GEOTECH TESTING PTY LTD
ABN 71 076 676 321

Job No: 7824/4
Our Ref: 7824/4-ABR
3 September 2012

Landcom
c/- Craig & Rhodes Pty Ltd
PO Box 233
EPPING NSW 2121

Attention: Mr A Cameron

Dear Sir

re: **Proposed Residential Subdivision**
North Penrith Defence Lands – Stage 1.2
Coreen Avenue, Penrith
Site Classification

Please find herewith our site classification report for proposed dwellings to be located at the above subdivision. This report covers thirty six (36) lots, as follows;

- Lots 1201 to 1217 & Lot 1220 (18 lots)
- Reserve Lots 1218, 1219 (2 lots)
- Reserve Lot 1221, which has been subdivided into Lots 1221-1 to 1221-16, (16 lots)

This report contains information on surface and sub-surface conditions encountered at the site, together with an assessment of the site classifications in accordance with Australian Standard AS2870-2011 "Residential slabs and footings".

If you have any questions, please do not hesitate to contact the undersigned.

Yours faithfully
GEOTECH TESTING PTY LTD

JOSEPH KEANE
Geotechnical Engineer

Reviewed by

EMGED RIZKALLA
Director

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GEOTECH TESTING PTY LTD
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Certified System
Quality
ISO 9001
SAI GLOBAL

LANDCOM
c/- CRAIG & RHODES PTY LTD

PROPOSED RESIDENTIAL SUBDIVISION
NORTH PENRITH DEFENCE LANDS – STAGE 1.2
COREEN AVENUE, PENRITH

SITE CLASSIFICATION

REPORT 7824/4-ABR 3 SEPTEMBER 2012

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APPENDICES

1.0 INTRODUCTION

This report describes a geotechnical investigation for proposed dwellings to be constructed at Stage 1.2 North Penrith Defence Lands, Coreen Avenue, Penrith.

The following thirty six (36) lots are covered in this report.

- Lots 1201 to 1217 & Lot 1220 (18 lots)
- Reserve Lots 1218, 1219 (2 lots)
- Reserve Lot 1221, which has been subdivided into Lots 1221-1 to 1221-16, (16 lots)

Site classification in accordance with Australian Standard AS2870-2011 "Residential Slabs and Footings" is only applicable for the design of footing systems for a single dwelling, house, townhouse or similar structure that would be detached or separated by a party wall or common wall. AS2870-2011 is not suitable for dwellings situated vertically above or below another dwelling, including buildings classified as Class 1 and Class 10a in the Building Code of Australia (BCA). Therefore, a geotechnical investigation would be required for other dwellings to be classified in accordance with the BCA.

It is understood that the proposed dwellings are to be of brick veneer construction and wall loadings are expected to be in the range of 15kN/m to 50kN/m. The maximum working load (safe bearing pressure) would be in the order of 50kPa for ground supported floor slabs and 100kPa for strip and pad footings (AS2870-2011).

2.0 FIELD WORK

Field work for the investigation was carried out on 8 May and 25 August 2012 and consisted of excavation of seventeen test pits (TP1 to TP6 and TP24 to TP34) to a depth of 1.5m, using a rubber-tyred backhoe. The test pit logs are summarised and presented in Appendix A.

A geotechnical engineer supervised test pit excavation, recovered representative undisturbed samples and prepared the field logs.

The test pit locations are indicated on Drawing No 7824/4-AB1 in Appendix A.

3.0 LABORATORY TESTING

During the course of the investigation, three undisturbed (U50) samples of natural and fill materials were recovered for laboratory testing aimed at determining the reactivity of the materials to variations in moisture changes. The tests conducted were Shrink/Swell Index Determination (Iss), in accordance with Australian Standard AS1289.7.1.1. The laboratory test results are presented in Appendix C and summarised below.

