



# ENGEO

— Expect Excellence —

## Geotechnical Investigation

858 Selwyn Road

Rolleston

Christchurch

Submitted to:

Hughes Developments Ltd

Christchurch

**ENGEO Limited**

124 Montreal Street, Sydenham, Christchurch 8023

PO Box 373, Christchurch 8140, New Zealand

Tel +64 3 328 9012 Fax +64 3 328 9013

[www.engeo.co.nz](http://www.engeo.co.nz)

19.08.2020

12903.000.004\_92



## Contents

1	Introduction.....	3
2	Site Description .....	3
3	Geological Model .....	5
3.1	Regional Geology.....	5
3.2	Geomorphology.....	5
3.3	Geohazards.....	6
3.3.1	Seismicity .....	6
3.3.2	Liquefaction and Lateral Spreading .....	6
3.4	Site Investigation .....	6
3.5	ECan Boreholes .....	7
3.6	Groundwater.....	8
3.7	Site Seismic Class .....	8
4	Liquefaction Analysis .....	8
5	RMA Section 106 Requirements and Suitability to Subdivide .....	9
6	Geotechnical Recommendations .....	9
6.1	Earthworks .....	9
6.2	Subdivision Roding .....	10
6.3	Stormwater Control .....	10
6.4	Foundations.....	10
7	References.....	11
8	Limitations .....	12

## Tables

Table 1: Summary of Subsurface Investigations

Table 2: Generalised Summary of ECan Boreholes

## Figures

Figure 1: Site Location Plan

Figure 2: Historical Aerial Photo – 1940 - 1944

Figure 3: Nearby ECan Borehole Locations

## Appendices

Appendix 1: Site Plan and Inferred Paleo Channels

Appendix 2: ENGEO Hand Auger and Test Pit Logs

Appendix 3: ECan Borelogs

### ENGEO Document Control:

Report Title	Geotechnical Investigation - 858 Selwyn Road, Rolleston			
Project No.	12903.000.004	Doc ID	92	
Client	Hughes Developments Ltd	Client Contact	Kelvin Back	
Distribution (PDF)	Kelvin Back			
Date	Revision Details/Status	WP	Author	Reviewer
19/08/2020	Issued to Client	DF	JRW	GM

## 1 Introduction

ENGEO Ltd was requested by Hughes Developments Ltd to undertake a geotechnical investigation of the property at 858 Selwyn Road, Rolleston, Christchurch, as outlined in our variation proposal (ref: P2020.001.676\_01).

The purpose of this assessment was to conceptualise 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 eleven 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 nine test pits, 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, including 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 comprises of one property with a total area of four hectares and the following legal description (Canterbury Maps):

- LOT 3 DP 355996 BLK III.

The site is located approximately 3.5 km south of Rolleston town centre and is bound on all sides by rural properties (Figure 1).



Figure 1: Site Location Plan



Images sourced from Canterbury Maps and "© OpenStreetMap contributors". 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 brownish grey river alluvium (Q2a).

#### 3.2 Geomorphology

The site comprises relatively flat ground, with gentle undulations and depressions in some areas. As evident on aerial imagery (Canterbury Maps, 2019) and observed during our site walkover conducted on 5 August 2020, undulating and depressed ground can be attributed to paleo-channels, which traverse the site in a general northwest to southeast direction (Figure 2). Based on observations, sandy silt deposits with variable thickness 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).

**Figure 2: Historical Aerial Photo – 1940 - 1944**

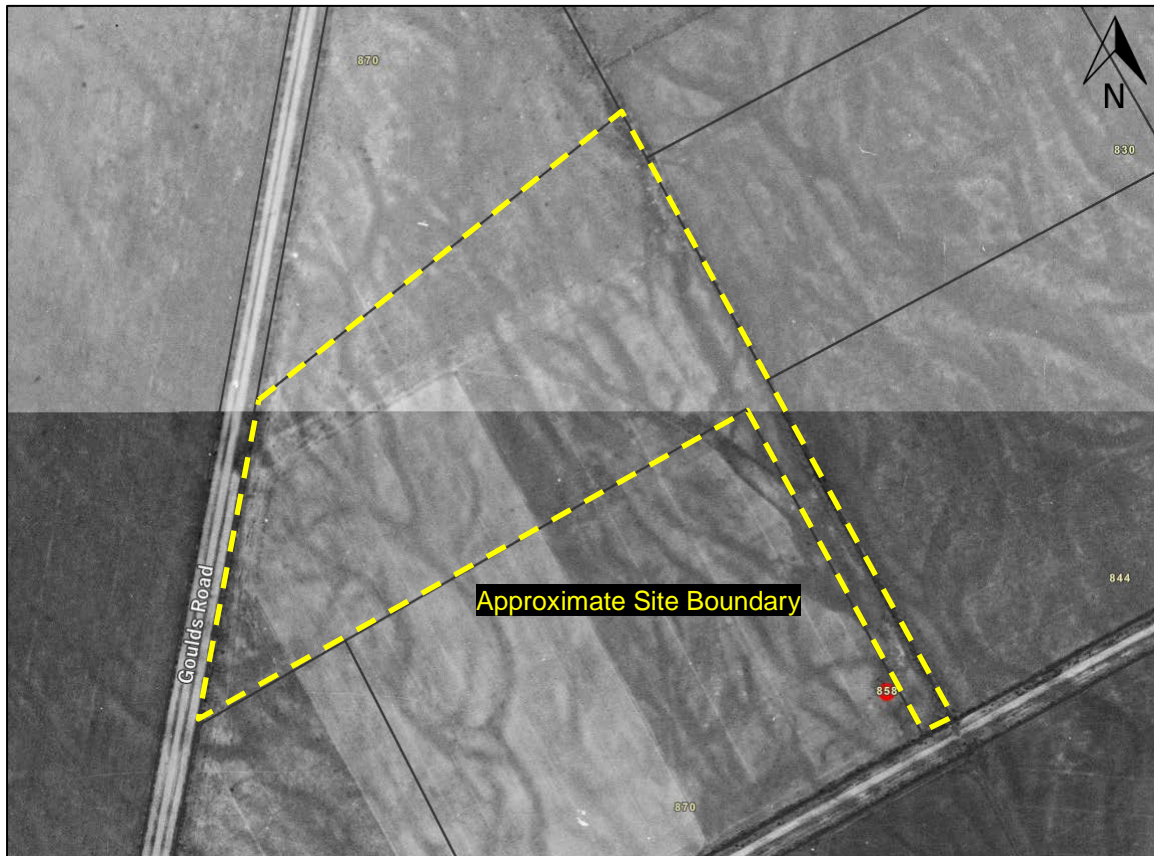


Image sourced from Canterbury Maps. Not to scale.

