



ENGEO

— Expect Excellence —

Geotechnical Investigation

523 East Maddisons Road

Rolleston

Canterbury

Submitted to:

Hughes Developments Limited

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ENGEO Document Control:

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1 Introduction

ENGEO Ltd was requested by Hughes Development Ltd to undertake a geotechnical investigation of the property at 523 East Maddisons Road, Rolleston, Christchurch, as outlined in our variation proposal (ref. P2016.000.248_29).

The purpose of the assessment was to determine 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 recommendations for subdivision works and foundations for typical timber framed residential dwellings.

Our scope of works included the following:

- Complete a desktop study of relevant available geotechnical and geological publications, including the NZ Geotechnical and Environment Canterbury Databases.
- Undertake a geotechnical site walkover.
- Undertake five hand auger boreholes with associated Scala penetrometer tests to assess the near surface material types and strength characteristics.
- Organise and technically supervise the excavation of seven test pits, including geotechnical logging of the exposed soils.
- Preparation of this report outlining our findings on the ground conditions and the suitability of the site for residential subdivision. This will include geotechnical advice on the likely foundation Technical Category, conceptual foundation recommendations for typical timber framed residential dwellings, and address likely geohazards as required by Section 106 of the RMA.

2 Site Description

The site covers a total area of 4.27 ha, and has the following legal description (Selwyn District Council):

- 523 East Maddisons Road - Lot 2 DP 326339

It is located approximately 3.3 km south of Rolleston town centre, and is bounded to the northeast by East Maddisons Road. Rural properties border the site on the remaining sides (Figure 1).

Figure 1: Site Location Plan

Aerial photograph sourced from Canterbury Maps. Not to scale.

3 Geological Model

3.1 Regional Geology

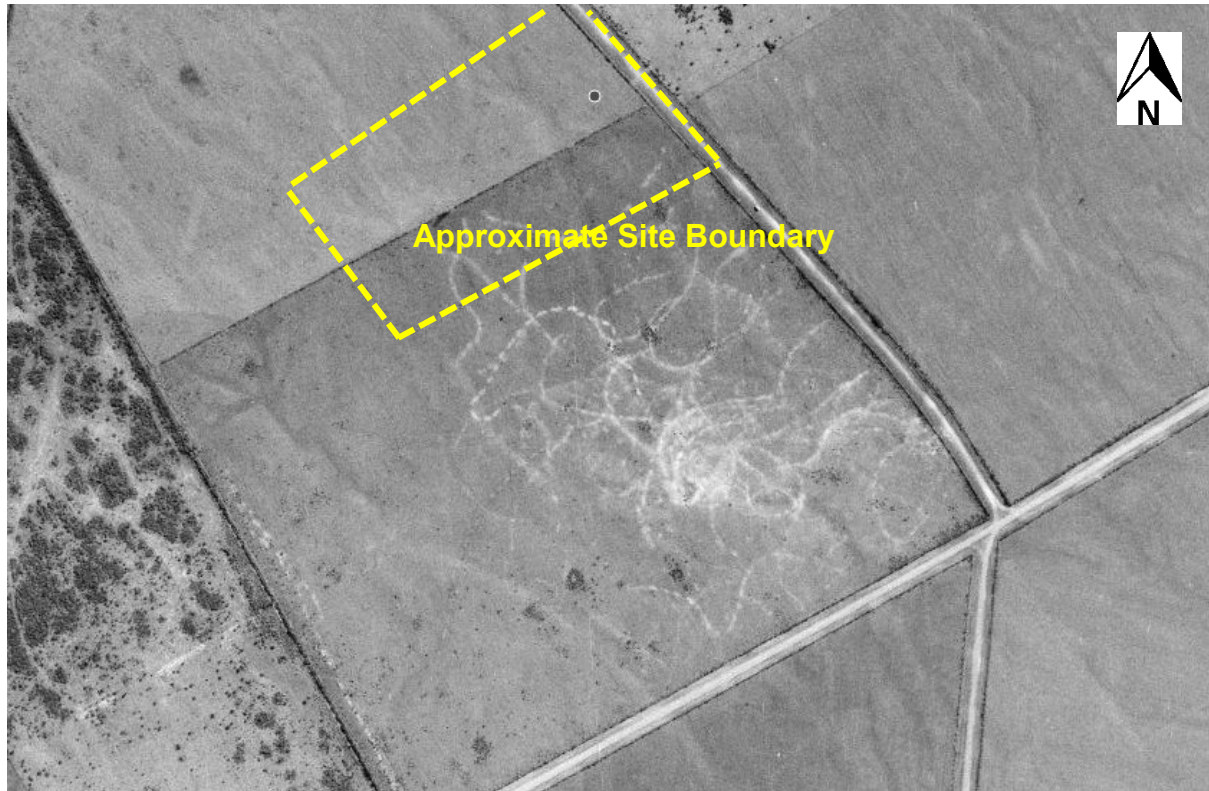
The site has been regionally mapped by GNS (Forsyth et al., 2008) as being underlain by grey river alluvium.

