

Appendix B

Geotechnical Assessment



Geotechnical Report for Proposed Plan Change

Falcons Subdivision Proposed Extension

Issue Date: 25 November 2020

Miyamoto Ref: **200357-RP-002[A]**

Prepared for: Yoursection Ltd

Report Tracking

Revision	Status	Date	Prepared by	Reviewed by
А	FINAL	25 November 2020	C. Gibbens	C. McDermott

Authorisation

Author's Signature		Approver's Signature	Alfred -
Name	Clem Gibbens	Name	Charles McDermott
Title	Engineering Geologist BSc MSc (Hons) MEngNZ	Title	Associate Geotechnical Engineer BEng (Hons) CMEngNZ CPEng

Miyamoto International New Zealand Ltd

Level 1, 236 Hereford Street | Christchurch 8011

www.miyamoto.nz

© 2020 Miyamoto International New Zealand Ltd. All rights reserved. This report or any part thereof must not be reproduced in any form without the written permission of Miyamoto International New Zealand Ltd.

Table of Contents

1.	Introduction	1
2.	Site Description	1
3.	Data Sources	2
4.	Geotechnical Assessment	2
5.	Development Considerations	4
6.	Assessment Against RMA Section 106	5
7.	Limitations	5
Refe	erences	7

Appendices

A. Ground Investigation Data

1. Introduction

Miyamoto International NZ Limited (MINZ) has been engaged by Yoursection Limited to undertake a geotechnical investigation, evaluation and land suitability assessment as part of the proposed land reclassification and plan change required for the proposed extension of the Falcons residential subdivision (encompassing 151 and 153 Lincoln Rolleston Road).

Our assessment comprised the following scope of works:

- Research of available information; including historic reports, the New Zealand Geotechnical Database (NZGD), Selwyn District Council (SDC) and Environment Canterbury (ECan);
- Site walkover inspection of the land;
- Shallow field investigation comprising:
 - Machine excavated trial pits (TP);
 - Dynamic cone penetrometer (DCP) testing.
- Geotechnical Assessment including high-level assessment of the site with regard to the Resource Management Act (RMA) Section 106.

This report presents the findings of our investigation and assessment which were carried out considering the Ministry of Business, Innovation & Employment (MBIE) Guidance documents "Planning and engineering guidance for potentially liquefaction-prone land" - Version 1, dated September 2017, "Repairing and rebuilding houses affected by the Canterbury earthquakes" - Version 3, dated December 2012, and "Earthquake geotechnical engineering practice - Modules 2 & 3".

It is noted that this report is limited to geotechnical assessment. Advice related to other development requirements (such as roading infrastructure, pavements, services, stormwater management and contaminated land) should be sought from appropriately qualified personnel.

2. Site Description

The site (approximately 25 hectares in area) is located in a rural setting in Rolleston, Selwyn, south of the existing Falcons / Branthwaite residential subdivision, and encompasses the following land parcels (as shown in Figure 1):

- Lot 1 DP 357634;
- Lot 1 DP 50631 BLKS III IV Leeston SD.

The site is predominantly flat with a global elevation difference of 2.0 m to 3.0 m (increasing to the north-west). The land is predominantly grass covered farmland with residential dwellings, workshops and sheep farming buildings currently occupying two relatively small areas of the proposed development area.



Figure 1: Site Location / Layout Plan

3. Data Sources

The following sources of third-party information were considered and are referenced in this report:

- GNS Science Geological Maps;
- New Zealand Geotechnical Database (NZGD);
- Environment Canterbury (ECan);
- Aurecon (2017). Falcons Landing Geotechnical Subdivision Report;
- Selwyn District Council (SDC);
- Canterbury Maps.

4. Geotechnical Assessment

Geological Setting

The geological map of the area (GNS 1:250,000 QMap) indicates that the site geology is described as 'modern (Quaternary) river floodplain/low-level degradation terraces of unweathered, variably sorted gravel/sand/silt/clay'.

Field Investigations

Miyamoto undertook a site-specific ground investigation on 17 November 2020, comprising:

- 27No. machine excavated trial pits (referenced TP001 to TP027);
- 27No. Dynamic Cone Penetrometer (DCP) tests associated with the above exploratory holes.

In addition to our site-specific investigation we have also utilised available geotechnical information from the surrounding subdivisions and a number of ECan well bores as part of our assessment.

The test locations are shown in Figure 2, the general details of the ground investigations are summarised in Table 1, and the engineering and well bore logs are presented in Appendix A.



Figure 2: Ground Investigation Location Plan

Table 1: Summary of Ground Investigations

Test Ref.	Source	Source Ref.	Test Type	Depth (mbgl)
TP001 to TP027	MINZ	200357	TP / DCP	0.7 to 1.8
Various	Aurecon	254246	TP	1.6 to 1.7
Various	NZGD / Landtech	LTCL18051	TP / DCP	2.1 to 2.6
HA-DCP_128990	NZGD / Davis Ogilvie	39353	HA / DCP	1.2 to 1.7
HA-DCP_27798	NZGD / LDE	10774	TP / DCP	0.8 to 3.0
ECan Well Bores	ECan	Various	Rotary / Percussion / Cable Tool	37.0 to 48.0

Ground Conditions

The ground profile interpreted from the on-site shallow ground investigation, correlated with the available existing data, generally comprises a layer of topsoil (0.2 m to 0.4 m in thickness), overlying low plasticity, firm to stiff Sandy SILT to between 0.4 m and 1.1 mbgl, below which dense to very dense Sandy fine to coarse GRAVEL is present to depth. It is

noted that the upper 0.1 m to 0.2 of the gravel layer is more of a gravelly Sand and a relatively thin layer (0.2 m to 0.4 m) of sand was encountered at isolated locations.

Groundwater

Standing groundwater was not encountered during our site-specific investigation and the soils encountered were dry. Long-term groundwater level monitoring information available from ECan well bores from the surrounding area indicate the groundwater table to average around 10 to 13 mbgl with seasonal fluctuations reaching a shallowest level of ~6 mbgl.

Liquefaction Assessment

The site is located within an area of 'low geotechnical risk' as defined by Selwyn District Council (McCahon, 2013). The site is also located within an area identified as 'Liquefaction damage is unlikely' (2012), and a 'Zone of low liquefaction potential' (2006) as presented on the Canterbury Maps Viewer.

Based on our assessment (including the site-specific ground conditions and groundwater regime) we concur that the risk of damaging effects from liquefaction at the site is low with the seismic performance expected to be equivalent to MBIE Technical Category (TC) 1 as per the MBIE Guidance (2012).

NZS1170.5 Site Sub-soil Class

Based on our geotechnical assessment, geological maps and other available information, NZS1170.5 Site Sub-soil Class D (deep or soft soil site) is considered appropriate for the site.

Flood Hazard

The site is not currently located within one of the Flood Zones identified by Selwyn District Council, however, restrictions around building floor levels must be checked at building consent stage.

5. Development Considerations

At this stage in the project, the future development plans are not defined. However, considering likely residential subdivision similar to that in the local area, the following preliminary guidance is provided:

- Earthworks should be undertaken in general accordance with the requirements of NZS 4431:1989. All unsuitable materials should be stripped from the work areas and stockpiled clear of the operations or removed from site;
- Preliminarily, NZS3604 foundations are considered geotechnically feasible for NZS3604 compliant structures, subject to building-specific geotechnical investigations to assess the available bearing capacity.

It is noted that this report is limited to geotechnical assessment. Advice related to other development requirements (such as roading infrastructure, pavements, services,

stormwater management and contaminated land) should be sought from appropriately qualified personal.

6. Assessment Against RMA Section 106

As per the requirements of Section 106 of the Resource Management Act (RMA) (2017), we have undertaken a high-level assessment of the significant geotechnical hazards that may affect the site. These hazards include, but are not limited to:

- Erosion;
- Falling debris;
- Slippage;
- Subsidence
- Inundation.

At the time of our site visit, there was no evidence of erosion or erosional features on site. The shallow soils could be vulnerable to erosion if the topsoil layer is removed and left unprotected for prolonged periods of time. This can be easily mitigated with appropriate design measures during construction.

Given the proximity of the site to any source, rockfall (falling debris) is not considered a risk to the site and given the site is generally flat with only a minor gradual change in elevation across the site, slope instability (slippage) is not considered to be a risk.

On the basis of our geotechnical assessment herein, we do not consider subsidence (under either static or seismic loading) to be a significant hazard for normal construction (i.e. NZS3604 compliant buildings).

The site is not currently located within one of the Flood Zones identified by Selwyn District Council, however, restrictions around building floor levels must be checked at building consent stage.

Based on our assessment, we consider that the geotechnical hazards may be mitigated to an acceptable standard, provided that the geotechnical recommendations given in this report are followed, and the appropriate engineering measures implemented, we consider that the development is unlikely to be affected nor worsen, accelerate or result in material damage.

7. Limitations

This report is subject to the following limitations:

- This report has been prepared by Miyamoto for the Client for the purpose/s agreed with the Client (Purpose). Miyamoto accepts no responsibility for the validity, appropriateness, sufficiency or consequences of the Client using the report for purposes other than for the Purpose.
- This report is not intended for general publication or circulation. This report is not to be reproduced by the Client except in relation to the Purpose, without Miyamoto's prior written permission. Miyamoto disclaims all risk and all responsibility to any third party.
- This report is provided based on the various assumptions contained in the report.

- Miyamoto's professional services are performed using a degree of care and skill
 reasonably exercised by reputable consultants providing the same or similar services as
 at the date of this report.
- The sub surface information has been obtained from investigation carried out at discrete locations, which by their nature only provide information about a relatively small volume of subsoils. While Miyamoto has taken reasonable skill and care in carrying out the investigation to determine the subsoil condition, the subsoil condition could differ substantially from the results of any sampling investigation. Miyamoto is not responsible for and does not accept any liability in respect of any difference between the actual subsoil conditions and the results of our investigation.
- A change in circumstances, facts, information after the report has been provided may affect the adequacy or accuracy of the report. Miyamoto is not responsible for the adequacy or accuracy of the report as a result of any such changes.
- This report is not to be reproduced, either wholly or in part, without our prior written permission.

If you have any queries or you require any further clarification on any aspects of this report, please do not hesitate to contact Miyamoto International (NZ) Ltd.

References

- Environment Canterbury, 2014. Canterbury Maps Viewer, http://canterburymaps.govt.nz/Viewer/#webmap
- Environment Canterbury, Web app viewer Flood Hazard,
 https://ecanmaps.ecan.govt.nz/portal/apps/webappviewer/index.html?id=57c74073c
 2f14a85ac0caf30073ae48a
- Forsyth, P.J.; Barrell, D.J.A.; Jogens, R. (compilers) 2008. Geology of the Christchurch area. Institute of Geological and Nuclear Sciences 1: 250000 geological map 16. Lower Hutt, New Zealand.
- GNS Science (2012). Review of liquefaction hazard information in eastern Canterbury, including Christchurch City and parts of Selwyn, Waimakariri and Hurunui Districts, Report No. R12/83
- Ministry of Business, Innovation and Employment (MBIE), 2012. Revised issue o
- Ian MacCahon, 2013. Selwyn District Council 'Area of low geotechnical risk' map.
- Ministry of Business, Innovation, and Employment, 2012. *Repairing and rebuilding houses affected by the Canterbury earthquakes.*
- New Zealand Geotechnical Database, 2017. Accessed via Google Earth from https://www.nzgd.org.nz/.
- New Zealand Geotechnical Society (NZGS) and Ministry of Business, Innovation and Employment (MBIE) (2016). Earthquake geotechnical engineering practice Module 2: Geotechnical investigations for earthquake engineering, November 2016.
- New Zealand Geotechnical Society (NZGS) and Ministry of Business, Innovation and Employment (MBIE) (2016). Earthquake geotechnical engineering practice Module 3: Identification, assessment and mitigation of liquefaction hazards, May 2016.
- New Zealand Standard NZS1170.5 (2004). Structural Design Actions, Part 5: Earthquake Actions New Zealand Standard, NZS 2004.
- Selwyn District Council District Plan Online Maps, https://eplan.selwyn.govt.nz/eplan/#/Property/7941662.

Appendices

A. Ground Investigation Data

MINZ site-specific investigation logs

ECan well bore logs

Aurecon 2017 investigation logs (nearby only)

LandTech 2018 investigation logs (nearby only)

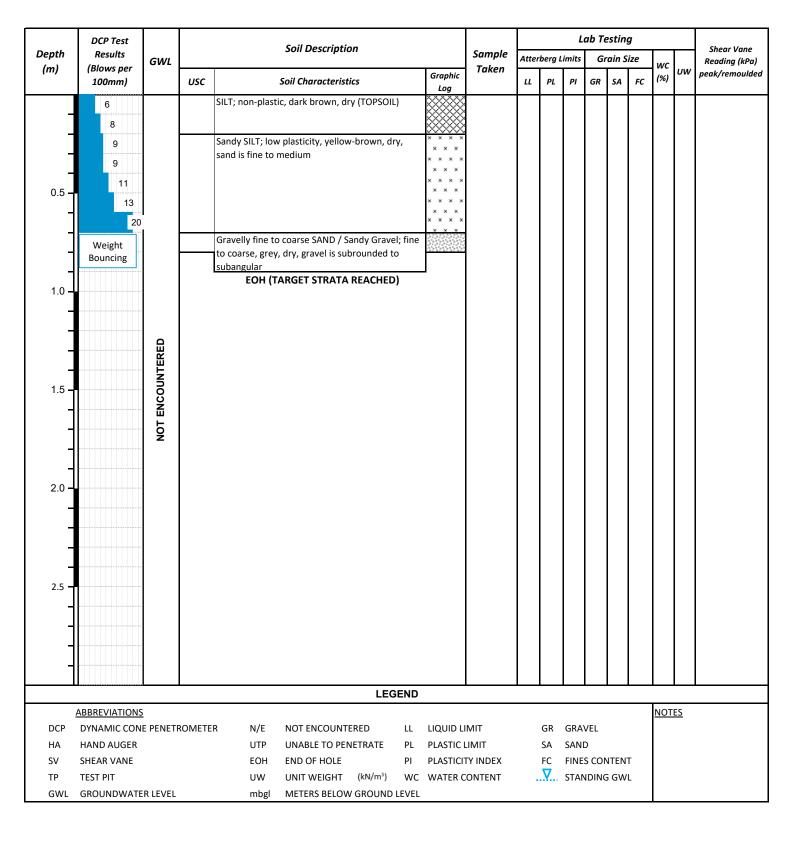
Davis Ogilvie 2019 investigation logs (nearby only)



200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	151 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.8	mbgl	HOLE DIAMETER:	50 mm
PROCESSED BY:	CG	TESTING METHOD:	TP + D	СР	SHEAR VANE NUMBER:	-
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E		This report may only be reproduced in full	

