



Job No: 8574/14
Our Ref: 8574/14-AA
6 September 2018

J K Williams Contracting Pty Ltd
44 Jack Williams Drive
PENRITH NSW 2750
Email: SHartog@jkw.com.au

Attention: Mr S Hartog

Dear Sir

Re: **Proposed Caddens Hill Residential Subdivision – Stage 5**
117 O'Connell Street, Caddens
Site Classification Report

Please find herewith the site classification report for the proposed dwellings to be located at the above site. The following one hundred and five (105) lots are covered in this report:

- Stage 5: Lots 501 to 605

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 & Footings".

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

Yours faithfully
GEOTECH TESTING PTY LTD

A handwritten signature in black ink, appearing to read "K Singh", enclosed within a circular scribble.

KARTIK SINGH
Geotechnical Engineer

A handwritten signature in black ink, appearing to read "Emged Rizkalla", written in a cursive style.

EMGED RIZKALLA
Director

TABLE OF CONTENTS

	page
1.0 INTRODUCTION -----	1
2.0 FIELD WORK-----	1
3.0 SITE CONDITIONS -----	1
3.1 Surface Conditions -----	1
3.2 Sub-Surface Conditions-----	2
4.0 LABORATORY TESTING -----	2
5.0 DISCUSSION & RECOMMENDATIONS -----	2
5.1 Assessment of Fill -----	2
5.2 Site Classifications -----	3

APPENDICES

<i>APPENDIX A</i>	<i>Table A (Summary of Test Pits)</i> <i>Test Pit Location Plan (Drawing No 8574/14-AA1)</i>
<i>APPENDIX B</i>	<i>Summary of Site Classifications</i>
<i>APPENDIX C</i>	<i>Laboratory Test Results</i>

8574/14-AA
Stage 5 - 117 O'Connell Street, Caddens

1.0 INTRODUCTION

This report describes geotechnical investigations for the proposed dwellings to be constructed at Stage 5 of the proposed residential subdivision at Caddens as follows:

- Stage 5: Lots 501 to 605 (105 Lots)

Site classification in accordance with AS2870-2011 is only applicable for 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 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 that 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 24 August 2018, under the full time supervision of a Geotechnical Engineer and consisted of excavation of thirty seven test pits (TP1 to TP37) using a 5.5 tonne excavator.

The test pit locations are indicated on Drawing No 8574/14-AA1 in Appendix A of this report. A summary of the field data obtained is presented in Appendix A.

3.0 SITE CONDITIONS

3.1 Surface Conditions

Stage 5 of the Caddens Hill Residential Subdivision is located to the south O'Connell Lane and surrounded by land under development on all other adjacent sides. The following observations were made at the time of conducting field work:

- The fill has been placed as part of the bulk earthworks for Stage 5.
- The site generally sloped towards to east.
- Installations of services are completed.
- There were no trees planted at the time of the investigation and the ground devoid of any vegetation.
- No rocky outcrops, watercourses or heaving zones were observed.

8574/14-AA
Stage 5 - 117 O'Connell Street, Caddens

3.2 Sub-Surface Conditions

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

Topsoil	Silty Clay, low plasticity, brown, traces of root fibres
Fill	Silty Clay, medium plasticity, brown, pale brown mottled grey and red, traces of gravel, traces of shale fragments and oversize gravel
Natural	(Cl) Silty CLAY, medium plasticity, pale brown mottled grey and red (CI-CH) Silty CLAY, medium to high plasticity, red mottled pale brown (CH) Shaley CLAY, high plasticity, grey

Geotechnical Model

Based on information presented in the foregoing table, the sub-surface profile within the proposed development is anticipated to comprise a sequence of fill of variable depths and natural clays.

Groundwater Condition

Groundwater was not observed in the test pits during the short time that 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.

4.0 LABORATORY TESTING

During the course of the investigation, three undisturbed samples (U_{50}) were recovered for shrink/swell index tests aimed at assessing soil reactivity at moisture changes. The tests were conducted as per AS1289 7.1.1 and the results are summarised below and detailed in the attached test certificates:

Summary of Test Results

Test Pit	Depth (m)	Material Description	$I_{ss} \%_p F$
TP3	0.5-0.7	(CL-CI) Silty CLAY, low to medium plasticity, pale brown & red-grey	1.3
TP11	0.6-0.8	(CL-CI) Silty CLAY, low to medium plasticity, pale brown & red-grey	1.9
TP15	0.65-0.85	(CL-CI) Silty CLAY, low to medium plasticity, pale brown & red-grey	1.6

I_{ss} : Shrink/Swell Index

5.0 DISCUSSION & RECOMMENDATIONS

5.1 Assessment of Fill

Geotech Testing Pty Ltd provided geotechnical inspections and testing during construction and conducted sufficient compaction control testing during placement of fill. A final site fill testing summary (Reference 8574-5AD dated 24 August 2018) has been provided.