3.2 Geomorphology

The site comprises relatively flat ground, with gentle undulations and depressions in some areas. As evident on aerial imagery (Canterbury Maps, 2016) and observed during our site walkover conducted on 7 and 8 May 2018, undulating and depressed ground can be attributed to paleo-channels, which traverse the site in a general northwest to southeast trend. Based on observations, silt and sand deposits with variable thickness (up to 0.4 m) are expected to have in-filled the paleo-channels where they have not remained as channel features. Inferred paleo-channels have been mapped to give an indication of areas with potential channel in-fill (Appendix 1).

Our review of historical aerial photos revealed dashed lines (1960 – 1964) on the southern side of the property, continuing onto the neighbouring property to the south. These appear to be on the photos themselves and could be due to damage to the original photos or damage to the negatives when processing the film, before the scanning process. These markings were also noticed on other properties around the area from this timeframe (1960 -1964). The markings were not observed on the property in other available aerial photos.

Figure 2: Aerial photograph 1960 - 1964



Aerial photograph sourced from Canterbury Maps. Image not to scale.

3.3 Geohazards

3.3.1 Seismicity

There are no known or mapped faults in 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 5 km northwest / west 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 M8 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 7 November and 8 May 2018. The investigations comprised 5 hand auger boreholes and 7 test pit investigations with associated Scala penetrometer tests.

The investigations revealed subsurface conditions across the site are consistent with the published geological mapping, as summarised in Table 1. Hand auger and test pit logs are included in Appendix 2 of this report.

Table 1: Generalised Summary of Subsurface Conditions

Soil Type	Depth to Top of Layer (m)	Layer Thickness	Density/ Consistency	Additional Comments
TOPSOIL	0.0	0.1 to 0.4	Medium-Dense	
SILT	0.3	0.1	Stiff	Not present at all locations
Sandy GRAVEL and GRAVEL	0.1 to 0.4	Unknown	Very Dense	

3.5 ECan Boreholes

A review of two deep ECan borehole logs was conducted; one located north of the site (M36/7648) and one to the west (M36/7512) (Canterbury Maps).

The location of these boreholes is presented in Figure 2 and includes well points on-site and to the northeast that have no log data available. The logs from the two holes of interest are presented in Appendix 3 and indicate the site is broadly underlain by a mixture of sandy gravels to depths of at least 28.5 m below ground level.

Figure 3: ECan Well Borehole Locations

Image sourced from Canterbury Maps. Image not to scale.

3.6 Groundwater

Groundwater is recorded in the surrounding boreholes between approximately 7 m and 8 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 have Technical Category 1 (TC1) future land performance 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 the land is likely to be subject to the following:

- Erosion, including surface and subsurface erosion, associated with water and wind.
- Falling debris, including rockfall that could impact the site from upslope sources.
- Subsidence, which involves the removal of underlying support by natural or artificial means.
- Slippage, which is defined as the downslope transfer of materials by sliding and / or flowage.
- Inundation, which may be sourced from streams, coastal processes or excess precipitation.

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 any of the above hazards and, 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 all vegetation, topsoil, non-engineered fill, soft or organic soils prior to fill placement.

Fill may comprise clean natural 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 2V:1H 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 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 natural 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.

Site specific testing will be required for Building Consent, to confirm the bearing materials and capacity. For preliminary design, we anticipate that a geotechnical Ultimate Bearing Capacity of 300 kPa may be assumed for foundations bearing on natural silt, sandy gravel or engineered fill, below any topsoil. We anticipate this to be typically below 0.3 m depth based on our subsurface investigations.

7 References

Canterbury Maps, Groundwater. Retrieved May 2018, from <http://canterburymaps.govt.nz/Viewer>.

Canterbury Maps, Historic Aerial Imagery. Retrieved May 2018, from <https://apps.canterburymaps.govt.nz/CanterburyHistoricAerialImagery>.