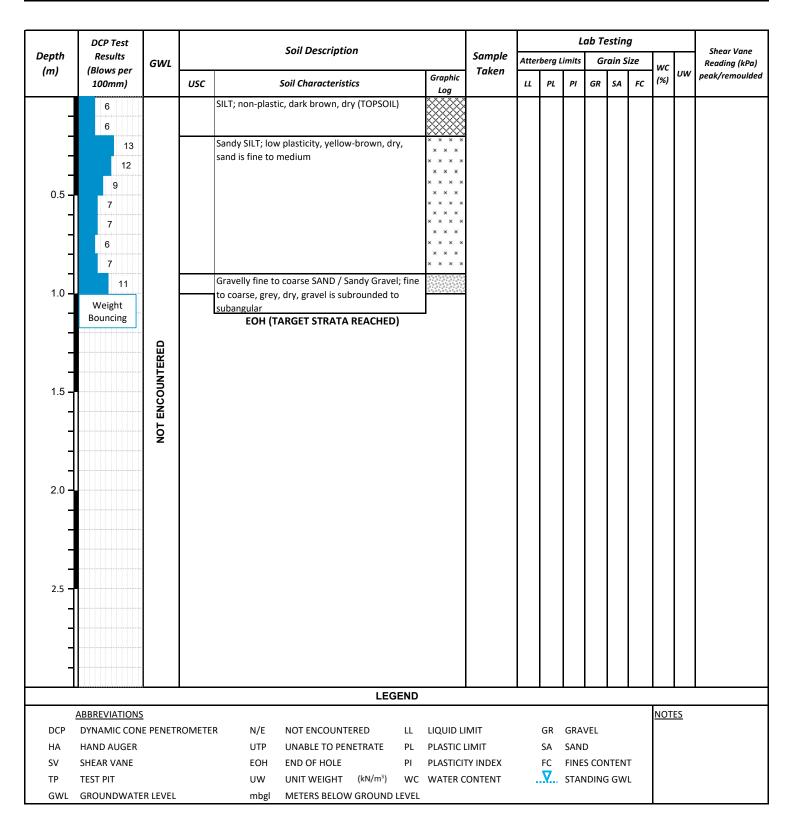




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	151 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	1.0 mbgl	HOLE DIAMETER: 50 m	ım	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

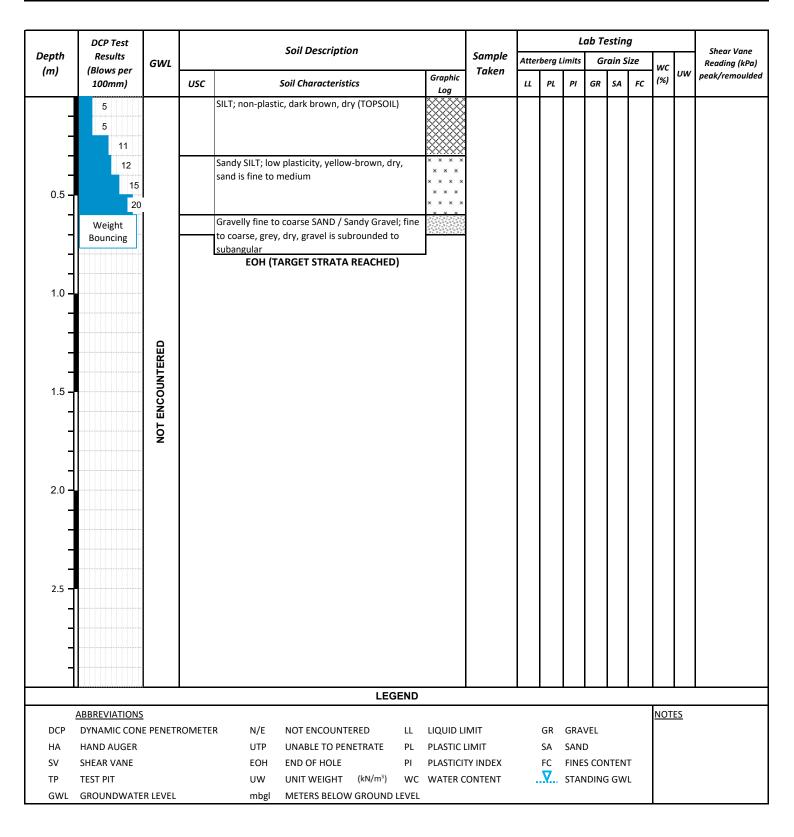




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.7	mbgl	HOLE DIAMETER:	50 mm
PROCESSED BY:	CG	TESTING METHOD:	TP + D	СР	SHEAR VANE NUMBER:	-
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E		This report may only be reproduced in full	

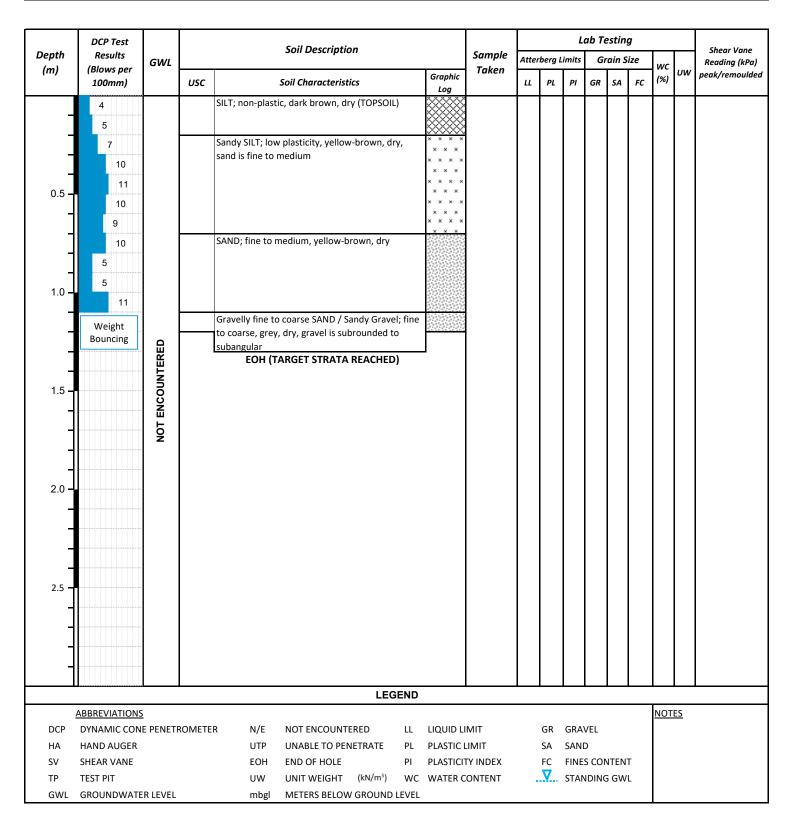




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	151 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	1.2 mbgl	HOLE DIAMETER: 50	0 mm	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

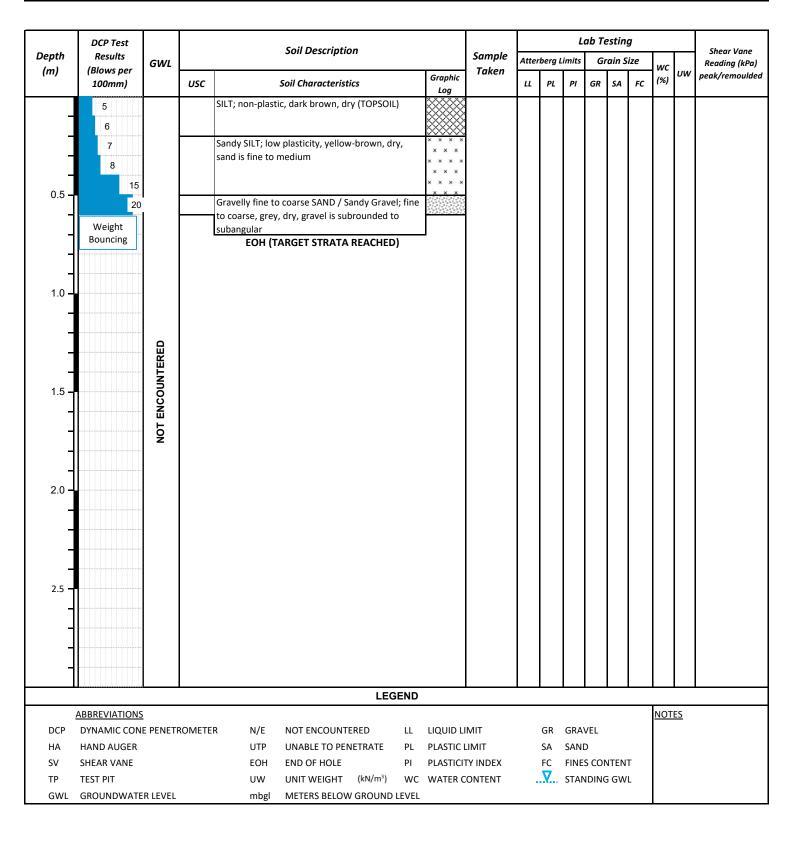




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	151 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.6 mbgl	HOLE DIAMETER: 50 m	ım	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

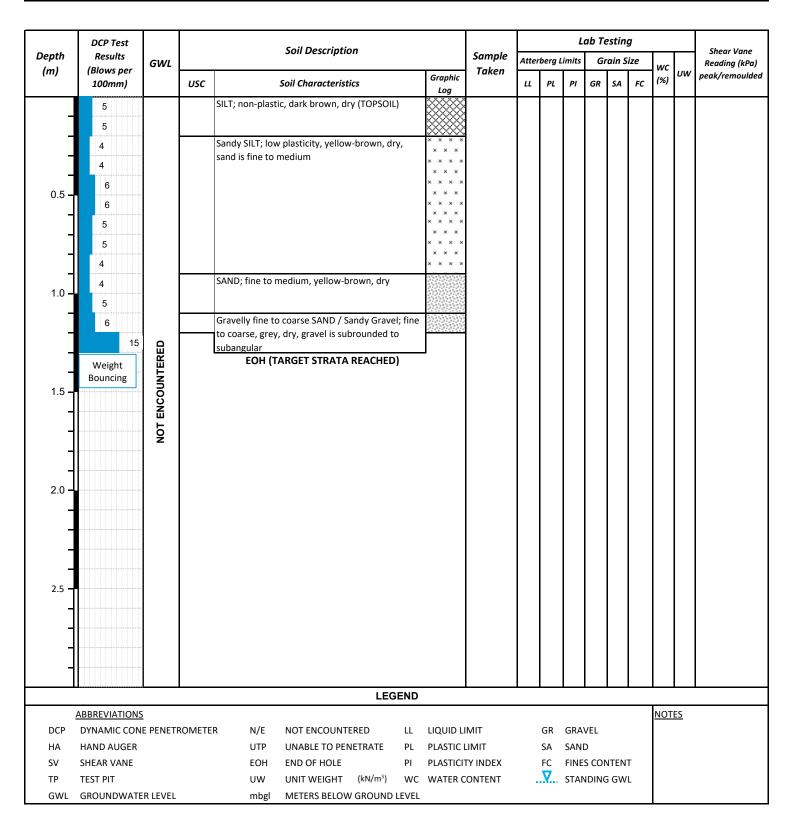




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	151 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	1.3 mbgl	HOLE DIAMETER: 50 m	ım	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

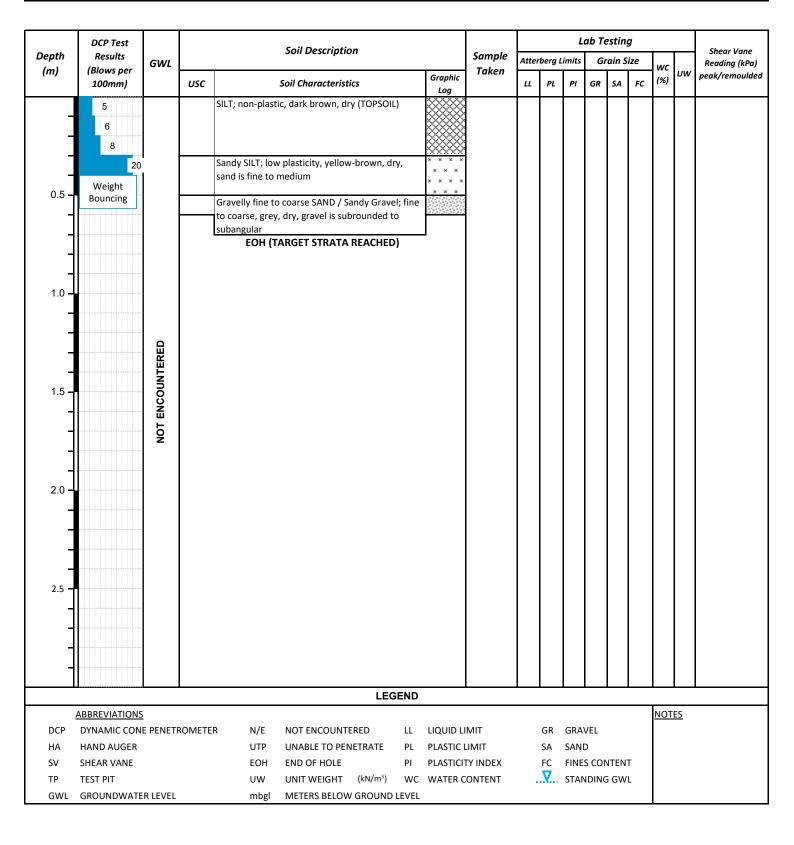




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	151 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.6 mbgl	HOLE DIAMETER: 50 I	mm	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:		
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

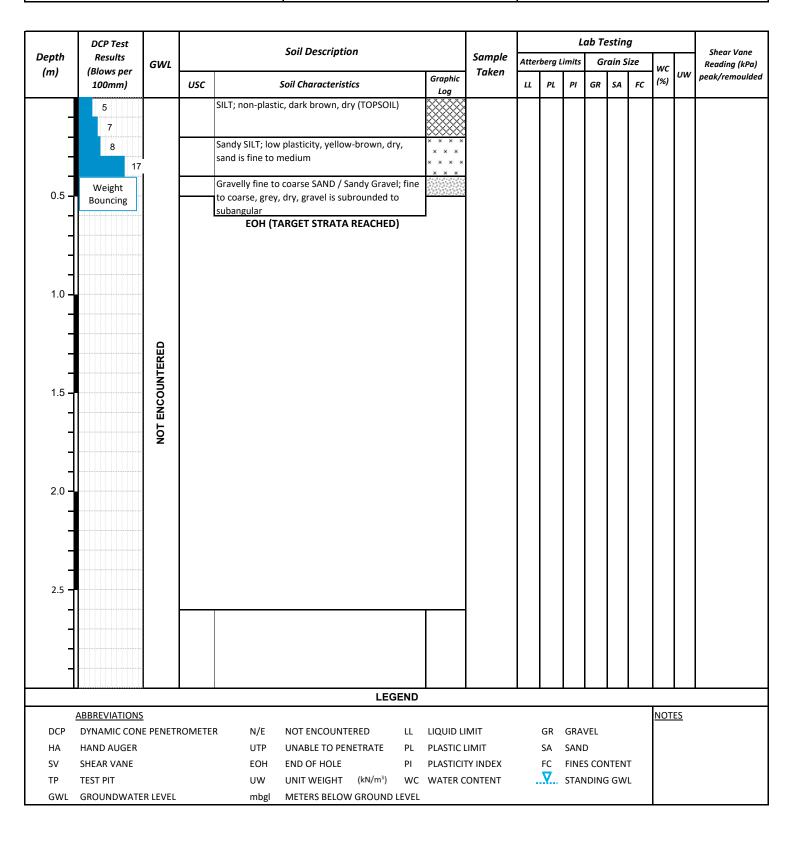




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	151 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.5 mbgl	HOLE DIAMETER:	50 mm	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

