



ENGEO

— Expect Excellence —

Geotechnical Investigation

585 Springston Rolleston Road

Rolleston

Christchurch

Submitted to:

Urban Estates Ltd

Level 2

Building 1

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Christchurch 8144

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27.05.2019

16130.000.000_01



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ENGEO Document Control:

Report Title	Geotechnical Investigation - 585 Springston Rolleston Road, Rolleston			
Project No.	16130.000.000	Doc ID	01	
Client	Urban Estates Ltd	Client Contact	Brad Wilson	
Distribution (PDF)	Brad Wilson			
Date	Revision Details/Status	WP	Author	Reviewer
27/05/2019	Issued to Client	DF	JW	GM

1 Introduction

ENGEO Ltd was requested by Urban Estates Ltd to undertake a Geotechnical Investigation of the property for a proposed subdivision, as outlined in our proposal (ref.P2019.000.512, dated 14 March 2019).

The property at 585 Springston Rolleston Road is currently a residential lifestyle block. The purpose of this investigation was to evaluate the subsurface conditions at the site, develop a geological model of the site, assess the likely future land performance, comment on the suitability of the site for residential subdivision, address the requirements of Section 106 of the Resource Management Act (RMA), and provide geotechnical recommendations associated with subdivision works and typical foundations for timber framed residential dwellings.

Our scope of works included the following:

- Complete a desktop study of the relevant geotechnical and geological publications, including the New Zealand Geotechnical Database;
- Visit the site and undertake a geotechnical site walkover;
- Undertake up to six hand augers and associated Scala penetrometer and Shear Vane tests to a depth of 1.0 m below ground level or practical refusal to assess the near surface material types and strength characteristics;
- Organise and technically supervise the excavation of up to eight test pits to a target depth of 2.0 m, including geotechnical logging of the exposed soils; and
- Preparation of this report outlining our findings on the ground conditions and the suitability of the site for residential subdivision. This includes geotechnical advice on the likely foundation Technical Category, conceptual foundation recommendations for typical timber-framed residential dwellings, and addresses the likely Geohazards required by Section 106 of the RMA.

2 Site Description

The site covers a total area of 4.45 ha, and has the legal description of LOT 15 D P 8530 BLK III (Selwyn District Council). We understand that the property at 585 Springston Rolleston Road and the five blocks northwest of the lot are to be subdivided into residential lots. This report will refer to the six lots as “the site”

