



Appendix B

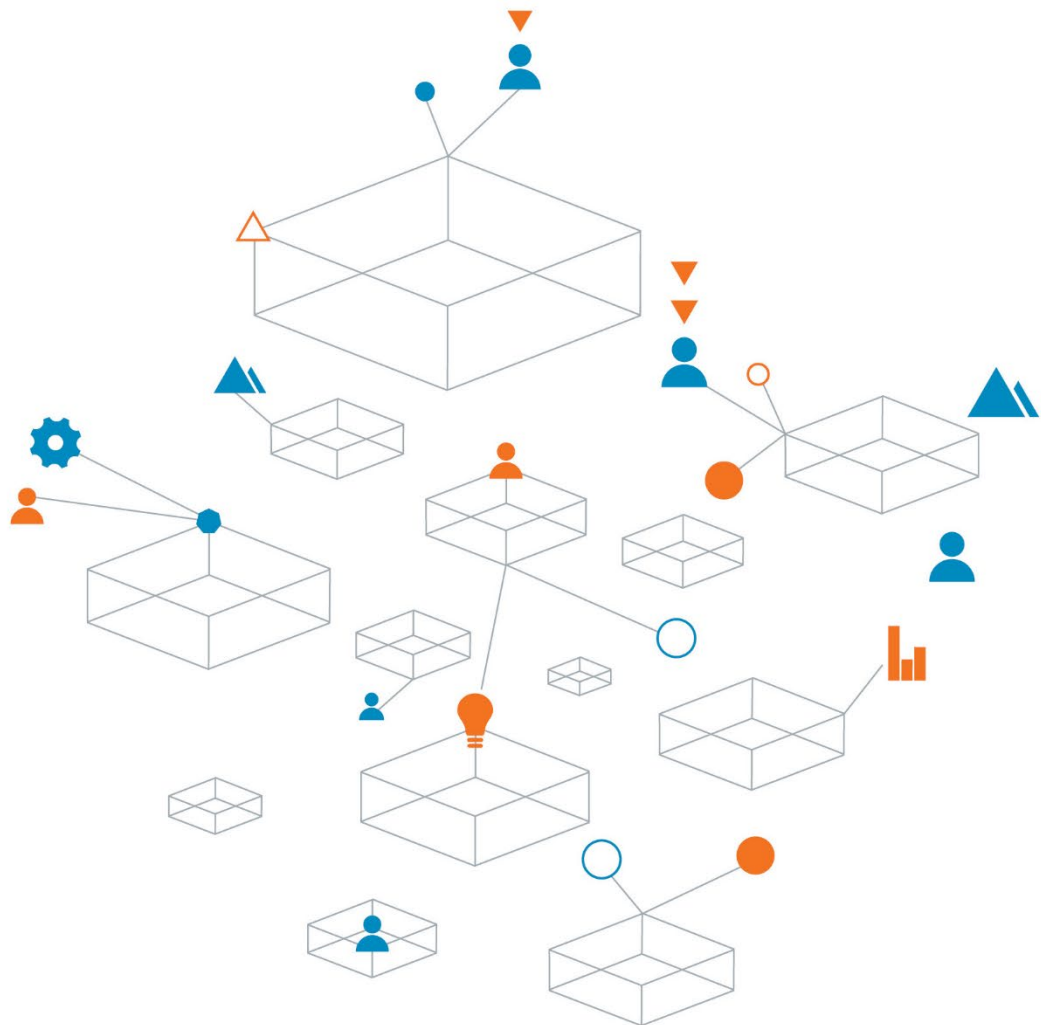
Geotechnical Assessment

**Rolleston West Residential Ltd
Rolleston West Plan Change**

773-CHCGE281253

Geotechnical Assessment Report

9 November 2020



Trust is the
cornerstone
of all our
projects

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9 November 2020

Our ref: 773-CHCGE281253

Rolleston West Residential Ltd
ASB House, 166 Cashel Street
Christchurch Central

Attention: Tim Carter / Bruce Van Duyn

Executive Summary: Rolleston West – Geotechnical Assessment to support a Plan Change application

Rolleston West Residential Ltd has engaged Coffey Services (NZ) Limited to carry out a geotechnical investigation and assessment of suitability for the proposed Plan Change and future subdivision of the Holmes and Skellerup Blocks in Rolleston, Canterbury. The purpose of this report is to support a Plan Change application for the construction of approximately 2,100 new residential Lots at the site.

