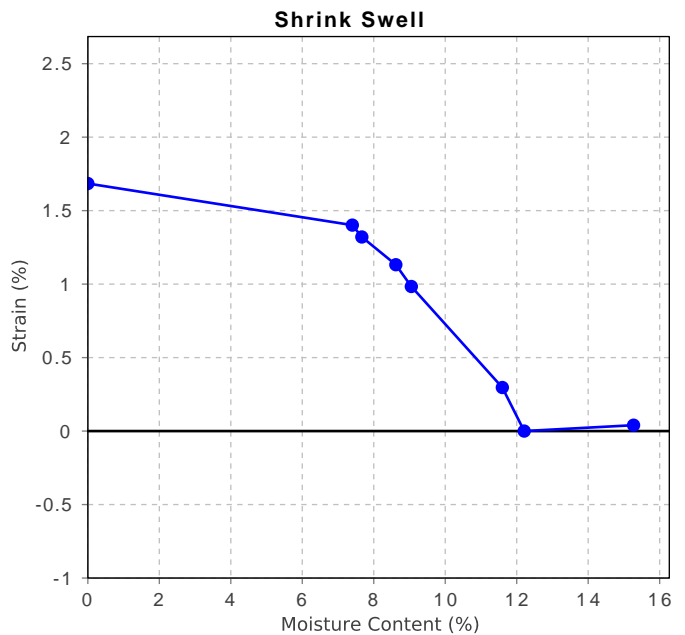
Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	0.9
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.7
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	12.2

Swell Test	
Initial Pocket Penetrometer (kPa)	>600
Final Pocket Penetrometer (kPa)	>600
Initial Moisture Content (%)	12.0
Final Moisture Content (%)	15.3
Swell (%)	-0.0
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758Y
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 29/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1728 - (0.70 - 1.05m)
Material: Clay
Material Source: On-Site Insitu



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Approved Signatory: Brent Cullen

Engineering Geologist

NATA Accredited Laboratory Number: 18686

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	3.8
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

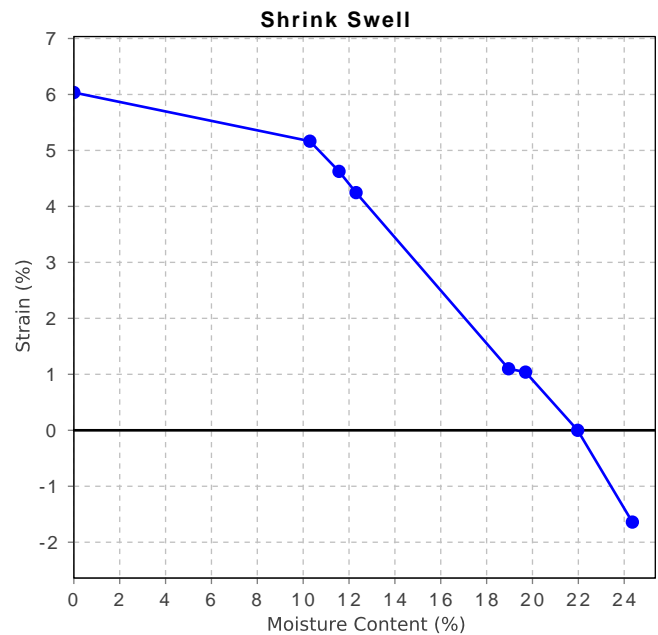
Core Shrinkage Test

Shrinkage Strain - Oven Dried (%)	6.0
Estimated % by volume of significant inert inclusions	5
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	22.0

Swell Test

Initial Pocket Penetrometer (kPa)	330
Final Pocket Penetrometer (kPa)	220
Initial Moisture Content (%)	21.3
Final Moisture Content (%)	24.4
Swell (%)	1.6

* NATA Accreditation does not cover the performance of pocket penetrometer readings.



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758Z
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 29/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1728 - (1.50 - 1.90m)
Material: Sandy Clay
Material Source: On-Site Insitu



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Engineering Geologist

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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	4.1
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

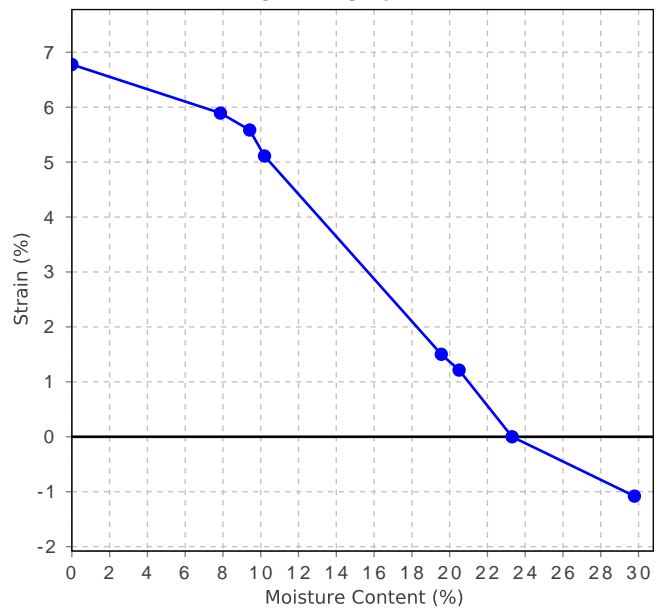
Shrinkage Strain - Oven Dried (%)	6.8
Estimated % by volume of significant inert inclusions	1
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	23.3

Swell Test

Initial Pocket Penetrometer (kPa)	360
Final Pocket Penetrometer (kPa)	240
Initial Moisture Content (%)	23.9
Final Moisture Content (%)	29.8
Swell (%)	1.1

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AA
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 29/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1729 - (0.70 - 1.00m)
Material: Clay
Material Source: On-Site Insitu



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B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	3.2
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

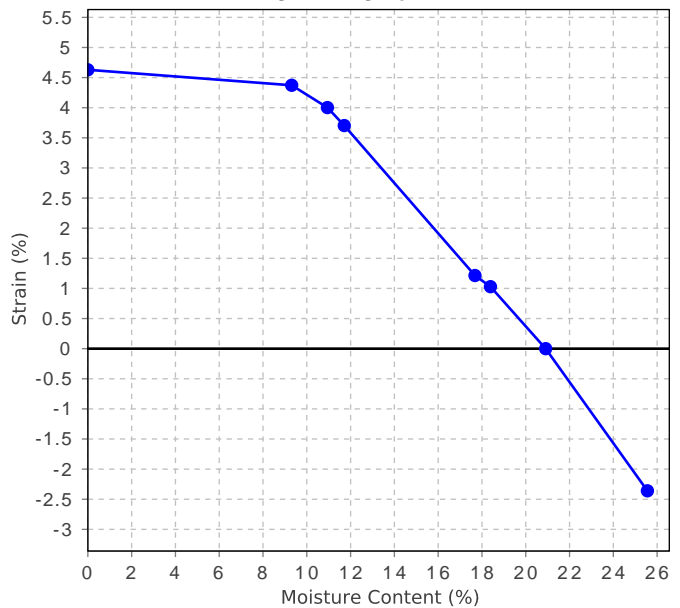
Shrinkage Strain - Oven Dried (%)	4.6
Estimated % by volume of significant inert inclusions	3
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	20.9

Swell Test

Initial Pocket Penetrometer (kPa)	430
Final Pocket Penetrometer (kPa)	210
Initial Moisture Content (%)	20.8
Final Moisture Content (%)	25.6
Swell (%)	2.4

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AB
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 29/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1729 - (1.00 - 1.15m)
Material: Clay
Material Source: On-Site Insitu



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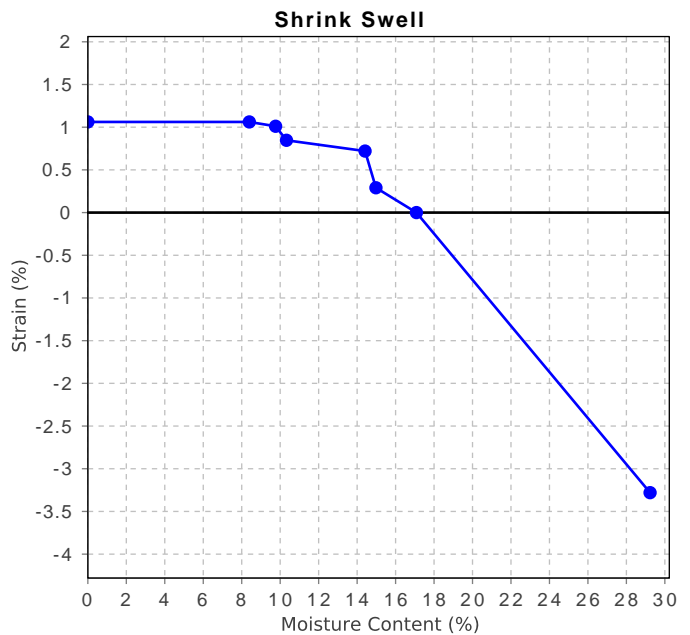
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 NATA Accredited Laboratory Number: 18686

B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	1.5
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Unable to achieve accurate Iss result due to shrinkage specimen fragmenting.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.1
Estimated % by volume of significant inert inclusions	6
Cracking	Fragmented
Crumbling	No
Moisture Content (%)	17.1
Swell Test	
Initial Pocket Penetrometer (kPa)	460
Final Pocket Penetrometer (kPa)	190
Initial Moisture Content (%)	17.1
Final Moisture Content (%)	29.2
Swell (%)	3.3
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AC
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 29/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1729 - (1.50 - 1.85m)
Material: Clay
Material Source: On-Site Insitu