Forsyth, P., Barrell, D. J., & Jongens, R. (2008). Sheet 16 - Geology of the Christchurch Area 1:250,000. Lower Hutt: Institute of Geological and Nuclear Sciences.

GNS Science (2015). New Zealand Active Faults Database. Retrieved May 2018, from <http://data.gns.cri.nz/af>.

Pettinga J.R., Yetton M.D., Van Dissen R.J., & Downes G. (2001). Earthquake Source Identification and Characterisation for the Canterbury Region, South Island, New Zealand. Bulletin of the New Zealand Society for Earthquake Engineering, Vol 34, No. 4, pp 282-317.

Selwyn District Council (2015), Selwyn District Council Operative District Plan. May 2018, from <http://www.selwyn.govt.nz/services/planning/district-plan>.

Selwyn District Council, Property Search, retrieved May 2018, from <https://www.selwyn.govt.nz/my-property/rates/search-properties>.

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Standards Association of New Zealand (2010). NZS 4404:2010. Land Development and Subdivision Infrastructure.

The Ministry of Business, Innovation, and Employment (2016). New Zealand Geotechnical Database. Retrieved December 2017, from <https://www.nzgd.org.nz>.

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, Hughes Developments Limited, 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 Engineers 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



Hugh Brenstrum

Engineering Geologist

Report reviewed by



Greg Martin, CMEngNZ (PEngGeol)

Principal Engineering Geologist

APPENDIX 1:

Test Location and Paleo Channel Plan

DATE PLOTTED: 15 May 2018 8:45 a.m. BY: DOUG FINLAY

XREF's: selwyn-0125m-urban-aerial-photos-2012-13
CAD File: Z:\Drawing\12001 to 13000\12903 - Farrington South Subdivision\12903_29_TestLocPlan-523EastMaddisonsRd-0518.dwg



Rev	Date	Description	Drwn	Chkd
-				

ENGEO
—Expect Excellence—
Christchurch Office
124 Montreal Street, Sydenham
Christchurch 8023, Tel: 03 328 9012

Title: PALEO CHANNELS & TEST LOCATIONS	Client: Hughes Developments		Appendix No: 1
	Project: 523 East Maddisons Road Rolleston, Canterbury Selwyn District	Designed: JW	
		Drawn: DF	
		Checked: -	
		Date: 15.5.18	
Proj No: 12903.000.000_29	Scale: 1:2000	Size: A4	
		Revision: -	

APPENDIX 2:
Hand Auger and Test Pit Logs

LOG OF AUGER HA01

Geotechnical Investigation
523 East Madisons Road
Rolleston
12903_29

Client : Hughes Developments Ltd. Shear Vane No :
Client Ref. : Logged By : EG
Date : 08/05/18 Reviewed By : JW
Hole Depth : 0.3 m Latitude : -43.626041
Hole Diameter : 50 mm Longitude : 172.383993


Depth (m)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer					
									Blows per 100mm					
									2	4	6	8	10	12
	FILL	ML	Gravelly SILT with minor sand, trace plastic and rootlets; brown. Low plasticity. Gravel, fine to coarse, sub-rounded to rounded. Sand, fine to coarse [FILL].			M	MD							
			End of Hole Depth: 0.3 m Termination Condition: Practical refusal											
0.5														
1.0														
1.5														
2.0														

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

LOG OF AUGER HA02

Geotechnical Investigation
523 East Madisons Road
Rolleston
12903_29

Client : Hughes Developments Ltd. Shear Vane No :
Client Ref. : Logged By : EG
Date : 08/05/18 Reviewed By : JW
Hole Depth : 0.2 m Latitude : -43.625411
Hole Diameter : 50 mm Longitude : 172.384726

Depth (m)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer					
									Blows per 100mm					
									2	4	6	8	10	12
	TOPSOIL	ML	SILT with some sand, trace gravel and rootlets; brown. Low plasticity. Sand, fine to medium [TOPSOIL].			M	St							
			End of Hole Depth: 0.2 m Termination Condition: Practical refusal											
0.5														
1.0														
1.5														
2.0														



GEOSCIENCE HAND AUGER 523 EAST MADDISONS HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 16-5-18

Hand auger met practical refusal at 0.2 m depth on inferred gravel.
Scala Penetrometer met practical refusal at 0.3 m depth.
Standing groundwater was not encountered

