Geotechnical Report for Proposed Plan Change

Wilfield Subdivision Proposed Southern Extension

Issue Date: **20 November 2020**

Miyamoto Ref: **200509-RP-001[A]**

Prepared for: **GW Wilfield**

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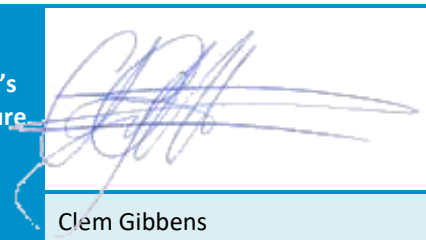
Report Tracking

Revision	Status	Date	Prepared by	Reviewed by
A	FINAL	20 November 2020	C. Gibbens	C. McDermott

Authorisation

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

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1. Introduction

Miyamoto International NZ Limited (MINZ) has been engaged by GW Wilfield to undertake a geotechnical investigation, evaluation and land suitability assessment as part of the proposed land reclassification and plan change required for the proposed extension of the Wilfield residential subdivision.

Our assessment comprised the following scope of works:

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

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

It is noted that contaminated land assessment does not form part of our scope of works.

2. Site Description

The site (approximately 32 hectares in area) is located in a rural setting in West Melton, Selwyn, directly south of the existing Wilfield residential subdivision, and encompasses the following land parcels (as shown in Figure 1):

- Lot 163 DP 508829;
- Lot 707 DP 508829;
- Lot 708 DP 531293;
- Lot 709 DP 531293;
- Rural Sec 10802 Blk XI.

The site is predominantly flat with a global elevation difference of 3.0 m to 4.0 m (increasing to the west) and a step up (probable terrace feature) in the topography approximately through the middle of the site running northwest-southeast. The land is predominantly grass covered farmland with two existing residential dwellings, a pump station and a chicken farm currently located on the site.

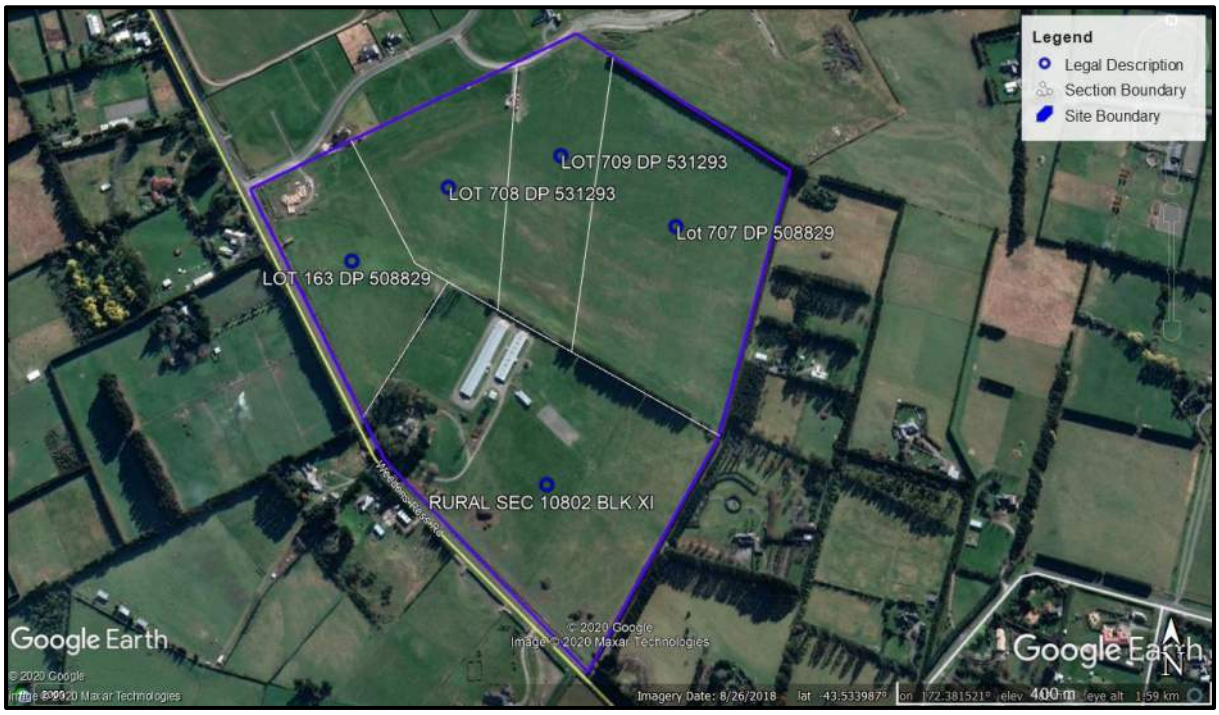


Figure 1: Site Location / Layout Plan

3. Data Sources

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

- Davie Lovell Smith (2014). Geotechnical Appraisal - Wilfield Subdivision;
- GNS Science - Geological Maps;
- New Zealand Geotechnical Database (NZGD);
- Environment Canterbury (ECan);
- Selwyn District Council (SDC);
- Canterbury Maps.