TP	Depth (m)	Iss (%/$_{pF}$)	Summary Description
8	0.4 – 0.55	0.7	Fill: Clay, low plasticity, grey-brown
26	0.4 – 0.6	1.9	FILL: Silty Clay, medium plasticity, dark grey, trace of fine to medium gravel
34	0.3 – 0.45	1.4	FILL: Silty Clay, low plasticity, grey, trace of fine to medium gravel

4.0 SITE CONDITIONS

4.1 Surface Conditions

The site comprises part of the North Penrith Defence Lands. The present investigation was carried out on lots located on the western, northern and north-eastern sides of the site. The lots were prepared by filling and devoid of grass and trees. The general slope of the site is towards the north-east. The site is bound to the north by Coreen Avenue, to the south by future development and Penrith Station, to the east by residential properties and to the west by future development and an unnamed road.

4.2 Sub-Surface Conditions

The test pit investigation revealed the following generalised sub-surface profile.

Fill	Silty Clay, low to medium plasticity, orange-brown, with traces of shale gravel
	Clay, medium plasticity, grey, with traces of fine to medium grained red sand
	Clayey Sand, medium plasticity, yellow-brown
	Silty Sand, fine to medium grained, orange-brown
Natural	(CL-CI) Silty Clay, low to medium plasticity, dark grey, grey, orange-brown
	(CL-CI) Gravelly Silty Clay, low to medium plasticity, brown
	(CI) Clay, medium plasticity, grey

Groundwater was not observed in the test pits during the short time they remained open. It must be noted that fluctuations in the level of groundwater might occur due to variations in rainfall, temperature and/or other factors not evident during investigation.

5.0 DISCUSSION & RECOMMENDATIONS

5.1 Fill Assessment

We have not received a fill plan for the Lots classified in this report. The test pits generally indicated that fill has been placed on almost all Lots.

Geotech Testing Pty Ltd carried out a number of compaction tests across the site in 2012 (Project Reference 7824/2). Based on test pit excavations and compaction tests results the fill is assessed to be "Controlled".

5.2 Site Classification

Based on the above information the classifications to AS2870-2011 are summarised in Appendix B. It should be noted that lots containing more than 400mm of clay fill (assessed as controlled fill) would originally be classified as Class P in accordance with AS2870-2011. However, based on the results of this investigation, which included laboratory testing, the lots are classified as detailed in Appendix B.

It is recommended that footings for proposed dwellings are founded on the same stratum, below any topsoil or deleterious material, to minimise the potential for differential movement.

The above recommendations are applicable to the Lots at the date of conducting the investigation, being 25 August 2012 and are made on the following assumptions;

- The design and construction requirements of AS2870 must be followed.
- The recommendations for foundation performance and site maintenance set out in Appendix B of AS2870-2011 must be followed.
- The proposed dwellings must be in accordance with AS2870-2011. A detailed geotechnical investigation will be required for other dwellings that would be classified in accordance with the BCA.

It is recommended that house owners are made aware of recommendations in the CSIRO publication, "Guide to Home Owners on Foundation Maintenance and Footing Performance" and Appendix H of AS2871-2011.

GEOTECHNIQUE PTY LTD

APPENDIX A

TABLE A - TEST PIT LOGS
DRAWING NO 7824/4-AB1 – TEST PIT LOCATION PLAN

TABLE A

Job No: 7824/4
Our Ref: 7824/4-ABR

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
1	0.0-0.7	-	(SG) Sandy GRAVEL, fine to medium grain, brown-grey, traces of medium plasticity clay, (M)
	0.7-1.5	-	(CI) Silty CLAY, medium plasticity, grey, orange-brown, M=PL
2	0.0-0.3	-	FILL; Silty Clay, low to medium plasticity, brown
	0.3-0.9	0.4-0.55	(CL-CI) Silty CLAY, low to medium plasticity, dark grey
	0.9-1.5	-	(CI) Silty CLAY, medium plasticity, grey, orange-brown
3	0.0-0.7	-	FILL; Sandy Clay, medium plasticity, yellow-brown
	0.7-1.5	-	(CI) CLAY, medium plasticity, grey-brown
4	0.0-0.6	-	(CL-CI) Silty CLAY, low to medium plasticity, dark grey
	0.6-1.5	-	(CI) Silty CLAY, medium plasticity, grey, orange-brown, M>PL
5	0.0-0.7	-	FILL; Clay, medium plasticity, grey, with traces of fine to medium grained red sand
	0.7-1.5	-	(CL-CI) Silty CLAY, low to medium plasticity, grey
6	0.0-0.7	-	FILL; Silty Sand, fine to medium grained, orange
	0.7-1.1	-	FILL; Silty Clay, low to medium plasticity, grey, traces of shale fragments
	1.1-1.5	-	(CL-CI) Silty CLAY, low to medium plasticity, grey, M≥PL