LOG OF AUGER HA03

Geotechnical Investigation
523 East Madisons Road
Rolleston
12903_29

Client : Hughes Developments Ltd. Shear Vane No :
Client Ref. : Logged By : EG
Date : 08/05/18 Reviewed By : JW
Hole Depth : 0.4 m Latitude : -43.624711
Hole Diameter : 50 mm Longitude : 172.385931


Depth (m)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer					
									Blows per 100mm					
									2	4	6	8	10	12
	TOPSOIL	ML	SILT with some sand; trace gravel and rootlets; brown. Low plasticity. Sand, fine to coarse [TOPSOIL].			M	F	UTP						
	A	ML	SILT with some sand; grey. Low plasticity. Sand, fine to medium.				St							
0.5			End of Hole Depth: 0.4 m Termination Condition: Practical refusal											>>
1.0														
1.5														
2.0														

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
A = ALLUVIUM

LOG OF AUGER HA04

Geotechnical Investigation
523 East Madisons Road
Rolleston
12903_29

Client : Hughes Developments Ltd. Shear Vane No :
Client Ref. : Logged By : EG
Date : 08/05/18 Reviewed By : JW
Hole Depth : 0.2 m Latitude : -43.626449
Hole Diameter : 50 mm Longitude : 172.385373


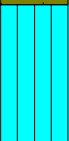
Depth (m)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer					
									Blows per 100mm					
									2	4	6	8	10	12
	TOPSOIL	ML	SILT with minor sand and trace rootlets; brown. Low plasticity. Sand, fine to medium [TOPSOIL].			M	St							
			End of Hole Depth: 0.2 m Termination Condition: Practical refusal											
0.5														
1.0														
1.5														
2.0														

Hand auger met practical refusal at 0.2 m depth on inferred gravel.
Scala Penetrometer met practical refusal at 0.3 m depth.
Standing groundwater was not encountered

LOG OF AUGER HA05

Geotechnical Investigation
523 East Madisons Road
Rolleston
12903_29

Client : Hughes Developments Ltd. Shear Vane No :
Client Ref. : Logged By : EG
Date : 08/05/18 Reviewed By : JW
Hole Depth : 0.4 m Latitude : -43.626016
Hole Diameter : 50 mm Longitude : 172.386523

Depth (m)	Material	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength (kPa) Peak/Remolded	Scala Penetrometer					
									Blows per 100mm					
									2	4	6	8	10	12
	TOPSOIL	ML	SILT with trace fine sand, gravel and rootlets; brown. Low plasticity [TOPSOIL].				F							
	ALLUVIUM	ML	SILT with minor sand; brownish grey. Sand, fine to medium.			M	St							
0.5			End of Hole Depth: 0.4 m Termination Condition: Practical refusal											
1.0														
1.5														
2.0														

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


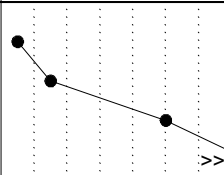

LOG OF TEST PIT TP01

Geotechnical Investigation

523 East Maddisons Road
Rolleston
12903 - 029

Client : Hughes Developements Ltd
Date : 8/5/2018
Max Test Pit Depth : 2.1 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No :
Logged By : HB
Reviewed By : JW
Latitude : -43.625995
Longitude : 172.383502

Depth (m)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
		Easier	Harder							2 4 6 8 10 12
	TS		ML	Sandy SILT with trace rootlets; brown. Low plasticity. Sand, fine to medium [TOPSOIL].				St		
0.5			GW	Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Well graded, sub-rounded to rounded. Sand, fine to coarse.			M	VD		
1.0										
1.5										
2.0										
Depth of Excavation: 2.1 m Termination Condition: Target depth										

GEOSCIENCE TEST PIT LOG - PHOTOS TEST PIT LOGS - 523 EAST MADDISONS ROAD.GPJ NZ MASTER DATA TEMPLATE.GDT 16-5-18

Excavator met target depth. at 2.1 m.
Scala Penetrometer met practical refusal at 0.4 m depth.
Standing groundwater was not encountered

TS=TOPSOIL

LOG OF TEST PIT TP02

Geotechnical Investigation

523 East Maddisons Road
Rolleston
12903 - 029

Client : Hughes Developements Ltd
Date : 8/5/2018
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No :
Logged By : HB
Reviewed By : JW
Latitude : -43.625982
Longitude : 172.384781