Figure 1: Site Location

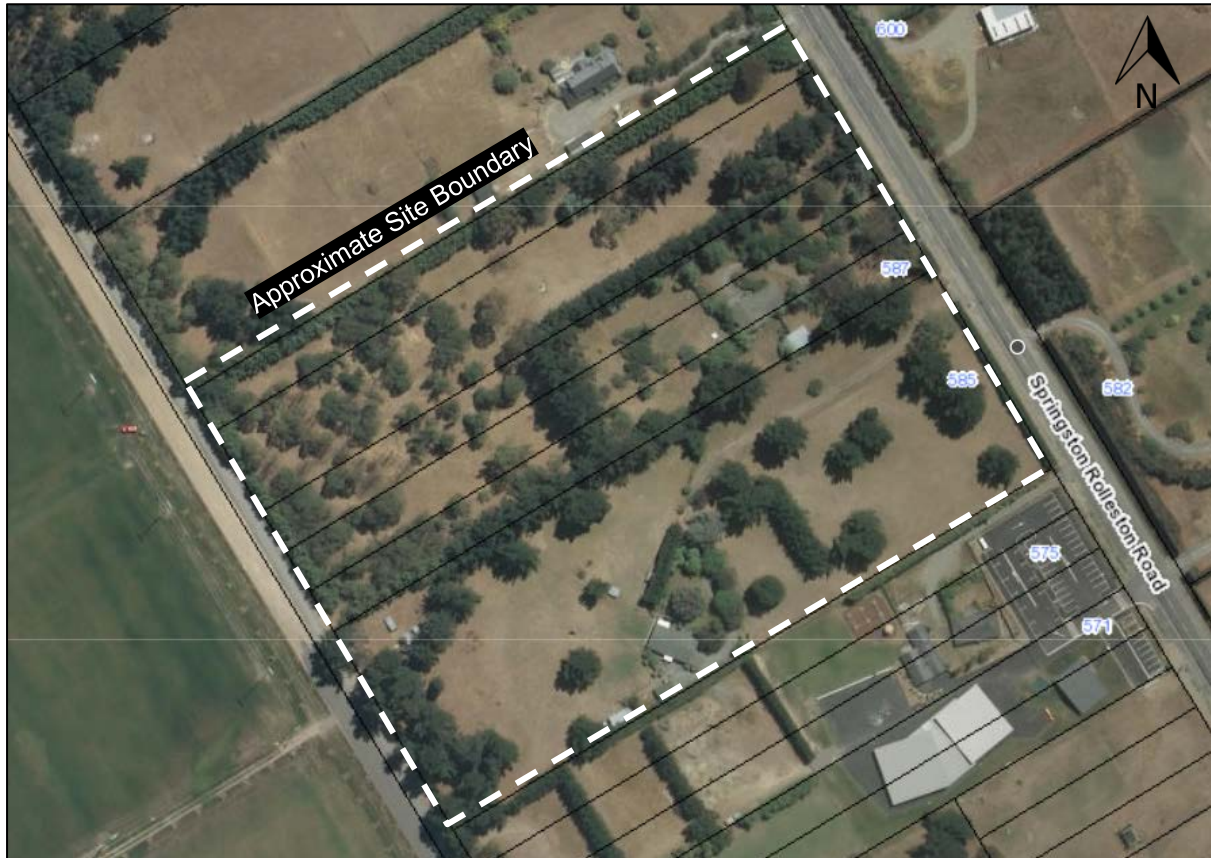


Image sourced from Canterbury Maps

The predominantly flat site is currently agricultural land and occupied by two residential dwellings with associated gardens and lawn areas, and a number of barn and shed structures.

There are no significant watercourses in the area and the site is outside of any ECan defined flood zones as indicated in the Selwyn District Council (SDC Operative District Plan (SDC, 2015).

The Canterbury Earthquake Recovery Authority (CERA, now disestablished) has categorised the site as ‘N/A Rural & Unmapped’, meaning future development can proceed following normal consenting processes.

3 Geological Model

3.1 Regional Geology

The site has been regionally mapped by GNS (Forsyth et al., 2008) as being underlain by grey river alluvium.

3.2 Geomorphology

The site comprises relatively flat ground, with gentle undulations and shallow depressions in some areas. As evident on historical aerial imagery (Figure 2) and observed during the site walkover conducted on 7 May 2019, undulating and depressed ground can be attributed to paleo-channels, which traverse the site in a general northwest to southeast trend. Due to the vegetation on site obscuring the evidence of paleo-channels in the aerial photographs, the inferred paleo-channels have not been mapped.

Figure 2: Historical Aerial Photography

1940 - 1944



Image sourced from Canterbury Maps

1970 – 1994



Image sourced from Canterbury Maps

3.3 Geohazards

3.3.1 Seismicity

There are no known or mapped faults within the immediate area of the site, however the site may be at risk of ground shaking induced by movement of proximal or distal faults.

The site is located between two recently discovered fault systems, the Greendale Fault and the Port Hills Fault, the ruptures of which initiated the ongoing Canterbury Earthquake Sequence (CES). The Greendale Fault has been mapped approximately 4.5 km northwest of the site and trends roughly east – west with a surface rupture of approximately 28 km (GNS, 2015), while the Port Hills Fault remains unmapped as the fault did not rupture at the surface. Movement on the Port Hills Fault is believed to have occurred at a depth of 1 km to 2 km below ground surface.

Large regional areas of faulting (GNS, 2015) namely the Ashley Fault, Porters Pass-Amberley Fault Zone, and the Hope and Alpine Faults, are further afield but present a high seismic hazard to the Christchurch area due to the anticipated size of earthquakes generated. The largest of these faults is the Alpine Fault, which has a return period of 250-300 years and is expected to produce a M 8 earthquake. The last rupture on the Alpine Fault is believed to have occurred in 1717 (Pettinga et al. 2001).

3.3.2 Liquefaction and Lateral Spreading

The site is located within an area mapped as ‘damaging liquefaction unlikely’ (NZGD Map CGD5140, 2012).