TABLE A

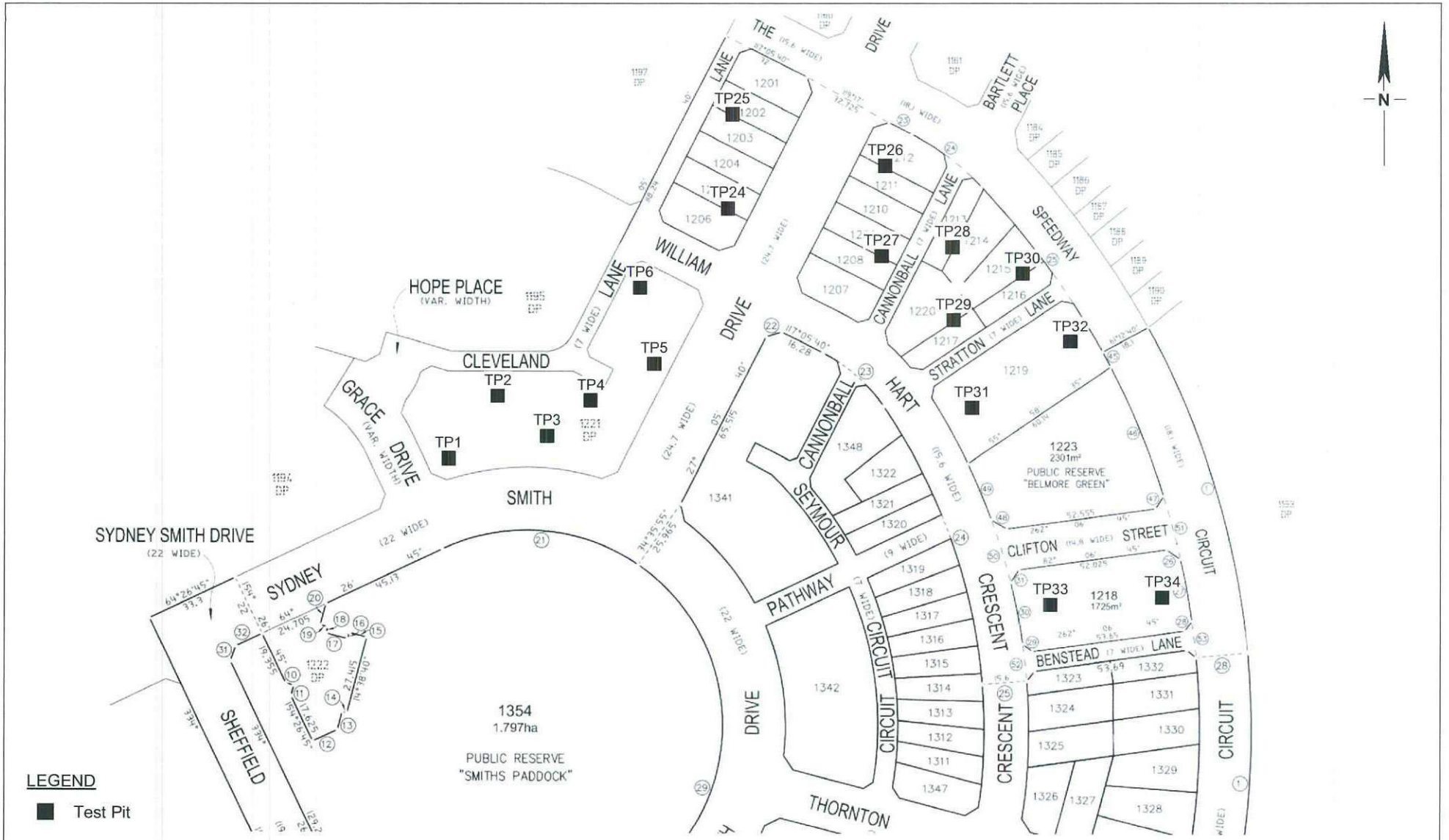
Job No: 7824/4
Our Ref: 7824/4-ABR

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
24	0.0-0.4	-	FILL; Silty Clay, low to medium plasticity, orange-brown
	0.4-1.1	-	FILL; Silty Sand, fine to medium grained, brown-orange, grey, with medium plasticity clay
	1.1-1.5	-	FILL; Clay, medium plasticity, grey, with orange-brown, fine to medium grained sand
25	0.0-0.15	-	FILL; Silty Clay, low to medium plasticity, grey-brown
	0.15-1.1	-	FILL; Silty Sand, fine to medium grained, orange, traces of low to medium plasticity clay
	1.1-1.5	-	(CI-CH) CLAY, medium to high plasticity, grey
26	0.0-1.1	0.4-0.6	FILL; Silty Clay, low to medium plasticity, grey-brown, traces of shale fragments
	1.1-1.5	-	(CL) Silty CLAY, low plasticity, grey-brown
27	0.0-0.1	-	FILL; Silty Clay, low to medium plasticity, grey
	0.1-0.5	-	FILL; Silty Clay, medium plasticity, grey, yellow-brown
	0.5-1.5	-	FILL; Silty Clay, low to medium plasticity, grey, brown, traces of fine to medium grained sand
28	0.0-1.0	-	FILL; Silty Clay, low to medium plasticity, brown-grey
	1.0-1.5	-	(CL-CI) Gravelly Silty CLAY, low to medium plasticity, brown
29	0.0-0.6	-	FILL; Silty Clay, low to medium plasticity, brown
	0.6-1.1	-	FILL; Silty Shaley Clay, low to medium plasticity, grey
