Proposed Residential Subdivision – Kurrajong Estate, Stage 5 Site Classification

Cockatoo Close, Scone

NEW23P-0038-AA
14 April 2023

Qualtest
LABORATORY (NSW) PTY LTD

GEOTECHNICAL I LABORATORY I EARTHWORKS I QUARRY I CONSTRUCTION MATERIAL TESTING

14 April 2023

McCloy Project Management Pty Ltd
Suite 2, Ground Floor, 317, Hunter Street,
NEWCASTLE NSW 2309

Attention: Mr Rylan Gibson

Dear Rylan,

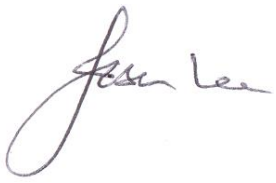
RE: PROPOSED RESIDENTIAL SUBDIVISION – KURRAJONG ESTATE, STAGE 5
COCKATOO CLOSE, SCONE
SITE CLASSIFICATION (LOTS 501 TO 516)

Please find enclosed our geotechnical report for Stage 5 of the 'Kurrajong Estate' residential subdivision, located at Cockatoo Close, Scone.

The report includes recommendations for Site Classification in accordance with AS2870-2011, "*Residential Slabs and Footings*".

If you have any 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



Jason Lee
Principal Geotechnical Engineer

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Attachments:

1.0 Introduction

Qualtest Laboratory NSW Pty Ltd (Qualtest) is pleased to present this geotechnical report to McCloy Project Management Pty Ltd (McCloy) for Stage 5 of the 'Kurrajong Estate' residential subdivision, located at Cockatoo Close, Scone.

Based on the brief and plans provided by the client, Stage 5 is understood to include 16 residential lots (Lots 501 to 516), as shown on the attached Figure AA1.

The scope of work included providing Site Classification in accordance with AS2870-2011, "*Residential Slabs and Footings*".

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

2.0 Field Work

The field work investigations were carried out on 13 March 2023, and comprised of:

- DBYD search was undertaken to check proposed test locations for the presence of underground services;
- Site walkover to make observations of surface features at the property and in the immediate surrounding area;
- Drilling of ten boreholes (BH501 to BH510) using a 2.7 tonne excavator equipped with 300mm diameter auger to depths of 3.50m;
- Undisturbed samples (U50 tubes) and disturbed samples were taken for subsequent laboratory testing; and,
- Boreholes were backfilled with the excavation spoil and compacted using the excavator auger and tracks.

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

Engineering logs of the boreholes are presented in Appendix A. Approximate borehole locations are shown on the attached Figure AA1. Boreholes were located in the field by handheld GPS and relative to existing site features including lot boundaries.

3.0 Site Description

3.1 Surface Conditions

The site of Kurrajong Estate – Stage 5 is located at Cockatoo Close, off Ibis Place, Scone. The site is generally bounded by low density residential allotments containing recently constructed dwellings to the south and east, by undeveloped grasslands to the west, and by Scone Memorial Airport to the north.

At the time of the site investigation, trafficability by way of 4WD vehicle was good by means of sealed pavements (Cockatoo Close). The site was judged to generally be moderately to well drained by way of surface runoff to installed stormwater systems.

Selected photographs of the site taken on the day of the site investigation are shown below.

Photograph 1: From near eastern boundary of Lot 501, facing west.

Photograph 2: From near eastern boundary of Lot 501, facing north.

Photograph 3: From near north-western corner of Lot 508, facing east.

Photograph 4: From near north-western corner of Lot 508, facing south.

Photograph 5: From near north-western corner of Lot 510, facing east.

Photograph 6: From near north-western corner of Lot 510, facing south.

Photograph 7: From near western boundary of Lot 516, facing north.

Photograph 8: From near western boundary of Lot 516, facing east.

3.2 Subsurface Conditions

Reference to the 1:250,000 Singleton Geological Series Sheet indicates the site to be underlain by the Singleton Coal Measures, which is characterised by Sandstone, Shale, Mudstone, and Conglomerate rock types with some coal seams.

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

TABLE 1 – SUMMARY OF GEOTECHNICAL UNITS AND SOIL TYPES

Unit	Soil Type	Description
1	TOPSOIL	CLAY – medium to high plasticity, dark grey-brown, with some fine to medium grained sand, root affected.
2	ALLUVIUM	CLAY – high plasticity, generally dark grey to black and brown. CLAY – medium to high plasticity, brown to pale brown, trace fine to medium grained (mostly fine grained) sand. With some / trace inclusions of fine to medium grained angular to sub-angular gravel in places. Possibly Residual Soil in places.
3	RESIDUAL SOIL	Sandy CLAY, CLAY, Silty Sandy CLAY – generally medium to high plasticity, pale grey-brown to pale brown, trace pale orange-brown and grey, fine to medium grained (mostly fine grained) sand. Gravelly Sandy CLAY – medium plasticity, pale brown, fine to coarse grained (mostly fine to medium grained) sand, fine to medium grained (mostly fine grained) sub-angular gravel. With some relict rock structure, borderline Extremely Weathered Rock in places. Possibly Alluvium in places.
4	EXTREMELY WEATHERED (XW) ROCK (with soil properties)	Sandy Siltstone; breaks down into Clayey Sandy GRAVEL – fine to medium grained, angular, pale grey-brown to pale brown, trace pale orange-brown to pale yellow-brown and grey, fine to coarse grained (mostly fine grained) sand, fines of medium plasticity. Sandy Siltstone, Siltstone; breaks down into Gravelly Sandy CLAY – medium to high plasticity, pale brown to pale grey-brown, trace pale orange-brown to pale yellow-brown and grey, fine to coarse grained (mostly fine grained) sand, fine to medium grained angular gravel.
5	HIGHLY WEATHERED (HW) ROCK	Sandy SILTSTONE, Silty SANDSTONE – fine grained sand, pale grey-brown, trace grey and pale orange-brown, estimated very low to low strength. Generally includes Extremely Weathered bands / pockets.