The site investigations and preliminary liquefaction assessment indicates that the site is TC1-like. Other geotechnical hazards (erosion, slippage and inundation) are considered low to very low risk with appropriate future engineering design.

Our assessment has considered the items required by Section 106 of the RMA and in our opinion the site is considered geotechnically suitable for Plan Change and future subdivision. Further investigations and design will need to be carried out at the subdivision consent stage.

If you have any queries, please contact the undersigned.

For and on behalf of Coffey



Chris Thompson
BSc (Tech)
Associate Engineering Geologist

Rolleston West Plan Change

Prepared for
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Quality information

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Revision	Description	Date	Originator	Reviewer	Approver
V1	GAR	09/11/2020	CT	RB	CT
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Distribution

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1. Introduction

Rolleston West Residential Ltd has engaged Coffey Services (NZ) Limited to carry out a geotechnical investigation and assessment of suitability for a proposed Plan Change and future subdivision of the Holmes and Skellerup Blocks, referred to as the “site”, in Rolleston, Canterbury. The purpose of this report is to support a Plan Change application for the construction of approximately 2,100 new residential Lots at the site.

Our assessment has considered the items required by Section 106 of the RMA. In our opinion the site is considered geotechnically suitable for subdivision subject to further investigation and design at the subdivision consent stage.

2. Scope

A scope of assessment work for the approximately 160 Ha total area of the site was developed and carried out by Coffey, as outlined below:

- Review of previous geotechnical investigations including previous work on the site and surrounding area.
- Site walkovers to assess geotechnical hazards.
- Assessment of the geotechnical hazards at the site per Section 106 of the RMA.
- Geotechnical analyses and reporting.

Coffey have considered the following in the preparation of this report:

- Existing geotechnical investigation data available from the New Zealand Geotechnical Database (NZGD).
- Project correspondence with the wider Plan Change consultants engaged by Rolleston West Residential Ltd.

Reference has also been made to the MBIE Guidance Part D: Subdivisions, to confirm that the requirements outlined in these documents have been incorporated in this report.

3. Proposed development

The proposed Plan Change area comprises four land parcels totalling approximately 160 Ha located to the west of Rolleston, bordering the existing township. The Plan Change area is split into two blocks; the Holmes Block, bordered by State Highway 1, Dunns Crossing Road and Burnham School Road and the Skellerup Block, which is located to the west of Dunns Crossing Road.

The Holmes Block has a gentle slope to the southeast. An existing water race is located in the northwestern corner of the site and the West Rolleston Primary School is located in the southeastern corner. The site was used for forestry until the mid 2000's when it was converted to cropland.

The Skellerup Block also has a gentle slope to the south/southeast with a water race located along the western boundary. The site was used for forestry until the mid 2000's when it was converted to cropland.

4. Site investigation

The location of the geotechnical investigations carried out on the site to develop the ground models are provided in Figure 1 (in Appendix A) and are summarised below. Investigation logs are presented in Appendix B.

Table 1: Holmes Hub Block existing investigation data

Reference	Depth of test (metres below ground level)	Termination criteria
TP H-1	1.5	Target depth
TP H-2	1.4	Target depth
TP H-3	1.4	Target depth

Table 2: Skellerup Block existing investigation data

Reference	Depth of test (metres below ground level)	Termination criteria
TP S-1	1.4	Target depth
TP S-2	1.5	Target depth
TP S-3	1.4	Target depth
TP_100580	2.1	Effective refusal

5. Site performance

5.1. Ground motion

The site is not in an area mapped for ground damage effects as part of the Canterbury Earthquake Sequence response. However, the nearby Rolleston School strong motion sensor recorded the following peak ground accelerations (PGA):

- 4 September 2010: 0.34g
- 22 February 2011: 0.18g
- Later 2011 earthquakes: <0.11g

Based on the above, we consider that the site was “sufficiently tested” to the serviceability limit state (SLS) level of earthquake demand during the 4 September 2010 earthquake of the Canterbury earthquake sequence (CES) using the MBIE¹ and Bradley & Hughes (2012)² procedures.

An assessment has been made regarding predicted earthquake-induced deformation that may occur in a design earthquake based on geological setting, site terrain, and the level of “test” previously experienced. It is considered that:

- An SLS earthquake event is likely to cause less damage to that experienced in the 4 September 2010 earthquake and to be similar to the February 2011 earthquake.