3.4 Site Investigation

Site investigations to assess the shallow subsurface material types and strength characteristics were undertaken by ENGEO on 8 May 2018. The investigations comprised of eight hand auger boreholes with associated Scala penetrometer tests and eight test pit investigations with associated Scala penetrometer tests.

Topsoil depths were recorded in the subsurface tests completed at site which we believe are indicative of the site topsoil balance across the site. It should be noted that the hand auger topsoil depths are less accurate than the test pit topsoil depths as gravel depth is inferred due to the grainsize limitations of hand auger borehole testing.

The investigations revealed subsurface conditions across the site are consistent with the published geological mapping, as summarised in Table 1.

Table 1: Summary of Subsurface Conditions

Soil Type	Depth to top of layer (m)	Layer Thickness (m)	Density / Consistency	Comment
TOPSOIL	0.0	0.2 – 0.4	Firm to Stiff	-
SILT / SAND	0.4	0.1 to 0.4	Stiff to Very Stiff / Loose to Dense	Not encountered in all test locations
GRAVEL	0.2 to 0.8	Unknown	Medium Dense to Very Dense (inferred)	-

Test pit TP04 was completed adjacent to an existing burn pit and encountered fill material up to 0.8 m depth. The fill material consisted of silty sand with charcoal, plastic, metal, glass and other waste material. ENGEO is also completing an environmental assessment on the site at the time of writing however, the burn pit and any other fill material will likely need to be excavated and remediated during construction.

“Good ground” (as defined in NZS 3604:2010) under static conditions was typically encountered immediately beneath the topsoil layer (typically 0.3 m) and at a maximum depth of 0.4 m below ground level.

Test Locations are shown on the site plan presented in Appendix 1. Test pit and hand auger hole logs, showing detailed soil descriptions are presented in Appendix 2.

3.5 ECan Boreholes

A review was conducted of three deep ECan borehole logs all located on site (Canterbury Maps). The location of these boreholes is presented in Figure 3. The logs from the three boreholes of interest are presented in Appendix 3 and indicate the site is underlain by gravel and sandy gravel with thin clay layers to depths of at least 42 m below ground level.

Figure 3: Nearby ECan Borehole Locations



3.6 Groundwater

Groundwater is recorded in the surrounding boreholes between approximately 9 m and 13 m depth.

3.7 Site Seismic Class

In accordance with NZS 1170.5:2004, Class D applies to this particular site, defining it as a 'deep soft soil site'.

4 Liquefaction Assessment

Based on our site investigation and observations, and owing to the nature of the subsurface materials and depth to groundwater at the site, we consider the potential for liquefaction and lateral spreading on the site to be very low.

We therefore consider the site of the proposed subdivision to be classified as Technical Category 1 (TC1) whereby future land damage from liquefaction is unlikely, and ground settlements are expected to be within normally accepted tolerances.

5 RMA Section 106 Requirements and Suitability to Subdivide

Section 106 of the Resource Management Act 1991 states a consent authority may refuse to grant a subdivision consent, or may grant a consent subject to specific consent conditions if it considers that:

- There is a significant risk from natural hazards; or
- Sufficient provision has not been made for legal or physical access to each allotment to be created by the subdivision.

An assessment of the risk from natural hazards as required by the RMA includes the following:

- The likelihood of natural hazards occurring (whether individually or in combination);
- The material damage to land in respect of which the consent is sought, other land, or structures that would result from natural hazards; and
- Any likely subsequent use of the land in respect of which the consent is sought that would accelerate, worsen, or result in material damage of the kind referred to in paragraph (b).

We have assessed the risk of natural hazards at the site in accordance with Section 106 of the Resource Management Act (RMA) and considered the risk to the site from rockfall, inundation (debris), slope stability, subsidence, flooding and tsunamis. Based on our observations and the nature of the site, its performance during the CES, and the site's distance from the nearest significant watercourse, we consider it is unlikely for the site to be subject to natural hazards such as rockfall, inundation (debris), slope stability, subsidence, flooding and tsunamis. As such, the site is considered suitable for subdivision from a geotechnical perspective.

6 Geotechnical Recommendations

6.1 Earthworks

Earthworks carried out for the subdivision shall be in accordance with NZS 4404:2010, Land Development and Subdivision Infrastructure and NZS 4431:1989, Code of Practice for Earthfilling for Residential Development. In particular, any areas to receive fill should be stripped of any vegetation, topsoil, non-engineered fill, soft or organic soils prior to fill placement.