The fill placed on the lots is classified as "Controlled" fill and the testing associated with fill placement was carried out to Level 1 requirements and reported in Geotech Testing summary report.

5.2 Site Classifications

Based on the above information, site 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, including laboratory testing, the lots are classified as detailed in Appendix C.

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

The classifications presented in Appendix B of this report are applicable to the lots at the date of conducting the investigation, being 24 August 2018 and have been 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 must be followed.
- The proposed dwellings must be in accordance with AS2870. 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 AS2870 Appendix H of AS2871-2011.

GEOTECH TESTING PTY LTD

APPENDIX A

TABLE A (Test Pit Summary)

TEST PIT LOCATION PLAN (Drawing No 8574/14-AA1)

TABLE A

Job No: 8574/14
Our Ref: 8574/14-AA

Page 1 of 7

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP1	0.0-0.3	0.5-0.7 (U ₅₀)	TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, traces of shale fragments and oversize gravel
TP2	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-0.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel
	0.5-1.5		FILL: Silty Clay, medium plasticity, pale brown mottled grey and red
TP3	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-0.4		FILL: Silty Clay, medium plasticity, brown, traces of gravel
	0.4-0.8		(CI) Silty CLAY, medium plasticity, pale brown mottled grey and red
	0.8-0.9		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered
	0.9		Refusal
TP4	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-0.7		(CI) Silty CLAY, medium plasticity, pale brown mottled grey and red
	0.7-0.8		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered
	0.8		Refusal
TP5	0.0-0.15		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.15-0.3		(CI) Silty CLAY, medium plasticity, pale brown mottled grey and red
	0.3-0.4		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered
	0.4		Refusal

TABLE A

Job No: 8574/14
Our Ref: 8574/14-AA

Page 2 of 7

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP6	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-0.7		(CI) Silty CLAY, medium plasticity, pale brown mottled grey and red
	0.7-0.8		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered
	0.8		Refusal
TP7	0.0-0.25		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.25-0.6		(CI) Silty CLAY, medium plasticity, pale brown mottled grey and red
	0.6-0.7		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered
	0.7		Refusal
TP8	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-0.65		(CI) Silty CLAY, medium plasticity, pale brown mottled grey and red
	0.65-0.75		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered
	0.75		Refusal
TP9	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-0.5		(CI) Silty CLAY, medium plasticity, pale brown mottled grey and red
	0.5-0.6		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered
	0.6		Refusal

TABLE A

Job No: 8574/14
Our Ref: 8574/14-AA

Page 3 of 7

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP10	0.0-0.25	0.6-0.8 (U ₅₀)	TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.25-0.6		(CI) Silty CLAY, medium plasticity, pale brown mottled grey and red
	0.6-0.7		SHALE, grey with ironstained bands, very low strength, extremely to distinctly weathered
	0.7		Refusal
TP11	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-0.6		FILL: Silty Clay, medium plasticity, brown, traces of gravel
	0.6-1.2		(CI-CH) Silty CLAY, medium to high plasticity, red mottled pale brown
	1.2-1.3		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered
	1.3		Refusal
TP12	0.0-0.25		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.25-1.5		FILL: Silty Clay, medium plasticity, pale brown mottled grey and red, traces of shale fragments
TP13	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, traces of shale fragments
TP14	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-0.45		FILL: Silty Clay, medium plasticity, brown, traces of gravel, traces of shale fragments
	0.45-1.5		FILL: Silty Clay, medium plasticity, pale brown mottled grey and red

TABLE A

Job No: 8574/14
Our Ref: 8574/14-AA

Page 4 of 7

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP15	0.0-0.3	0.65-0.85 (U ₅₀)	TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-0.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel
	0.5-1.5		(CI) Silty CLAY, medium plasticity, grey mottled pale brown
TP16	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-0.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel
	0.5-0.95		(CI) Silty CLAY, medium plasticity, grey mottled pale brown
	0.95-1.5		(CH) Shaley CLAY, high plasticity, grey
TP17	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-0.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel
	0.5-0.9		(CH) Shaley CLAY, high plasticity, grey
	0.9		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered Refusal
TP18	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-0.8		FILL: Silty Clay, medium plasticity, brown, traces of gravel
	0.8-1.1		(CH) Shaley CLAY, high plasticity, grey
	1.1-1.2		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered
	1.2		Refusal
TP19	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-0.8		(CI) Silty CLAY, medium plasticity, grey mottled pale brown
	0.8-1.5		(CH) Shaley CLAY, high plasticity, grey