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Engineering Geologist

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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)

Iss (%)	4.2
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test

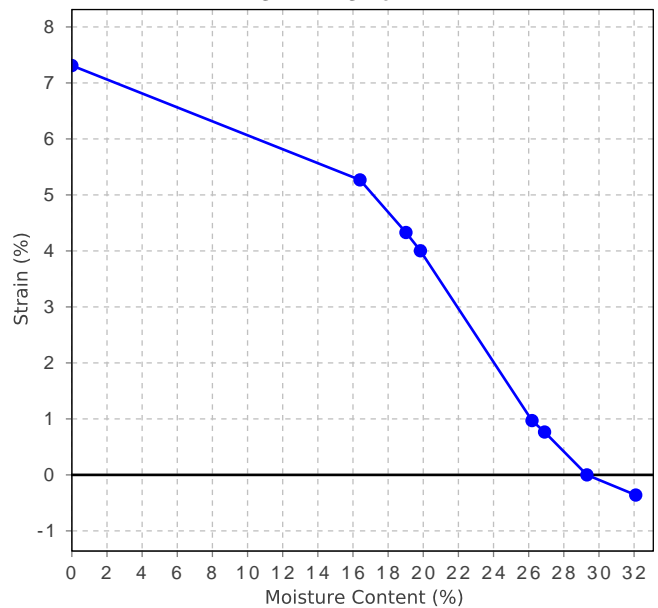
Shrinkage Strain - Oven Dried (%)	7.3
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	29.3

Swell Test

Initial Pocket Penetrometer (kPa)	320
Final Pocket Penetrometer (kPa)	180
Initial Moisture Content (%)	28.5
Final Moisture Content (%)	32.1
Swell (%)	0.4

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AD
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 29/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1730 - (0.60 - 0.75m)
Material: Clay
Material Source: On-Site Insitu



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Approved Signatory: Brent Cullen

Engineering Geologist

NATA Accredited Laboratory Number: 18686

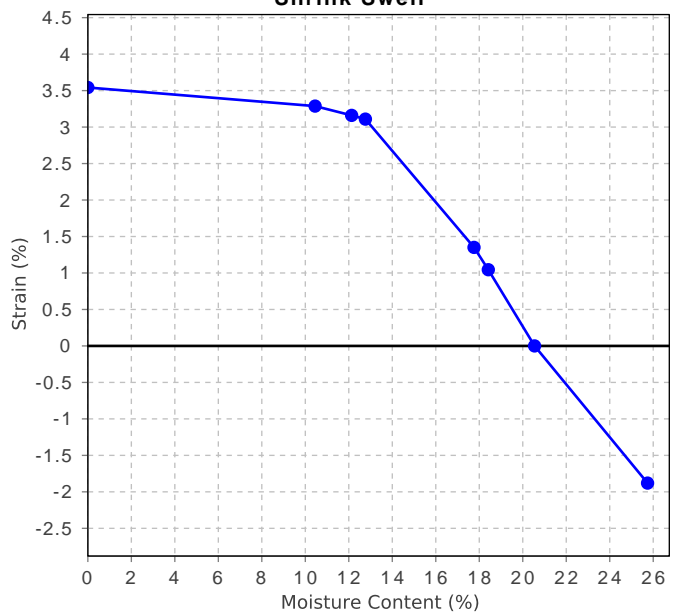
Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.5
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	3.5
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	20.5

Swell Test	
Initial Pocket Penetrometer (kPa)	320
Final Pocket Penetrometer (kPa)	190
Initial Moisture Content (%)	22.4
Final Moisture Content (%)	25.7
Swell (%)	1.9

* NATA Accreditation does not cover the performance of pocket penetrometer readings.

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AE
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 29/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1730 - (1.00 - 1.15m)
Material: Sandy Clay
Material Source: On-Site Insitu



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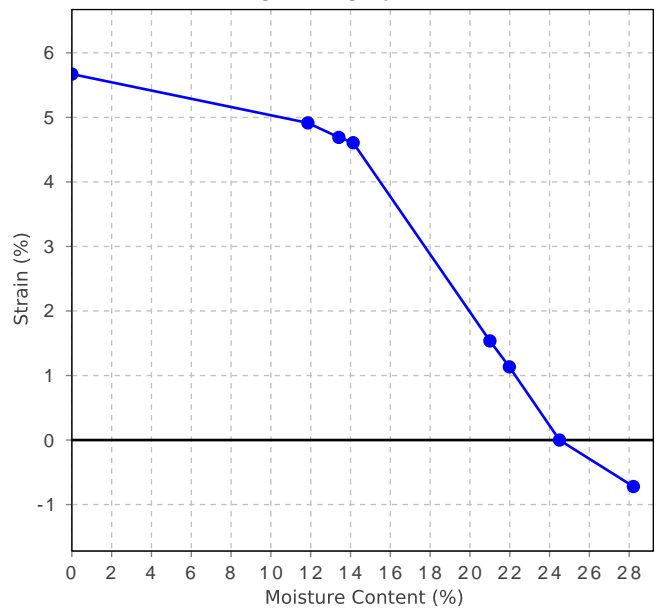
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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.4
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	5.7
Estimated % by volume of significant inert inclusions	3
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	24.5

Swell Test	
Initial Pocket Penetrometer (kPa)	220
Final Pocket Penetrometer (kPa)	150
Initial Moisture Content (%)	24.6
Final Moisture Content (%)	28.2
Swell (%)	0.7
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AF
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 29/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1730 - (1.50 - 1.90m)
Material: Clay
Material Source: On-Site Insitu



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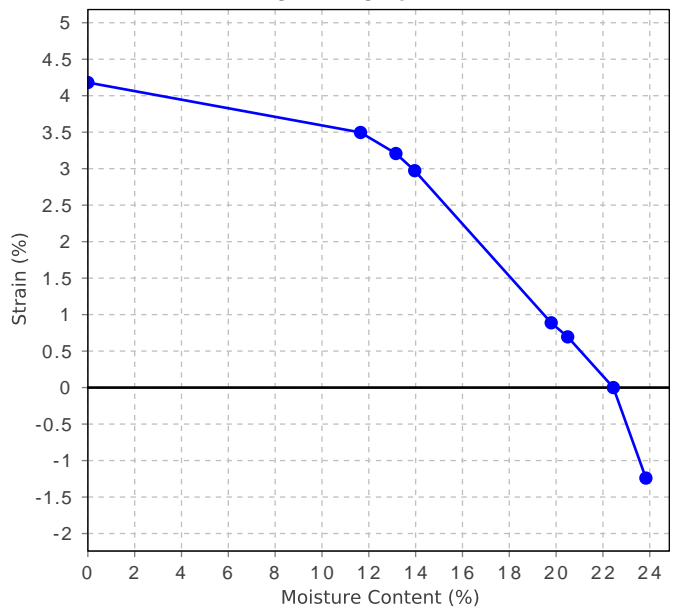
B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.7
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.2
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	22.4

Swell Test	
Initial Pocket Penetrometer (kPa)	320
Final Pocket Penetrometer (kPa)	220
Initial Moisture Content (%)	22.1
Final Moisture Content (%)	23.8
Swell (%)	1.2
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Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AG
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 30/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1731 - (0.70 - 1.00m)
Material: Clay
Material Source: On-Site Insitu



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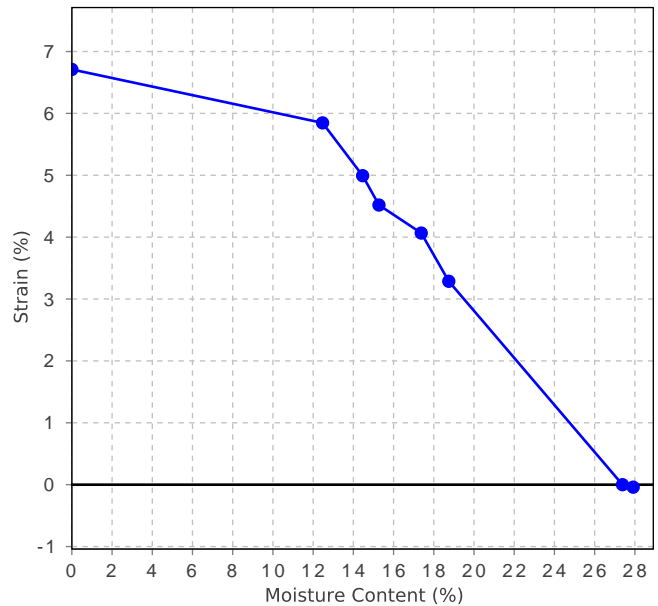
B. Cullen

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.7
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	6.7
Estimated % by volume of significant inert inclusions	
Cracking	Moderately Cracked
Crumbling	No
Moisture Content (%)	27.4

Swell Test	
Initial Pocket Penetrometer (kPa)	120
Final Pocket Penetrometer (kPa)	100
Initial Moisture Content (%)	27.1
Final Moisture Content (%)	27.9
Swell (%)	0.0
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	

Shrink Swell



Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AH
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 30/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: TP1731 - (1.60 - 1.80m)
Material: Clay
Material Source: On-Site Insitu