Fill may comprise clean native sandy gravel or silty soils, or clean imported soils and / or granular fill, compacted to achieve no less than 95% of maximum dry density. Fill faces steeper than 2:1 (H:V) and higher than 600 mm should be retained and referred back to ENGEO. Although unlikely, where any springs or groundwater seeps are encountered they should be intercepted with suitable drainage and discharged to a Council approved outlet.

All unretained batters of pond and stormwater drains constructed with the native sandy gravel material should be at an inclination of no steeper than 1V:3H, with protection schemes in place to control erosion of the formed batters within the waterways.

A comprehensive earthworks specification should be provided to the earthworks contractor prior to starting excavations and an inspection / testing regime agreed, along with a robust erosion and sediment control plan.

6.2 Subdivision Roding

Vegetation, any organic or deleterious material, topsoil and non-engineered fill should be removed from the site under pavement areas prior to aggregate placement. Based on our observations during testing, we consider the native ground below the topsoil at the site should provide an adequate subgrade for the proposed pavement areas.

6.3 Stormwater Control

Concentrated stormwater flows from all impermeable areas must be collected and carried in sealed pipes to the Council system or an alternative disposal point subject to approval from Council. Uncontrolled stormwater must not be allowed to saturate the ground as this will potentially affect future foundation performance both statically and during future seismic activity.

6.4 Foundations

Foundations for future proposed residential dwellings within the subdivision may comprise pad, strip or slab foundations designed in accordance with the provisions of NZS 3604 Timber Framed Buildings.

An Ultimate Bearing Capacity of 300 kPa may be assumed for foundations bearing on native sandy gravel or engineered fill, below any topsoil or non-engineered fill. We anticipate this to be at / below 0.4 m depth based on our subsurface investigations.

6.5 Additional Works

Future geotechnical work at the site will include a detailed subsurface exploration to support design of all earthwork and development concepts, including specific foundation recommendations appropriate for the proposed structures. Subject to the proposed development concept and timeline, this exploration can be tailored to inform the earthworks design, and to support building consent applications to the Selwyn District Council.

7 References

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We also acknowledge the New Zealand GeoNet project and its sponsors EQC, GNS Science and LINZ, for providing data used in this report.

8 Limitations

- i. We have prepared this report in accordance with the brief as provided. This report has been prepared for the use of our client, Urban Estates Ltd, their professional advisers and the relevant Territorial Authorities in relation to the specified project brief described in this report. No liability is accepted for the use of any part of the report for any other purpose or by any other person or entity.
- ii. The recommendations in this report are based on the ground conditions indicated from published sources, site assessments and subsurface investigations described in this report based on accepted normal methods of site investigations. Only a limited amount of information has been collected to meet the specific financial and technical requirements of the client's brief and this report does not purport to completely describe all the site characteristics and properties. The nature and continuity of the ground between test locations has been inferred using experience and judgement and it should be appreciated that actual conditions could vary from the assumed model.
- iii. Subsurface conditions relevant to construction works should be assessed by contractors who can make their own interpretation of the factual data provided. They should perform any additional tests as necessary for their own purposes.
- iv. This Limitation should be read in conjunction with the Engineering NZ/ACENZ Standard Terms of Engagement.
- v. This report is not to be reproduced either wholly or in part without our prior written permission.

We trust that this information meets your current requirements. Please do not hesitate to contact the undersigned on (03) 328 9012 if you require any further information.

Report prepared by



Jed Watts

Engineering Geologist

Report reviewed by







Greg Martin, CMEngNZ (PEngGeol)

Principal Engineering Geologist

APPENDIX 1:
Site Plan



Legend

-  Hand auger
-  Test pit
-  Site outline
-  Title boundary

Aerial: LINZ and Eagle Technology, CC-BY-3.0-NZ.
Map image: Eagle Technology, CC-BY-3.0-NZ.