### 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 6 km north / northwest of the site and trends roughly east-west with a surface rupture length 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 extended to within 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 in an area mapped where “damaging liquefaction is unlikely” (NZGD Map CGD5140, 2012), and a “zone of very low liquefaction potential” (GNS, 2006).

### 3.4 Site Investigation

Site investigations to assess the shallow subsurface material types and strength characteristics were undertaken by ENGEO on 13 August 2020. Nine test pits and eleven hand auger investigations with associated Scala penetrometer tests were completed to a maximum depth of 2.1 m below ground level.

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 attached as Appendix 2 of this report.

**Table 1: Summary of Subsurface Investigations**

Soil Type	Depth to Top of Layer (m)	General Layer Thickness (m)	Density / Consistency	Additional Comments
TOPSOIL	0.0	0.1 – 0.3	Stiff to Very Stiff	-
Sandy GRAVEL	0.3	Unknown	Medium Dense to Very Dense	Tightly packed and consistent across the site. A thin lens of loosely packed fine to medium gravel was encountered at approximately 1 m depth across the test pit locations.

### 3.5 ECan Boreholes

A review of six, deep ECan borehole logs was conducted. The first (M36/4449 & M36/4387), are located on-site, and appear to be water wells providing the properties irrigation and domestic supply. The other boreholes are located to the north (M36/4450), east (M36/20535), south (BX23/0895) and west (M36/7416) of the site.

Well logs from the six holes of interest are attached to this report as Appendix 3 and summarised in Table 2.

**Table 2: Generalised Summary of ECan Boreholes**

ECan Borehole	Total Depth (m)	Water Level Below Ground Level (m)	Generalised Borelog as Logged by Driller
M36/5041	21.4	9.07	Gravel with clay and sand to 21.4 m depth.
M36/0016	30	9.12	Claybound gravel to 30 m depth.
M36/5042	21.3	8.81	Sandy and claybound gravel to 21.3 m depth.



Figure 3: Nearby ECan Borehole Locations



Aerial photograph sourced from Canterbury Maps. Not to scale.

### 3.6 Groundwater

Groundwater is recorded in the surrounding boreholes at approximately 9 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 Analysis

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 future land performance to be in line with 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 Earth filling 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 shallow 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 sandy gravel or engineered fill, below any topsoil. All topsoil shall be stripped from within building footprints, we anticipate this to be typically below 0.3 m depth based on our subsurface investigations.

## 7 References

- Canterbury Maps, Groundwater. Retrieved August 2020, from <http://canterburymaps.govt.nz/Viewer>.
- Canterbury Maps, Historic Aerial Imagery. Retrieved August 2020, 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 August 2020, 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, Property Search, retrieved August 2020, from <https://www.selwyn.govt.nz/my-property/rates/search-properties>.
- Standards Association of New Zealand (1989). NZS 4431:1989. Code of Practice for Earthfilling for Residential Development.
- Standards Association of New Zealand (2004). NZS 1170.5:2004. Structural Design Actions Part 5: Earthquake Actions – New Zealand.
- Standards Association of New Zealand (2010). NZS 3604:2010. Timber Framed Buildings.
- 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 August 2020, 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 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 and Inferred Paleo Channels





- Legend**
-  Test Pit Locations
  -  Hand Auger Locations
  -  Flow Paths
  -  Site Boundary

Aerial: LINZ and Eagle Technology, CC BY 4.0.  
Map image: Eagle Technology.

PROJECTION: NZGD 2000 New Zealand Transverse Mercator

**ENGEO**

Christchurch Office  
124 Montreal Street Sydenham, Christchurch 8023  
Tel: 03 328 9012, www.engeo.co.nz

Title:  
**Geotechnical Site Location Plan**

Client: Hughes Developments Ltd		Figure No:
Project: 858 Selwyn Road Rolleston	Designed: NF	<b>1</b>
	Drawn: NF	
	Checked: JW/GM	
Date: Aug 20	Size: A3	
Proj No: 12903.000.004	Scale: 1:1,500	Revision: A

5169200

5169000

5169200

5169000

1550000

1550200

1550000

1550200

PATH: Z:\Projects\12901 to 13000\12903 - Farrington South Subdivision\068\_858 Selwyn Road\04\_GIS\Fig01.mxd

DATE PLOTTED: 17 August 2020 4:12:17 pm BY: NPF/amm



**APPENDIX 2:**  
ENGEO Hand Auger and Test Pit Logs



# LOG OF TEST PIT TP01

**Geotechnical Investigation**  
 858 Selwyn Road  
 Rolleston  
 12903.004.000

**Client :** Hughes Developments Ltd **Shear Vane No :** N/A  
**Date :** 13/8/2020 **Logged By :** JC  
**Max Test Pit Depth :** 2 m **Reviewed By :** JW  
**Digger Type/Size :** Bucket Excavator **Latitude :** -43.630291  
**Bucket Type/Size :** Toothed Bucket, 1.0 m **Longitude :** 172.379306

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					
												2	4	6	8	10	12
0.0 - 0.2	TS			SM	Sandy SILT with some gravel and trace rootlets; brown. Low plasticity. Sand, fine to medium. Gravel, fine to coarse, subrounded to subangular [TOPSOIL].					L							
0.2 - 1.5	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles, trace rootlets and silt; brownish grey. Well graded, subrounded to subangular. Sand, fine to coarse. Cobbles, subrounded to subangular.				D	MD-VD							
1.3 - 1.35					Encountered 50 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 1.3 m depth.												
1.5 - 1.55					Encountered 50 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 1.5 m depth.												
2.0					Depth of Excavation: 2 m Termination Condition: Target depth												

GEOTECH TEST PIT LOG - 858 SELWYN RD TEST PIT.GPJ - NZ MASTER DATA TEMPLATE.GDT 18/8/20

Test pit met target depth at 2.0 m bgl.  
 Scala Penetrometer met practical refusal  
 Groundwater was not encountered within test pit investigation.

N/A = Not Assessed  
 TS = Topsoil



# LOG OF TEST PIT TP02

**Geotechnical Investigation**  
 858 Selwyn Road  
 Rolleston  
 12903.004.000

**Client :** Hughes Developments Ltd **Shear Vane No :** N/A  
**Date :** 13/8/2020 **Logged By :** JC  
**Max Test Pit Depth :** 2.1 m **Reviewed By :** JW  
**Digger Type/Size :** Bucket Excavator **Latitude :** -43.629716  
**Bucket Type/Size :** Toothed Bucket, 1.0 m **Longitude :** 172.379826

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					
												2	4	6	8	10	12
0.0 - 0.1	TS			SM	Sandy SILT with some gravel and trace rootlets; brown. Low plasticity. Sand, fine to medium. Gravel, fine to coarse, subrounded to subangular [TOPSOIL].					L							
0.1 - 0.3				SP	Fine to medium SAND with trace silt and rootlets; light brown. Poorly graded.					L							
0.3 - 1.6	ALLUVIUM			GW	<p>Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Well graded, subrounded to subangular. Sand, fine to coarse. Cobbles, subrounded to subangular. Trace roots and silt encountered between 0.45 m and 0.60 m depth.</p> <p>Encountered 150 - 200 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 0.9 m depth.</p> <p>Encountered 150 - 200 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 1.6 m depth.</p>				D	MD-VD							
Depth of Excavation: 2.1 m Termination Condition: Target depth																	

GEOTECH TEST PIT LOG - 858 SELWYN RD TEST PIT.GPJ - NZ MASTER DATA TEMPLATE.GDT 18/8/20

Test pit met target depth at 2.1 m bgl.  
 Scala Penetrometer met practical refusal  
 Groundwater was not encountered within test pit investigation.