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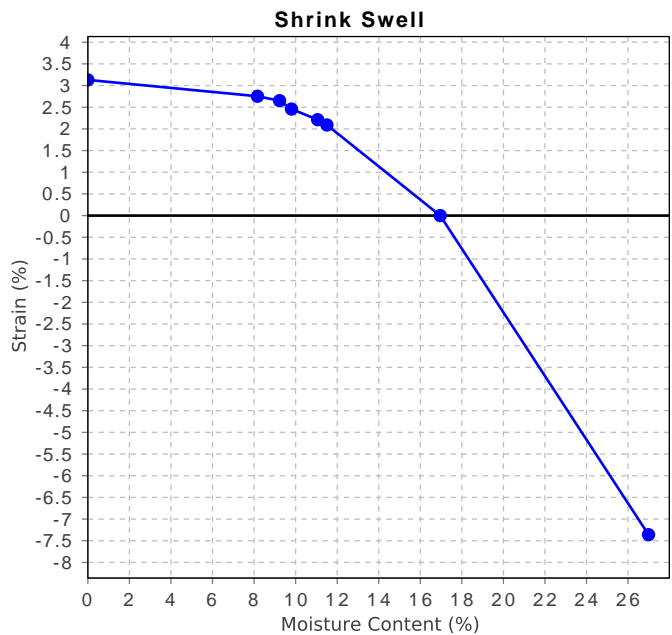
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Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.8
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	

Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	3.1
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	17.0

Swell Test	
Initial Pocket Penetrometer (kPa)	>600
Final Pocket Penetrometer (kPa)	150
Initial Moisture Content (%)	16.9
Final Moisture Content (%)	27.0
Swell (%)	7.4

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Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
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Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AR
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 06/09/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: SL2A
Material: Clay
Material Source: On-Site Insitu



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Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	34		
Plastic Limit (%)	26		
Plasticity Index (%)	8		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	4.0		
Cracking Crumbling Curling	Cracking		

Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AT
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 06/09/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: DBT1A (0.20 - 0.40m)
Material: Clay
Material Source: On-Site Insitu



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Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Oven Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	19		
Plastic Limit (%)	16		
Plasticity Index (%)	3		
Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	2.5		
Cracking Crumbling Curling	None		

Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Dates Tested: 21/08/2024 - 03/09/2024



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Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5758A	NEW24S-5758B	NEW24S-5758C	NEW24S-5758D	NEW24S-5758E
Date Sampled	20/08/2024	20/08/2024	20/08/2024	20/08/2024	20/08/2024
Date Tested	22/08/2024	22/08/2024	22/08/2024	22/08/2024	22/08/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1716 - (0.50 - 0.80m)	TP1716 - (1.20 - 1.32m)	TP1717 - (0.70 - 0.90m)	TP1717 - (1.20 - 1.45m)	TP1718 - (0.60 - 0.85m)
Inert Material Estimate (%)	3	1	1	1	1
Pocket Penetrometer before (kPa)	350	240	440	550	200
Pocket Penetrometer after (kPa)	270	150	320	280	180
Shrinkage Moisture Content (%)	14.5	9.6	17.3	15.0	30.5
Shrinkage (%)	1.8	1.5	1.5	2.0	8.8
Swell Moisture Content Before (%)	15.0	9.8	17.2	14.8	30.1
Swell Moisture Content After (%)	24.1	21.9	22.3	23.0	31.4
Swell (%)	0.7	0.2	0.4	-0.1	1.0
Shrink Swell Index Iss (%)	1.2	0.9	1.0	1.1	5.2
Visual Description	Clay	Sandy Clay	Sandy Clay	Sandy Clay	Clay
Cracking	SC	SC	SC	SC	UC
Crumbling	No	Yes	Yes	Yes	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Dates Tested: 21/08/2024 - 03/09/2024



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NATA Accredited Laboratory Number: 18686

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5758F	NEW24S-5758G	NEW24S-5758H	NEW24S-5758I	NEW24S-5758J
Date Sampled	20/08/2024	20/08/2024	20/08/2024	20/08/2024	20/08/2024
Date Tested	22/08/2024	22/08/2024	22/08/2024	22/08/2024	22/08/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1718 - (1.45 - 1.60m)	TP1719 - (0.60 - 0.80m)	TP1719 - (1.10 - 1.65m)	TP1719 - (1.50 - 1.70m)	TP1720 - (0.70 - 1.00m)
Inert Material Estimate (%)	1	2	3	2	1
Pocket Penetrometer before (kPa)	200	300	250	250	160
Pocket Penetrometer after (kPa)	30	240	210	110	130
Shrinkage Moisture Content (%)	10.9	25.7	24.6	29.4	28.7
Shrinkage (%)	**	4.9	5.8	5.0	8.0
Swell Moisture Content Before (%)	10.2	25.8	24.8	30.4	28.5
Swell Moisture Content After (%)	25.3	29.2	28.4	31.2	33.5
Swell (%)	-0.2	0.6	0.8	-0.1	0.3
Shrink Swell Index Iss (%)	**	2.9	3.4	2.8	4.5
Visual Description	Sandy Clay	Clay	Clay	Clay	Clay
Cracking	FR	SC	UC	SC	SC
Crumbling	Yes	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

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Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Dates Tested: 21/08/2024 - 03/09/2024



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Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5758K	NEW24S-5758L	NEW24S-5758M	NEW24S-5758N	NEW24S-5758O
Date Sampled	20/08/2024	20/08/2024	20/08/2024	20/08/2024	20/08/2024
Date Tested	22/08/2024	22/08/2024	22/08/2024	22/08/2024	22/08/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1720 - (1.30 - 1.60m)	TP1721 - (0.60 - 0.80m)	TP1721 - (1.50 - 1.80m)	TP1722 - (0.70 - 0.90m)	TP1722 - (1.50 - 1.70m)
Inert Material Estimate (%)	1	1	1	1	1
Pocket Penetrometer before (kPa)	420	400	260	320	400
Pocket Penetrometer after (kPa)	>600	170	140	170	220
Shrinkage Moisture Content (%)	21.4	25.6	34.7	27.5	23.5
Shrinkage (%)	2.5	4.9	**	6.6	6.7
Swell Moisture Content Before (%)	21.5	25.7	35.3	27.0	23.8
Swell Moisture Content After (%)	31.6	29.3	45.8	32.2	28.9
Swell (%)	0.3	1.2	1.7	1.9	3.8
Shrink Swell Index Iss (%)	1.5	3.0	**	4.2	4.8
Visual Description	Clay	Sandy Clay	Sandy Clay	Clay	Clay
Cracking	SC	SC	FR	MC	SC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

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Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Dates Tested: 21/08/2024 - 03/09/2024



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Engineering Geologist

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Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5758P	NEW24S-5758Q	NEW24S-5758R	NEW24S-5758S	NEW24S-5758T
Date Sampled	20/08/2024	20/08/2024	20/08/2024	20/08/2024	20/08/2024
Date Tested	22/08/2024	23/08/2024	23/08/2024	26/08/2024	28/08/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1723 - (0.65 - 0.85m)	TP1723 - (1.40 - 1.65m)	TP1724 - (0.70 - 0.95m)	TP1725 - (0.20 - 0.45m)	TP1725 - (1.40 - 1.70m)
Inert Material Estimate (%)	1	1	1	2	2
Pocket Penetrometer before (kPa)	300	250	580	500	420
Pocket Penetrometer after (kPa)	200	>600	300	260	500
Shrinkage Moisture Content (%)	27.3	17.0	25.1	21.8	16.0
Shrinkage (%)	6.5	4.2	7.3	2.4	1.9
Swell Moisture Content Before (%)	27.7	16.5	25.2	22.6	16.4
Swell Moisture Content After (%)	32.0	19.6	29.3	25.5	20.3
Swell (%)	0.6	-0.0	3.2	0.1	0.2
Shrink Swell Index Iss (%)	3.8	2.3	4.9	1.4	1.1
Visual Description	Clay	Sandy Clay	Clay	Sandy Clay	Sandy Clay
Cracking	SC	SC	SC	MC	SC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

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Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Dates Tested: 21/08/2024 - 03/09/2024



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Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5758U	NEW24S-5758V	NEW24S-5758W	NEW24S-5758X	NEW24S-5758Y
Date Sampled	20/08/2024	20/08/2024	20/08/2024	20/08/2024	20/08/2024
Date Tested	28/08/2024	28/08/2024	29/08/2024	03/09/2024	29/08/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1726 - (0.20 - 0.50m)	TP1726 - (0.90 - 1.10m)	TP1727 - (0.80 - 1.10m)	TP1727 - (1.40 - 1.70m)	TP1728 - (0.70 - 1.05m)
Inert Material Estimate (%)	1	3	1	1	5
Pocket Penetrometer before (kPa)	300	>600	230	>600	330
Pocket Penetrometer after (kPa)	300	600	140	>600	220
Shrinkage Moisture Content (%)	21.2	22.8	23.6	12.2	22.0
Shrinkage (%)	2.3	3.7	6.2	1.7	6.0
Swell Moisture Content Before (%)	21.7	23.9	22.4	12.0	21.3
Swell Moisture Content After (%)	25.7	26.8	25.0	15.3	24.4
Swell (%)	0.6	0.2	2.6	-0.0	1.6
Shrink Swell Index Iss (%)	1.5	2.1	4.2	0.9	3.8
Visual Description	Sandy Clay	Clay	Clay	Sandy Clay	Clay
Cracking	MC	SC	SC	UC	SC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Dates Tested: 21/08/2024 - 03/09/2024



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 Phone: (02) 4968 4468
 Email: brentcullen@qualtest.com.au