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

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

Location	Unit 1 Topsoil	Unit 2 Alluvium	Unit 3 Residual Soil	Unit 4 Extremely Weathered Rock	Unit 5 Highly Weathered Rock
	Depth (m)				
BH501	0.00 - 0.30	0.30 - 1.90	1.90 - 3.00	3.00 - 3.50	-
BH502	0.00 - 0.25	0.25 - 1.40	1.40 - 2.00	2.00 - 2.40	2.40 - 3.50
BH503	0.00 - 0.30	0.30 - 1.50	1.50 - 3.00	3.00 - 3.40	3.40 - 3.50
BH504	0.00 - 0.15	0.15 - 1.50	1.50 - 1.75	-	1.75 - 3.50
BH505	0.00 - 0.20	0.20 - 2.90	2.90 - 3.50	-	-
BH506	0.00 - 0.20	0.20 - 2.30	2.30 - 3.50	-	-
BH507	0.00 - 0.30	0.30 - 2.00	2.00 - 2.40	2.40 - 3.00	3.00 - 3.50
BH508	0.00 - 0.25	0.25 - 2.00	2.00 - 3.50	-	-
BH509	0.00 - 0.20	0.20 - 1.80	1.80 - 3.20	3.20 - 3.50	-
BH510	0.00 - 0.20	0.20 - 1.50	1.50 - 3.30	3.30 - 3.50	-

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

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.

4.0 Laboratory Testing

Samples collected during the current field investigations were returned to our NATA accredited Newcastle Laboratory for testing which comprised of twenty (20 no.) Shrink / Swell tests.

Due to limitations on sampling depths with the U50 tubes, some soils sampled from greater depths (i.e. 1.5m and greater) were collected as disturbed samples and remoulded for Shrink / Swell testing.

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

TABLE 3 – SUMMARY OF SHRINK / SWELL TESTING RESULTS

Location	Depth (m)	Material Description	I_{ss} (%)
BH501	0.50 - 0.80	(CH) CLAY	3.7
BH501	2.20 - 2.30	(CI) Sandy CLAY	3.7
BH502	0.40 - 0.65	(CH) CLAY	5.4
BH502	1.10 - 1.25	(CH) CLAY	3.9
BH503	0.40 - 0.65	(CH) CLAY	3.1
BH503	1.20 - 1.40	(CH) CLAY	2.4
BH504	0.50 - 0.80	(CH) CLAY	4.7
BH504	1.00 - 1.15	(CH) CLAY	3.2
BH505	0.40 - 0.65	(CH) CLAY	6.2
BH505	2.50 - 2.70	(CH) CLAY	4.2
BH506	0.40 - 0.65	(CH) CLAY	3.9
BH506	1.00 - 1.25	(CH) CLAY	4.1
BH507	0.40 - 0.70	(CH) CLAY	3.7
BH507	1.00 - 1.30	(CH) CLAY	3.7
BH508	1.00 - 1.25	(CH) CLAY	4.2
BH508	2.20 - 2.30	(CI) Sandy CLAY	3.6
BH509	0.40 - 0.65	(CH) CLAY	4.8
BH509	1.00 - 1.30	(CH) CLAY	4.4
BH510	0.40 - 0.65	(CH) CLAY	4.7
BH510	1.00 - 1.22	(CH) CLAY	3.5

5.0 Site Classification to AS2870-2011

Based on the results of the field work and laboratory testing carried out, residential lots within Stage 5 of the Kurrajong Estate Residential subdivision, located at Cockatoo Close, Scone, as shown in the attached Figure AA1 are classified in their current condition in accordance with AS2870-2011 *'Residential Slabs and Footings'*, as shown in Table 5.

TABLE 5 – SITE CLASSIFICATION TO AS2870-2011

Lot Numbers	Site Classification to AS2870-2011
501 to 516	**E-D**

A characteristic free surface movement of greater than 75mm is estimated for the lots classified as **Class 'E-D'** in their existing condition.

Generally, the characteristic free surface movement calculated for most of the lots identified as **Class 'E-D'** (i.e. lots 501 to 507, and 509 to 516) are up to about 115mm. A characteristic free surface movement of about 130mm is estimated for lot 508 in its 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. If any site regrade works take place, final site classification will be dependent on the type of fill and 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.

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, 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.

6.0 Limitations

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

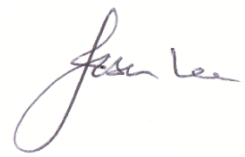
The extent of testing associated with this assessment is limited to discrete borehole locations. It should be noted that subsurface conditions between and away from the borehole and test pit locations may be different to those observed during the field work and used as the basis of the recommendations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

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

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

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

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



Jason Lee
Principal Geotechnical Engineer

FIGURE AA1

Site Plan and Approximate Test Locations

APPENDIX A:

Results of Field Investigations

APPENDIX B:

Results of Laboratory Testing

APPENDIX C:

CSIRO Sheet BTF 18

Foundation Maintenance and Footing Performance: A Homeowner's Guide