N/A = Not Assessed  
 TS = Topsoil





# LOG OF TEST PIT TP03

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.004.000

Client : Hughes Developments Ltd Shear Vane No : N/A  
Date : 13/8/2020 Logged By : JC  
Max Test Pit Depth : 2 m Reviewed By : JW  
Digger Type/Size : Bucket Excavator Latitude : -43.629223  
Bucket Type/Size : Toothed Bucket, 1.0 m Longitude : 172.37959

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					
												2	4	6	8	10	12
0.0 - 0.2	TS			SM	Sandy SILT with some gravel and trace rootlets; brown. Low plasticity. Sand, fine to medium. Gravel, fine to coarse, subrounded to subangular [TOPSOIL].					L							
0.2 - 1.5	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Well graded, subrounded to subangular. Sand, fine to coarse. Cobbles, subrounded to subangular. Trace roots and silt encountered between 0.30 m and 0.60 m depth.				D	D-VD							
1.85					Encountered 50 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 1.85 m depth.												
2.0					Depth of Excavation: 2 m Termination Condition: Target depth												

GEOTECH TEST PIT LOG - 858 SELWYN RD TEST PIT.GPJ - NZ MASTER DATA TEMPLATE.GDT 18/8/20

Test pit met target depth at 2.0 m bgl.  
Scala Penetrometer met practical refusal  
Groundwater was not encountered within test pit investigation.

N/A = Not Assessed  
TS = Topsoil



# LOG OF TEST PIT TP04

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.004.000

Client : Hughes Developments Ltd Shear Vane No : N/A  
Date : 13/8/2020 Logged By : JC  
Max Test Pit Depth : 2.1 m Reviewed By : JW  
Digger Type/Size : Bucket Excavator Latitude : -43.628862  
Bucket Type/Size : Toothed Bucket, 1.0 m Longitude : 172.380277

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					
												2	4	6	8	10	12
0.0 - 0.1	TS			SM	Sandy SILT with some gravel and trace rootlets; brown. Low plasticity. Sand, fine to medium. Gravel, fine to coarse, subrounded to subangular [TOPSOIL].					L							
0.1 - 0.7				GW	Sandy fine to coarse GRAVEL with trace rootlets and silt; brownish grey. Well graded, subrounded to subangular. Sand, fine to coarse.					VD							
0.7 - 0.9				SP	Fine to medium SAND with trace gravel; greyish brown. Poorly graded.					N/A							
0.9 - 1.5	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Tightly packed, well graded, subrounded to subangular. Sand, fine to coarse. Cobbles, subrounded to subangular.				D	N/A							
1.5 - 2.1				GW						N/A							
Depth of Excavation: 2.1 m Termination Condition: Target depth																	

GEOTECH TEST PIT LOG - 858 SELWYN RD TEST PIT.GPJ - NZ MASTER DATA TEMPLATE.GDT - 18/8/20

Test pit met target depth at 2.1 m bgl.  
 Scala Penetrometer met practical refusal  
 Groundwater was not encountered within test pit investigation.

N/A = Not Assessed  
 TS = Topsoil



# LOG OF TEST PIT TP05

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.004.000

Client : Hughes Developments Ltd Shear Vane No : N/A  
Date : 13/8/2020 Logged By : JC  
Max Test Pit Depth : 2.1 m Reviewed By : JW  
Digger Type/Size : Bucket Excavator Latitude : -43.628854  
Bucket Type/Size : Toothed Bucket, 1.0 m Longitude : 172.38083

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							
												2	4	6	8	10	12		
0.0 - 0.2	TS			SM	Sandy SILT with some gravel and trace rootlets; brown. Low plasticity. Sand, fine to medium. Gravel, fine to coarse, subrounded to subangular [TOPSOIL].					L									
0.2 - 1.5	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles, trace rootlets and silt; brownish grey. Well graded, subrounded to subangular. Sand, fine to coarse. Cobbles, subrounded to subangular.  Encountered 150 - 200 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 1.0 m depth.  Encountered 100 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 1.55 m depth.				D	VD									
Depth of Excavation: 2.1 m Termination Condition: Target depth																			

GEOTECH TEST PIT LOG - 858 SELWYN RD TEST PIT.GPJ - NZ MASTER DATA TEMPLATE.GDT - 18/8/20

Test pit met target depth at 2.1 m bgl.  
Scala Penetrometer met practical refusal  
Groundwater was not encountered within test pit investigation.

N/A = Not Assessed  
TS = Topsoil



# LOG OF TEST PIT TP06

**Geotechnical Investigation**  
 858 Selwyn Road  
 Rolleston  
 12903.004.000

**Client :** Hughes Developments Ltd **Shear Vane No :** N/A  
**Date :** 13/8/2020 **Logged By :** JC  
**Max Test Pit Depth :** 2.1 m **Reviewed By :** JW  
**Digger Type/Size :** Bucket Excavator **Latitude :** -43.628214  
**Bucket Type/Size :** Toothed Bucket, 1.0 m **Longitude :** 172.381446

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					
												2	4	6	8	10	12
0.0 - 0.1	TS			SM	Sandy SILT with some gravel and trace rootlets; brown. Low plasticity. Sand, fine to medium. Gravel, fine to coarse, subrounded to subangular [TOPSOIL].					L							
0.1 - 0.3				GW	Sandy fine to coarse GRAVEL with trace rootlets and silt; brownish grey. Well graded, subrounded to subangular. Sand, fine to coarse.					L-MD							
0.3 - 0.4				SP	Fine to medium SAND with trace gravel; light brown. Poorly graded.					L							
0.4 - 1.5	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Well graded, subrounded to subangular. Sand, fine to coarse. Cobbles, subrounded to subangular.  Encountered 200 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 0.95 m depth.				D	VD							
Depth of Excavation: 2.1 m Termination Condition: Target depth																	

GEOTECH TEST PIT LOG - 858 SELWYN RD TEST PIT.GPJ - NZ MASTER DATA TEMPLATE.GDT 18/8/20

Test pit met target depth at 2.1 m bgl.  
 Scala Penetrometer met practical refusal  
 Groundwater was not encountered within test pit investigation.