	1.1-1.5	-	(CL-CI) Silty CLAY, low to medium plasticity, grey
30	0.0-0.9	-	FILL; Silty Clay, low to medium plasticity, dark grey
	0.9-1.5	-	FILL; Silty Clay, low to medium plasticity, grey, with shale fragments and gravel

TABLE A

Job No: 7824/4
Our Ref: 7824/4-ABR

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
31	0.0-0.2	-	FILL; Silty Clay, low to medium plasticity, brown
	0.2-0.4	-	FILL; Clay, medium plasticity, brown, grey
	0.4-0.8	-	(SM) Silty SAND, fine to medium grained, orange
	0.8-1.2	-	(CL-CI) Silty CLAY, low to medium plasticity, grey, traces of shale
	1.2-1.5	-	(CL) Silty CLAY, low plasticity, grey-brown
32	0.0-0.2	-	FILL; Clay, medium plasticity, grey
	0.2-1.1	-	FILL; Silty Clay, low to medium plasticity, grey, traces of shale fragments
	1.1-1.5	-	(CI) CLAY, medium plasticity, pale brown-orange
33	0.0-0.3	-	FILL; Silty Clay, low to medium plasticity, grey-brown, with shale fragments
	0.3-0.6	-	(SM) Silty SAND, fine to medium grained, dark grey
	0.6-1.1	-	(CL-CI) Silty CLAY, low to medium plasticity, grey
	1.1-1.5	-	(CL-CI) Silty CLAY, low to medium plasticity, brown-orange
34	0.0-0.2	-	FILL; Silty Clay, low to medium plasticity, brown, traces of gravel
	0.2-0.9	0.3-0.45	FILL; Silty Clay, low to medium plasticity, grey, traces of shale fragments
	0.9-1.5	-	(CL-CI) Silty CLAY, low to medium plasticity, brown