PROJECTION: NZGD 2000 New Zealand Transverse Mercator

ENGEO

Christchurch Office
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Tel: 03 328 9012, www.engeo.co.nz

Title:
Site and testing location plan

Client: Urban Estates Limited		Figure No:
Project:	Designed: JW	1
585 Springston Rolleston Road Rolleston	Drawn: RW	
	Checked: XX	
Proj No:	Date: May 19	Size: A3
16130.000.000	Scale: 1:1,100	Revision: A

APPENDIX 2:
Test Pit Logs and Hand Auger Logs



LOG OF TEST PIT TP01

Geotechnical Investigation
 585 Springton Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
Date : 08/05/2019
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size :

Shear Vane No : N/A
Logged By : KF/SC/JW
Reviewed By : JW
Latitude :
Longitude :

Depth (m BGL)	Material	Excavability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer						
		Easier	Harder									Blows per 100mm						
	TS			SP					M	MD		2	4	6	8	10	12	
0.0 - 0.2					Fine to medium SAND with some silt and trace rootlets; brown. Poorly graded [TOPSOIL].													
0.2 - 1.0					Sandy fine to coarse GRAVEL with trace cobbles; brownish grey. Well graded. Sand, fine to coarse. Gravel, subrounded. Rootlets observed from 0.2 to 0.5 m depth.					D								
1.0 - 2.0	ALLUVIUM			GW	Minor cobbles observed from 1.0 m depth.				M									
2.0 - 2.0	Depth of Excavation: 2 m Termination Condition: Target depth																	

GEOTECH TEST PIT LOG - 585 SPRINGTON ROLLESTON ROAD.GPJ - NZ MASTER DATA TEMPLATE.GDT 22/5/19

Scala Penetrometer met practical refusal
 Standing groundwater was not encountered

TS = TOPSOIL



LOG OF TEST PIT TP02

Geotechnical Investigation
 585 Springton Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
Date : 08/05/2019
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size :

Shear Vane No : N/A
Logged By : KF/SC
Reviewed By : JW
Latitude :
Longitude :

Depth (m BGL)	Material	Excavability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer						
		Easier	Harder									Blows per 100mm						
	TS			SP					M	L-MD		2	4	6	8	10	12	
0.5					Sandy fine to coarse GRAVEL with trace cobbles; greyish brown. Well graded. Sand, fine to coarse. Gravel, subrounded. Rootlets observed from 0.3 to 0.7 m depth.					D								
1.0	ALLUVIUM			GW	Cobbles become minor from 1.0 m depth.				M									
2.0					Depth of Excavation: 2 m Termination Condition: Target depth													

GEOTECH TEST PIT LOG - 585 SPRINGTON ROLLESTON ROAD.GPJ - NZ MASTER DATA TEMPLATE.GDT 22/5/19

Scala Penetrometer met practical refusal
 Standing groundwater was not encountered

TS = TOPSOIL



LOG OF TEST PIT TP03

Geotechnical Investigation
 585 Springton Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
Date : 08/05/2019
Max Test Pit Depth : 2.1 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size :

Shear Vane No : N/A
Logged By : KF/SC
Reviewed By : JW
Latitude :
Longitude :

Depth (m BGL)	Material	Excavability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer						
		Easier	Harder									Blows per 100mm						
	TS			SM					M	MD		2	4	6	8	10	12	
0.5	ALLUVIUM			GW	Sandy fine to coarse GRAVEL; greyish brown. Well graded. Sand, fine to coarse. Gravel, subrounded. Trace rootlets observed from 0.3 to 1.3 m depth. Trace cobbles observed from 0.5 m depth.					D								
1.5					Minor cobbles observed from 1.3 m depth.					M								
2.1	Depth of Excavation: 2.1 m Termination Condition: Target depth																	

GEOTECH TEST PIT LOG - 585 SPRINGTON ROLLESTON ROAD.GPJ - NZ MASTER DATA TEMPLATE.GDT 22/5/19

Scala Penetrometer met practical refusal
 Standing groundwater was not encountered

TS = TOPSOIL



LOG OF TEST PIT TP04

Geotechnical Investigation
 585 Springston Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
Date : 08/05/2019
Max Test Pit Depth : 2.2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size :

Shear Vane No : N/A
Logged By : KF/SC
Reviewed By : JW
Latitude :
Longitude :