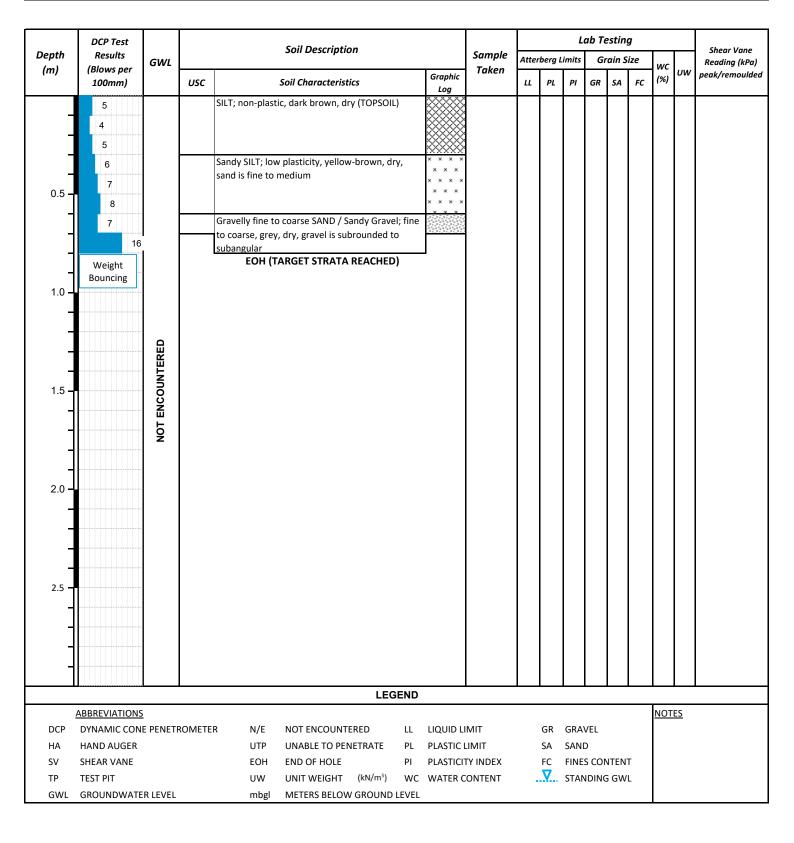




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.7 r	mbgl	HOLE DIAMETER:	50 mm
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	,	SHEAR VANE NUMBER:	-
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E		This report may only be reproduced in full	

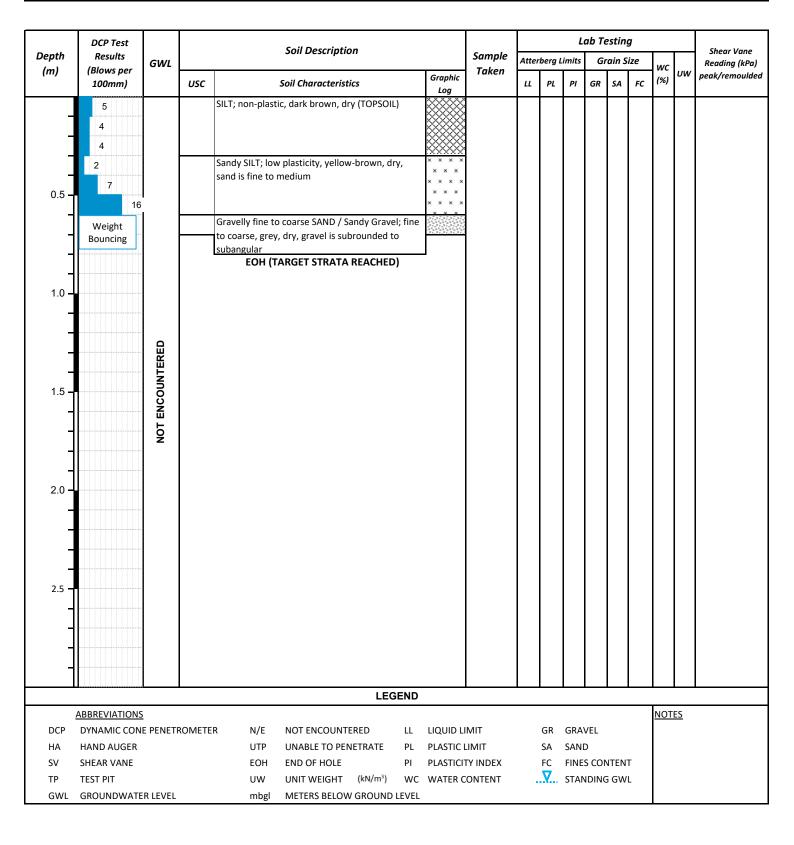




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.7 mbgl	HOLE DIAMETER: 50 r	nm	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

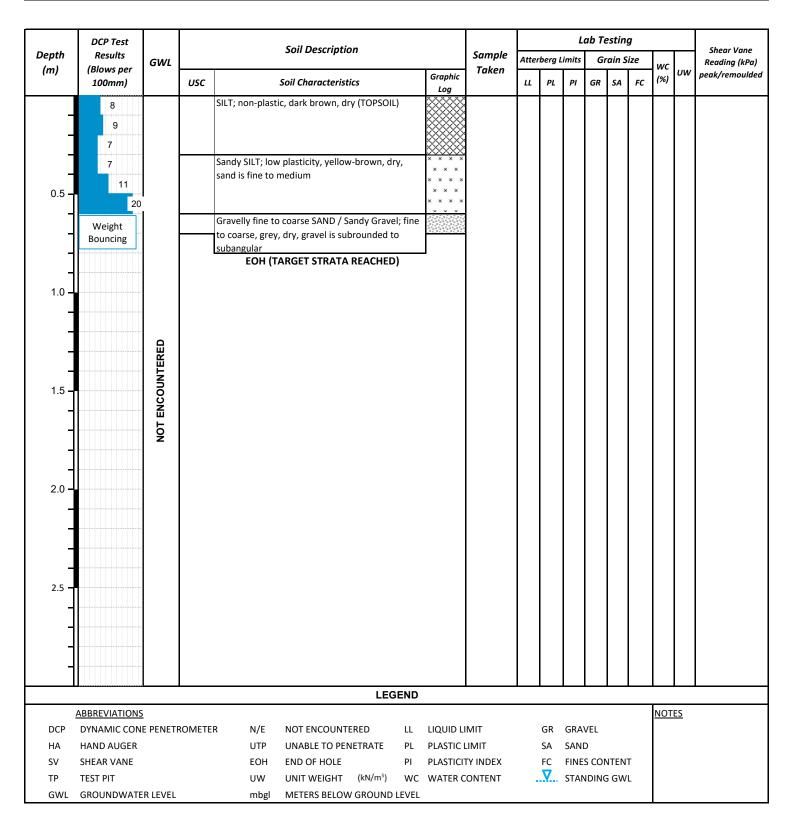




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.7 mbgl	HOLE DIAMETER: 50	0 mm	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

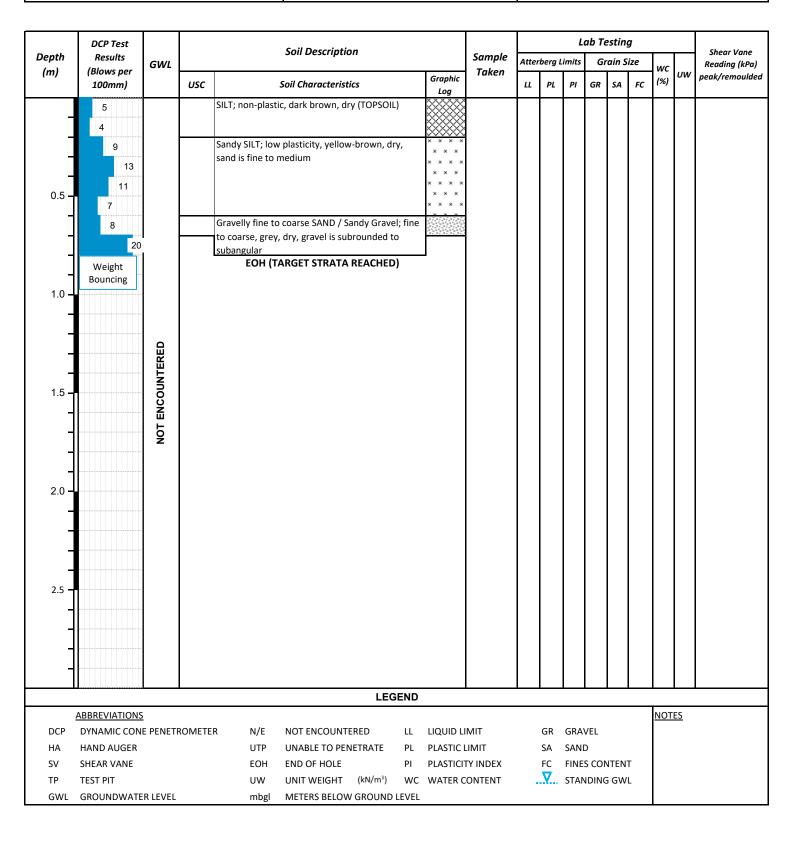




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.8	mbgl	HOLE DIAMETER:	50 mm
PROCESSED BY:	CG	TESTING METHOD:	TP + DO	CP	SHEAR VANE NUMBER:	-
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E		This report may only be reproduced in full	

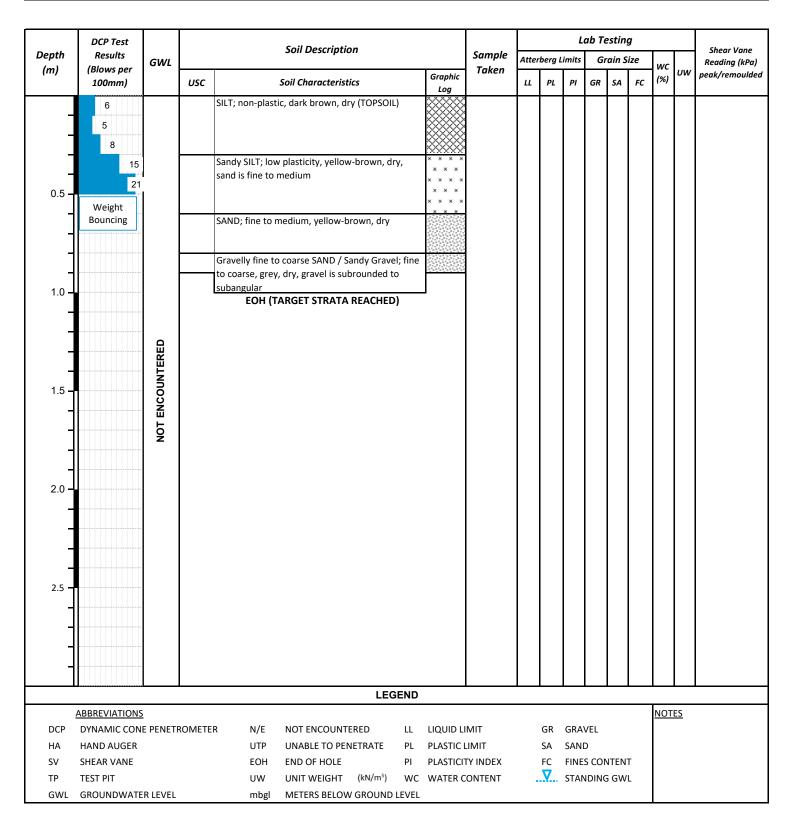




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.9 mbgl	HOLE DIAMETER: 5	0 mm	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

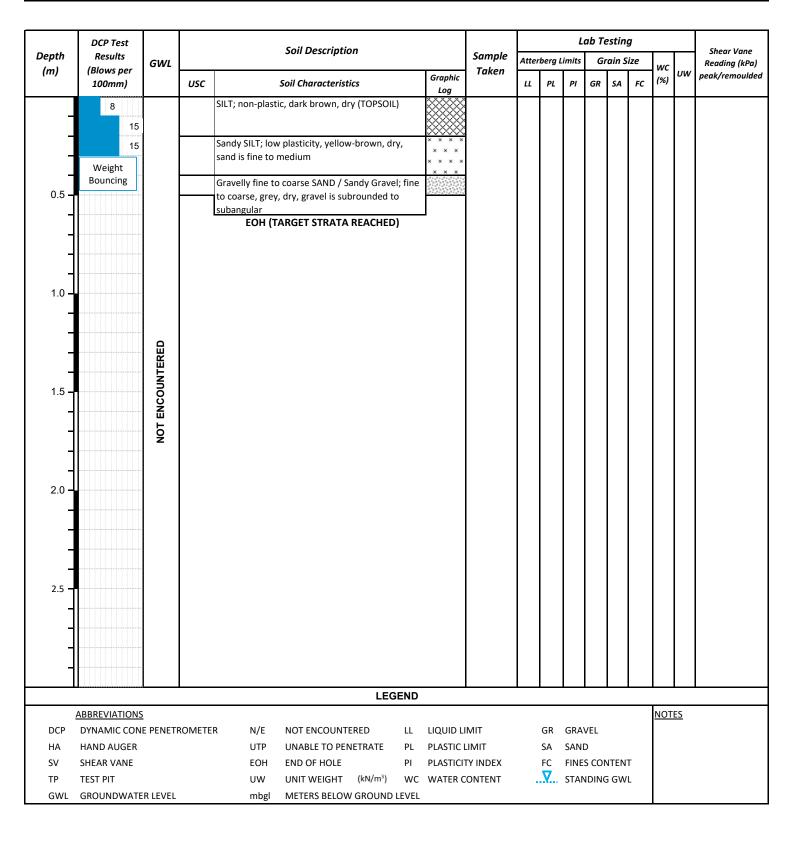




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.5 mbgl	HOLE DIAMETER: 50 m	ım	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

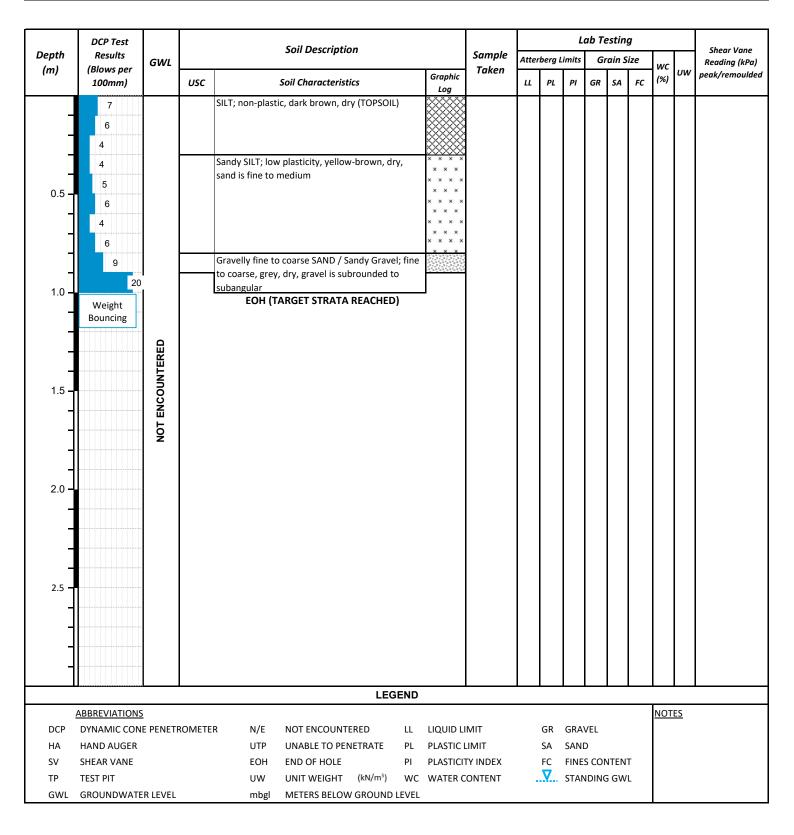




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	1.0 mbgl	HOLE DIAMETER: 50	0 mm	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