TABLE A

Job No: 8574/14
Our Ref: 8574/14-AA

Page 5 of 7

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP20	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-1.2		(CI) Silty CLAY, medium plasticity, grey mottled pale brown
	1.2-1.5		(CH) Shaley CLAY, high plasticity, grey
TP21	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, traces of shale fragments, oversize gravel, and boulders
TP22	0.0-0.25		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.25-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, traces of shale fragments, oversize gravel, and boulders
TP23	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, traces of shale fragments, oversize gravel, and boulders
TP24	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, traces of shale fragments, oversize gravel, and boulders
TP25	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, oversize gravel and boulders
TP26	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel

TABLE A

Job No: 8574/14
Our Ref: 8574/14-AA

Page 6 of 7

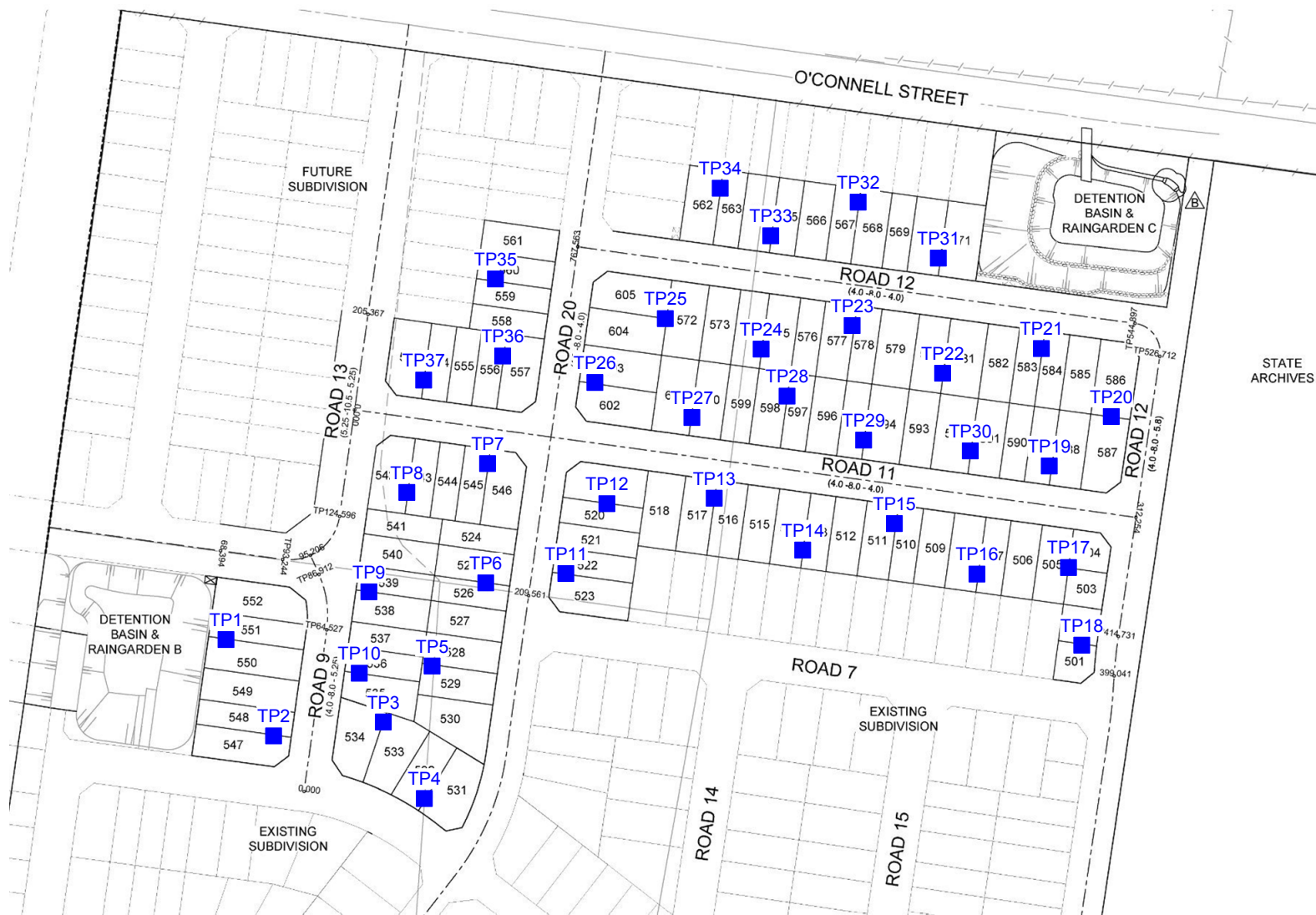
TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP27	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, with oversize gravel and boulders
TP28	0.0-0.25		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.25-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, with oversize gravel and boulders
TP29	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel
TP30	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel
TP31	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, with oversize gravel and boulders
TP32	0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel
TP33	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, with oversize gravel and boulders
TP34	0.0-0.3		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.3-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, with oversize gravel and boulders