N/A = Not Assessed  
 TS = Topsoil



# LOG OF TEST PIT TP07

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.004.000

Client : Hughes Developments Ltd Shear Vane No : N/A  
Date : 13/8/2020 Logged By : JC  
Max Test Pit Depth : 2 m Reviewed By : JW  
Digger Type/Size : Bucket Excavator Latitude : -43.628357  
Bucket Type/Size : Toothed Bucket, 1.0 m Longitude : 172.382257

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					
												2	4	6	8	10	12
0.0 - 0.2	TS			SM	Sandy SILT with some gravel and trace rootlets; brown. Low plasticity. Sand, fine to medium. Gravel, fine to coarse, subrounded to subangular [TOPSOIL].					L							
0.2 - 1.5	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Well graded, subrounded to subangular. Sand, fine to coarse. Cobbles, subrounded to subangular.				D	VD							
Depth of Excavation: 2 m Termination Condition: Target depth																	

GEOTECH TEST PIT LOG - 858 SELWYN RD TEST PIT.GPJ - NZ MASTER DATA TEMPLATE.GDT 18/8/20

Test pit met target depth at 2.0 m bgl.  
Scala Penetrometer met practical refusal  
Groundwater was not encountered within test pit investigation.

N/A = Not Assessed  
TS = Topsoil





# LOG OF TEST PIT TP08

**Geotechnical Investigation**  
 858 Selwyn Road  
 Rolleston  
 12903.004.000

**Client** : Hughes Developments Ltd **Shear Vane No** : N/A  
**Date** : 13/8/2020 **Logged By** : JC  
**Max Test Pit Depth** : 2.1 m **Reviewed By** : JW  
**Digger Type/Size** : Bucket Excavator **Latitude** : -43.629169  
**Bucket Type/Size** : Toothed Bucket, 1.0 m **Longitude** : 172.382229

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					
												2	4	6	8	10	12
0.0 - 0.2	TS			SM	Sandy SILT with some gravel and trace rootlets; brown. Low plasticity. Sand, fine to medium. Gravel, fine to coarse, subrounded to subangular [TOPSOIL].					L							
0.2 - 1.5	ALLUVIUM			GW	<p>Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Well graded, subrounded to subangular. Sand, fine to coarse. Cobbles, subrounded to subangular. Trace roots and silt encountered between 0.25 m and 0.60 m depth.</p> <p>Encountered 50 - 100 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 0.80 m depth.</p> <p>Encountered 150 - 400 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 1.1 m depth.</p>				D	VD							
Depth of Excavation: 2.1 m Termination Condition: Target depth																	

GEOTECH TEST PIT LOG - 858 SELWYN RD TEST PIT.GPJ - NZ MASTER DATA TEMPLATE.GDT 18/8/20

Test pit met target depth at 2.1 m bgl.  
 Scala Penetrometer met practical refusal  
 Groundwater was not encountered within test pit investigation.

N/A = Not Assessed  
 TS = Topsoil



# LOG OF TEST PIT TP09

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.004.000

Client : Hughes Developments Ltd Shear Vane No : N/A  
Date : 13/8/2020 Logged By : JC  
Max Test Pit Depth : 2 m Reviewed By : JW  
Digger Type/Size : Bucket Excavator Latitude : -43.629293  
Bucket Type/Size : Toothed Bucket, 1.0 m Longitude : 172.381222

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						
												2	4	6	8	10	12	
0.0 - 0.2	TS			SM	Sandy SILT with some gravel and trace rootlets; brown. Low plasticity. Sand, fine to medium. Gravel, fine to coarse, subrounded to subangular [TOPSOIL].				D	L-MD								
0.2 - 1.0	ALLUVIUM			GW	Sandy fine to coarse GRAVEL with minor cobbles; brownish grey. Well graded, subrounded to subangular. Sand, fine to coarse. Cobbles, subrounded to subangular. Trace roots and silt encountered between 0.25 m and 0.60 m depth.				M	VD								
1.0 - 1.5					Encountered 150 - 200 mm band of subrounded to subangular, fine to coarse gravel with some fine to coarse sand at 1.0 m depth.													
1.5 - 2.0																		
Depth of Excavation: 2 m Termination Condition: Target depth																		

GEOTECH TEST PIT LOG - 858 SELWYN RD TEST PIT.GPJ - NZ MASTER DATA TEMPLATE.GDT 18/8/20

Test pit met target depth at 2.0 m bgl.  
Scala Penetrometer met practical refusal  
Groundwater was not encountered within test pit investigation.

N/A = Not Assessed  
TS = Topsoil



# LOG OF AUGER HA01

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.000.004

Client : Hughes Developments Ltd  
Client Ref. : N/A  
Date : 13/08/2020  
Hole Depth : 0.45 m  
Hole Diameter : 50 mm

Shear Vane No : N/A  
Logged By : JC  
Reviewed By : JW  
Latitude : -43.629767  
Longitude : 172.379429

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	Fine to medium sandy SILT with trace gravel and rootlets; brown. Low plasticity [TOPSOIL].					L								
	ALLUVIUM	SP	Fine to medium SAND with trace silt and rootlets; brown. Poorly graded.				D	L-MD								
0.5	End of Hole Depth: 0.45 m Termination Condition: Practical refusal															
1.0																

GEOTECH HAND AUGER 858 SELWYN RD HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 18/8/20

Hand auger met practical refusal at 0.45 m depth on inferred gravel.  
Scala Penetrometer met practical refusal at 0.6 m depth.  
Standing groundwater was not encountered



# LOG OF AUGER HA02

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.000.004

Client : Hughes Developments Ltd    Shear Vane No : N/A  
 Client Ref. : N/A    Logged By : JC  
 Date : 13/08/2020    Reviewed By : JW  
 Hole Depth : 0.3 m    Latitude : -43.630027  
 Hole Diameter : 50 mm    Longitude : 172.380121

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	Fine to medium sandy SILT with trace gravel and rootlets; brown. Low plasticity [TOPSOIL].				D	L-MD								
	End of Hole Depth: 0.3 m Termination Condition: Practical refusal															
0.5																
1.0																

GEOTECH HAND AUGER 858 SELWYN RD HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 18/8/20

Hand auger met practical refusal at 0.3 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  
858 Selwyn Road  
Rolleston  
12903.000.004

Client : Hughes Developments Ltd    Shear Vane No : N/A  
 Client Ref. : N/A    Logged By : JC  
 Date : 13/08/2020    Reviewed By : JW  
 Hole Depth : 0.3 m    Latitude : -43.629666  
 Hole Diameter : 50 mm    Longitude : 172.380926

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	Fine to medium sandy SILT with trace gravel and rootlets; brown. Low plasticity [TOPSOIL].					D	L-MD						
	End of Hole Depth: 0.3 m Termination Condition: Practical refusal														
0.5															
1.0															