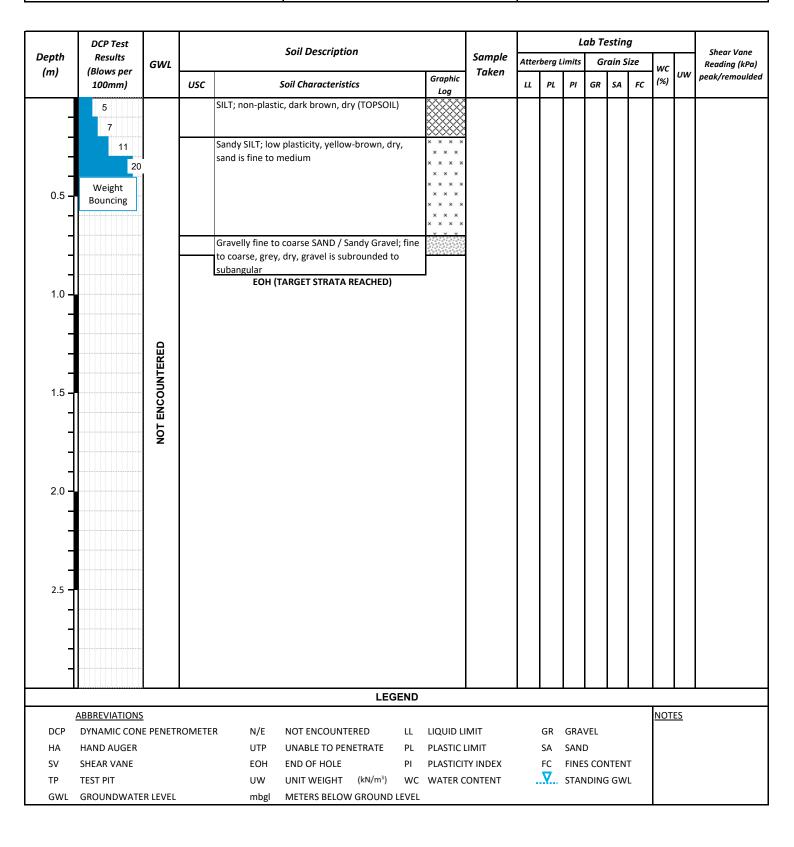




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.8	mbgl	HOLE DIAMETER:	50 mm
PROCESSED BY:	CG	TESTING METHOD:	TP + DO	CP	SHEAR VANE NUMBER:	-
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E		This report may only be reproduced in full	

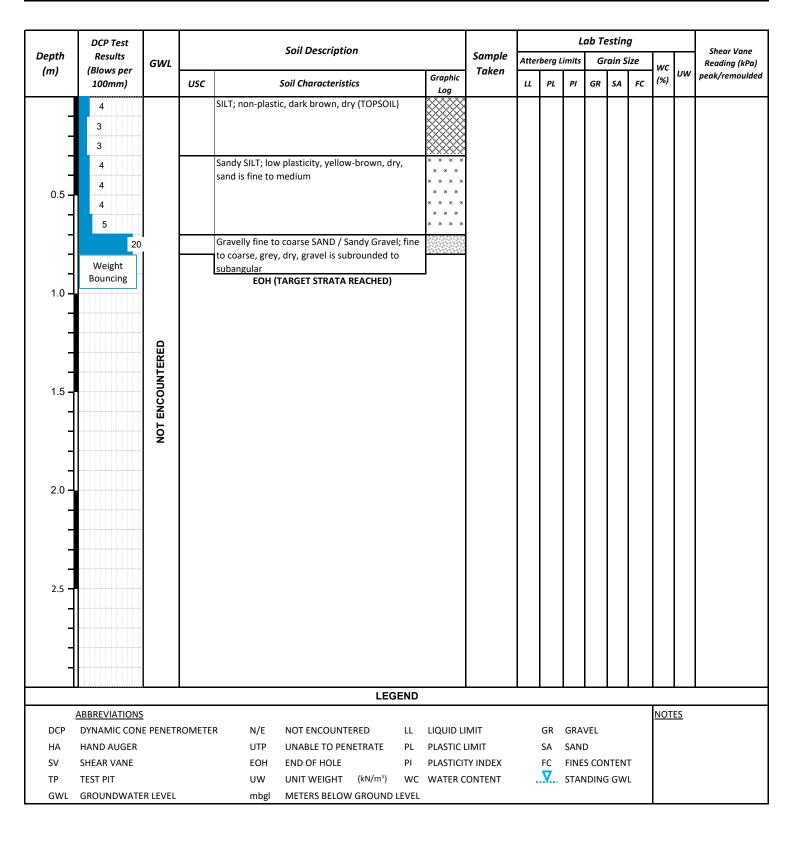




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.8 mbgl	HOLE DIAMETER: 50 m	ım	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

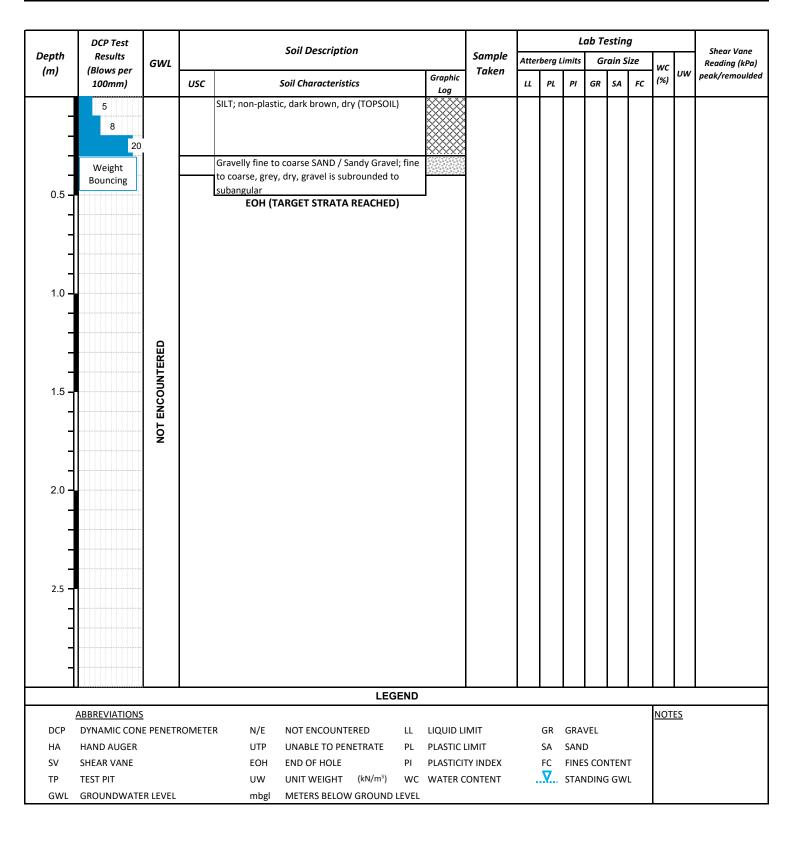




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.4	mbgl	HOLE DIAMETER:	50 mm
PROCESSED BY:	CG	TESTING METHOD:	TP + DO	CP	SHEAR VANE NUMBER:	-
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E		This report may only be reproduced in full	

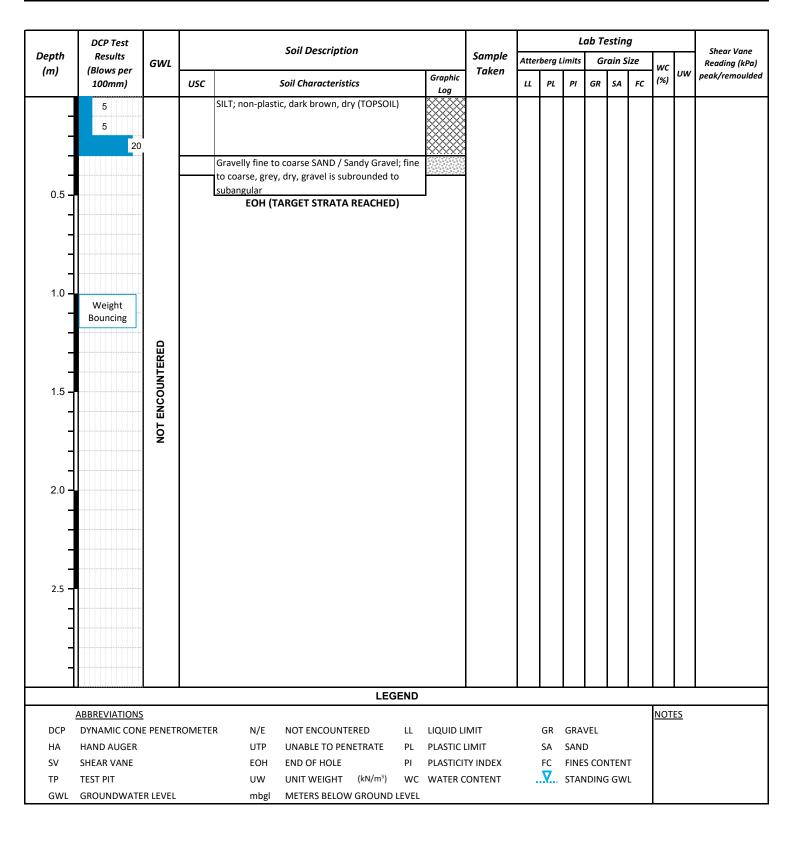




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.4 mbgl	HOLE DIAMETER:	50 mm	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

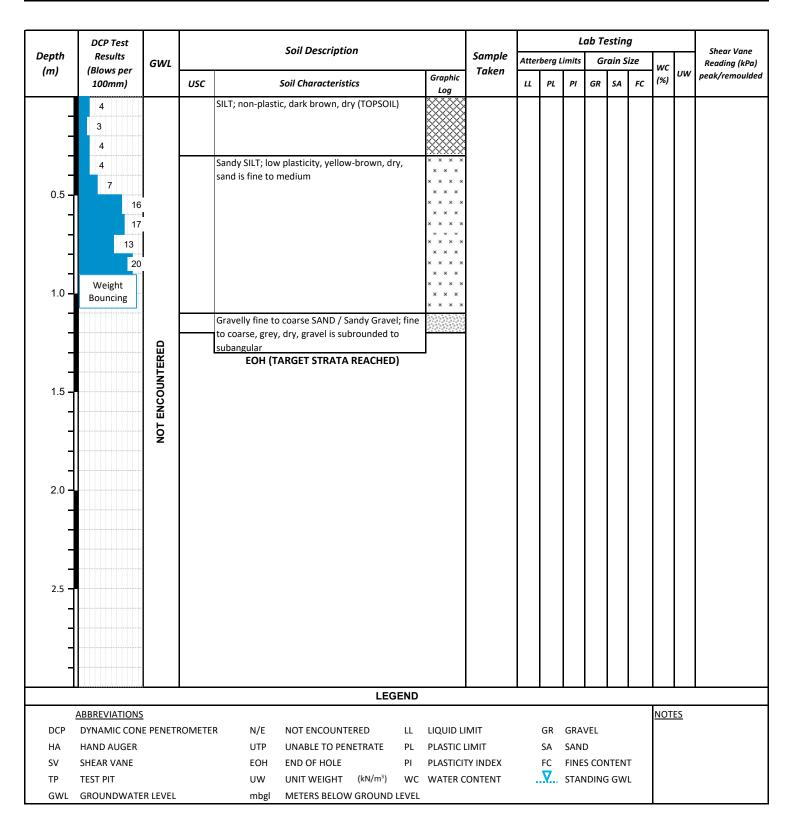




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	51 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	1.2 mbgl	HOLE DIAMETER: 50 m	ım	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

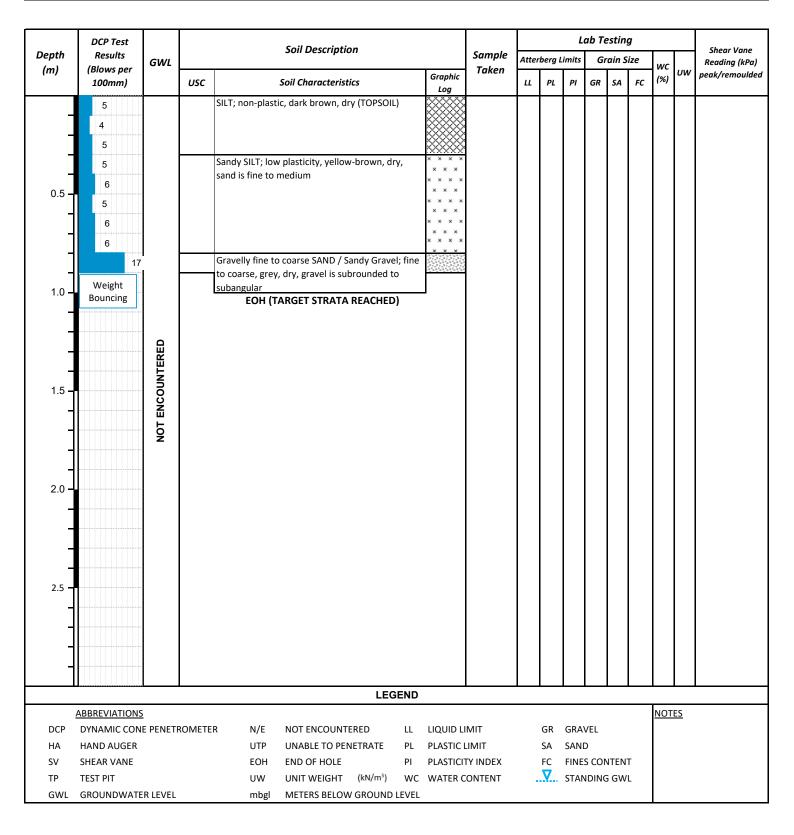




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	151 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.9 mbgl	HOLE DIAMETER: 5	0 mm	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