TABLE A

Job No: 8574/14
Our Ref: 8574/14-AA

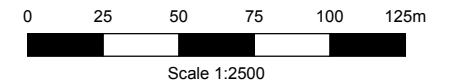
Page 7 of 7

TEST PIT NUMBER	DEPTH (m)	SAMPLE DEPTH (m)	MATERIAL DESCRIPTION
TP35	0.0-0.15		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.15-1.5		FILL: Silty Clay, medium plasticity, brown, traces of gravel, traces of sandstone
TP36	0.0-0.15		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.15-0.95		(CI) Silty CLAY, medium plasticity, grey mottled pale brown
	0.95-1.05		SHALE, grey with iron-stained bands, very low strength, extremely to distinctly weathered
	1.05		Refusal
TP37	0.0-0.2		TOPSOIL: Silty Clay, low plasticity, brown, traces of gravel
	0.2-1.5		(CI) Silty CLAY, medium plasticity, grey mottled pale brown



LEGEND

■ Test Pit



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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

J K Williams Contracting Pty Ltd
Proposed Caddens Hill Residential Subdivision
Stage 5
O'Connell Lane, Caddens

Test Pit Locations

Drawing No: 8574/14-AA1
Job No: 8574/14
Drawn By: MH
Date: 24 August 2018
Checked By: KS

File No: 8574-14
Layers: 0, AA1

APPENDIX B

SUMMARY OF SITE CLASSIFICATIONS

Job No: 8574/14
Our Ref: 8574/14-AA

TABLE B
SUMMARY OF SITE CLASSIFICATIONS
Caddens Hill Residential Subdivision – Stage 5

Lot	Classification	Lot	Classification	Lot	Classification
501	M	536	S	571	M
502	M	537	S	572	M
503	M	538	S	573	M
504	M	539	S	574	M
505	M	540	S	575	M
506	M	541	S	576	M
507	M	542	S	577	M
508	M	543	S	578	M
509	M	544	S	579	M
510	M	545	S	580	M
511	M	546	S	581	M
512	M	547	M	582	M
513	M	548	M	583	M
514	M	549	M	584	M
515	M	550	M	585	M
516	M	551	M	586	M
517	M	552	M	587	M
518	M	553	S	588	M
519	M	554	S	589	M
520	M	555	S	590	M
521	M	556	S	591	M
522	M	557	S	592	M
523	M	558	M	593	M
524	S	559	M	594	M
525	S	560	M	595	M
526	S	561	M	596	M
527	S	562	M	597	M
528	S	563	M	598	M
529	S	564	M	599	M
530	S	565	M	600	M
531	S	566	M	601	M
532	S	567	M	602	M
533	M	568	M	603	M
534	M	569	M	604	M
535	S	570	M	605	M
S: Slightly Reactive (0-20mm), M: Moderately Reactive (20-40mm)					

APPENDIX C

LABORATORY TEST RESULTS

J K WILLIAMS CONTRACTING PTY LTD
PO BOX 308
PENRITH NSW 2750

Job No: 8574/14
Tested By: AN
Checked By: AK
Date Tested: 28/08/2018
Laboratory: Penrith

SITE CLASSIFICATION
PROPOSED CADDENS HILL RESIDENTIAL SUBDIVISION - O'CONNELL LANE, STAGE 5, CADDENS

TEST RESULTS - SHRINK / SWELL INDEX

Page 1 of 1

Test Procedure: AS 1289 7.1.1				
Sample Identification	Test Pit 3	Test Pit 11	Test Pit 15	
Depth (m)	0.5 - 0.7	0.6 - 0.8	0.65 - 0.85	
Laboratory Number	8574/14-1	8574/14-2	8574/14-3	
Test Description				
Moisture Content				
Initial %	12.8	19.4	17.1	
Final %	15.8	25.7	22.0	
Swell %	1.3	Nil	2.0	
Shrinkage %	1.7	3.5	1.8	
Shrink/Swell Index %/pF	1.3	1.9	1.6	
Material Description	(CL-CI) Silty CLAY, low to medium plasticity, pale brown & red-grey	(CL-CI) Silty CLAY, low to medium plasticity, pale brown & red-grey	(CL-CI) Silty CLAY, low to medium plasticity, pale brown & red-grey	

Form No R007 Version 12 06/13



NATA Accreditation Number 2734
Corporate Site Number 2727

Accredited for compliance with
ISO/IEC 17025 - Testing.

A Kench 31/08/2018
Approved Signatory

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