4. Geotechnical Assessment

Geological Setting

The geological map of the area (GNS 1:250,000 QMap) indicates that a geological boundary dissects the site approximately through the middle running northwest-southeast approximately along the line of a step-up in elevation (probable terrace feature). The geology is described as 'modern (Quaternary) river floodplain/low-level degradation terraces of unweathered, variably sorted gravel/sand/silt/clay' to the northeast and 'dunes of unweathered, wind-deposited river sand' to the southwest.

Field Investigations

Miyamoto undertook a site-specific ground investigation on 9 November 2020, comprising:

- 9No. machine excavated trial pits (referenced TP001 to TP009);

- 5No. hand-augered boreholes (referenced HA001 to HA005) with in-situ shear vane testing;
- 14No. Dynamic Cone Penetrometer (DCP) tests associated with the above exploratory holes.

As part of the Wilfield subdivision, directly north of the site, Davie Lovell Smith undertook a ground investigation comprising 32No. Trial Pits, the data collected from which has been used in our assessment. Additionally, a number of ECan well bore logs available for the surrounding area have been referenced in our assessment.

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

Figure 2: Ground Investigation Location Plan

Table 1: Summary of Ground Investigations

Test Ref.	Source	Source Ref.	Test Type	Depth (mbgl)
TP001 to TP009	MINZ	200509	TP / DCP	0.7 to 1.8
HA001 to HA005	MINZ	200509	HA / DCP	0.3 to 2.3
TP001 to TP032	Davis Lovell Smith (2014)		TP / DCP	0.1 to 2.7
ECan Well Bores	ECan	Various	Rotary / Percussion / Cable Tool	Max. 200+

Ground Conditions

The ground conditions over the majority of the site interpreted from the on-site shallow ground investigation, correlated with the available existing data, comprise a layer of topsoil

(0.2 m to 0.4 m in thickness), overlying low plasticity, firm to stiff Sandy SILT to between 0.3 m and 0.8 mbgl, below which dense to very dense Sandy fine to coarse GRAVEL is encountered to depth. An exception to the above is the ground profile identified at HA001, which encountered a layer of fine to medium SAND to 2.2 mbgl.

Groundwater

Standing groundwater was not encountered during our site-specific investigation. Groundwater level monitoring information available for a number of the ECan well bores indicate the groundwater table to average around ~20 mbgl with seasonal fluctuations reaching a highest level of ~12 mbgl.

It is noted that saturated soil was encountered at 2.2 mbgl in HA001 and water was noted at 3.5 mbgl in Davis Lovell Smith TP021.

Liquefaction Assessment

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

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

Sloping Ground

The likely terrace feature running northwest-southeast through the middle of the site presents the most significant sloping ground on-site. No signs of instability were observed during our site visit and considering the ground conditions and slope geometry the slope is considered to be stable.

Any earthworks or development proposed in proximity to the sloping ground should carefully consider the effects of the works on the stability of the slope.

NZS1170.5 Site Sub-soil Class

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

Flood Hazard

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

5. Development Considerations

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

- Earthworks should be undertaken in general accordance with the requirements of NZS 4431:1989. All unsuitable materials should be stripped from the work areas and stockpiled clear of the operations or removed from site;
- The stability of the sloping ground (terrace feature) should be assessed considering any proposed developments or earthworks;
- Preliminarily, NZS3604 foundations are considered suitable for NZS3604 compliant structures, subject to building-specific geotechnical investigations to assess the available bearing capacity.

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

6. Assessment Against RMA Section 106

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

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

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

Given the proximity of the site to any source, rockfall (falling debris) is not considered a risk to the site.

The likely terrace feature running northwest-southeast through the middle of the site presents the most significant sloping ground on-site. No signs of instability were observed during our site visit and considering the ground conditions and slope geometry the slope is considered to be stable. Any earthworks or development proposed in proximity to the sloping ground should carefully consider the effects of cutting and / or filling works and loading on the stability of the slope.