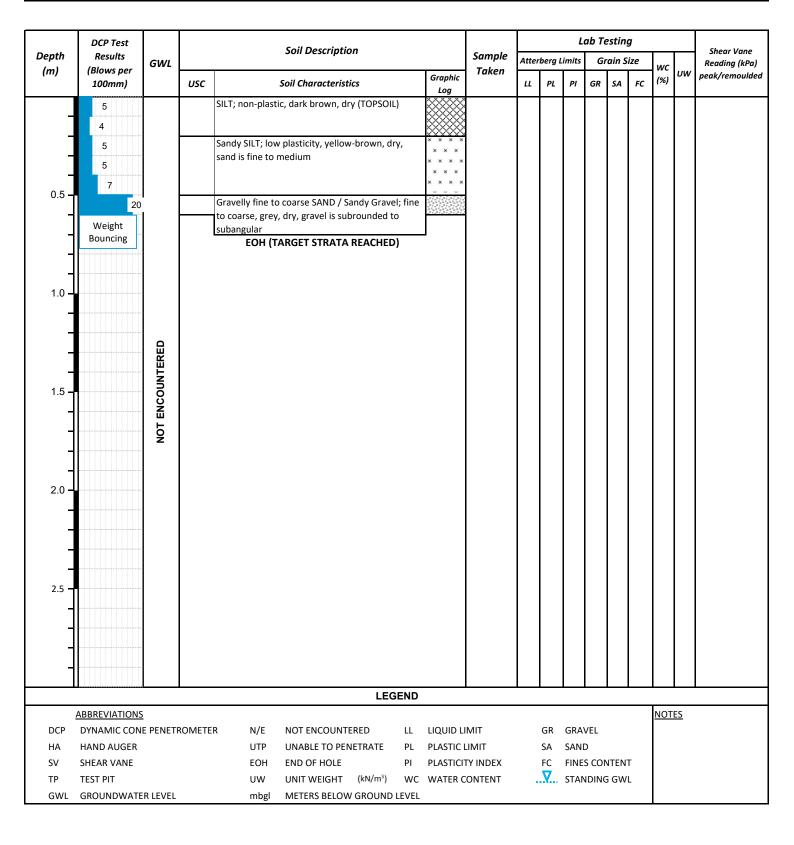




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln	151 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.6 n	nbgl	HOLE DIAMETER:	50 mm
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP		SHEAR VANE NUMBER:	-
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E		This report may only be reproduced in full	

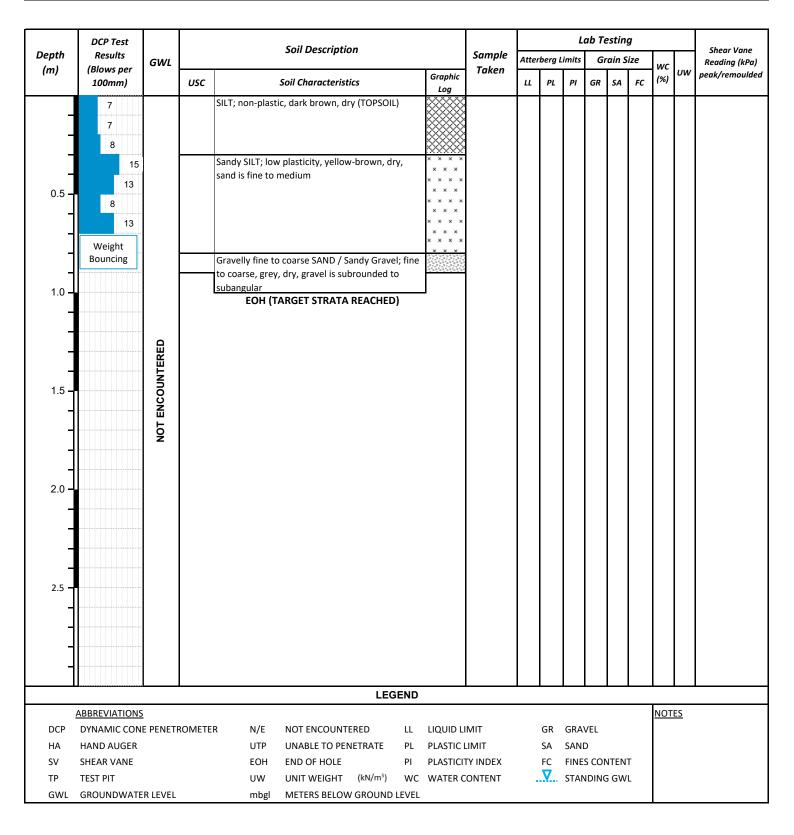




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT:	151 & 153 Lincoln Rolleston Road, Rolleston				
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.9 mbgl	HOLE DIAMETER: 5	0 mm
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full	

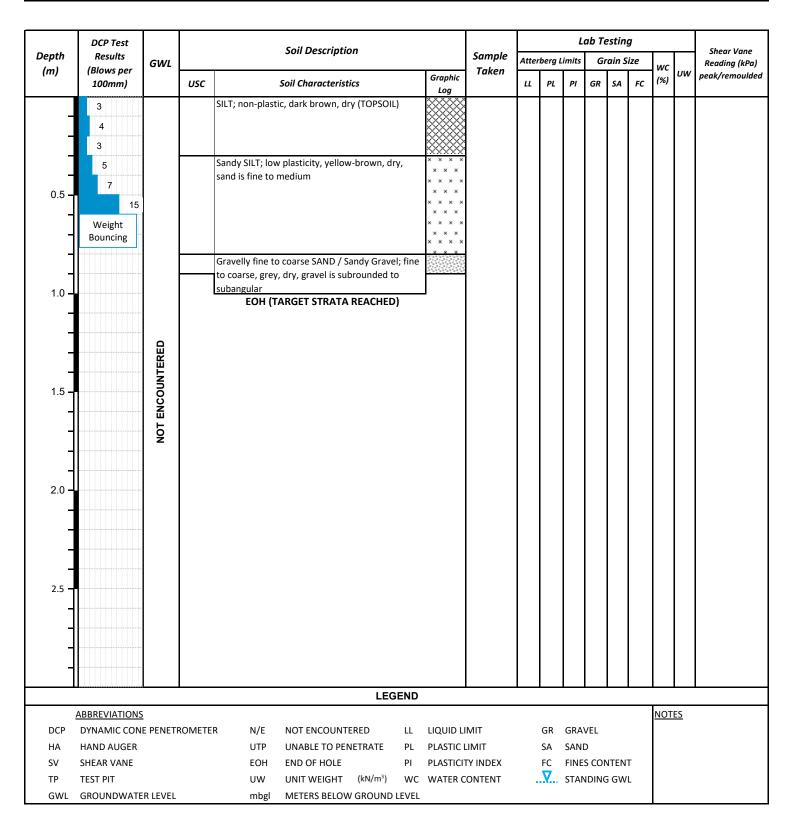




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT: 151 & 153 Lincoln Rolleston Road, Rolleston						
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.9 mbgl	HOLE DIAMETER: 50 I	mm	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:	-	
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

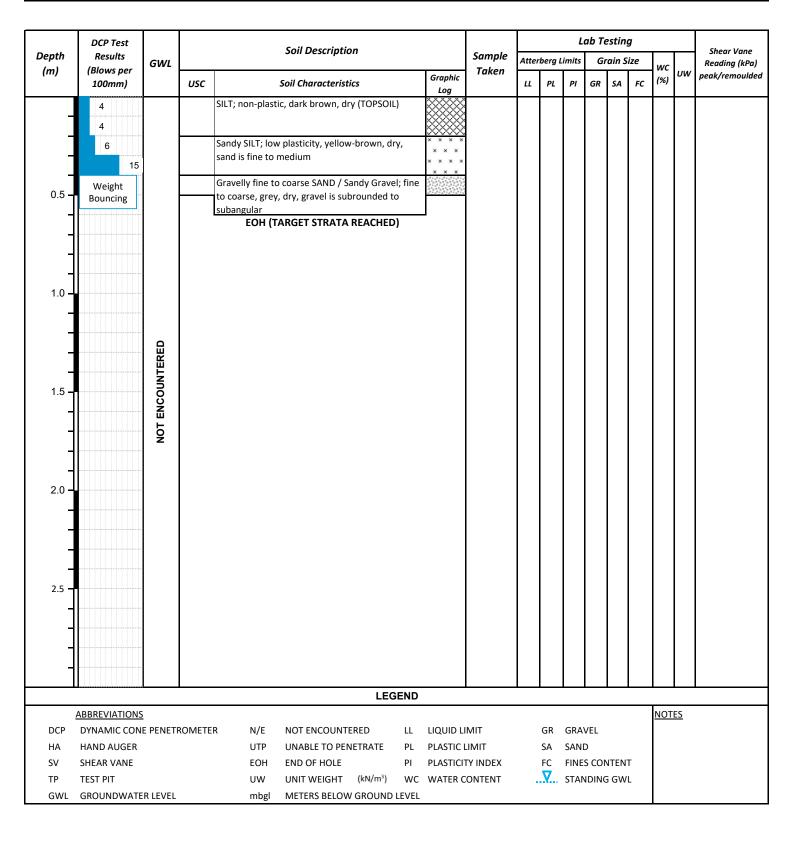




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT: 151 & 153 Lincoln Rolleston Road, Rolleston						
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.5 mbgl	bgl HOLE DIAMETER: 5		
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP	SHEAR VANE NUMBER:		
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full		

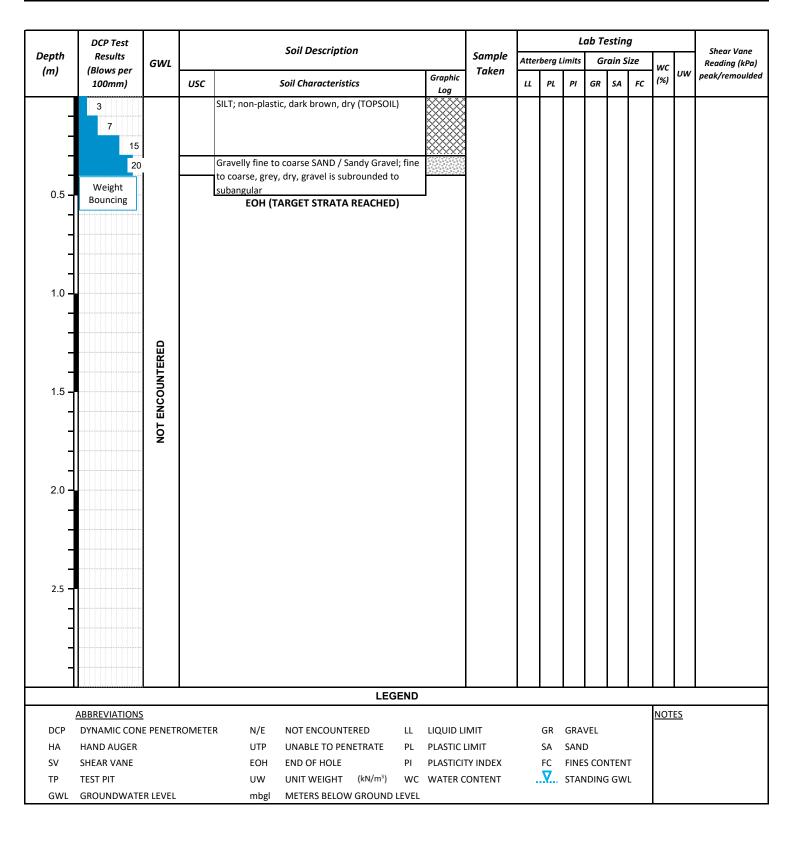




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT: 151 & 153 Lincoln Rolleston Road, Rolleston					
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.4 mbgl	mbgl HOLE DIAMETER: 5	
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP SHEAR VANE NUMBER:		-
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full	

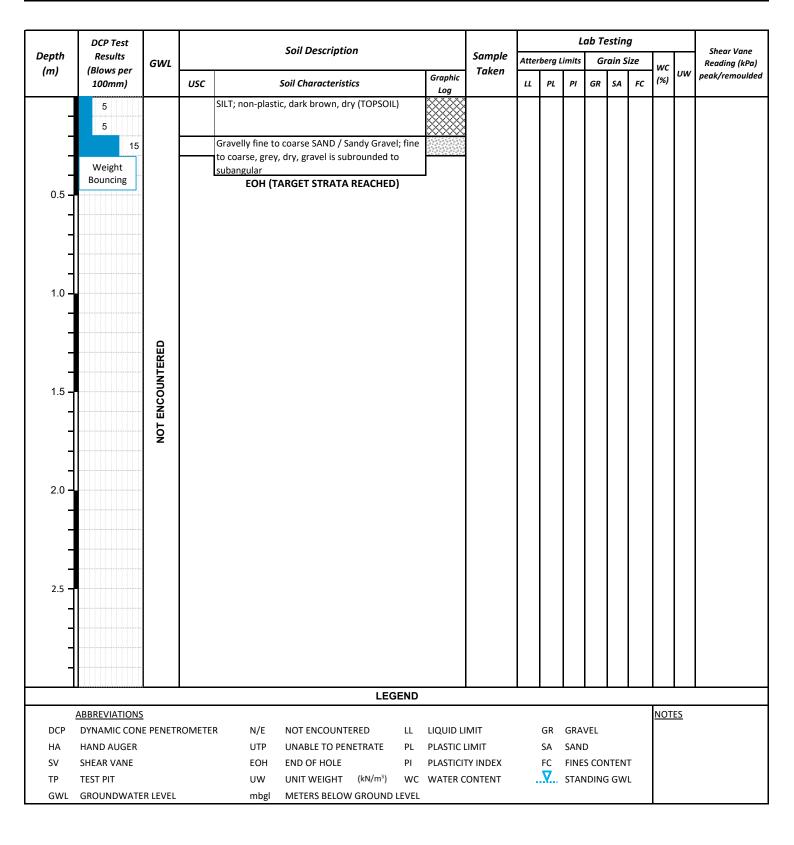




200357 Yoursection Ltd 17 November 2020

SHALLOW GROUND INVESTIGATION LOG

PROJECT: 151 & 153 Lincoln Rolleston Road, Rolleston					
LOGGED BY:	CG	TOTAL TESTING DEPTH:	0.3 mbgl	HOLE DIAMETER: 50 r	nm
PROCESSED BY:	CG	TESTING METHOD:	TP + DCP SHEAR VANE NUMBER:		-
LOCATION:	REFER TO SITE PLAN	GROUNDWATER LEVEL:	N/E	This report may only be reproduced in full	



Borelog for well M36/3868

Grid Reference (NZTM): 1552494 mE, 5171203 mN

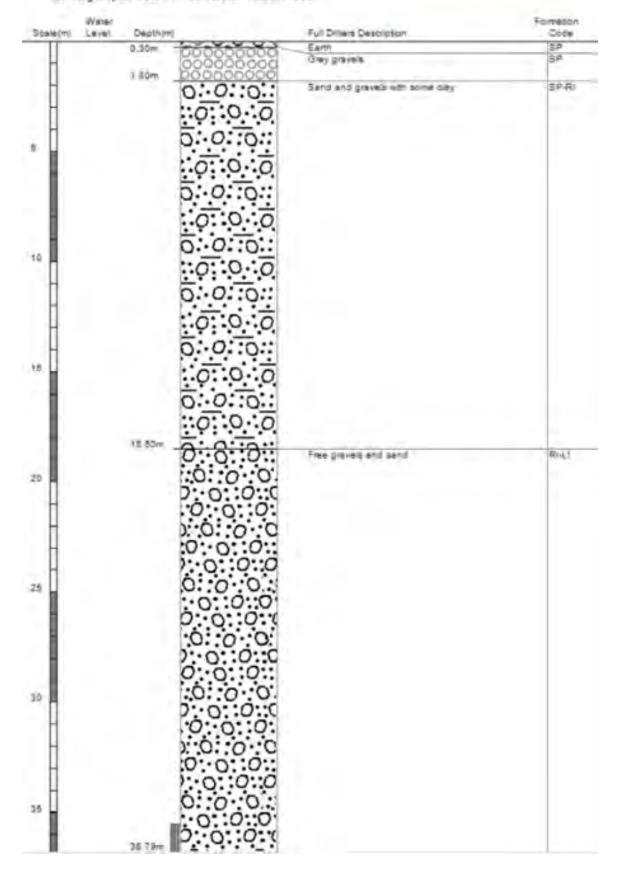
Location Accuracy: 10 - 50m

Ground Level Attitude: 38.4 m +MSD Accuracy: < 2.5 m

Driller: McMillan Drilling Ltd Drill Method: Rotary/Percussion

Borelog Depth: 36.8 m Drill Date: 18-Jan-1988





Borelog for well M36/7975

Grid Reference (NZTM): 1552317 mE, 5171001 mN

Location Accuracy: 50 - 300m

Ground Level Attitude: 37.7 m +MSD Accuracy: < 2.5 m

Driller: Dynes Road Drilling Drill Method: Cable Tool

Borelog Depth: 37.5 m Drill Date: 05-Sep-2005



Stale(m)	Level.	Depth (m)		Full Drivers Description	Formator Code
II		0.70	0.0000000	traver topself	
				small-mad gravel some ait	
10			0=0=0=0		
Ħ		12.00m		areal rounced gravel	
		18.00m			
0			00000000 00000000 00000000 00000000 0000	small-mad suprounded gra-	
5		25 00m	000000000	solic yellow sit water sealing	_
-		25.00m	000000000		
		28.00m	000000000	smell-med rounded gravel - some stained	
		26.50m	000000000	some sand with gravel amail rounded stained gravel	
		30.00m	000000000		
		20.501	00000000000000000000000000000000000000	loose rounded med grevel	
Н		34.00m	2000000000	NAME AND ADDRESS OF THE PARTY O	
15		38.00m	000000000	34m hit a tree 0.2m thisk	
-		36.50m	000000000	orange gravel	
H		37.50m	000000000	plack stained gravel	

Borelog for well M36/4966

Grid Reference (NZTM): 1552787 mE, 5171550 mN

Location Accuracy: 50 - 300m Ground Level Altitude: 38.6 m +MSD Accuracy: < 2.5 m

Driller: McMillan Drilling Ltd. Drill Method: Rotary/Percussion.