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Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5758Z	NEW24S-5758AA	NEW24S-5758AB	NEW24S-5758AC	NEW24S-5758AD
Date Sampled	20/08/2024	20/08/2024	20/08/2024	20/08/2024	20/08/2024
Date Tested	29/08/2024	29/08/2024	29/08/2024	29/08/2024	29/08/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	TP1728 - (1.50 - 1.90m)	TP1729 - (0.70 - 1.00m)	TP1729 - (1.00 - 1.15m)	TP1729 - (1.50 - 1.85m)	TP1730 - (0.60 - 0.75m)
Inert Material Estimate (%)	1	3	6	1	1
Pocket Penetrometer before (kPa)	360	430	460	320	320
Pocket Penetrometer after (kPa)	240	210	190	180	190
Shrinkage Moisture Content (%)	23.3	20.9	17.1	29.3	20.5
Shrinkage (%)	6.8	4.6	1.1	7.3	3.5
Swell Moisture Content Before (%)	23.9	20.8	17.1	28.5	22.4
Swell Moisture Content After (%)	29.8	25.6	29.2	32.1	25.7
Swell (%)	1.1	2.4	3.3	0.4	1.9
Shrink Swell Index Iss (%)	4.1	3.2	1.5	4.2	2.5
Visual Description	Sandy Clay	Clay	Clay	Clay	Clay
Cracking	UC	SC	FR	SC	SC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report

Report Number: NEW20P-0146D-8
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Dates Tested: 21/08/2024 - 03/09/2024



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B. Cullen

Approved Signatory: Brent Cullen
 Engineering Geologist
 NATA Accredited Laboratory Number: 18686

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5758AE	NEW24S-5758AF	NEW24S-5758AG	NEW24S-5758AH	
Date Sampled	20/08/2024	20/08/2024	20/08/2024	20/08/2024	
Date Tested	29/08/2024	29/08/2024	30/08/2024	30/08/2024	
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	
Sample Location	TP1730 - (1.00 - 1.15m)	TP1730 - (1.50 - 1.90m)	TP1731 - (0.70 - 1.00m)	TP1731 - (1.60 - 1.80m)	
Inert Material Estimate (%)	3	2	**	2	
Pocket Penetrometer before (kPa)	220	320	120	>600	
Pocket Penetrometer after (kPa)	150	220	100	150	
Shrinkage Moisture Content (%)	24.5	22.4	27.4	17.0	
Shrinkage (%)	5.7	4.2	6.7	3.1	
Swell Moisture Content Before (%)	24.6	22.1	27.1	16.9	
Swell Moisture Content After (%)	28.2	23.8	27.9	27.0	
Swell (%)	0.7	1.2	0.0	7.4	
Shrink Swell Index Iss (%)	3.4	2.7	3.7	3.8	
Visual Description	Sandy Clay	Clay	Clay	Clay	
Cracking	SC	SC	MC	SC	
Crumbling	No	No	No	No	
Remarks	**	**	**	**	

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report

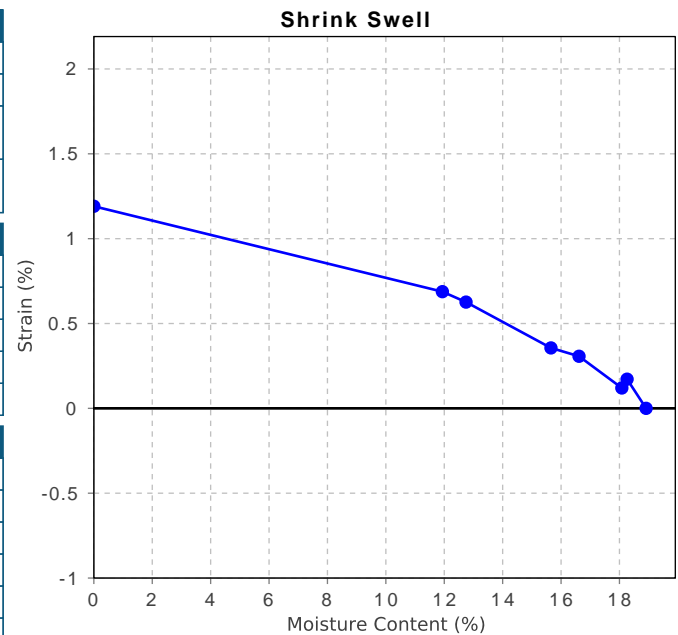


Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AI
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 04/09/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: SP1A
Material: Clay
Material Source: On-Site Insitu

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Brent Cullen (Engineering Geologist)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	0.7
Visual Description	Gravelly Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.2
Estimated % by volume of significant inert inclusions	5
Cracking	Uncracked
Crumbling	Yes
Moisture Content (%)	18.9
Swell Test	
Initial Pocket Penetrometer (kPa)	350
Final Pocket Penetrometer (kPa)	450
Initial Moisture Content (%)	18.6
Final Moisture Content (%)	18.1
Swell (%)	-0.1
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

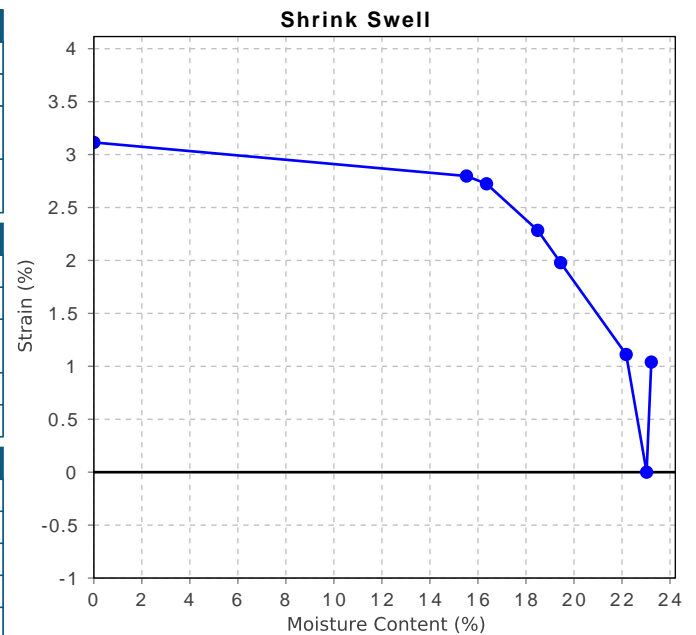


Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AJ
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 02/09/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: SP1B
Material: Clay
Material Source: On-Site Insitu

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Brent Cullen (Engineering Geologist)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	1.7
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	3.1
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	23.0
Swell Test	
Initial Pocket Penetrometer (kPa)	50
Final Pocket Penetrometer (kPa)	50
Initial Moisture Content (%)	23.0
Final Moisture Content (%)	23.2
Swell (%)	-1.0
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

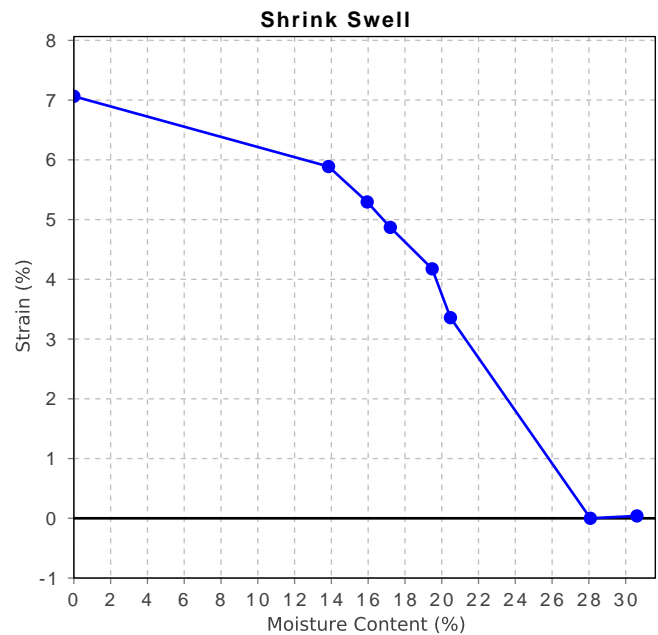


Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AK
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 30/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: SP1C
Material: Clay
Material Source: On-Site Insitu

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Brent Cullen (Engineering Geologist)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	3.9
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	7.1
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	28.1
Swell Test	
Initial Pocket Penetrometer (kPa)	80
Final Pocket Penetrometer (kPa)	80
Initial Moisture Content (%)	28.5
Final Moisture Content (%)	30.6
Swell (%)	-0.0
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AL
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 02/09/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: SP1D
Material: Clay
Material Source: On-Site Insitu