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

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

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

7. Limitations

This report is subject to the following limitations:

- This report has been prepared by Miyamoto for the Client for the purpose/s agreed with the Client (Purpose). Miyamoto accepts no responsibility for the validity, appropriateness, sufficiency or consequences of the Client using the report for purposes other than for the Purpose.
- This report is not intended for general publication or circulation. This report is not to be reproduced by the Client except in relation to the Purpose, without Miyamoto's prior written permission. Miyamoto disclaims all risk and all responsibility to any third party.
- This report is provided based on the various assumptions contained in the report.
- Miyamoto's professional services are performed using a degree of care and skill reasonably exercised by reputable consultants providing the same or similar services as at the date of this report.
- The sub surface information has been obtained from investigation carried out at discrete locations, which by their nature only provide information about a relatively small volume of subsoils. While Miyamoto has taken reasonable skill and care in carrying out the investigation to determine the subsoil condition, the subsoil condition could differ substantially from the results of any sampling investigation. Miyamoto is not responsible for and does not accept any liability in respect of any difference between the actual subsoil conditions and the results of our investigation.
- A change in circumstances, facts, information after the report has been provided may affect the adequacy or accuracy of the report. Miyamoto is not responsible for the adequacy or accuracy of the report as a result of any such changes.
- This report is not to be reproduced, either wholly or in part, without our prior written permission.

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

References

Brown, L.J. and Weeber, J.H., 1992. *Geology of the Christchurch urban area: Institute of Geological and Nuclear Sciences Geological Map 1*. Institute of Geological and Nuclear Sciences Limited, Lower Hutt, New Zealand, scale, 1(25,000), p.1.

Forsyth, P.J. ; Barrell, D.J.A. ; Jogens, R. (compilers) 2008. Geology of the Christchurch area. Institute of Geological and Nuclear Sciences 1: 250000 geological map 16. Lower Hutt, New Zealand.

Environment Canterbury, 2014. Canterbury Maps Viewer, http://canterburymaps.govt.nz/Viewer/#webmap

Environment Canterbury, Web app viewer - Flood Hazard, https://ecanmaps.ecan.govt.nz/portal/apps/webappviewer/index.html?id=57c74073c2f14a85ac0caf30073ae48a

Ian MacCahon, 2013. Selwyn District Council 'Area of low geotechnical risk' map.

Ministry of Business, Innovation, and Employment, 2012. *Repairing and rebuilding houses affected by the Canterbury earthquakes.*

New Zealand Geotechnical Database, 2017. Accessed via Google Earth from https://www.nzgd.org.nz/.

New Zealand Geotechnical Society (NZGS) and Ministry of Business, Innovation and Employment (MBIE) (2016). Earthquake geotechnical engineering practice Module 2: Geotechnical investigations for earthquake engineering, November 2016.

New Zealand Geotechnical Society (NZGS) and Ministry of Business, Innovation and Employment (MBIE) (2016). Earthquake geotechnical engineering practice Module 3: Identification, assessment and mitigation of liquefaction hazards, May 2016.

New Zealand Standard NZS1170.5 (2004). Structural Design Actions, Part 5: Earthquake Actions - New Zealand Standard, NZS 2004.

Selwyn District Council - District Plan Online Maps, https://eplan.selwyn.govt.nz/eplan/#/Property/7941662.

Appendices

A. Geotechnical Investigation Results

MINZ site-specific investigation logs

ECan well bore logs

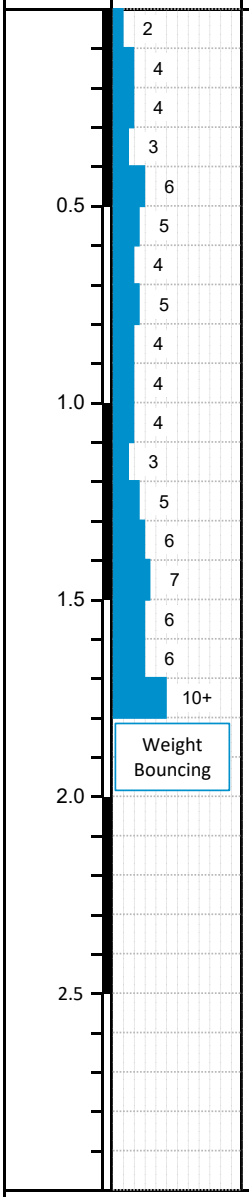
Davis Lovell Smith investigation location plan and logs (nearby only)