GEOTECH HAND AUGER 858 SELWYN RD HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 18/8/20

Hand auger met practical refusal at 0.3 m depth on inferred gravel.  
 Scala Penetrometer met practical refusal at 0.4 m depth.  
 Standing groundwater was not encountered



# LOG OF AUGER HA04

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.000.004

Client : Hughes Developments Ltd    Shear Vane No : N/A  
 Client Ref. : N/A    Logged By : JC  
 Date : 13/08/2020    Reviewed By : JW  
 Hole Depth : 0.3 m    Latitude : -43.629313  
 Hole Diameter : 50 mm    Longitude : 172.380577

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	Fine to medium sandy SILT with trace gravel and rootlets; brown. Low plasticity [TOPSOIL].					D L-MD								
	End of Hole Depth: 0.3 m Termination Condition: Practical refusal															
0.5																
1.0																

GEOTECH HAND AUGER 858 SELWYN RD HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 18/8/20

Hand auger met practical refusal at 0.3 m depth on inferred gravel.  
 Scala Penetrometer met practical refusal at 0.4 m depth.  
 Standing groundwater was not encountered





# LOG OF AUGER HA05

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.000.004

Client : Hughes Developments Ltd    Shear Vane No : N/A  
 Client Ref. : N/A    Logged By : JC  
 Date : 13/08/2020    Reviewed By : JW  
 Hole Depth : 0.6 m    Latitude : -43.62856  
 Hole Diameter : 50 mm    Longitude : 172.380647

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	Fine to medium sandy SILT with trace gravel and rootlets; brown. Low plasticity [TOPSOIL].					L								
0.5	ALLUVIUM	SP	Fine to medium SAND with some silt and trace gravel; light brown. Poorly graded.				D	L-MD								
	End of Hole Depth: 0.6 m Termination Condition: Practical refusal															

GEOTECH HAND AUGER 858 SELWYN RD HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 18/08/20

Hand auger met practical refusal at 0.6 m depth on inferred gravel.  
 Scala Penetrometer met practical refusal at 0.7 m depth.  
 Standing groundwater was not encountered



# LOG OF AUGER HA06

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.000.004

Client : Hughes Developments Ltd    Shear Vane No : N/A  
Client Ref. : N/A    Logged By : JC  
Date : 13/08/2020    Reviewed By : JW  
Hole Depth : 0.6 m    Latitude : -43.628214  
Hole Diameter : 50 mm    Longitude : 172.381446

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	
0.5	TOPSOIL	SM	Fine to medium sandy SILT with trace gravel and rootlets; brown. Low plasticity [TOPSOIL].					L								
	ALLUVIUM	SP	Fine to medium SAND with some gravel and silt; brown. Poorly graded. Gravel, fine to coarse, subrounded to subangular.				D	L-MD								
		SP	Fine to medium SAND with some silt and trace gravel; brown. Poorly graded.					L-MD								
			End of Hole Depth: 0.6 m Termination Condition: Practical refusal													

GEOTECH HAND AUGER 858 SELWYN RD HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 18/08/20

Hand auger met practical refusal at 0.6 m depth on inferred gravel.  
Scala Penetrometer met practical refusal at 0.7 m depth.  
Standing groundwater was not encountered



# LOG OF AUGER HA07

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.000.004

Client : Hughes Developments Ltd    Shear Vane No : N/A  
 Client Ref. : N/A    Logged By : JC  
 Date : 13/08/2020    Reviewed By : JW  
 Hole Depth : 0.4 m    Latitude : -43.62788  
 Hole Diameter : 50 mm    Longitude : 172.381864

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	Fine to medium sandy SILT with trace gravel and rootlets; brown. Low plasticity [TOPSOIL].				M	L-MD								
0.5	End of Hole Depth: 0.4 m Termination Condition: Practical refusal															
1.0																

GEOTECH HAND AUGER 858 SELWYN RD HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 18/8/20

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 HA08

Geotechnical Investigation  
858 Selwyn Road  
Rolleston  
12903.000.004

Client : Hughes Developments Ltd    Shear Vane No : N/A  
 Client Ref. : N/A    Logged By : JC  
 Date : 13/08/2020    Reviewed By : JW  
 Hole Depth : 0.3 m    Latitude : -43.629169  
 Hole Diameter : 50 mm    Longitude : 172.382229

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	Fine to medium sandy SILT with trace gravel and rootlets; brown. Low plasticity [TOPSOIL].				W	L-MD								
	End of Hole Depth: 0.3 m Termination Condition: Practical refusal															
0.5																
1.0																

GEOTECH HAND AUGER 858 SELWYN RD HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 18/8/20

Hand auger met practical refusal at 0.3 m depth on inferred gravel.  
 Scala Penetrometer met practical refusal at 0.4 m depth.  
 Standing groundwater was not encountered



# LOG OF AUGER HA09

Geotechnical Investigation  
 858 Selwyn Road  
 Rolleston  
 12903.000.004

Client : Hughes Developments Ltd    Shear Vane No : N/A  
 Client Ref. : N/A    Logged By : JC  
 Date : 13/08/2020    Reviewed By : JW  
 Hole Depth : 0.25 m    Latitude : -43.628633  
 Hole Diameter : 50 mm    Longitude : 172.382803

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	Fine to medium sandy SILT with trace gravel and rootlets; brown. Low plasticity [TOPSOIL].				M	L								
	End of Hole Depth: 0.25 m Termination Condition: Practical refusal															
0.5																
1.0																

GEOTECH HAND AUGER 858 SELWYN RD HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 18/8/20

Hand auger met practical refusal at 0.25 m depth on inferred gravel.  
 Scala Penetrometer met practical refusal at 0.4 m depth.  
 Standing groundwater was not encountered



# LOG OF AUGER HA10

Geotechnical Investigation  
 858 Selwyn Road  
 Rolleston  
 12903.000.004

Client : Hughes Developments Ltd    Shear Vane No : N/A  
 Client Ref. : N/A    Logged By : JC  
 Date : 13/08/2020    Reviewed By : JW  
 Hole Depth : 0.3 m    Latitude : -43.628555  
 Hole Diameter : 50 mm    Longitude : 172.381709

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	Fine to medium sandy SILT with trace gravel and rootlets; brown. Low plasticity [TOPSOIL].				M	L								
	End of Hole Depth: 0.3 m Termination Condition: Practical refusal															
0.5																>>
1.0																