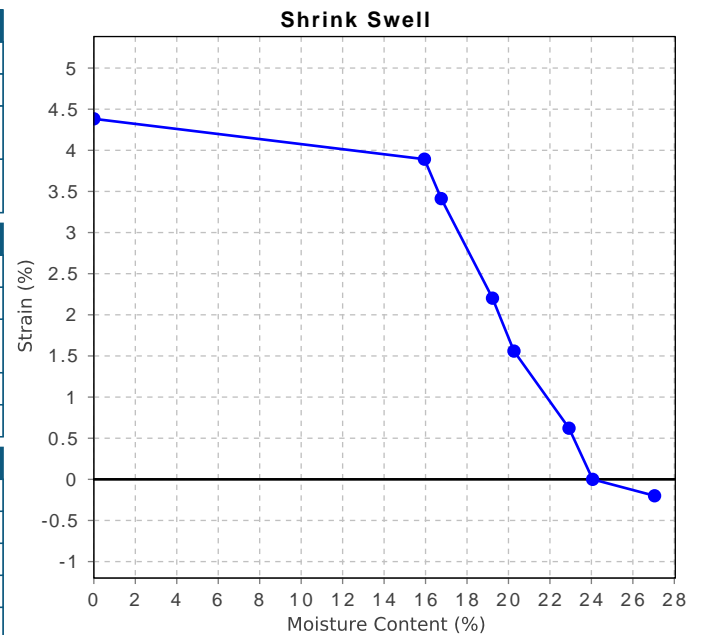


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B. Cullen

Brent Cullen (Engineering Geologist)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.5
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.4
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	24.1
Swell Test	
Initial Pocket Penetrometer (kPa)	150
Final Pocket Penetrometer (kPa)	150
Initial Moisture Content (%)	24.8
Final Moisture Content (%)	27.0
Swell (%)	0.2
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

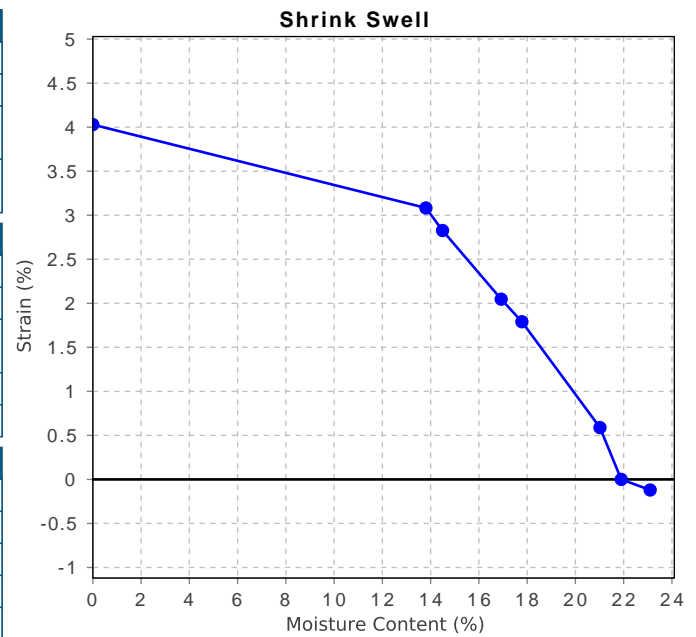


Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AM
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 02/09/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: SP2A
Material: Clay
Material Source: On-Site Insitu

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Brent Cullen (Engineering Geologist)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.3
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.0
Estimated % by volume of significant inert inclusions	5
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	21.9
Swell Test	
Initial Pocket Penetrometer (kPa)	250
Final Pocket Penetrometer (kPa)	170
Initial Moisture Content (%)	22.0
Final Moisture Content (%)	23.1
Swell (%)	0.1
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

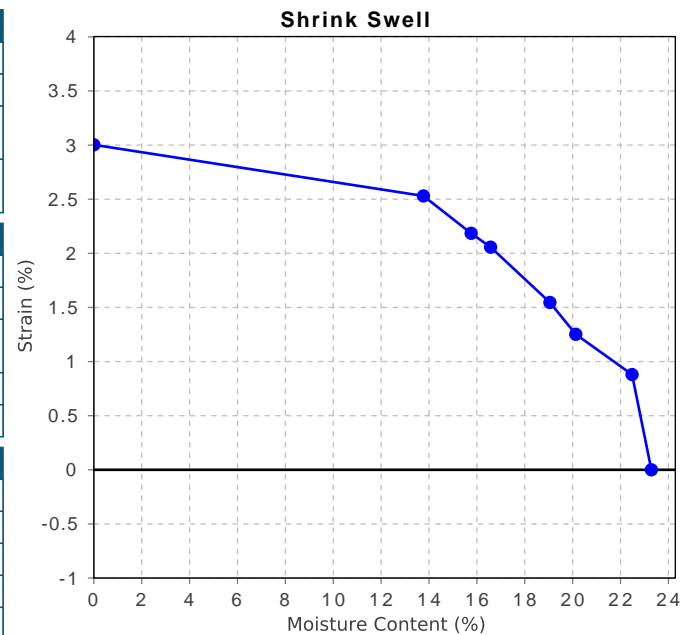


Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AN
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 02/09/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: SP2B
Material: Clay
Material Source: On-Site Insitu

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Brent Cullen (Engineering Geologist)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	1.7
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	3.0
Estimated % by volume of significant inert inclusions	2
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	23.3
Swell Test	
Initial Pocket Penetrometer (kPa)	50
Final Pocket Penetrometer (kPa)	60
Initial Moisture Content (%)	23.5
Final Moisture Content (%)	22.5
Swell (%)	-0.9
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

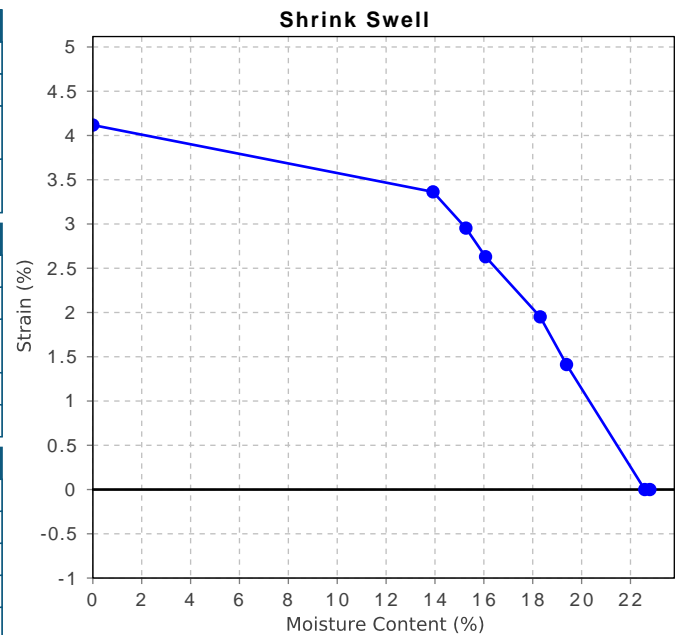


Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AO
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 02/09/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: SL1A
Material: Clay
Material Source: On-Site Insitu

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Brent Cullen (Engineering Geologist)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.3
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.1
Estimated % by volume of significant inert inclusions	5
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	22.6
Swell Test	
Initial Pocket Penetrometer (kPa)	220
Final Pocket Penetrometer (kPa)	190
Initial Moisture Content (%)	22.7
Final Moisture Content (%)	22.8
Swell (%)	0.0
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

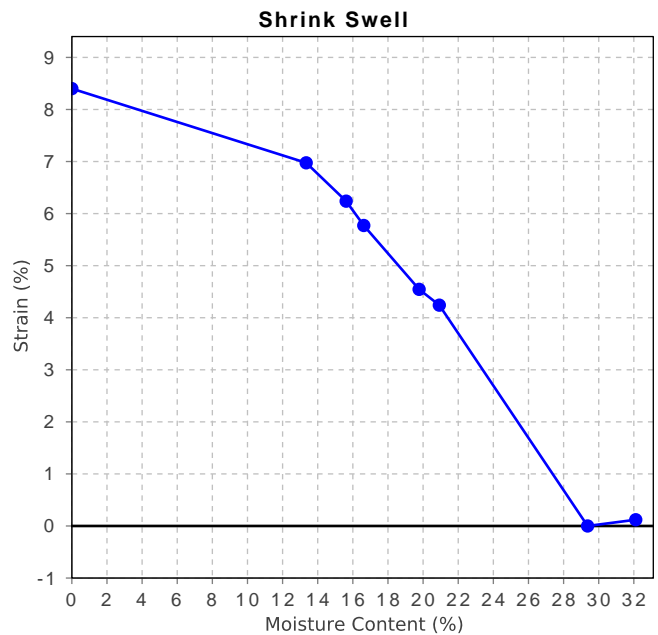


Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AP
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 30/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: SL1B
Material: Clay
Material Source: On-Site Insitu

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Brent Cullen (Engineering Geologist)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	4.7
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	8.4
Estimated % by volume of significant inert inclusions	1
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	29.4
Swell Test	
Initial Pocket Penetrometer (kPa)	140
Final Pocket Penetrometer (kPa)	120
Initial Moisture Content (%)	30.6
Final Moisture Content (%)	32.1
Swell (%)	-0.1
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

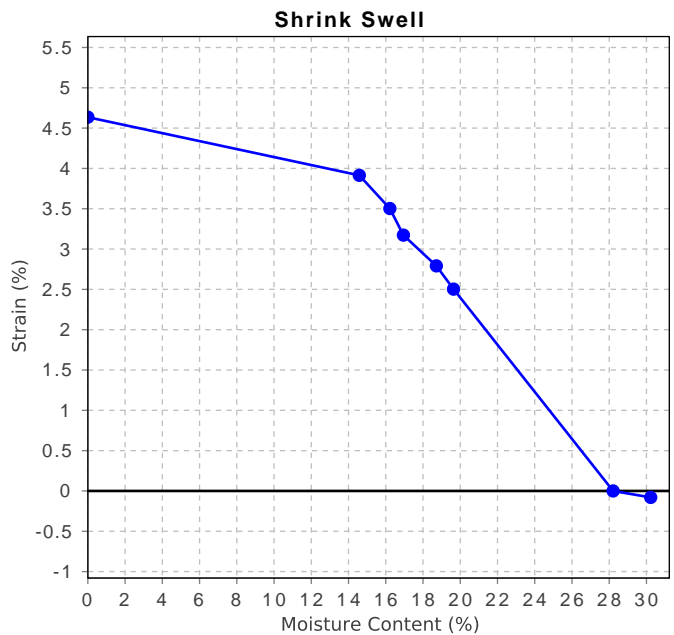


Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AQ
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 30/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: SL1C
Material: Clay
Material Source: On-Site Insitu