Depth (m)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
		Easier	Harder							2 4 6 8 10 12
0.5	TS		ML	Sandy SILT with trace rootlets; brown. Low plasticity. Sand, fine to medium [TOPSOIL].				F		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Well graded, sub-rounded to rounded. Sand, fine to coarse.			M	VD		
1.5										
2.0										
Depth of Excavation: 2 m Termination Condition: Target depth										

GEOSCIENCE TEST PIT LOG - PHOTOS TEST PIT LOGS - 523 EAST MADDISONS ROAD.GPJ NZ MASTER DATA TEMPLATE.GDT 16-5-18

Excavator met target depth. at 2 m.
Scala Penetrometer met practical refusal at 0.4 m depth.
Standing groundwater was not encountered

TS=TOPSOIL

LOG OF TEST PIT TP03

Geotechnical Investigation

523 East Maddisons Road
Rolleston
12903 - 029

Client : Hughes Developements Ltd
Date : 8/5/2018
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No :
Logged By : HB
Reviewed By : JW
Latitude : -43.625257
Longitude : 172.38547

Depth (m)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
	TS	Easier	ML	SILT with some sand and trace rootlets; brown. Low plasticity. Sand, fine to medium [TOPSOIL].				St		2 4 6 8 10 12
0.5				Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Well graded, sub-rounded to rounded. Sand, fine to coarse.						
1.0	ALLUVIUM		GW			M		VD		
1.5										
2.0										
Depth of Excavation: 2 m Termination Condition: Target depth										

GEOSCIENCE TEST PIT LOG - PHOTOS TEST PIT LOGS - 523 EAST MADDISONS ROAD.GPJ NZ MASTER DATA TEMPLATE.GDT 16-5-18

Excavator met target depth. at 2 m.
Scala Penetrometer met practical refusal at 0.3 m depth.
Standing groundwater was not encountered

TS=TOPSOIL

LOG OF TEST PIT TP04

Geotechnical Investigation

523 East Maddisons Road
Rolleston
12903 - 029

Client : Hughes Developements Ltd
Date : 8/5/2018
Max Test Pit Depth : 2.1 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No :
Logged By : HB
Reviewed By : JW
Latitude : -43.625254
Longitude : 172.386604

Depth (m)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
		Easier	Harder							2 4 6 8 10 12
0.5	TS		ML	Sandy SILT with trace rootlets; brown. Low plasticity. Sand, fine to medium [TOPSOIL].				St		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Well graded, sub-rounded to rounded. Sand, fine to coarse.			M	D - VD		
1.5				Encountered trace boulders from 1.7 m depth.						
2.0				Depth of Excavation: 2.1 m Termination Condition: Target depth						

GEOSCIENCE TEST PIT LOG - PHOTOS TEST PIT LOGS - 523 EAST MADDISONS ROAD.GPJ NZ MASTER DATA TEMPLATE.GDT 16-5-18

Excavator met target depth. at 2.1 m.
Scala Penetrometer met practical refusal at 0.5 m depth.
Standing groundwater was not encountered