¹ Ministry of Business, Innovation and Employment (MBIE), December 2012: Repairing and rebuilding houses affected by the Canterbury earthquakes

² Bradley & Hughes (2012) Conditional Peak Ground Accelerations in the Canterbury Earthquakes for Conventional Liquefaction Assessment. Report for DBH (MBIE), April 2012.

- Under ultimate limit state (ULS) conditions, the nature of land and building damage is likely to be similar to that already experienced in the 4 September 2010 earthquake of the CES.

6. Ground model

6.1. Geology

The geological map³ of the area indicates that the site is underlain by “Brownish-grey river alluvium (Q2a).”

6.2. Groundwater

Based on geotechnical investigations carried out for the nearby Stonebrook development, groundwater was encountered between 10.3m and 13.1mbgl. We consider these groundwater levels to be relatively consistent and representative of the general area.

6.3. Subsurface profile

A summary of the ground model for each block is provided below:

Table 3: Holmes Block ground profile

Description	Strength/ consistency	Thickness (m)	Depth to top of layer (mbgl)
Silt (topsoil)		0.2	0.0
Sandy Gravel, with minor silt lenses	Dense to very dense	>30	0.2

Table 4: Skellerup Block ground profile

Description	Strength/ consistency	Thickness (m)	Depth to top of layer (mbgl)
Silt (topsoil)		0.2 to 0.4	0.0
Sandy Gravel / gravelly Silt (grading to sandy Gravel)	Dense to very dense	>30	0.2 to 0.4

6.4. Site sub-soil class

In accordance with NZS1170.5, Section 3.1.3, a subsoil classification of “Class D – Deep or soft soil sites” can be assumed for the site.

³ Forsyth, P.J.; Barrell, D.J.A.; Jongens, R. (compilers) 2008: Geology of the Christchurch area: scale 1:250,000. Lower Hutt: GNS Science. Institute of Geological & Nuclear Sciences 1:250,000 geological map 16. 67 p. + 1 folded map

7. Geotechnical hazard assessment

7.1. Erosion

The site has relatively flat topography and is bounded by newly developed residential areas as well as grassed paddock land. Provided appropriate stormwater systems are installed as part of the development, there will be few viable sources of erosion at this site.

7.2. Falling debris

As there are no slopes or exposed hills or rock faces surrounding the site, there are no sources of falling debris at the site, or for the surrounding area.

7.3. Subsidence

7.3.1. Liquefaction induced settlement

Saturated, loose, uniform fine grained alluvial soils are subject to seismic (liquefaction-induced) settlement during a significant earthquake. Liquefaction typically affects saturated, loose granular soils ranging from sandy silts to sands, but seismic shaking can also result in strength losses in fine-grained, cohesive soils. Liquefaction does not occur in dense, well-graded alluvial gravel soils that are present at this site.

Due to the dense nature of the gravel encountered, and the depth to groundwater (expected to be below 10m bgl), liquefaction risk is considered to be negligible for this project.

7.3.2. Static settlement

Settlement is a crucial factor that can cause structure serviceability issues. Static load-induced settlement typically occurs in low-lying areas underlain by soft, compressible soils as a result of increased overburden loads. As the site is underlain by dense river gravels, static settlement is not deemed a hazard for the site provided any earthworks are carried out to the relevant standards.

7.4. Slippage

We have not observed any sources of land instability on the site and due to the flat site topography, we consider the risk of slope failure to be very low. The appropriate design of batter slopes near waterways will mitigate this risk further.

7.5. Inundation

In relation to stormwater inundation, we recommend that drainage design and management at the site be addressed by specialist consultants as it is beyond the scope of this report. We expect that with appropriate stormwater and flood control systems, the risk of inundation will be low.

8. Conclusions

We consider that the site is suitable for development subject to further investigation and design at the subdivision consent stage. Based on the mapped geology and on-site testing carried out to date, the site is considered TC1-like.

Additional geotechnical investigation will be required to refine the ground model and address any geotechnical risks for the proposed Lots once a subdivision plan has been further developed.

9. Limitations

This report has been prepared solely for the use of our client, Rolleston West Residential Ltd, their professional advisers and Selwyn District Council (SDC) in relation to the specific project described herein. No liability is accepted in respect of its use for any other purpose or by any other person or entity.

It is recommended that all other parties seek professional geotechnical advice to satisfy themselves as to its on-going suitability for their intended use.