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Brent Cullen (Engineering Geologist)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	2.6
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	4.6
Estimated % by volume of significant inert inclusions	5
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	28.2
Swell Test	
Initial Pocket Penetrometer (kPa)	220
Final Pocket Penetrometer (kPa)	160
Initial Moisture Content (%)	28.2
Final Moisture Content (%)	30.2
Swell (%)	0.1
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

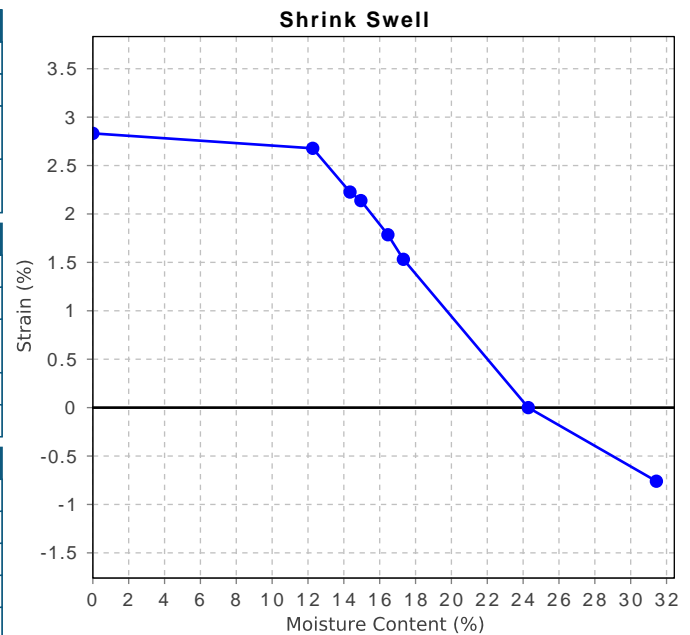


Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Sample Number: NEW24S-5758AS
Date Sampled: 20/08/2024
Dates Tested: 21/08/2024 - 30/08/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: DBT1A (0.00 - 0.20m)
Material: Clay
Material Source: On-Site Insitu

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Brent Cullen (Engineering Geologist)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	1.8
Visual Description	Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction.	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	2.8
Estimated % by volume of significant inert inclusions	3
Cracking	Moderately Cracked
Crumbling	No
Moisture Content (%)	24.3
Swell Test	
Initial Pocket Penetrometer (kPa)	260
Final Pocket Penetrometer (kPa)	200
Initial Moisture Content (%)	24.1
Final Moisture Content (%)	31.4
Swell (%)	0.8
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report



Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Dates Tested: 21/08/2024 - 04/09/2024

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 Email: brentcullen@qualtest.com.au

Brent Cullen (Engineering Geologist)

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5758AI	NEW24S-5758AJ	NEW24S-5758AK	NEW24S-5758AL	NEW24S-5758AM
Date Sampled	20/08/2024	20/08/2024	20/08/2024	20/08/2024	20/08/2024
Date Tested	04/09/2024	02/09/2024	30/08/2024	02/09/2024	02/09/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	SP1A	SP1B	SP1C	SP1D	SP2A
Inert Material Estimate (%)	5	2	1	1	5
Pocket Penetrometer before (kPa)	350	50	80	150	250
Pocket Penetrometer after (kPa)	450	50	80	150	170
Shrinkage Moisture Content (%)	18.9	23.0	28.1	24.1	21.9
Shrinkage (%)	1.2	3.1	7.1	4.4	4.0
Swell Moisture Content Before (%)	18.6	23.0	28.5	24.8	22.0
Swell Moisture Content After (%)	18.1	23.2	30.6	27.0	23.1
Swell (%)	-0.1	-1.0	-0.0	0.2	0.1
Shrink Swell Index Iss (%)	0.7	1.7	3.9	2.5	2.3
Visual Description	Gravelly Sandy Clay	Sandy Clay	Clay	Clay	Sandy Clay
Cracking	UC	SC	SC	SC	SC
Crumbling	Yes	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report



Report Number: NEW20P-0146D-8A
Issue Number: 1
Date Issued: 11/09/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 5758
Dates Tested: 21/08/2024 - 04/09/2024

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Brent Cullen (Engineering Geologist)

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-5758AN	NEW24S-5758AO	NEW24S-5758AP	NEW24S-5758AQ	NEW24S-5758AS
Date Sampled	20/08/2024	20/08/2024	20/08/2024	20/08/2024	20/08/2024
Date Tested	02/09/2024	02/09/2024	30/08/2024	30/08/2024	30/08/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	SP2B	SL1A	SL1B	SL1C	DBT1A (0.00 - 0.20m)
Inert Material Estimate (%)	2	5	1	5	3
Pocket Penetrometer before (kPa)	50	220	140	220	260
Pocket Penetrometer after (kPa)	60	190	120	160	200
Shrinkage Moisture Content (%)	23.3	22.6	29.4	28.2	24.3
Shrinkage (%)	3.0	4.1	8.4	4.6	2.8
Swell Moisture Content Before (%)	23.5	22.7	30.6	28.2	24.1
Swell Moisture Content After (%)	22.5	22.8	32.1	30.2	31.4
Swell (%)	-0.9	0.0	-0.1	0.1	0.8
Shrink Swell Index Iss (%)	1.7	2.3	4.7	2.6	1.8
Visual Description	Clay	Sandy Clay	Clay	Clay	Sandy Clay
Cracking	SC	SC	SC	SC	MC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.
 Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.
 NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report

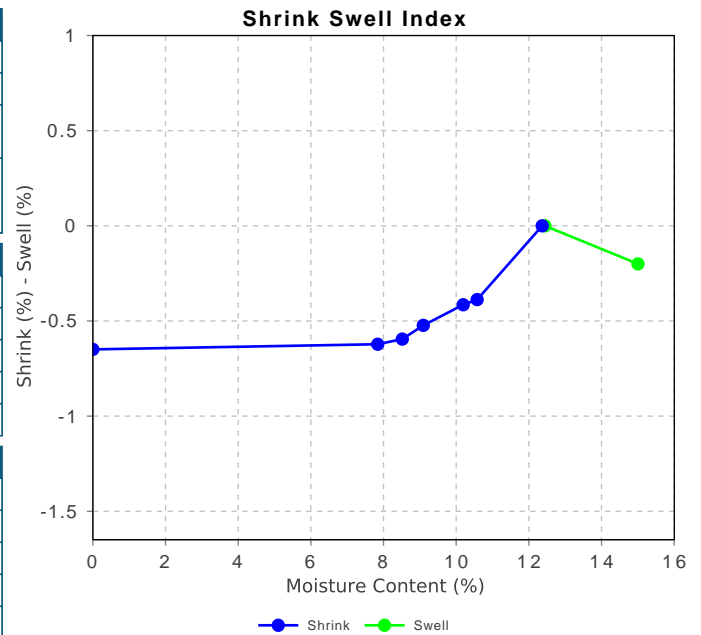


Report Number: NEW20P-0146D-26
Issue Number: 1
Date Issued: 12/11/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 7132
Sample Number: NEW24S-7132A
Date Sampled: 01/11/2024
Dates Tested: 04/11/2024 - 05/11/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: 1706 (0.10 - 0.40m)

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Kyle Spencer (Senior Geotechnician)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	0.4
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction 23.1% +19mm Material excluded from test	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	0.6
Estimated % by volume of significant inert inclusions	10
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	12.4
Swell Test	
Initial Pocket Penetrometer (kPa)	350
Final Pocket Penetrometer (kPa)	350
Initial Moisture Content (%)	12.4
Final Moisture Content (%)	15.0
Swell (%)	-0.2
* Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

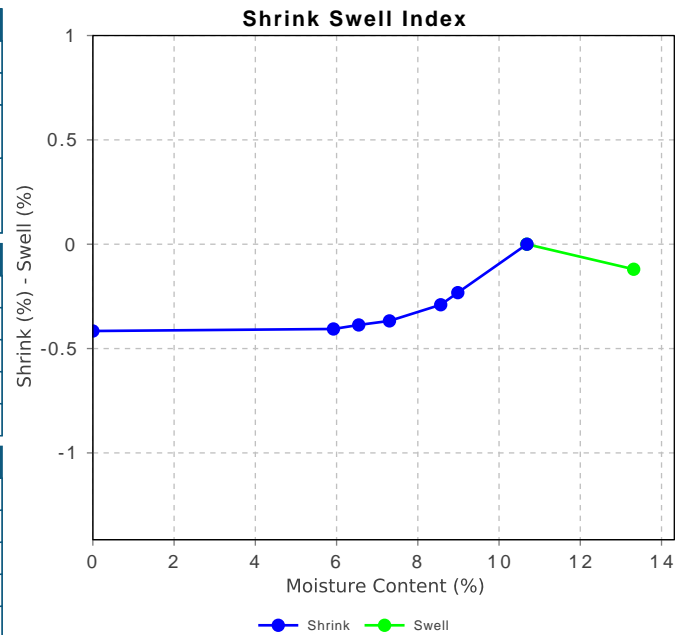


Report Number: NEW20P-0146D-26
Issue Number: 1
Date Issued: 12/11/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 7132
Sample Number: NEW24S-7132B
Date Sampled: 01/11/2024
Dates Tested: 04/11/2024 - 05/11/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: 1707 (0.10 - 0.40m)