Depth (m BGL)	Material	Excavability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer					
		Easier	Harder									Blows per 100mm					
												2	4	6	8	10	12
0.0	TS			SM	Silty fine to medium SAND with trace rootlets; brown. Poorly graded [TOPSOIL].				M	L							
0.5				SM	Silty fine to medium SAND with trace charcoal, plastic, metal, glass, wire, rope and gravel; dark brown. Poorly graded. Gravel, fine to medium, subrounded [FILL].				M	MD-D							
1.0	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with trace cobbles; greyish brown. Well graded. Sand, fine to coarse. Gravel, subrounded.				M								
1.5				GW	Minor cobbles observed from 1.5 m depth.				M								
2.2	Depth of Excavation: 2.2 m Termination Condition: Target depth																

GEOTECH TEST PIT LOG - 585 SPRINGSTON ROLLESTON ROAD.GPJ - NZ MASTER DATA TEMPLATE.GDT 22/05/19

Scala Penetrometer met practical refusal
 Standing groundwater was not encountered

TS = TOPSOIL
 FILL extends to 1.6 m depth.



LOG OF TEST PIT TP05

Geotechnical Investigation
 585 Springton Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
Date : 08/05/2019
Max Test Pit Depth : 2.2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size :

Shear Vane No : N/A
Logged By : KF/SC
Reviewed By : JW
Latitude :
Longitude :

Depth (m BGL)	Material	Excavability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer						
		Easier	Harder									Blows per 100mm						
	TS			SM					M	L		2	4	6	8	10	12	
0.0 - 0.2					Silty fine to medium SAND with trace rootlets; dark brown. Poorly graded [TOPSOIL].													
0.2 - 1.0					Sandy fine to coarse GRAVEL with trace cobbles; greyish brown. Well graded. Sand, fine to coarse. Gravel, subrounded. Trace rootlets observed from 0.2 to 1.0 m depth.					MD-D								
1.0 - 2.2	ALLUVIUM			GW	Cobbles become minor from 1.2 m depth. Trace rootlets observed from 1.4 to 2.0 m depth.				M									
Depth of Excavation: 2.2 m Termination Condition: Target depth																		

GEOTECH TEST PIT LOG - 585 SPRINGTON ROLLESTON ROAD.GPJ - NZ MASTER DATA TEMPLATE.GDT 22/05/19

Scala Penetrometer met practical refusal
 Standing groundwater was not encountered

TS = TOPSOIL



LOG OF TEST PIT TP06

Geotechnical Investigation
 585 Springston Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
Date : 08/05/2019
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size :

Shear Vane No : N/A
Logged By : KF/SC
Reviewed By : JW
Latitude :
Longitude :

Depth (m BGL)	Material	Excavatability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer						
		Easier	Harder									Blows per 100mm						
	TS			ML					M	L		2	4	6	8	10	12	
0.0 - 0.2					SILT with some fine to medium sand and trace rootlets and gravel; dark brown. Low plasticity. Gravel, fine, subrounded [TOPSOIL].													
0.2 - 0.8					Sandy fine to coarse GRAVEL; brownish grey. Well graded. Sand, fine to coarse. Gravel, subrounded. Trace rootlets observed from 0.2 to 0.6 m depth.					D								
0.8 - 2.0	ALLUVIUM			GW	Trace cobbles encountered from 0.8 m depth. Sand lens approximately 300 mm thick encountered in two sides of the test pit excavation at approximately 0.9 m depth. Cobbles become minor from 1.0 m depth.						M							
					Depth of Excavation: 2 m Termination Condition: Target depth													

GEOTECH TEST PIT LOG - 585 SPRINGSTON ROLLESTON ROAD.GPJ - NZ MASTER DATA TEMPLATE.GDT 22/05/19

Scala Penetrometer met practical refusal
 Standing groundwater was not encountered

TS = TOPSOIL
 Sand lense observed in NE face from 1.3 m depth.