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NOTES

1. Site features are indicative and are not to scale.
2. This drawing has been produced using a base plan provided by others to which additional information e.g test pits, borehole locations or notes have been added. Some or all of the plan may not be relevant at the time of producing this drawing

Landcom
North Penrith Defence Lands
Stage 1.2

Test Pit Locations

Drawing No: 7824/4-AB1
Job No: 7842/4
Drawn By: MH
Date: 3 September 2012
Checked By: JK

File No: 7842-4
Layers: 0, AB1

APPENDIX B

TABLE B
SUMMARY OF LOT CLASSIFICATIONS

Job No: 7824/4
Our Ref: 7824/4-ABR

TABLE B

PROPOSED RESIDENTIAL SUBDIVISION
NORTH PENRITH DEFENCE LANDS – STAGE 1.2
COREEN AVENUE, PENRITH

Lot Number	Classification	Lot Number	Classification
1201	M	1221-1	M
1202	M	1221-2	M
1203	M	1221-3	M
1204	M	1221-4	M
1205	M	1221-5	M
1206	M	1221-6	M
1207	M	1221-7	M
1208	M	1221-8	M
1209	M	1221-9	M
1210	M	1221-10	M
1211	M	1221-11	M
1212	M	1221-12	M
1213	M	1221-13	M
1214	M	1221-14	M
1215	M	1221-15	M
1216	M	1221-16	M
1217	M		
1218 (Reserve lot)	M		
1219 (Reserve lot)	M		
1220	M		
Class M (Moderately Reactive)			

Australian Standard AS2870-2011 "Residential Slabs and Footings"

APPENDIX C

LABORATORY TEST RESULTS

GEOTECH TESTING PTY LTD
ABN 71 076 676 321

Certified System
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CRAIG & RHODES PTY LTD
PO BOX 233
EPPING NSW 2121

Job No: 7824/4
Tested By: AN
Checked By: AK
Date Tested: 09/05/2012
Laboratory Penrith

SITE CLASSIFICATION
NORTH PENRITH - STAGE 1 - COREEN AVENUE, PENRITH

TEST RESULTS - SHRINK / SWELL INDEX

Test Procedure: AS 1289 7.1.1				
Sample Identification	Test Pit 2			
Depth (m)	0.4 - 0.55			
Laboratory Number	7824/4-1			
Test Description				
Moisture Content				
Initial %	18.9			
Final %	19.0			
Swell %	Nil			
Shrinkage %	3.5			
Shrink/Swell Index $\%/_pF$	1.9			
Material Description	(CL-CI) Silty CLAY, low to medium plasticity, grey & orange-brown			

Form No R007 Version 1106/11

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Corporate Site Number 2727

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A Kench 14/05/2012
Approved Signatory

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CRAIG & RHODES PTY LTD
PO BOX 233
EPPING NSW 2121

Job No: 7824/4
Tested By: AJP
Checked By: AK
Date Tested: 28/08/2012
Laboratory Penrith

SITE CLASSIFICATION
NORTH PENRITH - STAGE 1 - COREEN AVENUE, PENRITH

TEST RESULTS - SHRINK / SWELL INDEX

Test Procedure: AS 1289 7.1.1

Sample Identification	Test Pit 26	Test Pit 34		
Depth (m)	0.4 - 0.6	0.3 - 0.45		
Laboratory Number	7824/4-5	7824/4-6		
Test Description				
Moisture Content				
Initial %	14.7	12.8		
Final %	18.2	15.9		
Swell %	1.8	2.5		
Shrinkage %	2.5	1.3		
Shrink/Swell Index $\%/_pF$	1.9	1.4		
Material Description	FILL: Silty Clay, medium plasticity, dark grey, trace of fine to medium gravel	FILL: Silty Clay, low plasticity, grey, trace of fine to medium gravel		

Form No R007 Version 1106/11

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PROPOSED RESIDENTIAL SUBDIVISION NORTH PENRITH DEFENCE LANDS – STAGE 1.2 COREEN AVENUE, PENRITH

SITE CLASSIFICATION

REPORT 7824/4-ABR 3 SEPTEMBER 2012

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