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Kyle Spencer (Senior Geotechnician)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	0.2
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction 14.1% +19mm Material excluded from test	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	0.4
Estimated % by volume of significant inert inclusions	12
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	10.7
Swell Test	
Initial Pocket Penetrometer (kPa)	500
Final Pocket Penetrometer (kPa)	600
Initial Moisture Content (%)	10.7
Final Moisture Content (%)	13.3
Swell (%)	-0.1
* Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

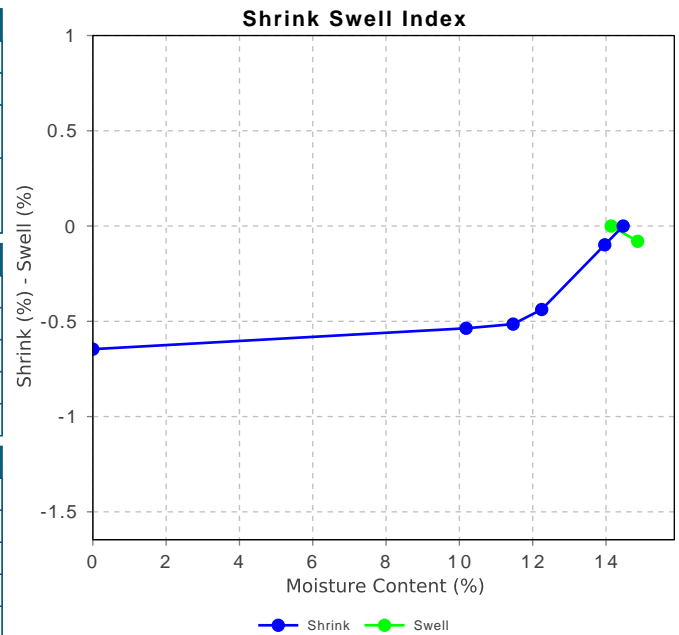


Report Number: NEW20P-0146D-26
Issue Number: 1
Date Issued: 12/11/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 7132
Sample Number: NEW24S-7132C
Date Sampled: 01/11/2024
Dates Tested: 04/11/2024 - 06/11/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: 1710 (0.10 - 0.30m)

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Kyle Spencer (Senior Geotechnician)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	0.4
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction 18.9% +19mm Material excluded from test	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	0.6
Estimated % by volume of significant inert inclusions	10
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	14.5
Swell Test	
Initial Pocket Penetrometer (kPa)	350
Final Pocket Penetrometer (kPa)	320
Initial Moisture Content (%)	14.1
Final Moisture Content (%)	14.9
Swell (%)	-0.1
* Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

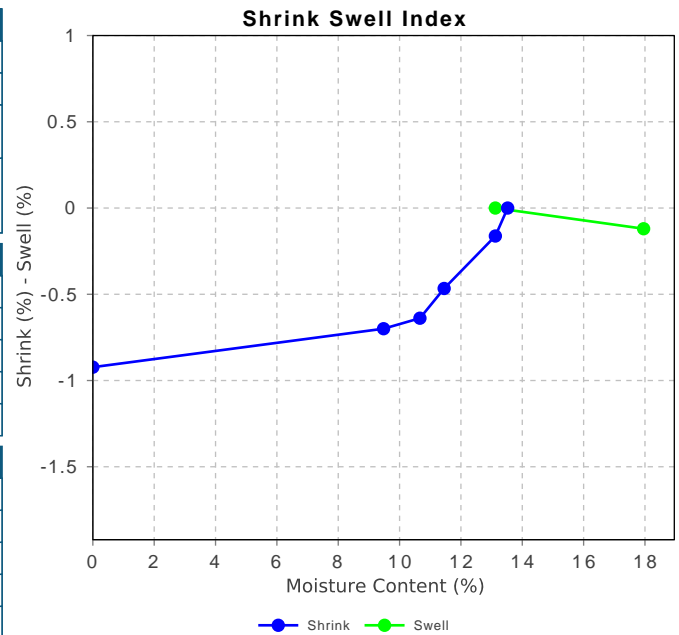


Report Number: NEW20P-0146D-26
Issue Number: 1
Date Issued: 12/11/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 7132
Sample Number: NEW24S-7132D
Date Sampled: 01/11/2024
Dates Tested: 04/11/2024 - 06/11/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: 1711 (0.10 - 0.30m)

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Kyle Spencer (Senior Geotechnician)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	0.5
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction 17.1% +19mm Material excluded from test	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	0.9
Estimated % by volume of significant inert inclusions	10
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	13.5
Swell Test	
Initial Pocket Penetrometer (kPa)	350
Final Pocket Penetrometer (kPa)	280
Initial Moisture Content (%)	13.1
Final Moisture Content (%)	18.0
Swell (%)	-0.1
* Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

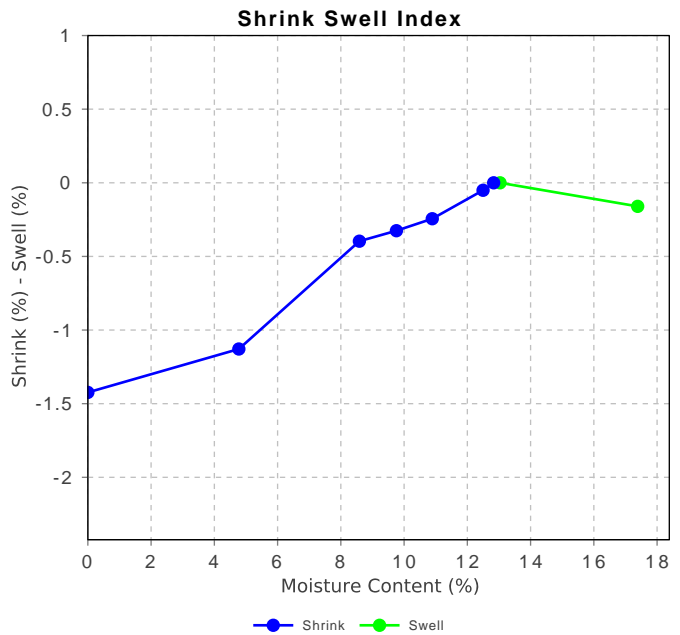
Report Number: NEW20P-0146D-26
Issue Number: 1
Date Issued: 12/11/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 7132
Sample Number: NEW24S-7132E
Date Sampled: 01/11/2024
Dates Tested: 04/11/2024 - 06/11/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Sample Location: 1722 (0.10 - 0.60m)



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Kyle Spencer (Senior Geotechnician)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	0.8
Visual Description	Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction 17.9% +19mm Material excluded from test	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.4
Estimated % by volume of significant inert inclusions	10
Cracking	Slightly Cracked
Crumbling	No
Moisture Content (%)	12.8
Swell Test	
Initial Pocket Penetrometer (kPa)	350
Final Pocket Penetrometer (kPa)	270
Initial Moisture Content (%)	13.0
Final Moisture Content (%)	17.4
Swell (%)	-0.2
* Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report



Report Number: NEW20P-0146D-26
Issue Number: 1
Date Issued: 12/11/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 7132
Dates Tested: 04/11/2024 - 06/11/2024

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Kyle Spencer (Senior Geotechnician)

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-7132A	NEW24S-7132B	NEW24S-7132C	NEW24S-7132D	NEW24S-7132E
Date Sampled	01/11/2024	01/11/2024	01/11/2024	01/11/2024	01/11/2024
Date Tested	05/11/2024	05/11/2024	06/11/2024	06/11/2024	06/11/2024
Material Source	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu	On-Site Insitu
Sample Location	1706 (0.10 - 0.40m)	1707 (0.10 - 0.40m)	1710 (0.10 - 0.30m)	1711 (0.10 - 0.30m)	1722 (0.10 - 0.60m)
Inert Material Estimate (%)	10	12	10	10	10
Pocket Penetrometer before (kPa)	350	500	350	350	350
Pocket Penetrometer after (kPa)	350	600	320	280	270
Shrinkage Moisture Content (%)	12.4	10.7	14.5	13.5	12.8
Shrinkage (%)	0.6	0.4	0.6	0.9	1.4
Swell Moisture Content Before (%)	12.4	10.7	14.1	13.1	13.0
Swell Moisture Content After (%)	15.0	13.3	14.9	18.0	17.4
Swell (%)	-0.2	-0.1	-0.1	-0.1	-0.2
Shrink Swell Index Iss (%)	0.4	0.2	0.4	0.5	0.8
Visual Description	Clay	Clay	Clay	Clay	Clay
Cracking	MC	SC	MC	SC	MC
Crumbling	No	No	No	No	No
Remarks	**	**	**	**	**

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.

Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.

NATA Accreditation does not cover the performance of pocket penetrometer readings.