As subsurface information has been obtained from discrete investigation locations, which by their nature only provide information about a relatively small volume of subsoils, there may be special conditions pertaining to this site which have not been disclosed by the investigation and which have not been taken into account in the report. If variations in the subsoils occur from those described or assumed to exist, then the matter should be referred to us immediately.

Please also refer to the enclosed *Important Information about Your Coffey Report*.

10. Closure

If you have queries or require further clarification regarding aspects of this report, please contact the undersigned.

For and on behalf of Coffey

Prepared by



Chris Thompson
BSc (Tech)
Associate Engineering Geologist

Reviewed by



Richmond Beetham
BSc MSc Eng BE CMEngNZ CPEng PEngGeol
Principal Geotechnical Engineer

Important information about your Coffey Report

As a client of Coffey you should know that site subsurface conditions cause more construction problems than any other factor. These notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report is based on project specific criteria

Your report has been developed on the basis of your unique project specific requirements as understood by Coffey and applies only to the site investigated. Project criteria typically include the general nature of the project; its size and configuration; the location of any structures on the site; other site improvements; the presence of underground utilities; and the additional risk imposed by scope-of-service limitations imposed by the client. Your report should not be used if there are any changes to the project without first asking Coffey to assess how factors that changed subsequent to the date of the report affect the report's recommendations. Coffey cannot accept responsibility for problems that may occur due to changed factors if they are not consulted.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man. For example, water levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project.

Interpretation of factual data

Site assessment identifies actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from literature and external data source review, sampling and subsequent laboratory testing are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, owners should retain the services of Coffey through the development stage, to identify variances, conduct additional tests if required, and recommend solutions to problems encountered on site.

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered as the project develops. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. Your report should not be applied to any project other than that originally specified at the time the report was issued.

Interpretation by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other project design professionals who are affected by the report. Have Coffey explain the report implications to design professionals affected by them and then review plans and specifications produced to see how they incorporate the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel) and laboratory evaluation of field samples. These logs etc. should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Geoenvironmental concerns are not at issue

Your report is not likely to relate any findings, conclusions, or recommendations about the potential for hazardous materials existing at the site unless specifically required to do so by the client. Specialist equipment, techniques, and personnel are used to perform a geoenvironmental assessment. Contamination can create major health, safety and environmental risks. If you have no information about the potential for your site to be contaminated or create an environmental hazard, you are advised to contact Coffey for information relating to geoenvironmental issues.