GEOTECH HAND AUGER 858 SELWYN RD HA LOGS.GPJ NZ DATA TEMPLATE 2.GDT 18/8/20

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



**APPENDIX 3:**  
ECan Borelogs



<b>Bore or Well No</b>	M36/4221		
<b>Well Name</b>	Cnr GOULDS RD and SELWYN RDS		
<b>Owner</b>	Mr & Ms R J & S E Silcock & Russell		
<b>Well Number</b>	M36/4221	<b>File Number</b>	CO6C/01718
<b>Owner</b>	Mr & Ms R J & S E Silcock & Russell	<b>Well Status</b>	Active (exist, present)
<b>Street/Road</b>	Cnr GOULDS RD and SELWYN RDS	<b>NZTM Grid Reference</b>	BX23:50160-69165
<b>Locality</b>	ROLLESTON	<b>NZTM X and Y</b>	1550160 - 5169165
<b>Location Description</b>	SEE M36/4220	<b>Location Accuracy</b>	2 - 15m
<b>CWMS Zone</b>	Selwyn - Waihora	<b>Use</b>	Irrigation,
<b>Groundwater Allocation Zone</b>	Selwyn-Waimakariri	<b>Water Level Monitoring</b>	--
<b>Depth</b>	21.44m	<b>Water Level Count</b>	0
<b>Diameter</b>	150mm	<b>Initial Water Level</b>	6.60m below MP
<b>Measuring Point Description</b>		<b>Highest Water Level</b>	
<b>Measuring Point Elevation</b>	35.47m above MSL (Lyttelton 1937)	<b>Lowest Water Level</b>	
<b>Elevation Accuracy</b>	< 2.5 m	<b>First reading</b>	
<b>Ground Level</b>	0.00m above MP	<b>Last reading</b>	
<b>Strata Layers</b>	7	<b>Calc Min 80%</b>	9.07m below MP (Estimated)
<b>Aquifer Name</b>	Riccarton Gravel	<b>Aquifer Tests</b>	0
<b>Aquifer Type</b>	Unknown	<b>Yield Drawdown Tests</b>	2
<b>Drill Date</b>	04 Feb 1991	<b>Max Tested Yield</b>	6 l/s
<b>Driller</b>	Weedons WellDrilling	<b>Drawdown at Max Tested Yield</b>	11 m
<b>Drilling Method</b>	Rotary/Percussion	<b>Specific Capacity</b>	0.51 l/s/m
<b>Casing Material</b>	STEEL	<b>Last Updated</b>	08 Nov 2013
<b>Pump Type</b>	Unknown	<b>Last Field Check</b>	
<b>Water Use Data</b>	No		

## Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	20.4	21.4				

## Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
04 Feb 1991	1	5.8	76.54947	11.35	3

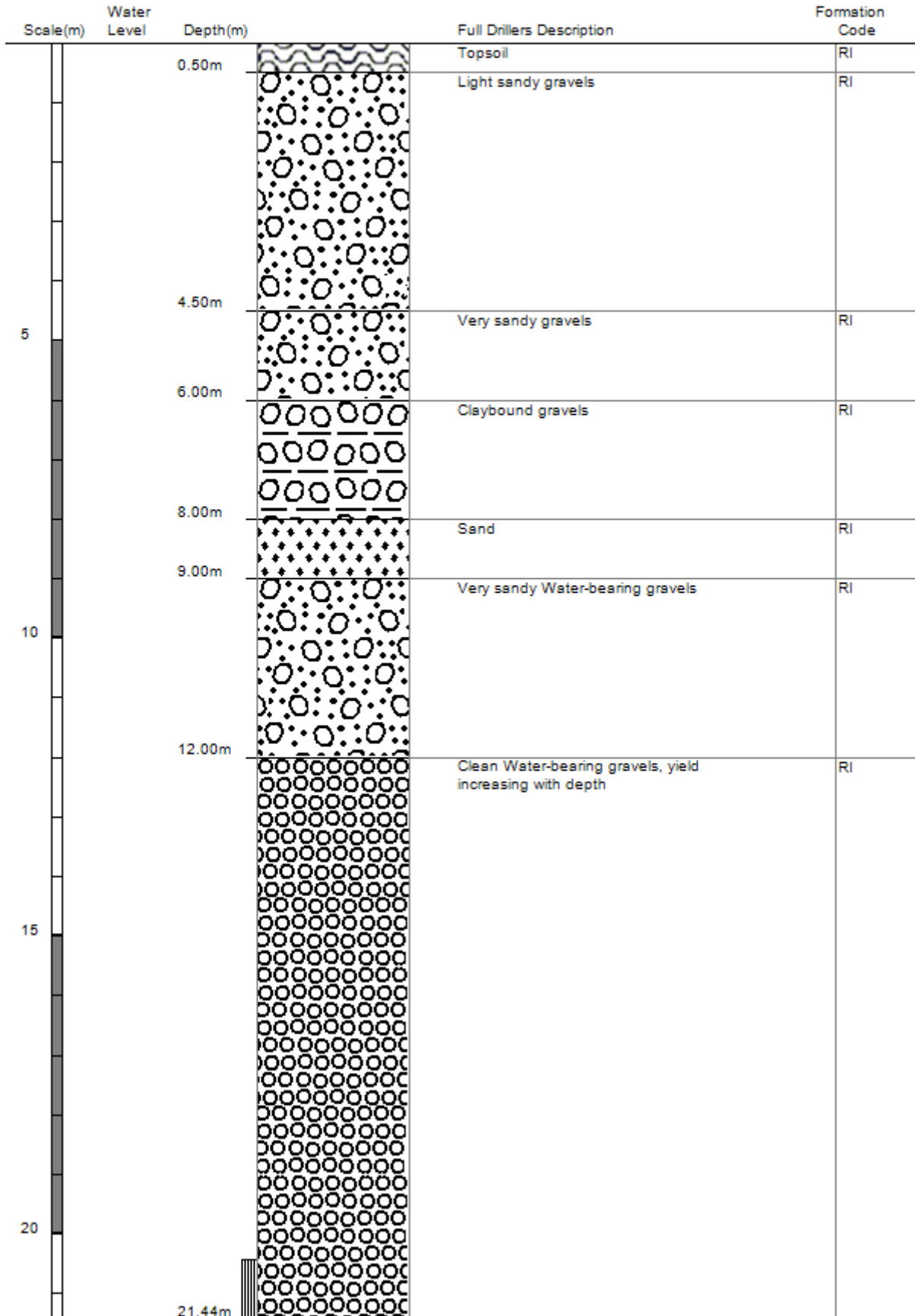
## Comments

Comment Date	Comment
02 Dec 2008	Gridref changed from: M36:6013-3078. Routine monitoring visit undertaken on 25/11/08. measured flow rate at 5 L/s

# Bore Log

### Borelog for well M36/4221

Grid Reference (NZTM): 1550161 mE, 5169165 mN  
 Location Accuracy: 2 - 15m  
 Ground Level Altitude: 35.5 m +MSD Accuracy: < 2.5 m  
 Driller: Weedons WellDrilling  
 Drill Method: Rotary/Percussion  
 Borelog Depth: 21.4 m Drill Date: 04-Feb-1991