LOG OF TEST PIT TP07

Geotechnical Investigation
 585 Springston Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
Date : 08/05/2019
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size :

Shear Vane No : N/A
Logged By : KF/SC
Reviewed By : JW
Latitude :
Longitude :

Depth (m BGL)	Material	Excavability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer								
		Easier	Harder									Blows per 100mm								
	TS			SM	Silty fine to medium SAND with trace rootlets; brown. Poorly graded [TOPSOIL].				M	L		2	4	6	8	10	12			
0.5	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with trace rootlets and cobbles; greyish brown. Well graded. Sand, fine to coarse. Gravel, subrounded.				M	MD-D										
1.0				GW	Fine to coarse GRAVEL with some sand and minor cobbles; grey. Well graded. Sand, fine to coarse. Gravel, subrounded. Trace rootlets encountered from 0.7 to 1.3 m depth.				M											
1.5																				
2.0	Depth of Excavation: 2 m Termination Condition: Target depth																			
2.5																				
3.0																				

GEOTECH TEST PIT LOG - 585 SPRINGSTON ROLLESTON ROAD.GPJ - NZ MASTER DATA TEMPLATE.GDT 22/5/19

Scala Penetrometer met practical refusal
 Standing groundwater was not encountered

TS = TOPSOIL



LOG OF TEST PIT TP08

Geotechnical Investigation
 585 Springton Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
Date : 08/05/2019
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size :

Shear Vane No : N/A
Logged By : KF/SC
Reviewed By : JW
Latitude :
Longitude :

Depth (m BGL)	Material	Excavability (Relative Scale)		USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Peak/Remoulded (kPa)	Scala Penetrometer							
		Easier	Harder									Blows per 100mm							
	TS			SM	Silty fine to medium SAND with trace rootlets; brown. Poorly graded [TOPSOIL].				M	MD		2	4	6	8	10	12		
0.5	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with trace cobbles and rootlets; brownish grey. Well graded. Sand, fine to coarse. Gravel, subrounded.					D									
1.0					No rootlets observed from 0.7 to 1.0 m depth.														
1.5					Minor cobbles observed from 1.0 m depth.						M								
2.0	Depth of Excavation: 2 m Termination Condition: Target depth																		
2.5																			
3.0																			

GEOTECH TEST PIT LOG - 585 SPRINGTON ROLLESTON ROAD.GPJ - NZ MASTER DATA TEMPLATE.GDT 22/5/19

Scala Penetrometer met practical refusal
 Standing groundwater was not encountered

TS = TOPSOIL



LOG OF AUGER HA01

Geotechnical Investigation
 585 Springston Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
 Client Ref. :
 Date : 08/05/2019
 Hole Depth : 0.4 m
 Hole Diameter : 50 mm

Shear Vane No : 1288
 Logged By : SC/KF
 Reviewed By : JW
 Latitude : 43.606553
 Longitude : 172.391382

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SM	Silty fine to medium SAND with trace rootlets; brown. Poorly graded [TOPSOIL].					MD								
	ALLUVIUM	SM	Silty fine SAND with trace rootlets; greyish brown. Poorly graded.				M	MD-D								
0.5	End of Hole Depth: 0.4 m Termination Condition: Practical refusal															

GEOTECH HAND AUGER - HAND AUGER LOGS - 585 SPRINGSTON ROLLESTON ROAD.GPJ NZ DATA TEMPLATE 2.GDT 20/5/19

Hand auger met practical refusal at 0.4 m depth on inferred gravel.
 Scala Penetrometer met practical refusal at 0.5 m depth.
 Standing groundwater was not encountered



LOG OF AUGER HA02

Geotechnical Investigation
 585 Springston Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
 Client Ref. :
 Date : 08/05/2019
 Hole Depth : 0.15 m
 Hole Diameter : 50 mm

Shear Vane No : 1288
 Logged By : SC/KF
 Reviewed By : JW
 Latitude : 43.607549
 Longitude : 172.390929

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SM	Silty fine to medium SAND with trace rootlets; brown. Poorly graded [TOPSOIL].				M	L-MD								
End of Hole Depth: 0.15 m Termination Condition: Practical refusal																
0.5																
1.0																

GEOTECH HAND AUGER - HAND AUGER LOGS - 585 SPRINGSTON ROLLESTON ROAD.GPJ NZ DATA TEMPLATE 2.GDT 20/5/19

Hand auger met practical refusal at 0.15 m depth on inferred gravel.
 Scala Penetrometer met practical refusal at 0.4 m depth.
 Standing groundwater was not encountered



LOG OF AUGER HA03

Geotechnical Investigation
 585 Springston Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
 Client Ref. :
 Date : 08/05/2019
 Hole Depth : 0.15 m
 Hole Diameter : 50 mm

Shear Vane No : 1288
 Logged By : SC/KF
 Reviewed By : JW
 Latitude : 43.607944
 Longitude : 172.389766