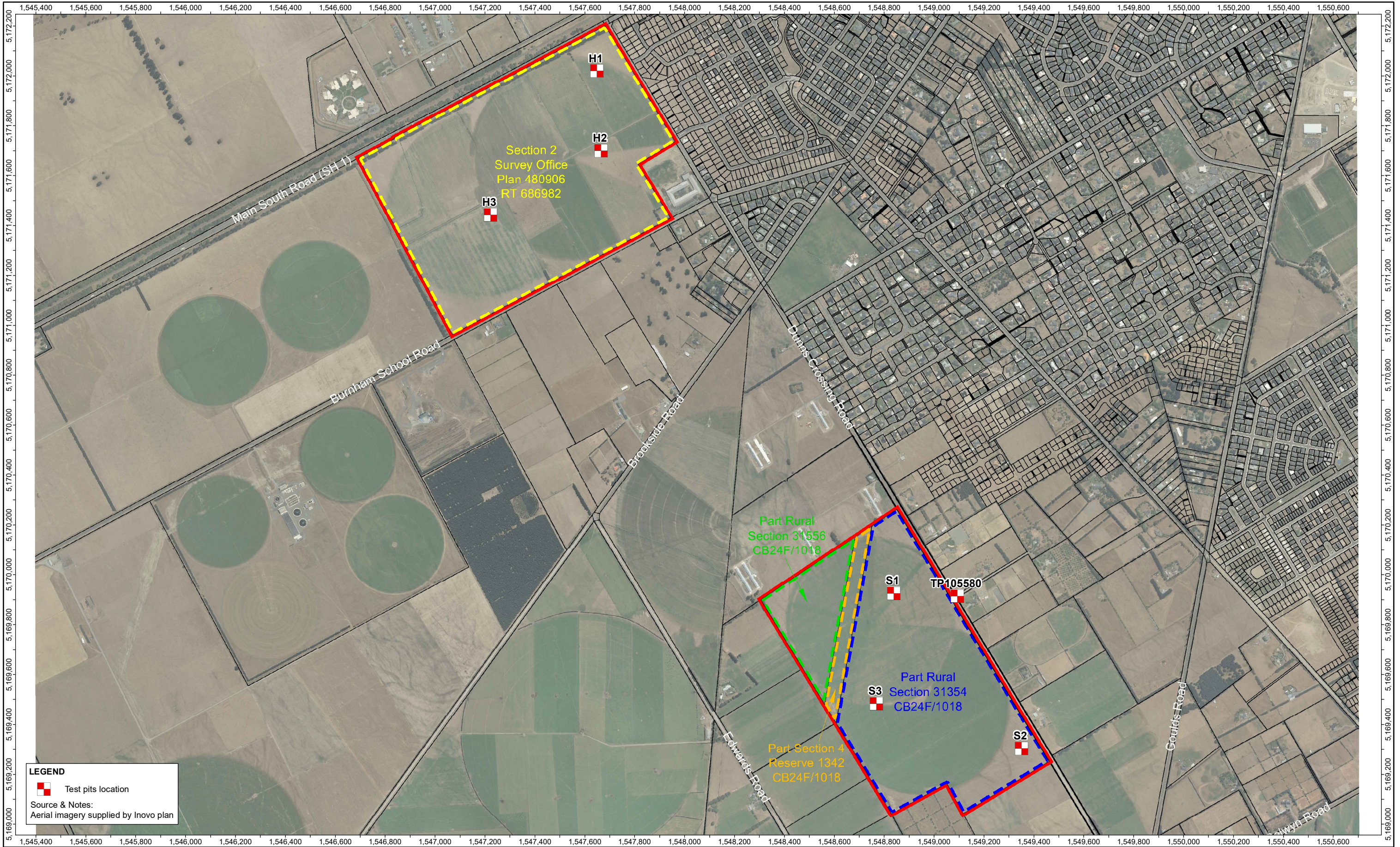
Rely on Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to a project, from design to construction. It is common that not all approaches will be necessarily dealt with in your site assessment report due to concepts proposed at that time. As the project progresses through design towards construction, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.


Responsibility

Reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than the design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

Appendix A - Site Plan




LEGEND

 Test pits location

Source & Notes:
Aerial imagery supplied by Inovo plan

revision	no.	description			drawn	approved	date
	A	ORIGINAL ISSUE			RZ	CT	04.11.20



0 150 300 450 600
SCALE 1:14,000 (A3) METRES


Projection: NZGD 2000 New Zealand Transverse Mercator


drawn	RZ
approved	CT
date	04.11.2020
scale	AS SHOWN
original size	A3




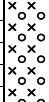
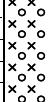
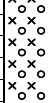
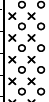
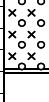
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project:		ROLLESTON WEST PLAN CHANGE	
title:		SITE INVESTIGATION PLAN	
project no:	773-CHCGE281253	figure no:	01
		rev:	A


Appendix B - Test Pit logs

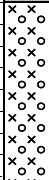
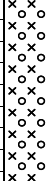
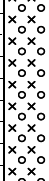
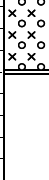
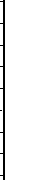
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Connell Wagner Limited 195 Hereford St. (PO Box 1061) Christchurch New Zealand			Client Selwyn Plantation Board Ltd			Location (measured using hand held GPS) 1547696 , 5172033			
Telephone: +64 3 366 0821 Facsimile: +64 3 379 6955			Project SPBL Rolleston Plan Change			Logged By CG			
			Weather Conditions cloudy & dry			Date 12/09/2008			
						Job Number 36951-001			
Water	Depth (m)	Soil Symbol	FACE 1		Water	Depth (m)	Soil Symbol	FACE 2	
			SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.					SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.	
			Grass over sandy TOPSOIL, brown, moist.					Undrained Shear Strength (kPa) • Measured Using a Hand Held Shear Vane ¹ 25 50 75 100 125 150	
			Sandy GRAVEL with cobbles and minor boulders. Mid brown, medium to coarse grained, rounded, gap graded, near horizontal long-axis pebble alignment. Moist.					Scala Penetrometer Test ² × (Blows/ 150mm) 2 4 6 8 10 12	
	0.5					0.5			
	1					1			
	1.5					1.5			
	2					2			
	2.5					2.5			
			End of Test Pit at 1.5m (Target Depth)						
Test Description 1 - Hand held shear vane test in accordance with BS1377:1990 2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters					Notes Groundwater not encountered Soak test undertaken and reported separately				
					Pit dimensions <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> 1.0m </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> 2.2m </div>				