Material Test Report

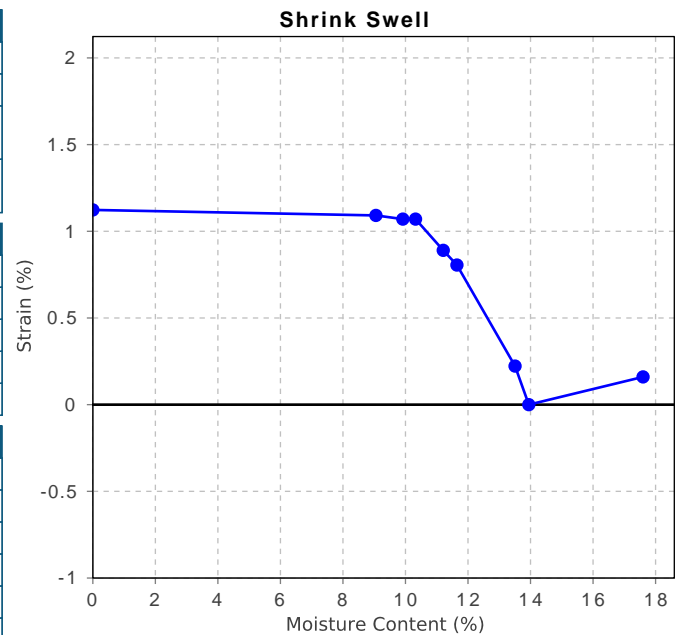


Report Number: NEW20P-0146D-15
Issue Number: 1
Date Issued: 21/10/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 6783
Sample Number: NEW24S-6783A
Date Sampled: 11/10/2024
Dates Tested: 14/10/2024 - 15/10/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: Lot 1716 (0.15-0.30m)

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Kyle Spencer (Senior Geotechnician)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	0.6
Visual Description	Gravelly Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.1
Estimated % by volume of significant inert inclusions	10
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	13.9
Swell Test	
Initial Pocket Penetrometer (kPa)	300
Final Pocket Penetrometer (kPa)	330
Initial Moisture Content (%)	13.7
Final Moisture Content (%)	17.6
Swell (%)	-0.2
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report

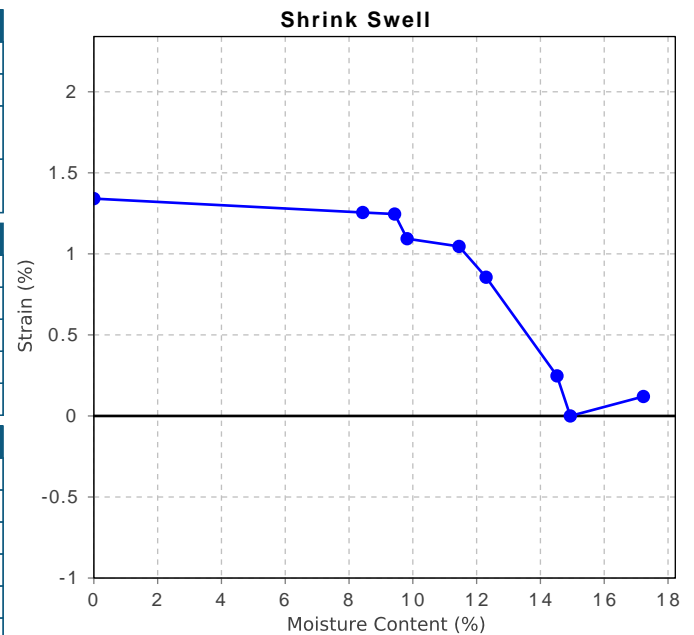
Report Number: NEW20P-0146D-15
Issue Number: 1
Date Issued: 21/10/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 6783
Sample Number: NEW24S-6783B
Date Sampled: 11/10/2024
Dates Tested: 14/10/2024 - 15/10/2024
Sampling Method: Sampled by Engineering Department
The results apply to the sample as received
Preparation Method: AS 1289.1.1 - Sampling and Preparation of Soils
Sample Location: Lot 1719 (0.20-0.40m)



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Kyle Spencer (Senior Geotechnician)

Shrink Swell Index (AS 1289 7.1.1 & 2.1.1)	
Iss (%)	0.7
Visual Description	Gravelly Sandy Clay
* Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.	
Sample remoulded at estimated OMC and approximately 98% Standard Compaction	
Core Shrinkage Test	
Shrinkage Strain - Oven Dried (%)	1.3
Estimated % by volume of significant inert inclusions	10
Cracking	Uncracked
Crumbling	No
Moisture Content (%)	14.9
Swell Test	
Initial Pocket Penetrometer (kPa)	350
Final Pocket Penetrometer (kPa)	310
Initial Moisture Content (%)	14.5
Final Moisture Content (%)	17.2
Swell (%)	-0.1
* NATA Accreditation does not cover the performance of pocket penetrometer readings.	



Material Test Report



Report Number: NEW20P-0146D-15
Issue Number: 1
Date Issued: 21/10/2024
Client: KCE Pty Ltd
 PO Box 574, East Maitland NSW 2323
Project Number: NEW20P-0146D
Project Name: Hereford Hill Stage 17 (KCE No. 21071)
Project Location: 855 New England Hwy, Lochinvar, NSW
Work Request: 6783
Dates Tested: 14/10/2024 - 15/10/2024

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 2 Murray Dwyer Circuit Mayfield West NSW 2304
 Phone: (02) 4968 4468
 Email: admin@qualtest.com.au

Kyle Spencer (Senior Geotechnician)

Shrink Swell Index AS 1289 7.1.1 & 2.1.1					
Sample Number	NEW24S-6783A	NEW24S-6783B			
Date Sampled	11/10/2024	11/10/2024			
Date Tested	15/10/2024	15/10/2024			
Material Source	On-Site	On-Site			
Sample Location	Lot 1716 (0.15-0.30m)	Lot 1719 (0.20-0.40m)			
Inert Material Estimate (%)	10	10			
Pocket Penetrometer before (kPa)	300	350			
Pocket Penetrometer after (kPa)	330	310			
Shrinkage Moisture Content (%)	13.9	14.9			
Shrinkage (%)	1.1	1.3			
Swell Moisture Content Before (%)	13.7	14.5			
Swell Moisture Content After (%)	17.6	17.2			
Swell (%)	-0.2	-0.1			
Shrink Swell Index Iss (%)	0.6	0.7			
Visual Description	Gravelly Clay	Gravelly Sandy Clay			
Cracking	SC	SC			
Crumbling	No	No			
Remarks	**	**			

Shrink Swell Index (Iss) reported as the percentage vertical strain per pF change in suction.
 Cracking Terminology: UC Uncracked, SC Slightly Cracked, MC Moderately Cracked, HC Highly Cracked, FR Fragmented.
 NATA Accreditation does not cover the performance of pocket penetrometer readings.

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).

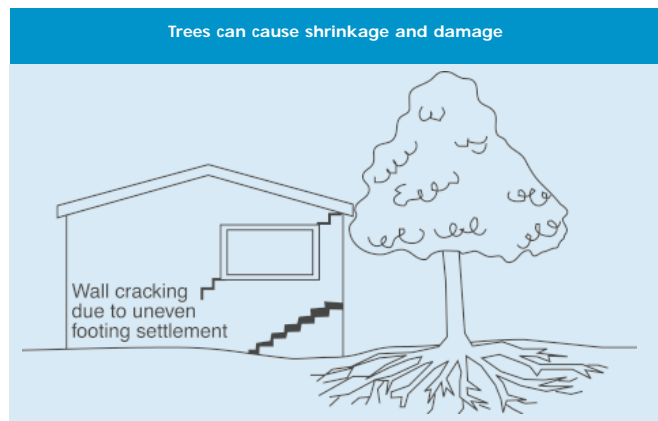
Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

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.



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

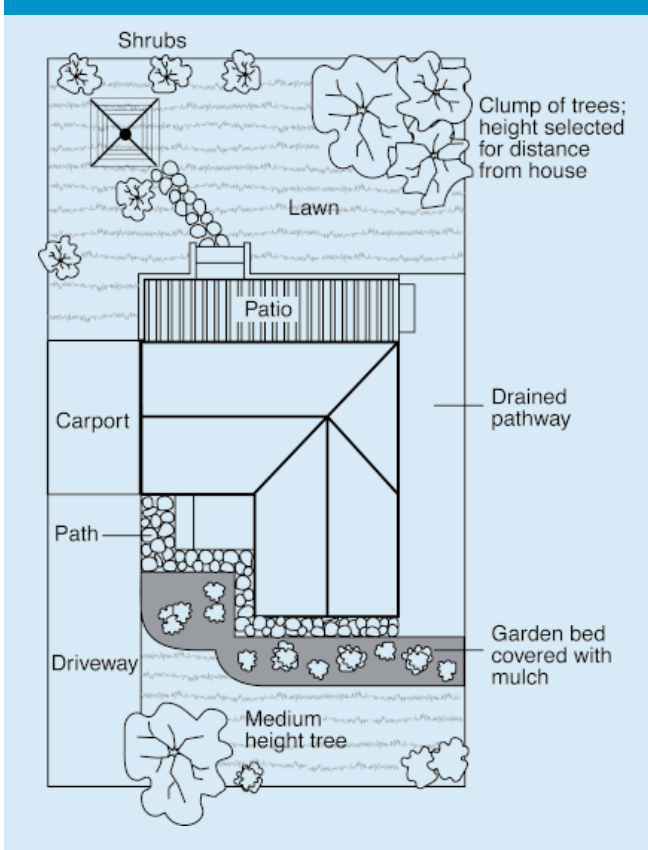
It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

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

Gardens for a reactive site



- 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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