TS=TOPSOIL

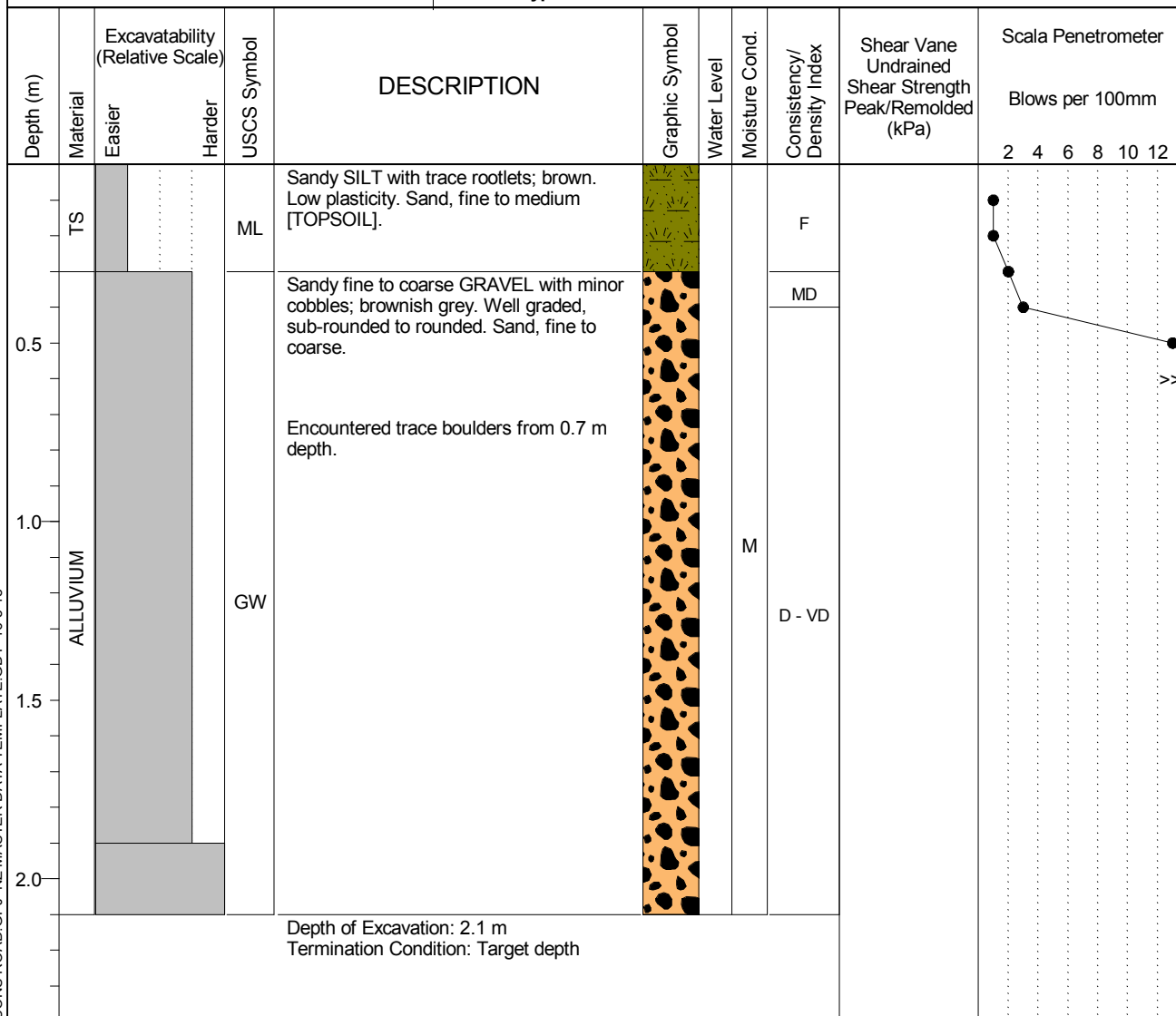
LOG OF TEST PIT TP05

Geotechnical Investigation

523 East Maddisons Road
Rolleston
12903 - 029

Client : Hughes Developements Ltd
Date : 8/5/2018
Max Test Pit Depth : 2.1 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No :
Logged By : HB
Reviewed By : JW
Latitude : -43.626559
Longitude : 172.384518



GEOSCIENCE TEST PIT LOG - PHOTOS TEST PIT LOGS - 523 EAST MADDISONS ROAD.GPJ NZ MASTER DATA TEMPLATE.GDT 16-5-18

Excavator met target depth. at 2.1 m.
Scala Penetrometer met practical refusal at 0.6 m depth.
Standing groundwater was not encountered

TS=TOPSOIL

LOG OF TEST PIT TP06

Geotechnical Investigation

523 East Maddisons Road
Rolleston
12903 - 029

Client : Hughes Developements Ltd
Date : 8/5/2018
Max Test Pit Depth : 2.1 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No :
Logged By : HB
Reviewed By : JW
Latitude : -43.625892
Longitude : 172.385677

Depth (m)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
		Easier	Harder							2 4 6 8 10 12
0.5	TS		ML	Sandy SILT with trace rootlets; brown. Low plasticity. Sand, fine to medium [TOPSOIL].				F		
1.0	ALLUVIUM		GW	Sandy fine to coarse GRAVEL with minor cobbles and roots; brownish grey. Well graded, sub-rounded to rounded. Sand, fine to coarse.			M	D - VD		
1.5				Roots cease from 1.5 m depth.						
2.0				Depth of Excavation: 2.1 m Termination Condition: Target depth						

GEOSCIENCE TEST PIT LOG - PHOTOS TEST PIT LOGS - 523 EAST MADDISONS ROAD.GPJ NZ MASTER DATA TEMPLATE.GDT 16-5-18

Excavator met target depth. at 2.1 m.
Scala Penetrometer met practical refusal at 0.4 m depth.
Standing groundwater was not encountered