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	ML	Silty fine to medium SAND with trace rootlets; brown. Poorly graded [TOPSOIL].				M	MD-D								
	End of Hole Depth: 0.15 m Termination Condition: Practical refusal															

GEOTECH HAND AUGER - HAND AUGER LOGS - 585 SPRINGSTON ROLLESTON ROAD.GPJ NZ DATA TEMPLATE 2.GDT 20/5/19

Hand auger met practical refusal at 0.15 m depth on inferred gravel.
 Scala Penetrometer met practical refusal at 0.2 m depth.
 Standing groundwater was not encountered



LOG OF AUGER HA04

Geotechnical Investigation
 585 Springston Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
 Client Ref. :
 Date : 08/05/2019
 Hole Depth : 0.55 m
 Hole Diameter : 50 mm

Shear Vane No : 1288
 Logged By : SC/KF
 Reviewed By : JW
 Latitude : 43.607633
 Longitude : 172.39069

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SM	Silty fine to medium SAND with trace rootlets; brown. Poorly graded [TOPSOIL].					L-MD								
	ALLUVIUM	SM	Silty fine to medium SAND with trace gravel; greyish brown. Poorly graded. Gravel, fine, subrounded.				M	MD								
		ML	SILT with some fine sand; brownish grey. Low plasticity.					VSt								
0.5	End of Hole Depth: 0.55 m Termination Condition: Practical refusal															

GEOTECH HAND AUGER - HAND AUGER LOGS - 585 SPRINGSTON ROLLESTON ROAD.GPJ - NZ DATA TEMPLATE 2.GDT - 20/5/19

Hand auger met practical refusal at 0.55 m depth on inferred gravel.
 Scala Penetrometer met practical refusal at 0.6 m depth.
 Standing groundwater was not encountered



LOG OF AUGER HA05

Geotechnical Investigation
585 Springston Rolleston Road
Rolleston
16130.000.000

Client : Urban Estates Ltd
Client Ref. :
Date : 08/05/2019
Hole Depth : 0.3 m
Hole Diameter : 50 mm

Shear Vane No : 1288
Logged By : SC/KF
Reviewed By : JW
Latitude : 43.608704
Longitude : 172.390451

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	FILL	SM	Silty fine to medium SAND with trace rootlets and charcoal; dark brown. Poorly graded [FILL].					L-MD								
	A	SW	Gravelly fine to coarse SAND; greyish brown. Well graded. Gravel, fine to medium, subrounded.				M	MD								
0.5	End of Hole Depth: 0.3 m Termination Condition: Practical refusal															
1.0																

GEOTECH HAND AUGER - HAND AUGER LOGS - 585 SPRINGSTON ROLLESTON ROAD.GPJ NZ DATA TEMPLATE 2.GDT 20/5/19

Hand auger met practical refusal at 0.3 m depth on inferred gravel.
Scala Penetrometer met practical refusal at 0.5 m depth.
Standing groundwater was not encountered
A = ALLUVIUM



LOG OF AUGER HA06

Geotechnical Investigation
 585 Springston Rolleston Road
 Rolleston
 16130.000.000

Client : Urban Estates Ltd
 Client Ref. :
 Date : 08/05/2019
 Hole Depth : 0.2 m
 Hole Diameter : 50 mm

Shear Vane No : 1288
 Logged By : SC/KF
 Reviewed By : JW
 Latitude : 43.607466
 Longitude : 172.391551

Depth (m BGL)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Elevation (mRL)	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remoulded	Scala Penetrometer						
										Blows per 100mm						
										2	4	6	8	10	12	
	TOPSOIL	SP	Fine to medium SAND with some silt, trace rootlets and gravel; brown. Poorly graded. Gravel, fine to medium, subrounded [TOPSOIL].				M	L								
End of Hole Depth: 0.2 m Termination Condition: Practical refusal																
0.5																
1.0																

GEOTECH HAND AUGER - HAND AUGER LOGS - 585 SPRINGSTON ROLLESTON ROAD.GPJ - NZ DATA TEMPLATE 2.GDT - 20/5/19

Hand auger met practical refusal at 0.2 m depth on inferred gravel.
 Scala Penetrometer met practical refusal at 0.6 m depth.
 Standing groundwater was not encountered