Borelog Depth: 48.0 m Drill Date: 16-Aug-1995



	wer Depthire		Full Onliers Description	Formation Code
H	0.30m	0::0::0::0	Earth Sandy graves some pay	\$P7 39.49
	9.50m	0::0::0::0 0::0::0::0 0::0::0::0		
		000000	Свубоила дамяя:	By
		000000		
5		000000		
	27 20m	000000	Sandy graves stained	BRLI
		.0.0.0.0 .0.0.0.0 .0.0.0		
	35.00m	000000	Steined gravers and play	(a.)
	42.29m	0:0:0:0:	Sandy greveis	(LL)
5	48,00m	00=000 000000 0=0000 000000	Staned graves, some clay	Li

Borelog for well BX23/0533

Grid Reference (NZTM): 1552674 mE, 5171682 mN

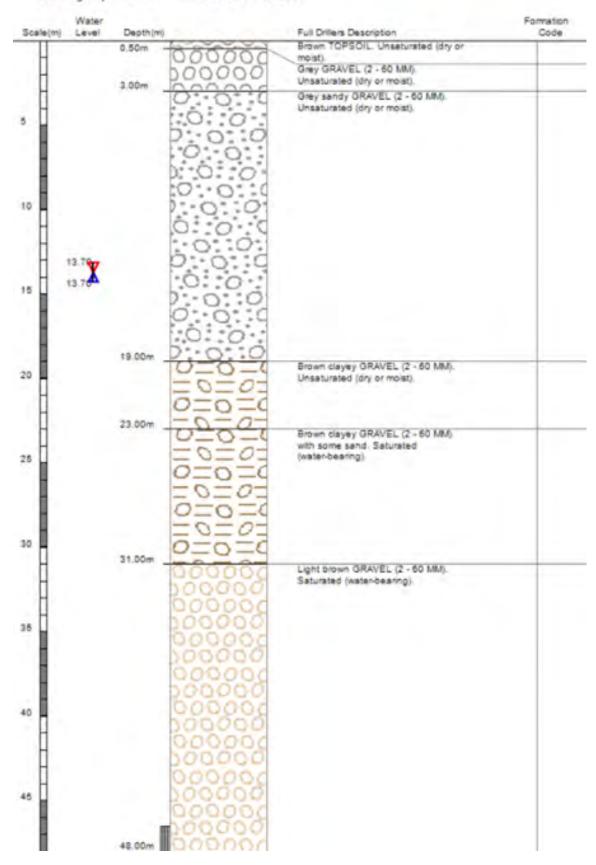
Location Accuracy: 10 - 50m

Ground Level Altitude: m +MSD Accuracy:

Driller: East Coast Drilling Drill Method: Air Rotary

Borelog Depth: 48.0 m Drill Date: 20-Nov-2015







CONTRACTOR Maugers

TEST PIT RECORD

TP7 TEST PIT NO.

254246

2/12/2016

PROJECT NO.

22/11/2016

PROJECT Branthwaite Drive LOGGED CHECKED CO-ORDINATES (NZTM) TP **METHOD** T. MITCHELL A. HILLS E 1552186 MACHINE & NO. Wheeled Excavator N 5171475 DATE DATE

GROUND LEVEL +37.00

_		STRATA	SAM	PLE	S & TESTS
Depth (m)	Legend	Description	Depth	No	Remarks/Tests
	- 121 /V. 12	SILT with minor sand and trace of rootlets; dark brown. Moist, low plasticity; sand, fine.			
	1/ 1/1/	(TOPSOIL)			
	100				
0.50	1/2 × 1/2	CILT. light have up with a result of many and the a Maint law alouting	1		
	- × ×	SILT; light brown with orange-grey mottles. Moist, low plasticity.			
	_x ×				
	-× × ×				
	× ×	4.00 4.40 December with military and			
1.40	- × ×	1.20 - 1.40 Becomes with minor sand.			
1.40	*0 °	Fine to coarse GRAVEL with minor sand, silt and cobbles; brownish grey. Moist,	1		
	300	subrounded to rounded; sand, fine to medium.			
1.70	-000	End of Trial pit/trench at 1.70m, on 22/11/2016			
]	Termination Reason: Target depth acheived.			
	-				
	_				
	-				
]				
	_				
	-				
	1				
	-				
·	1				
	-				
]				
	4				
	-				
	1				
	4				
	-				
	1				
	-				
	+				
	1				
	1				

GENERAL REMARKS

SHORING/SUPPORT: None STABILITY: Generally Stable

Groundwater not encountered.

Coordinates found using handheld GPS, likely accurate to +/- 5 m.

Ground level found using handheld GPS, likely accurate to +/- 10 m.

All dimensions in metres

CLIENT GW Rolleston Ltd.

Pocket Penetrometer Test Insitu Vane Shear Test

▼ Water Level

Report ID: AGS4 TEST PIT RECORD (NO SKETCH NO MAP) | Project: BRANTHWAITE DRIVE LOGS.GPJ || Library: AGS 4_0.GLB || Date: 5 December 2016



TP10 TEST PIT NO.

PROJECT NO.

254246

PROJECT Branthwaite Drive LOGGED CHECKED CO-ORDINATES (NZTM) TP **METHOD** E 1552053 T. MITCHELL A. HILLS MACHINE & NO. Wheeled Excavator N 5171529 DATE DATE CONTRACTOR Maugers GROUND LEVEL +43.00 22/11/2016 2/12/2016

		STRATA	SAM	PLE	S & TESTS
Depth (m)	Legend	Description	Depth	No	Remarks/Tests
	1/ 1/1/	SILT with minor sand and some rootlets; dark brown. Moist, low plasticity; sand, fine. (TOPSOIL)			
0.25	-X X	SILT with minor sand; light brown. Moist, low plasticity; sand, fine.			
	- × × >				
0.70	-\hat{\chi} \times \hat{\chi}				
	-000	Fine to coarse GRAVEL with some sand; greyish brown. Moist, subrounded to rounded; sand, fine to coarse.			
	J°0 5	curia, into to course.			
	-000				
	100				
	-000				
1.60		End of Trial pit/trench at 1.60m, on 22/11/2016			
	+	Termination Reason: Target depth acheived.			
	-				
1	1				
	}				
]				
2	1				
	-				
r' 	-				
5					
<u>.</u>	-				
5	-				
	-				
	_				
- 1 7	-				
]				
	_				
	-				
=]				
	1				
GENE SHOR STABI Ground Coordin Ground			<u> </u>		
GENE		EMARKS			
SHOR		JPPORT: None Generally Stable			
Ground Coording	ates fou	t encountered. nd using handheld GPS, likely accurate to +/- 5 m.			
Ground	level for	und using handheld GPS, likely accurate to +/- 10 m.			
All dime	ensions i	n metres CLIENT GW Rolleston Ltd. CLIENT GW Rolleston Ltd. Pocket Penetrometer Test Insitu Vane Shear Test	▼ Water Leve	ı	
	v Zealand Lii	mited, Tel: Fax:			



TP23 TEST PIT NO.

PROJECT NO.

254246

PROJECT Branthwaite Drive LOGGED CHECKED CO-ORDINATES (NZTM) TP **METHOD** T. MITCHELL A. HILLS E 1552359 MACHINE & NO. Wheeled Excavator N 5171660 DATE DATE CONTRACTOR Maugers GROUND LEVEL +43.00 23/11/2016 5/12/2016

Depth Logar Depth Description Depth No Remarks/Test			STRATA	SAM	PI F	S & TESTS
Section Sect		Logand				
Silty fine SAND with trace of rootlets; brown. Dry. Silty fine SAND with trace of rootlets; brown. Dry.	(m)		SILT with minor sand and rootlets; dark brown. Moist, low plasticity; sand, fine.	Dopui	1.40	. tomanto, rosto
Sitly fine SAND with trace of rootlets; brown. Dry. Fine to coarse GRAVEL with some sand, minor cobbles, trace of rootlets and occasional boulders; brown. Dry, subrounded to rounded; sand, fine to coarse. 1.00 Becomes with no rootlets; greyish brown. End of Trial pittrench at 1.60m, on 23/11/2016 Termination Reason: Target depth acheived.	0.25	1/ 1/	(TOPSOIL)			
Poel foundation of the coarse GRAVEL with some sand, minor cobbles, trace of rootlets and occasional boulders; brown. Dry, subrounded to rounded; sand, fine to coarse. 1.00 Becomes with no rootlets; greyish brown. Poel for fine to coarse of rootlets and occasional boulders; brown. Poel for fine to coarse of rootlets and occasional boulders; brown. Poel for fine to coarse of rootlets and occasional boulders; brown. Poel for fine to coarse. 1.00 Becomes with no rootlets; greyish brown. Poel for fine to coarse. End of Trial pit/trench at 1.60m, on 23/11/2016 Termination Reason: Target depth acheived.	0.20	-× .	Silty fine SAND with trace of rootlets; brown. Dry.			
boulders; brown. Dry, subrounded to rounded; sand, fine to coarse. 1.00 Becomes with no rootlets; greyish brown. Property of the coarse of t	0.50	1× · · · ·				
1.00 Becomes with no rootlets; greyish brown. End of Trial pit/trench at 1.60m, on 23/11/2016 Termination Reason: Target depth acheived.		-000	Fine to coarse GRAVEL with some sand, minor cobbles, trace of rootlets and occasional boulders: brown Dry subrounded to rounded; sand fine to coarse			
1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1.00 Becomes with no rootlets; greyish brown. 1		100	,,,,			
1.00 Becomes with no rootlets; greyish brown. End of Trial pit/trench at 1.60m, on 23/11/2016 Termination Reason: Target depth acheived.		100				
End of Trial pit/trench at 1.60m, on 23/11/2016 Termination Reason: Target depth acheived.		7001	1.00 Becomes with no rootlets; greyish brown.			
End of Trial pit/trench at 1.60m, on 23/11/2016 Termination Reason: Target depth acheived.		100				
End of Trial pit/trench at 1.60m, on 23/11/2016 Termination Reason: Target depth acheived.						
End of Trial pit/trench at 1.60m, on 23/11/2016 Termination Reason: Target depth acheived.	4.00	00				
	1.60		End of Trial pit/trench at 1.60m, on 23/11/2016			
		-	remination Reason: Target depth acheived.			
		1				
		-				
		1				
		-				
		1				
		-				
]				
		_				
		-				
]				
		-				
]				
		-				
]				
		-				
		1				
		-				
GENERAL REMARKS SHORING/SUPPORT: None]				
GENERAL REMARKS SHORING/SUPPORT: None		-				
GENERAL REMARKS SHORING/SUPPORT: None]				
GENERAL REMARKS SHORING/SUPPORT: None		-				
SHORING/SUPPORT: None	CENIC	- NI DI	EMADICS	L	1	
SHORING/SUPPORT: None						
STABILITY: Generally Stable						
Groundwater not encountered. Coordinates found using handheld GPS, likely accurate to +/- 5 m.						
Ground level found using handheld GPS, likely accurate to +/- 10 m.	Ground I	evel fou	and using handheld GPS, likely accurate to +/- 10 m.			
Coordinates found using handheld GPS, likely accurate to +/- 5 m. Ground level found using handheld GPS, likely accurate to +/- 10 m.						
CLIENT GW Rolleston Ltd. PP Pocket Penetrometer Test W Water Level	A 11		CLIENT GW Rolleston Ltd.	▼ Water Leve	əl	
All dimensions in metres Aurecon New Zealand Limited, Tel: Fax:			Insitu Vane Shear Test			



TP24 TEST PIT NO.

PROJECT NO.

254246

PROJECT Branthwaite Drive LOGGED CHECKED CO-ORDINATES (NZTM) TP **METHOD** T. MITCHELL A. HILLS E 1552208 MACHINE & NO. Wheeled Excavator N 5171608 DATE DATE CONTRACTOR Maugers GROUND LEVEL +44.00 23/11/2016 5/12/2016

	STRATA	SAM	PLE	S & TESTS
Depth (m) Legend	Description	Depth	No	Remarks/Test
\(\frac{1}{24}\frac{1}{12}\).	SILT with minor sand and tree roots (up to 10 mm); dark brown. Moist, low plasticity;			
0.20 1/ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\	sand, fine. (TOPSOIL) SILT with minor sand; brown. Moist, low plasticity; sand, fine.	-		
]× ^:	,,			
]× × :				
$\begin{pmatrix} 1 \\ \times \end{pmatrix}$				
0.80 ^ x	Fine to coarse GRAVEL with some sand, minor cobbles and trace of rootlets; light			
100	brown. Moist, subrounded to rounded; sand, medium.			
-00				
100	1.20 Becomes with no rootlets.			
-00				
1.70				
1.70	End of Trial pit/trench at 1.70m, on 23/11/2016			
-	Termination Reason: Target depth acheived.			
7				
-				
1				
-				
1				
+				
-				
]				
-				
]				
-				
]				
+				
]				
-				
1				
+				
1				
4		1		

GENERAL REMARKS

SHORING/SUPPORT: None STABILITY: Generally Stable

Groundwater not encountered.

Coordinates found using handheld GPS, likely accurate to +/- 5 m.