TS=TOPSOIL

LOG OF TEST PIT TP07

Geotechnical Investigation

523 East Maddisons Road
Rolleston
12903 - 029

Client : Hughes Developements Ltd
Date : 8/5/2018
Max Test Pit Depth : 2 m
Digger Type/Size : Bucket Excavator
Bucket Type/Size : 500 mm

Shear Vane No :
Logged By : HB
Reviewed By : JW
Latitude : -43.625611
Longitude : 172.387026

Depth (m)	Material	Excavatability (Relative Scale)	USCS Symbol	DESCRIPTION	Graphic Symbol	Water Level	Moisture Cond.	Consistency/ Density Index	Shear Vane Undrained Shear Strength Peak/Remolded (kPa)	Scala Penetrometer Blows per 100mm
		Easier	Harder							2 4 6 8 10 12
0.5	TS		ML	Sandy SILT with trace rootlets; brown. Low plasticity. Sand, fine to medium [TOPSOIL].				F		
			GW	Sandy fine to coarse GRAVEL with minor cobbles and roots; brownish grey. Well graded, sub-rounded to rounded. Sand, fine to coarse.				D - VD		
			GW	Fine to coarse GRAVEL with some sand; brownish grey. Well graded, sub-rounded to rounded. Sand, fine to coarse.				D - VD		
1.0				Sandy fine to coarse GRAVEL with minor cobbles and roots; brownish grey. Well graded, sub-rounded to rounded. Sand, fine to coarse.			M			
1.5			GW					D - VD		
2.0				Depth of Excavation: 2 m Termination Condition: Target depth						

GEOSCIENCE TEST PIT LOG - PHOTOS TEST PIT LOGS - 523 EAST MADDISONS ROAD.GPJ NZ MASTER DATA TEMPLATE.GDT 16-5-18

Excavator met target depth. at 2 m.
Scala Penetrometer met practical refusal at 0.4 m depth.
Standing groundwater was not encountered