			<h2 style="text-align: center;">Open Excavation Log</h2>			Test Pit No. TP H-2			
Connell Wagner Limited 195 Hereford St. (PO Box 1061) Christchurch New Zealand			Client Selwyn Plantation Board Ltd			Location (measured using hand held GPS) 1547734, 5171797			
Telephone: +64 3 366 0821 Facsimile: +64 3 379 6955			Project SPBL Rolleston Plan Change			Logged By CG			
			Weather Conditions cloudy & dry			Date 12/09/2008			
						Job Number 36951-001			
Water	Depth (m)	Soil Symbol	FACE 1		Water	Depth (m)	Soil Symbol	FACE 2	
			SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.					SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.	
			Grass over silty TOPSOIL, brown, moist.					Undrained Shear Strength (kPa) • Measured Using a Hand Held Shear Vane ¹ 25 50 75 100 125 150	
			Sandy GRAVEL with cobbles and minor boulders. Mid brown, medium to coarse grained, rounded, gap graded, near horizontal long-axis pebble alignment. Moist.					Scala Penetrometer Test ² × (Blows/ 150mm) 2 4 6 8 10 12	
	0.5					0.5			
	1					1			
	1.5		End of Test pit at 1.4m (Target depth)			1.5			
	2					2			
	2.5					2.5			
Test Description 1 - Hand held shear vane test in accordance with BS1377:1990 2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters					Notes Groundwater not encountered Soak test undertaken and reported separately				
					Pit dimensions <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> 1.0m </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> 2.0m </div>				


			<h1 style="text-align: center;">Open Excavation Log</h1>						TP H-3		
Connell Wagner Limited 195 Hereford St. (PO Box 1061) Christchurch New Zealand Telephone: +64 3 366 0821 Facsimile: +64 3 379 6955			Client: Selwyn Plantation Board Ltd			Location (measured using hand held GPS): 1547283, 5171554			Test Pit No.: 12/09/2008		
			Project: SPBL Rolleston Plan Change			Logged By: CG		Weather Conditions: cloudy & dry		Date: 36951-001	
Water	Depth (m)	Soil Symbol	FACE 1		Water	Depth (m)	Soil Symbol	FACE 2		Undrained Shear Strength (kPa) •	
			SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.					SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.		Measured Using a Hand Held Shear Vane¹ 25 50 75 100 125 150	
			Grass over silty TOPSOIL, brown, moist.							Scala Penetrometer Test² × (Blows/ 150mm) 2 4 6 8 10 12	
	0.5	[Symbol]	Sandy GRAVEL with cobbles and minor boulders. Mid brown, medium to coarse grained, rounded, gap graded, near horizontal long-axis pebble alignment. Moist.			0.5					
	1	[Symbol]				1					
	1.5		End of Test pit at 1.4m (Target depth)			1.5					
	2					2					
	2.5					2.5					
Test Description			Notes						Pit dimensions		
1 - Hand held shear vane test in accordance with BS1377:1990			Groundwater not encountered						1.0m		
2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters			Soak test undertaken and reported separately						2.1m		

			<h2 style="text-align: center;">Open Excavation Log</h2>			Test Pit No. TP S-1			
Connell Wagner Limited 195 Hereford St. (PO Box 1061) Christchurch New Zealand			Client Selwyn Plantation Board Ltd			Location (measured using hand held GPS) 1548839, 5169926			
Telephone: +64 3 366 0821 Facsimile: +64 3 379 6955			Project SPBL Rolleston Plan Change			Logged By CG			
			Weather Conditions cloudy & dry			Date 12/09/2008			
						Job Number 36951-001			
Water	Depth (m)	Soil Symbol	FACE 1		Water	Depth (m)	Soil Symbol	FACE 2	
			SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.					SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.	
			Grass over silty TOPSOIL, brown, moist with large tree roots.					Undrained Shear Strength (kPa) • Measured Using a Hand Held Shear Vane ¹ 25 50 75 100 125 150	
	0.5		Gravelly SILT with cobbles and minor clay and boulders. Light brown, cohesive. Gravel is medium to coarse grained, rounded, gap graded, near horizontal long-axis pebble alignment. Moist. Large tree roots in the upper part.			0.5		Scala Penetrometer Test ² × (Blows/ 150mm) 2 4 6 8 10 12	
	1					1			
	1.5					1.5			
	2					2			
	2.5					2.5			
			End of Test pit at 1.4m (Target depth)						
Test Description 1 - Hand held shear vane test in accordance with BS1377:1990 2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters					Notes Groundwater not encountered Soak test undertaken and reported separately				
					Pit dimensions <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> 1.0m </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> 2.0m </div>				