Ground level found using handheld GPS, likely accurate to +/- 10 m.

All dimensions in metres

CLIENT GW Rolleston Ltd.

Pocket Penetrometer Test

▼ Water Level

Report ID: AGS4 TEST PIT RECORD (NO SKETCH NO MAP) | Project: BRANTHWAITE DRIVE LOGS.GPJ || Library: AGS 4_0.GLB || Date: 5 December 2016

Insitu Vane Shear Test



TP25 TEST PIT NO.

PROJECT NO.

254246

PROJECT Branthwaite Drive									
METHOD TP	CO-ORDINATES (NZTM)	LOGGED	CHECKED						
MACHINE & NO. Wheeled Excavator	E 1552490 N 5171658	T. MITCHELL	A. HILLS						
CONTRACTOR Maugers	GROUND LEVEL +44.00 m RL	DATE 23/11/2016	DATE 5/12/2016						

	STRATA	SAM	PLE	S & TESTS
Depth (m) Legend	Description	Depth	No	Remarks/Tests
0.35	SILT with minor sand and rootlets; dark brown. Moist, low plasticity; sand, fine. (TOPSOIL)			ı
0.35 - \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	SILT with some sand; brown. Moist, low plasticity; sand, fine.			ı
0.70 × 1	Fine to coarse GRAVEL with some sand and trace of rootlets; brownish grey. Moist, subrounded to rounded; sand, fine to medium. 0.70 - 0.80 Sand becomes medium to coarse, light brown.			l
-000	1.30 Becomes with no rootlets.			l
	End of Trial pit/trench at 1.60m, on 23/11/2016 Termination Reason: Target depth acheived.			ſ
				ſ
				ſ
				ſ
				l
				l
:1				ſ
				ſ
GENERAL R	EMARKS	<u> </u>		
SHORING/SU STABILITY: (JPPORT: None Generally Stable			
Groundwater no Coordinates fou				
All dimensions i	in metres CLIENT GW Rolleston Ltd. PP Pocket Penetrometer Test Insitu Vane Shear Test	▼ Water Leve	I	

		71	Client: Hank Developments Limited					Augerhole N	o. HA01
	T	0 0	Project: Proposed Subdivision Address: 7/572 Selwyn Road, Rolleston					Sheet No.	1 of 1
Drill	Type:		8 Ton Excavator Project No: LTCL1808	51			Logged By:		BE
Dri ll e	ed By:		BE Coordinates: NZTM: 15			171418 mN	Shear Vane		N/A
	Starte Finish		6-Apr-18 Ground Conditions: Grassed, 6-Apr-18 Groundwater Level (m): Not Encou			r-18)	Calibration F Calibration I		N/A N/A
				T					
γı		Ď.		Groundwater Level (m)	_		In-situ Fie	d Testing	
Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes, NZ Geotechnical Society Inc	iter Le	Depth (m)	Shear Strength (kPa	ι) [ynamic Cone	Penetrometer
Stra	Del	Grap	2005	mpwn	Det	Peak:	Depth (m)	Sount	Scala Blow Count / 100mm
				Gro		Remoulded:	Dept	Blow Count	0 5 10 15 20
ПC			SILT, minor fine sand, minor organics, dark brown, medium dense, moist, no plastic [TOPSOIL]	n			-0.1	3	
TOPSOIL	_		padalo [10, 00 k]		-		-0.2	4	1
_	-	\triangle	SILT, minor fine sand, yellowish brown, dense, moist, non-plastic [RIVER		-	-	-0.3 -0.4	5 7	\
	0.5	× × × ×	DEPOSITS]		0.5	1	-0.5	8	1
		× × × ×					-0.6	10	
		x x x >					-0.7	12	
	_		Fine to coarse subrounded greywacke gravelly fine to coarse SAND, trace subrounded greywacke cobbles, greyish brown, tightly packed, moist		_	1	-0.8	25 +	
	-				-	1	-0.9 -1.0		
	1.0				1.0	1	-1.0 -1.1		
	-				-	1	-1.2		
TS		Dar L	Fine to coarse subrounded greywacke GRAVEL, some to minor fine to coarse sand, greyish brown, tightly packed, moist]	-1.3		
RIVER DEPOSITS			osaros saria, grogion promi, ligility paoneu, moist		_	1	-1.4		
R DE	1.5	A-74	Fine to coarse subrounded greywacke gravelly fine to coarse SAND, trace	4	1.5	-	-1.5		
RIVE	-		subrounded greywacke cobbles, greyish brown, tightly packed, moist		-	1	-1.6 -1.7		
	_				-	1	-1.8		
	_				_	1	-1.9		
	2.0				2.0		-2.0		
	_				-	1	-2.1		
	_				_	1	-2.2 -2.3		
	-	2 4 V.			-	1	-2.4		
	2.5				2.5		-2.5		
		i pri ki			_		-2.6		
	_		End of Test Pit (2.6m)		-	1	-2.7		
	-				-	1	-2.8 -2.9		
	3.0				3.0	1	-3.0		
							-3.1		
					l _		-3.2		
					-	1	-3.3		
	3.5				2 -	1	-3.4 -3.5		
	3.5				3.5		-3.6		
]	-3.7		
							-3.8		
					-	4	-3.9		
	4.0				4.0	1	-4.0 -4.1		
	-				-	1	-4.2		
]	-4.3		
					l _	1	-4.4		
	4.5				4.5	-	-4.5		
	-				-	1	-4.6 -4.7		
	-				-	1	-4.8		
					_]	-4.9		
	5.0			\bot	5.0		-5.0		
l						In-situ field testing in accordance Scala Penetrometer Testing: NZ			Penetrometer
						Shear Vane Testing: Guideline t			

			nelTook	Client: Hank Developments Limited						Augerhole No	o. HA02
		6 0	NSULTING	Project: Proposed Subdivision Address: 7/572 Selwyn Road, Rolleston						Sheet No.	1 of 1
D-:II:			O.T Francisco	District No.	1 701 40054				l I D		
	Type: ed By:		8 Ton Excavator BE	Project No: Coordinates:	LTCL18051 NZTM: 1552	207 r	nE, 51	171344 mN	Logged By: Shear Vane		E N
Date	Starte		6-Apr-18	Ground Conditions:	Grassed, Ne				Calibration		N
Date	Finish	ied:	6-Apr-18	Groundwater Level (m):	Not Encount	ered	(6-Apr	-18)	Calibration I	Date:	N
						(m)			In-situ Fie	eld Testing	
Stratigraphy	Depth (m)	Graphic Log		accordance with Guideline for the Field Classificat Rock for Engineering Purposes, NZ Geotechnical		Groundwater Level (m)	Depth (m)	Shear Strength (kPa)		Dynamic Cone	Penetrometer
Strati	Dept	Graph	Boochpilon or don and r	2005	Goolety Moi,	dwat	Dept	Peak:	Œ	nut	Scala Blow Count / 100mm
						Grour		Remoulded:	Depth (m)	Blow Count	
		\wedge	SILT minor fine sand	minor organics, dark brown, medium dense	moist non-	_		0	-0.1	3	0 5 10 15 20
TOPSOIL	_	$\times \times$	plastic [TOPSOIL]	organico, aarronom, modiam donos	, , , , , , , , , , , , , , , , , , , ,		_		-0.1	3	•
TOF	_	\times					_		-0.3	4	†
	-	× × × >		trace subrounded greywacke gravel, yellow	vish brown,		_		-0.4	7	🐧
	0.5	× × × >	dense, moist, non-plas	stic [RIVER DEPOSITS]			0.5		-0.5	10	
		< × × >					_		-0.6	11	
		× × × >							-0.7	12	7
		x x x >					_		-0.8	10	
		<					_		-0.9	19	
	1.0	: . ふ기	Fine to coarse sandy f	fine to coarse subrounded greywacke GRA\	/FI trace		1.0		-1.0	25 +	
SITS	-	204		greywacke cobbles, greyish brown, tightly pa			_		1.1		
RIVER DEPOSITS	-						-		1.3		
ER D	_	84 Ì					_		-1.4		
ΒN	1.5						1.5		-1.5		
	1.0	X					1.0		-1.6		
	-								-1.7		
									-1.8		
	_						_		-1.9		
	2.0	197					2.0		-2.0		
	_						_		-2.1		
	_			End of Test Pit (2.2m)			_		-2.2 -2.3		
	_						_		-2.4		
	2.5						2.5		-2.5		
	2.0								-2.6		
	-								-2.7		
									-2.8		
	_						_		-2.9		
	3.0						3.0		-3.0		
	-						_		-3.1		
	-						-		-3.2 -3.3		
	-						_		3.4		
	3.5						3.5		-3.5		
	5.5						5.5		-3.6		
]	-3.7		
									-3.8		
							_		-3.9		
	4.0						4.0		-4.0		
	-								-4.1 -4.2		
	-						-		-4.2 -4.3		
	-						-		4.4		
	4.5						4.5	1	4.5		
	-1.0						7.3		-4.6		
							_		-4.7		
							_		-4.8		
									-4.9		
	5.0						5.0		-5.0		
								In-situ field testing in accordance v Scala Penetrometer Testing: NZS			Penetrometer
		1	Ī				l	Shear Vane Testing: Guideline for			

	E	710	ndToch	Client: Hank Developments Limited						Augerhole N	o. HA	03
7	Ц	6 0	NSULTING	Project: Proposed Subdivision Address: 7/572 Selwyn Road, Rolleston						Sheet No.	1 of	f 1
ri ll Typ	ne:		8 Ton Excavator	Project No:	LTCL18051				Logged By:			
ri ll ed E			BE	Coordinates:	NZTM: 1552	231 ו	mE, 51	71302 mN	Shear Vane	No:		١
ate Sta			6-Apr-18	Ground Conditions:	Grassed, Ne			10)	Calibration F			١
ate Fir	nished:		6-Apr-18	Groundwater Level (m):	Not Encount	ered	(6-Apr	-18)	Calibration [Jate:		١
						(m)			In-situ Fie	eld Testing		
Stratigraphy		Graphic Log		accordance with Guideline for the Field Classifica Bock for Engineering Purposes, NZ Geotechnical		Groundwater Level (m)	Depth (m)	Shear Strength (kPa)		Dynamic Cone	e Penetrometer	
Stratig	d D	Graph	Decemplish of Con and I	2005	doolog mor,	dwat	Dept	Peak:	(E)	nut	Scala Blow C 100mm	
"		Ü				Srour		Remoulded:	Depth (m)	Blow Count		
-			SILT minor fine cand	minor organics, dark brown, medium dense	moiet non	_		0			0 5 10	15 2
- N	-К		plastic [TOPSOIL]	minor organics, dark brown, medium dense	f, 11101St, 11011		_		-0.1	3	,	
5	$+\!$	\times					_		-0.2	2	€	
-	+2	× × >	SILT. minor fine sand.	yellowish brown, dense, moist, non-plastic	IRIVER		-		-0.3 -0.4	4 6	\	
	 .5		DEPOSITS]	,,	–		0.5		-0.5	10		
0.	.5 ×	× × >					0.5		-0.6	12		
	×	× × >					=		-0.7	25 +		_
	 .	× × >							-0.8			
	_6	4		fine to coarse subrounded greywacke GRA greyish brown, tightly packed, moist	VEL, trace				-0.9			
1	.0	XX	subrounded CODDIeS, (groyion brown, agrilly packed, moist			1.0		-1.0			
. [<u> </u>	54ª							-1.1			
1	42	₹ \							-1.2			
) L Saji					_		-1.3			
	$- \lambda $						_		-1.4			
_1	.5	YY					1.5		-1.5			
	-	19 <u>4</u>					_		-1.6 -1.7			
	-0						-		-1.8			
	٦,	XX.					_		-1.9			
,	. 7	589					2.0		-2.0			
۲	2	*					2.0		-2.1			
) S							-2.2			
									-2.3			
				End of Test Pit (2.3m)					-2.4			
2	.5						2.5		-2.5			
	_						_		-2.6			
	_						-		-2.7			
	4						_		-2.8			
	-						_		-2.9 -3.0			
3	.0						3.0		-3.1			
	-						_		-3.2			
1	7								-3.3			
	7								-3.4			
3	.5						3.5		-3.5			
	_								-3.6			
I	4								-3.7			
	4						_		-3.8			
1	4						-		-3.9			
4	.0						4.0		-4.0			
	\dashv						-		-4.1 -4.2			
1	\dashv						-		-4.3			
1	\dashv						-		-4.4			
1,	.5						4.5		-4.5			
4	.5						4.5		-4.6			
	7								4.7			
1	7								-4.8			
									-4.9			
						ĺ	. —				n I I	
5	.0					L	5.0		-5.0			
5	.0							In-situ field testing in accordance v Scala Penetrometer Testing: NZS	ith the following Star		Daniel Land	

		71	Client: Hank Developments Limited				ļ	Augerho l e No.	. HA04
	1	6 0	Project: Proposed Subdivision Address: 7/572 Selwyn Road, Rolleston				s	Sheet No.	1 of 1
Drill	Туре:		8 Ton Excavator Project No: LTCL1805	1			Logged By:		В
Drille	ed By:		BE Coordinates: NZTM: 15	52136		171389 mN	Shear Vane N		N/
	Starte		6-Apr-18 Ground Conditions: Grassed, I 6-Apr-18 Groundwater Level (m): Not Encount			r-18)	Calibration Fa Calibration Da		N/ N/
				1		· 1			
				(E)			In-situ Field	d Testing	
raphy	(m)	Graphic Log	Soil description in accordance with Guideline for the Field Classification and	Groundwater Level (m)	Œ	Shear Strength (kPa)	. Dv	namic Cone	Penetrometer
Stratigraphy	Depth (m)	araphi	Description of Soil and Rock for Engineering Purposes, NZ Geotechnical Society Inc 2005	dwate	Depth (m)				Scala Blow Count / 100mm
0)		0		Broun		Peak:	Depth (m)	Blow Count	
_		$\wedge \wedge$	SILT, minor fine sand, minor organics, dark brown, medium dense, moist, no			0	-0.1	3	5 10 15 20
TOPSOIL	_	$\times \times$	plastic [TOPSOIL]		-	-	-0.1	4	•
Ď	_	$\times \times$			_		-0.3	3	<i>t</i>
		× × × >	SILT, minor fine sand, yellowish brown, dense, moist, non-plastic [RIVER DEPOSITS]				-0.4	8	
	0.5	× × × >	52. 661.6		0.5		-0.5	10	
	-	* * * * *	Fine to coarse sandy fine to coarse subrounded greywacke GRAVEL, trace	$\left\ \cdot \right\ $	-		-0.6 -0.7	12 25 +	•
	_	797	to minor subrounded greywacke cobbles, greyish brown, tightly packed, moi	st	-	1	-0.7	25 F	
		494			-]	-0.9		
	1.0				1.0		-1.0		
SITS	_	W.			_		1.1		
RIVER DEPOSITS	-				-	-	-1.2 -1.3		
ER D	_	/ XX			-	-	-1.4		
₩	1.5	XX4			1.5		-1.5		
		24) j					-1.6		
					_		-1.7		
	_				-		-1.8		
	2.0	()(L			2.0	-	-1.9 -2.0		
	2.0				2.0		-2.1		
		497					-2.2		
			End of Test Pit (2.2m)				-2.3		
	_				-		-2.4		
	2.5				2.5		-2.5 -2.6		
	_				-	-	-2.7		
							-2.8		
					_		-2.9		
	3.0				3.0		-3.0		
	_				-	-	-3.1 -3.2		
					-	1	-3.3		
						1	3.4		
	3.5				3.5		-3.5		
	_				_	-	-3.6		
	-				-	-	-3.7 -3.8		
	-				-	1	-3.9		
	4.0				4.0		-4.0		
] _		-4.1		
	_				_		4.2		
	_				-	1	4.3		
	4.5				4.5	1	4.5		
	7.0				+.5		-4.6		
							-4.7		
	_				l _		-4.8		
	_				-		4.9 5.0		
	5.0			+	5.0	n-situ field testing in accordance		ards:	
						Scala Penetrometer Testing: NZS			
				_		Shear Vane Testing: Guideline for	nang Held Shear Vane	rest, NZGS, Aug	uat 2001