TS=TOPSOIL

APPENDIX 3:
ECan Well Borehole Logs

Bore Log

Borelog for well M36/7512

Grid Reference (NZTM): 1550238 mE, 5169431 mN

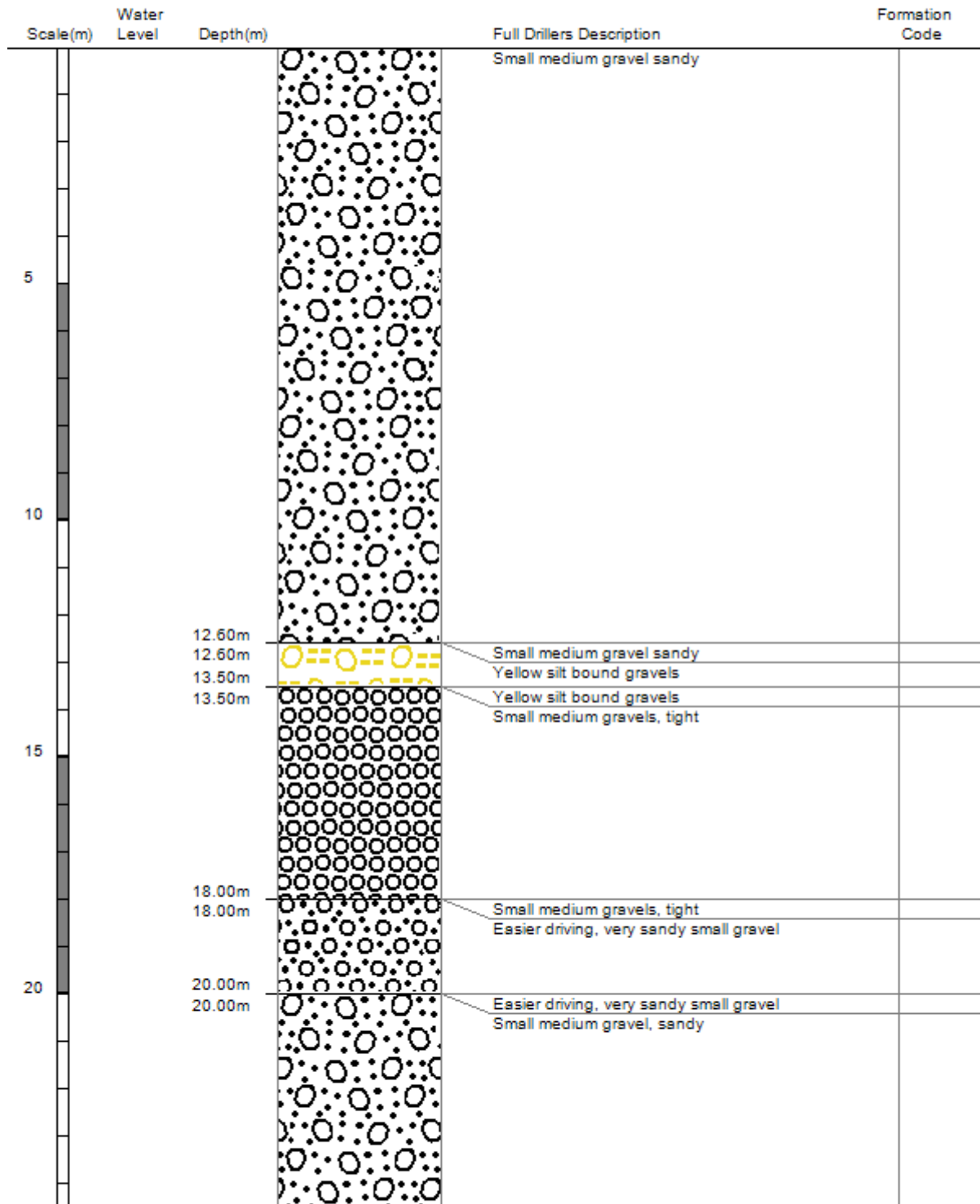
Location Accuracy: 50 - 300m

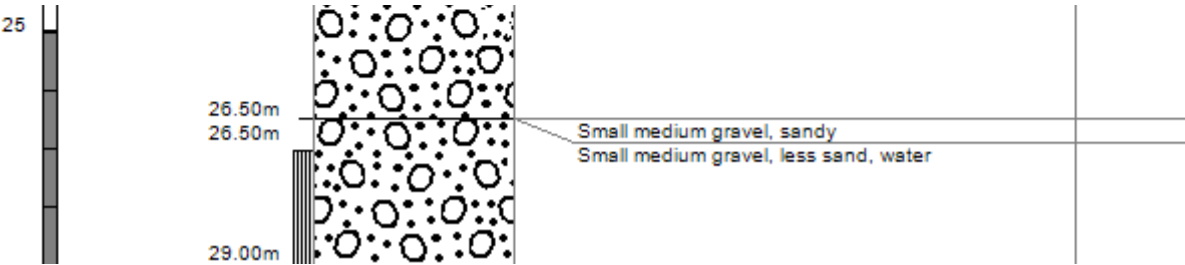
Ground Level Altitude: 34.9 m +MSD Accuracy: < 0.5 m

Driller: Dynes Road Drilling

Drill Method: Cable Tool

Borelog Depth: 29.0 m Drill Date: 01-Dec-2003





Bore or Well No	M36/7648		
Well Name	East Maddisons Road		
Owner	Mr & Ms PM & KI Tilling & Thompson		
Well Number	M36/7648	File Number	CO6C/21547
Owner	Mr & Ms PM & KI Tilling & Thompson	Well Status	Active (exist, present)
Street/Road	East Maddisons Road	NZTM Grid Reference	BX23:50377-69690
Locality	Rolleston	NZTM X and Y	1550377 - 5169690
Location Description		Location Accuracy	50 - 300m
CWMS Zone	Selwyn - Waihora	Use	Domestic and Stockwater,
Groundwater Allocation Zone	Selwyn-Waimakariri	Water Level Monitoring	--
Depth	26.00m	Water Level Count	0
Diameter	150mm	Initial Water Level	8.10m below MP
Measuring Point Description		Highest Water Level	
Measuring Point Elevation	35.66m above MSL (Lyttelton 1937)	Lowest Water Level	
Elevation Accuracy	< 5 m	First reading	
Ground Level	0.00m above MP	Last reading	
Strata Layers	7	Calc Min 95%	7.90m below MP
Aquifer Name		Aquifer Tests	0
Aquifer Type		Yield Drawdown Tests	2
Drill Date	15 May 2004	Max Tested Yield	8 l/s
Driller	Dynes Road Drilling	Drawdown at Max Tested Yield	4 m
Drilling Method	Cable Tool	Specific Capacity	2.24 l/s/m
Casing Material	STEEL	Last Updated	08 Nov 2013
Pump Type		Last Field Check	
Water Use Data	No		

Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	24	26				

Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
15 May 2004	1	3.4	44.8738251	1.52	3
15 May 2004	2	8.33	109.940872	3.96	4

No comments for this well