			<h2 style="text-align: center;">Open Excavation Log</h2>			Test Pit No. TP S-2		
Connell Wagner Limited 195 Hereford St. (PO Box 1061) Christchurch New Zealand			Telephone: +64 3 366 0821 Facsimile: +64 3 379 6955			Client Selwyn Plantation Board Ltd		
Project SPBL Rolleston Plan Change			Location (measured using hand held GPS) 1549448, 5169261			Date 12/09/2008		
Logged By CG			Weather Conditions cloudy & dry			Job Number 36951-001		

Water	Depth (m)	Soil Symbol	FACE 1	Water	Depth (m)	Soil Symbol	FACE 2	Undrained Shear Strength (kPa) • Measured Using a Hand Held Shear Vane ¹ 25 50 75 100 125 150
			SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.				SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.	
			Grass over silty TOPSOIL, with large tree roots up to 60mm diameter, brown, moist.					
	0.5		Gravelly SILT with boulders and minor clay. Light brown, cohesive. Gravel is medium to coarse grained, rounded, gap graded, near horizontal long-axis pebble alignment. Moist. Large tree roots in the upper part.		0.5			
	1				1			
	1.5				1.5			
	2				2			
	2.5				2.5			
			End of Test pit at 1.5m (Target depth)					

Test Description 1 - Hand held shear vane test in accordance with BS1377:1990 2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters	Notes Groundwater not encountered Soak test undertaken and reported separately	Pit dimensions <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> 1.0m <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px; margin-top: 5px;"></div> 1.9m </div>
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			<h2 style="text-align: center;">Open Excavation Log</h2>			Test Pit No. TP S-3			
Connell Wagner Limited 195 Hereford St. (PO Box 1061) Christchurch New Zealand			Client Selwyn Plantation Board Ltd			Location (measured using hand held GPS) 1548668, 5169475			
Telephone: +64 3 366 0821 Facsimile: +64 3 379 6955			Project SPBL Rolleston Plan Change			Logged By CG			
			Weather Conditions cloudy & dry			Date 12/09/2008			
						Job Number 36951-001			
Water	Depth (m)	Soil Symbol	FACE 1		Water	Depth (m)	Soil Symbol	FACE 2	
			SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.					SOIL DESCRIPTION: Colour, structure, weathering, subordinate/ main / minor COMPONENTS.	
			Grass over silty TOPSOIL, with large tree roots up to 60mm diameter, brown, moist.					Undrained Shear Strength (kPa) • Measured Using a Hand Held Shear Vane ¹ 25 50 75 100 125 150	
			Silty Sandy GRAVEL with minor cobbles yellowish brown, rounded, gap graded, near horizontal long-axis pebble alignment. Sand is angular. Moist. Large tree roots in the upper part.					Scala Penetrometer Test ² × (Blows/ 150mm) 2 4 6 8 10 12	
	0.5					0.5			
	1					1			
	1.5		End of Test pit at 1.4m (Target depth)			1.5			
	2					2			
	2.5					2.5			
Test Description 1 - Hand held shear vane test in accordance with BS1377:1990 2 - Scala Penetrometer Test in accordance with NZS4402:1986 for the first three meters					Notes Groundwater not encountered Soak test undertaken and reported separately				
					Pit dimensions <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> 1.0m </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 40px; height: 20px; margin-right: 5px;"></div> 2.0m </div>				

PROJECT: Geotechnical Investigation, Dunns Crossing
Subdivision, Rolleston

Sheet 1 of 1

Logged By:	MG
Reviewed By:	TK
Surface Conditions:	Near Level, Grass
Shear Vane Number:	N/A

HAND AUGER WITH SCALACHCH LOG C17231 TP01-TP20 12-11-2017 DRAFT.GPJ S+R 2012-AGS - REVISED.GDT 8/11/17

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