<b>Bore or Well No</b>	M36/20535		
<b>Well Name</b>	870 Goulds Road		
<b>Owner</b>	Mr S & Mrs M Baxter		
<b>Well Number</b>	M36/20535	<b>File Number</b>	CO6C/31914
<b>Owner</b>	Mr S & Mrs M Baxter	<b>Well Status</b>	Active (exist, present)
<b>Street/Road</b>	870 Goulds Road	<b>NZTM Grid Reference</b>	BX23:50017-69231
<b>Locality</b>	Rolleston	<b>NZTM X and Y</b>	1550017 - 5169231
<b>Location Description</b>		<b>Location Accuracy</b>	10 - 50m
<b>CWMS Zone</b>	Selwyn - Waihora	<b>Use</b>	Domestic and Stockwater,
<b>Groundwater Allocation Zone</b>	Selwyn-Waimakariri	<b>Water Level Monitoring</b>	--
<b>Depth</b>	30.00m	<b>Water Level Count</b>	0
<b>Diameter</b>	150mm	<b>Initial Water Level</b>	7.10m below MP
<b>Measuring Point Description</b>		<b>Highest Water Level</b>	
<b>Measuring Point Elevation</b>	35.00m above MSL (Lyttelton 1937)	<b>Lowest Water Level</b>	
<b>Elevation Accuracy</b>	< 5 m	<b>First reading</b>	
<b>Ground Level</b>	0.00m above MP	<b>Last reading</b>	
<b>Strata Layers</b>	4	<b>Calc Min 80%</b>	9.12m below MP (Estimated)
<b>Aquifer Name</b>		<b>Aquifer Tests</b>	0
<b>Aquifer Type</b>		<b>Yield Drawdown Tests</b>	0
<b>Drill Date</b>	04 Feb 2011	<b>Max Tested Yield</b>	
<b>Driller</b>	Daly Water Wells Ltd	<b>Drawdown at Max Tested Yield</b>	
<b>Drilling Method</b>	Rotary Rig	<b>Specific Capacity</b>	
<b>Casing Material</b>	STEEL	<b>Last Updated</b>	07 Dec 2011
<b>Pump Type</b>		<b>Last Field Check</b>	
<b>Water Use Data</b>	No		