		T 1:	Client: Hank Developments Limited					Augerhole No	o. HA07	
	1	CO	Project: Proposed Subdivision Address: 7/572 Selwyn Road, Rolleston					Sheet No.	1 of 1	
orille Oate	Type: ed By: Starte	ed:	8 Ton Excavator Project No: LTCL18051 BE Coordinates: NZTM: 155. 6-Apr-18 Ground Conditions: Grassed, N: 6-Apr-18 Groundwater Level (m): Not Encount	2139 ear le	vel		Logged By: Shear Vane Calibration F	actor:		N N N
À		Ď.		vel (m)			In-situ Fie	ld Testing		
Stratigraphy	Depth (m)	Graphic Log	Soil description in accordance with Guideline for the Field Classification and Description of Soil and Rock for Engineering Purposes, NZ Geotechnical Society Inc.,	iter Le	Depth (m)	Shear Strength (kPa)	_	ynamic Cone	Penetrometer	
Stra	Dep	Grap	2005	Groundwater Level (m)	Det	Peak: • Remoulded: •	Depth (m)	Blow Count	Scala Blow Count 100mm 0 5 10 15	
j o		$\langle \rangle \langle \rangle$	SILT, minor fine sand, minor organics, dark brown, medium dense, moist, non plastic [TOPSOIL]	1-			-0.1	3	•	_
IOPSOIL	-				_		-0.2 -0.3	3		
	-	× × × >	SILT, minor fine sand, yellowish brown, dense, moist, non-plastic [RIVER		_		-0.4	6	\	
	0.5	× × × >	DEPOSITS]		0.5		-0.5	8		
	_	< × × >	Fine to coarse sandy fine to coarse subrounded greywacke gravel, greyish	-	_		-0.6	11		
	-	200	brown, tightly packed, moist [RIVER DEPOSITS]		_		-0.7 -0.8	25 +		
	-	14			_		-0.9			
	1.0	56	trace to minor subrounded greywacke cobbles		1.0		-1.0			_
	-	DS:			-		-1.1 -1.2			
,	-				-		-1.3			
		(YX]	-1.4			
i	1.5				1.5		-1.5			
	-				-		-1.6 -1.7			
	-	74			-		-1.8			
							-1.9			
	2.0	1			2.0		-2.0			_
	-				_	1	-2.1 -2.2			
	-				_		-2.3			
		<u>8</u>					-2.4			
	2.5				2.5		-2.5			_
	-	Argolic St.	End of Test Pit (2.6m)	1	_		-2.6 -2.7			
	-				_		-2.8			
							-2.9			
	3.0				3.0		-3.0			_
	-				-		-3.1 -3.2			
	-				_		-3.3			
							-3.4			
	3.5				3.5		-3.5			_
	-	ł			-		-3.6 -3.7			
	-	1		1	-	1	-3.8			
							-3.9			
	4.0	-			4.0		-4.0			_
	-	1		1	-		-4.1 -4.2			
	-	1			-		-4.3			
]		1]	-4.4			
	4.5	1			4.5		-4.5			_
	-	1			-		-4.6 -4.7			
	-	1			-		-4.7			
		1			-]	-4.9			
	5.0				5.0		-5.0			
				1		In-situ field testing in accordance Scala Penetrometer Testing: NZS			Penetrometer	
						Shear Vane Testing: Guideline for				

		-1-	ndTook	Client: Hank Developments Limited						Augerhole N	No. HA	1 05
	1	0.0	N S U L T I N S	Project: Proposed Subdivision Address: 7/572 Selwyn Road, Rolleston						Sheet No.	1 c	of 1
Drill '	Туре:	- 7/27	8 Ton Excavator	Project No:	LTCL18051				Logged By:			BE
Drille	ed By:		BE	Coordinates:	NZTM: 1552			171307 mN	Shear Vane			N/A
	Starte Finish		6-Apr-18 6-Apr-18	Ground Conditions: Groundwater Level (m):	Grassed, Ne Not Encount			-18)	Calibration I			N/A N/A
			T					· ·				
						<u>E</u>			In-situ Fie	eld Testing		
aphy	(m)	с Год	Soil description in a	accordance with Guideline for the Field Classifica	tion and	Groundwater Level (m)	(m)	Shear Strength (kPa)	T 1	Ovnamic Con	e Penetrometer	
Stratigraphy	Depth (m)	Graphic Log	Description of Soil and R	Rock for Engineering Purposes, NZ Geotechnica 2005	Society Inc.,	dwate	Depth (m)				Scala Blow (
0)		Ð				sround		Peak: • Remoulded:	Depth (m)	Blow Count		
		\wedge	SILT minor fine sand	minor organics, dark brown, loose, moist, r	on-plastic	_		0	-0.1	음 2	0 5 10	15 20
TOPSOIL	-	\times	[TOPSOIL]	Timor organico, dan promi, iosso, moisi, i	ion piaono		_		-0.1	2	•	
TOF	-	\times					_		-0.3	3		
		× × × >	SILT, minor fine sand, [RIVER DEPOSITS]	yellowish brown, medium dense, moist, nor	n-plastic				-0.4	4		
	0.5	× × × >	[KIVEK DEFOSITS]				0.5		-0.5	5		
	-	× × × > × × × ×					_		-0.6	8		
	-	× × × >					-		-0.7 -0.8	8	†	
		34.		fine to coarse subrounded greywacke GRA			_		-0.9	7		
	1.0	MA	subrounded greywack	e cobbles, greyish brown, tightly packed, m	UIST		1.0		-1.0	8		
RIVER DEPOSITS		26/4					_		-1.1			
DEP	-	79 Y					_		-1.2 -1.3			
IVER	-						_		-1.4			
Ľ	1.5						1.5		-1.5			
							_		-1.6			
	_						_		-1.7			
	_						_		-1.8 -1.9			
	2.0						2.0		-2.0			
	2.0	WY.					2.0		-2.1			
				End of Test Pit (2.1m)					-2.2			
	_						_		-2.3			
	2.5								-2.4 -2.5			
	2.5						2.5		-2.6			
	_						-		-2.7			
									-2.8			
	_						_		-2.9			
	3.0						3.0		-3.0 -3.1			
							_		-3.2			
									-3.3			
							_		-3.4			
	3.5						3.5		-3.5			
	-						_		-3.6 -3.7			
							_		-3.8			
									-3.9			
	4.0						4.0		-4.0			
	_						_		-4.1 -4.2			
	_						_		-4.2 -4.3			
							_		-4.4			
	4.5						4.5		-4.5			
							_		-4.6			
	-						_		-4.7			
	-						_		-4.8 -4.9			
	5.0						5.0		-5.0			
	3.3						3.0	In-situ field testing in accordance			Position :	
			Ī			l		Scala Penetrometer Testing: NZS Shear Vane Testing: Guideline for				

		710	Client: Hank Developments Limited Project: Proposed Subdivision					Augerhole N	o. HA0	06
	L	CO	Project: Proposed Subdivision Address: 7/572 Selwyn Road, Rolleston					Sheet No.	1 of	1
Orill T	уре:		8 Ton Excavator Project No: LTCL18051				Logged By:			В
rille	d By:		BE Coordinates: NZTM: 155			71252 mN	Shear Vane			N/
	Starte Finish		6-Apr-18 Ground Conditions: Grassed, No 6-Apr-18 Groundwater Level (m): Not Encount			-18)	Calibration I Calibration I			N/A
1	- 1			1	1					
				Œ.			In-situ Fie	eld Testing		
aphy	Ê	Graphic Log	Soil description in accordance with Guideline for the Field Classification and	Groundwater Level (m)	(E)	Shear Strength (kPa)		Ovnamic Cone	e Penetrometer	
Stratigraphy	Depth (m)	sraphi	Description of Soil and Rock for Engineering Purposes , NZ Geotechnical Society Inc., 2005	dwate	Depth (m)				Scala Blow C 100mm	
0)		0		Groun		Peak:	Depth (m)	Blow Count		
		\wedge	SILT, minor fine sand, minor organics dark brown, loose, moist, non-plastic	Ü		0			0 5 10	15 20
TOPSOIL	-	\times	[TOPSOIL]				-0.1 -0.2	2	•	
전 전	-	\times			_		-0.3	3	†	
	_		SILT, minor to some fine sand, yellowish brown, medium dense, moist, non-	1	_		-0.4	4	1	
	0.5	× × × >	plastic [RIVER DEPOSITS]		0.5		-0.5	5	\	
	\dashv	< × × > ×			_		-0.6	5		
	4	× × × >			[_		-0.7	25 +		
	\dashv	× × × >			-		-0.8 -0.9			
	1.0	A.J.	Fine to coarse sandy fine to coarse subrounded greywacke GRAVEL, trace	1	1.0		-1.0			
2		/YX	subrounded greywacke cobbles, greyish brown, tightly packed, moist		1.0		-1.1			
NIVEN DEFOSITS	J	X 94					-1.2			
י ה		200					-1.3			
1	_	DY			_		-1.4			
	1.5	201			1.5		-1.5			
	\dashv				_		-1.6 -1.7			
	-				_		-1.8			
	_				_		-1.9			
	2.0	DY			2.0		-2.0			
							-2.1			
	_	14/4	End of Test Pit (2.2m)	-	_		-2.2			
	_		End of Test Fit (2.2m)		_		-2.3 -2.4			
	2.5				2.5		-2.4			
ŀ	2.5				2.5		-2.6			
					_		-2.7			
							-2.8			
	_				_		-2.9			
ŀ	3.0				3.0		-3.0			
	-						-3.1 -3.2			
	\exists				-		-3.3			
	╛				_		-3.4			
	3.5				3.5		-3.5			
	4				_		-3.6			
	4				_		-3.7			
	\dashv				_		-3.8 -3.9			
	4.0				4.0		-4.0			
ŀ	- 7.U				→. U		-4.1			
	J				_		-4.2			
							-4.3			
	4				_		-4.4			
ļ	4.5				4.5		-4.5			
	\dashv				-		-4.6 -4.7			
	\dashv				_		-4.7			
	\exists				-		-4.9			
	5.0			1	5.0		-5.0			
T						In-situ field testing in accordance				
- 1				1		Scala Penetrometer Testing: NZS Shear Vane Testing: Guideline for				

Davis Ogilvie & Partners Limited Level 1, 24 Moorhouse Avenue, Addington, Christchurch 8140 Office 0800 999 333 Email hello@do.nz

SHALLOW INVESTIGATION RESULTS

Job Nº /39353

Test Nº /DCP 1 + HA DCP 2

Dynamic Cone Penetrometer Test performed in accordance with NZS 4402 Test 6.5.2 (Procedure 1 and 2)

Project: 19 Raptor Street, Falcons Landing, Rolleston (Lot 298 DP 532807) Date: 28/08/19 Client: Compass Homes Time: 10:00 a.m. Test Location: Refer to attached Geotechnical Site Plan (DWG G01A) Excavation Method: DCP+HA

	14 - 12 - 12 - 12 - 13 - 14 - 15 - 15 - 15 - 15 - 15 - 15 - 15
3 4 5 6 7 8 9 1 2 3 4 5 6 7 8 9	14 - 12 - 12 - 12 - 27 - 130
13	14 - 12 - 12 - 0 - 13 - 14 - 15 - 15 - 15 - 15 - 15 - 15 - 15
13	12 -00 -00 -00 -00 -00 -00 -00 -00 -00 -0
13	27 -1 30 -
13	30 -
13	30 -
///////// /	- - -
30	-
	-
	_
	_
	-
	-
	F
	_
	-
	-2
	-
	-
	-
	Ę
Dynamic Penetrometer Test and loss give an indication of the	e ground
	Dynamic Penetrometer Test and logs give an indication of the condition at the location of the tests only. While they are repres typical conditions across the site, they do not identify variation ground away from the test locations. This log does not cover sic

Checked By: HC

Produced with Core-GS by Geroc

Davis Ogilvie & Partners Limited Level 1, 24 Moorhouse Avenue, Addington, Christchurch 8140 Office 0800 999 333 Email hello@do.nz

SHALLOW INVESTIGATION RESULTS

Job № /39353

Test Nº /DCP 3 + HA DCP 4

Project:19 Raptor Street, Falcons Landing, Rolleston (Lot 298 DP 532807)Date:28/08/19Client:Compass HomesTime:10:00 a.m.Test Location:Refer to attached Geotechnical Site Plan (DWG G01A)Excavation Method:DCP+HA

	Test Location: Refer to attached Geotechnical Site Plan (DVVC	i G()1A)			Excavation Method: DCP+HA	
D			ن	,		BLOV	VS / 100 mm	D
E P T	STRATA DESCRIPTION	nscs	ihai	Log	Water Table		DOD 4	E P T
H	Average of DOD 2	š	Gra	-	≥ 10	DCP 3	DCP 4	H
(m)	Auger at DCP 3 SILT; dark brown. Moist, moderately organic with trace rootlets					1 2 3 4 5 6 7 8 9	1 2 3 4 5 6 7 8 9	(m)
	(TOPSOIL). [0.50m]	ST	200 2 T: 200 2 T: 200 2 T: 200 2 3	5 <u>4</u> <u>m</u> TS ₂ S <u>4</u> <u>m</u> TS ₂ S 4 <u>m</u> TS ₂	water Not Encountere			-
0.5	SILT with some fine sand; yellowish brown with minor orange		20 <u>-</u>	<u>₩</u>	Got	////	//////	0.5
1.0-	mottling. Stiff, moist. [0.90m]	ML					28	- - - - -1.0
	SILT with trace fine sand, yellowish orangey brown. Hard,	M			1		15	
1.5	moist, low plasticity. [0.10m] Fine and medium SAND with some silt; greyish brown. Dense,	NS						-1.5
	wet. [0.10m] SILT with trace fine sand; mottled orange and grey. Hard,	ML					16	-
	moist, low plasticity. [0.10m] Auger terminated at 1.70m - Refusal on gravel.	2			1			_
	1.7m: Sandy fine and medium gravel recovered						30	-
2.0								2.0
								_
								-
2.5								-2.5
								-
								+
								-
								-3.0
3.0								

Produced with Core-GS by Geroc

Logged By: H

Plotted By: GC

Checked By: HC

Dynamic Penetrometer Test and logs give an indication of the ground condition at the location of the tests only. While they are representative of typical conditions across the site, they do not identify variations in the ground away from the test locations. This log does not cover slope stability or suitability of the site for building.

Dynamic Cone Penetrometer Test performed in accordance with NZS 4402 Test 6.5.2 (Procedure 1 and 2)