**No screen data for this well**

**No step tests for this well**

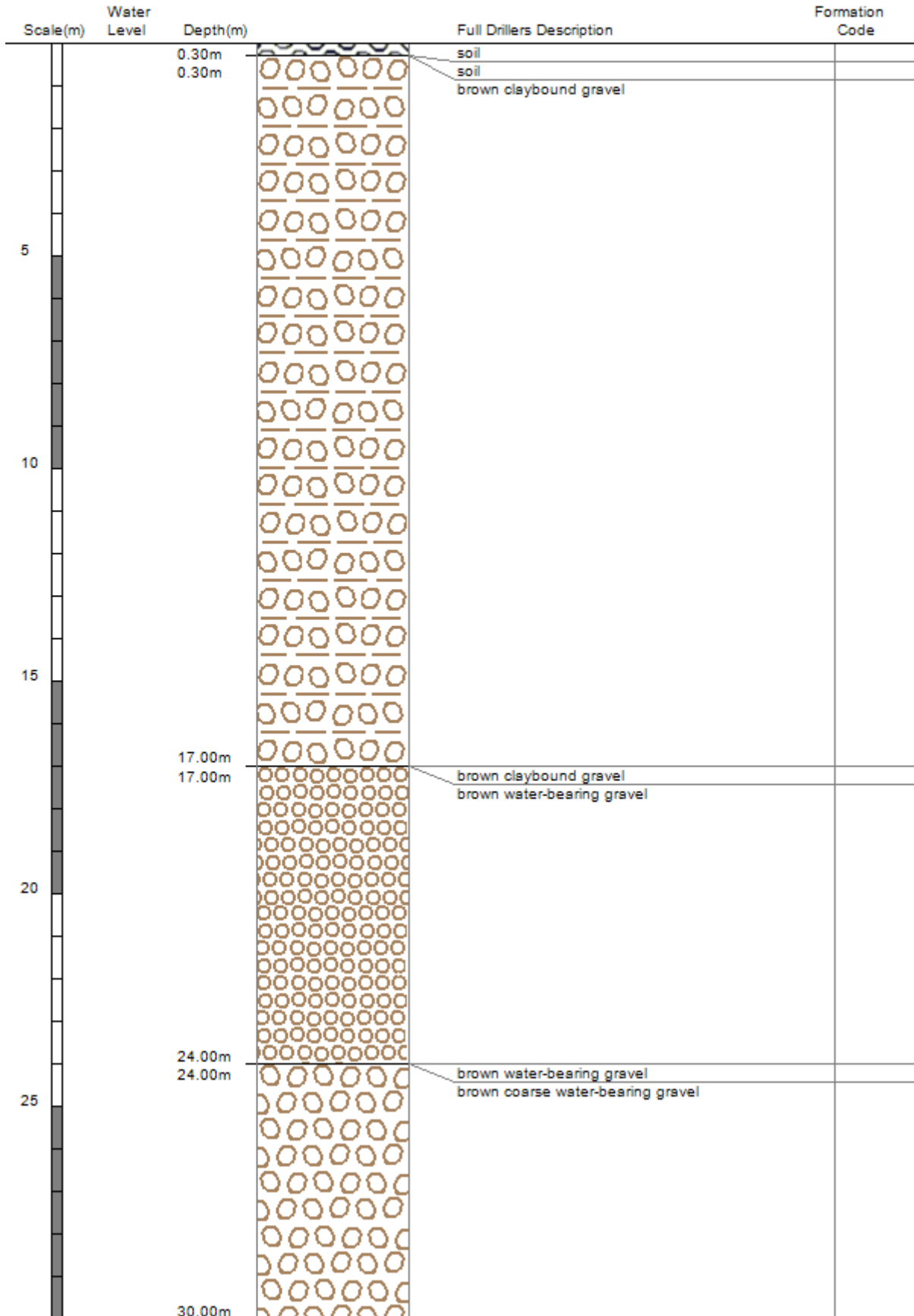
# Comments

Comment Date	Comment
12 May 2011	BCR confirms

# Bore Log

### Borelog for well M36/20535

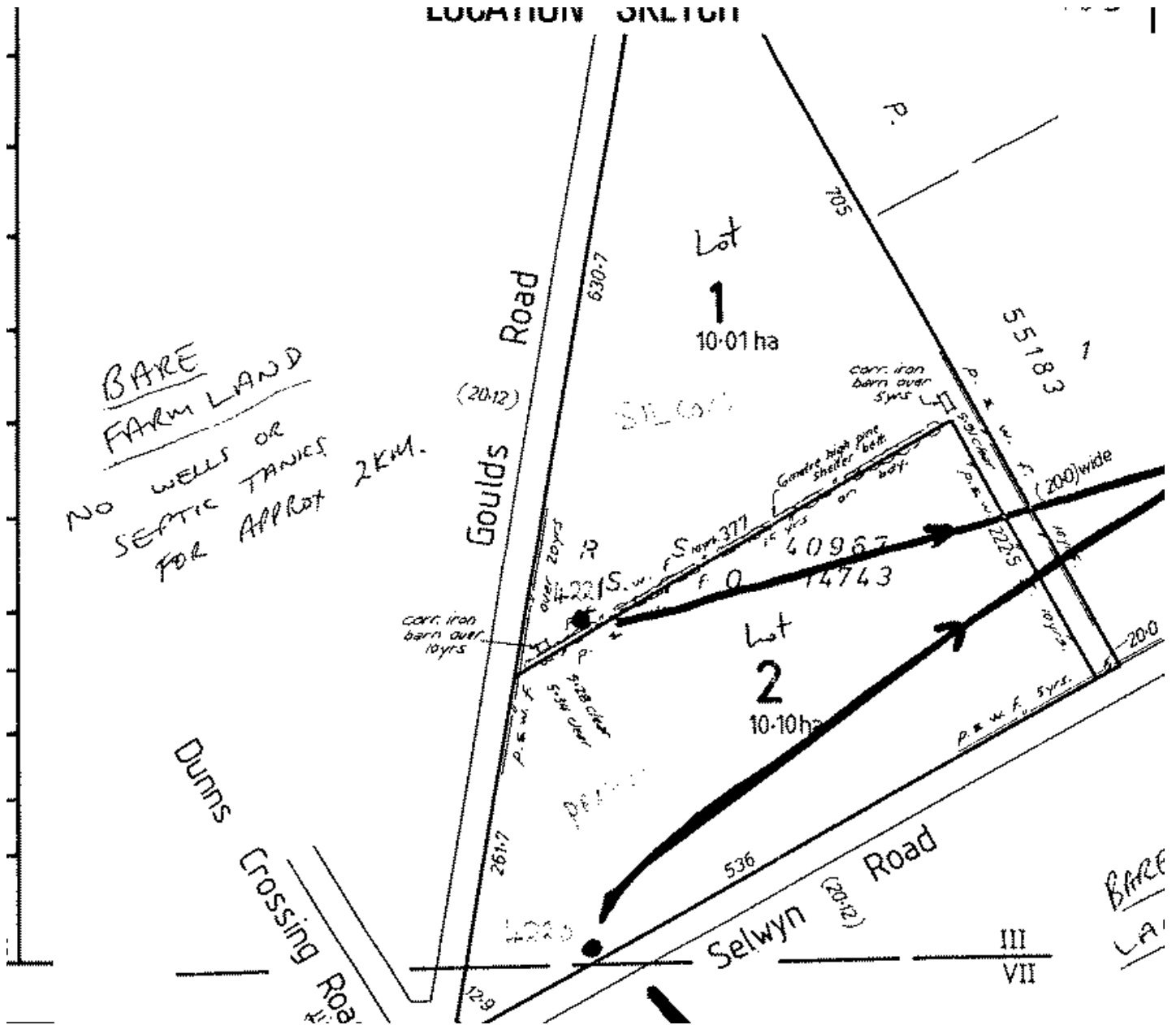
Grid Reference (NZTM): 1550018 mE, 5169231 mN  
 Location Accuracy: 10 - 50m  
 Ground Level Altitude: 35.0 m +MSD Accuracy: < 0.5 m  
 Driller: Daly Water Wells Ltd  
 Drill Method: Rotary Rig  
 Borelog Depth: 30.0 m Drill Date: 04-Feb-2011







<b>Bore or Well No</b>	M36/4220		
<b>Well Name</b>	SELWYN RD		
<b>Owner</b>	Mr G B Shadwell		
<b>Well Number</b>	M36/4220	<b>File Number</b>	CO6C/13726
<b>Owner</b>	Mr G B Shadwell	<b>Well Status</b>	Active (exist, present)
<b>Street/Road</b>	SELWYN RD	<b>NZTM Grid Reference</b>	BX23:50117-68868
<b>Locality</b>	ROLLESTON	<b>NZTM X and Y</b>	1550117 - 5168868
<b>Location Description</b>		<b>Location Accuracy</b>	2 - 15m
<b>CWMS Zone</b>	Selwyn - Waihora	<b>Use</b>	Irrigation,
<b>Groundwater Allocation Zone</b>	Selwyn-Waimakariri	<b>Water Level Monitoring</b>	--
<b>Depth</b>	21.30m	<b>Water Level Count</b>	0
<b>Diameter</b>	150mm	<b>Initial Water Level</b>	5.80m below MP
<b>Measuring Point Description</b>		<b>Highest Water Level</b>	
<b>Measuring Point Elevation</b>	34.29m above MSL (Lyttelton 1937)	<b>Lowest Water Level</b>	
<b>Elevation Accuracy</b>	< 2.5 m	<b>First reading</b>	
<b>Ground Level</b>	0.00m above MP	<b>Last reading</b>	
<b>Strata Layers</b>	4	<b>Calc Min 80%</b>	8.81m below MP (Estimated)
<b>Aquifer Name</b>	Riccarton Gravel	<b>Aquifer Tests</b>	0
<b>Aquifer Type</b>	Unknown	<b>Yield Drawdown Tests</b>	1
<b>Drill Date</b>	05 Feb 1991	<b>Max Tested Yield</b>	6 l/s
<b>Driller</b>	Weedons WellDrilling	<b>Drawdown at Max Tested Yield</b>	13 m
<b>Drilling Method</b>	Rotary/Percussion	<b>Specific Capacity</b>	0.44 l/s/m
<b>Casing Material</b>	STEEL	<b>Last Updated</b>	08 Nov 2013
<b>Pump Type</b>	Unknown	<b>Last Field Check</b>	20 Oct 2010
<b>Water Use Data</b>	No		



### Screens

Screen No.	Screen Type	Top (m)	Bottom (m)	Slot Size (mm)	Slot Length (mm)	Diameter (mm)	Leader Length (mm)
1	Stainless steel	20.3	21.3				

### Step Tests

Step Test Date	Step	Yield	Yield GPM	DrawDown	Step Duration
05 Feb 1991	1	5.8	76.54947	13.1	0



## Comments

Comment Date	Comment
29 Nov 2010	Gridref changed from: M36:6018-3052 to M36:60110-30477 and set to an accuracy of QAR 2, site visit
21 Jul 2011	Previous owner FRASER BE & JF

# Bore Log

### Borelog for well M36/4220

Grid Reference (NZTM): 1550118 mE, 5168868 mN  
 Location Accuracy: 2 - 15m  
 Ground Level Altitude: 34.3 m +MSD Accuracy: < 2.5 m  
 Driller: Weedons WellDrilling  
 Drill Method: Rotary/Percussion  
 Borelog Depth: 21.3 m Drill Date: 05-Feb-1991