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

HA001

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**2.3 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**HA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
						Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
		USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
	NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
			Silty SAND; fine, light brown, dry											
			SAND: fine to medium, light brown, moist at 1.0m: with some silt at 1.6m: becomes wet at 2.2m: becomes saturated											
			EOH (REFUSAL ON GRAVELS)											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

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	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

HA002

PROJECT:	**Wilfield Subdivision, West Melton**						
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**0.9**	**mbgl**	*HOLE DIAMETER:*	**50 mm**	
PROCESSED BY:	**CG**	*TESTING METHOD:*	**HA + DCP**		*SHEAR VANE NUMBER:*	**-**	
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	**mbgl**	This report may only be reproduced in full		

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
			USC	*Soil Characteristics*	*Graphic Log*		*Atterberg Limits*			*Grain Size*			*WC (%)*	*UW*	
							LL	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0	2	NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
	3														
	3														
	6			Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
0.5	8														
	5														
	5														
	4														
	10+			EOH (REFUSAL ON GRAVEL)											
1.0	Weight Bouncing														
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

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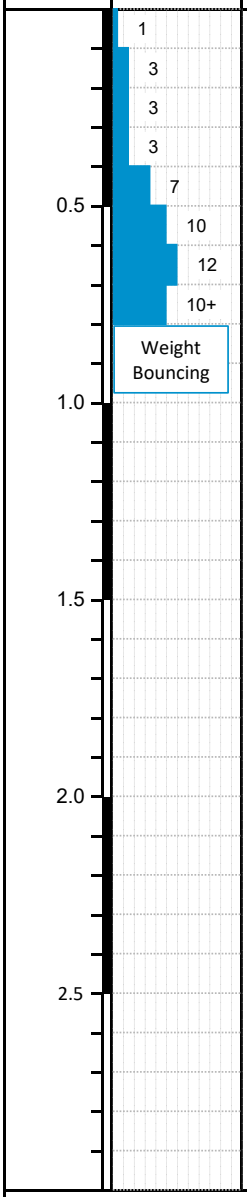
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

HA003

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**0.8 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**HA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
		NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
				Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
				EOH (REFUSAL ON GRAVEL)											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

HA004

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**0.3 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**HA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0	1 3 10+ Weight Bouncing	NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
				EOH (REFUSAL ON GRAVEL)											
0.5															
1.0															
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

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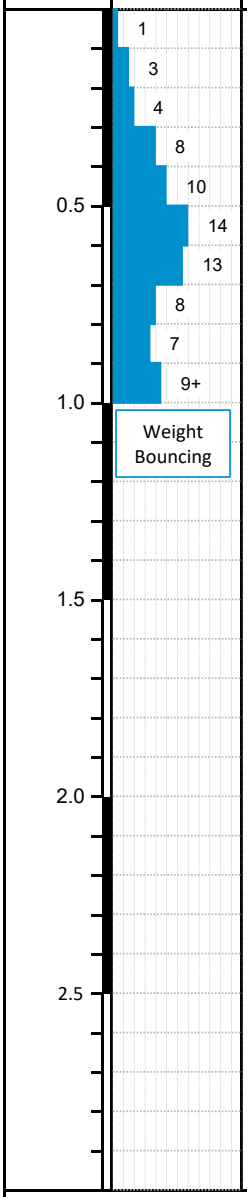
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

HA005

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**1.0 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**HA + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0		NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
0.5				Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
1.0				**EOH (REFUSAL ON GRAVEL)**											
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

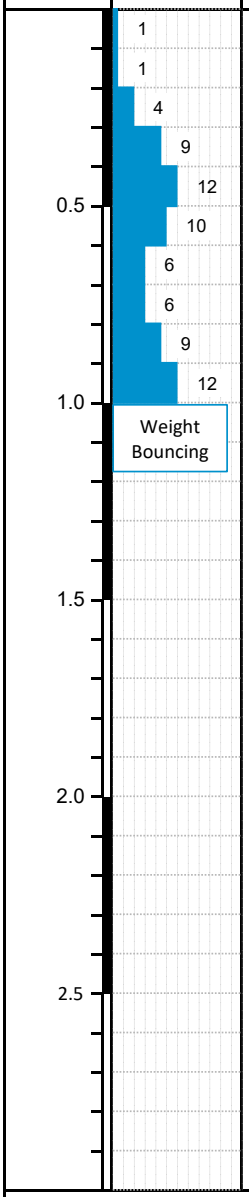
As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

TP001

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**1.0 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0	1	NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
0.5	1, 4, 9, 12, 10, 6, 6, 9, 12			Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
1.0	Weight Bouncing			**EOH (TARGET DEPTH REACHED - GRAVELS)**											
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

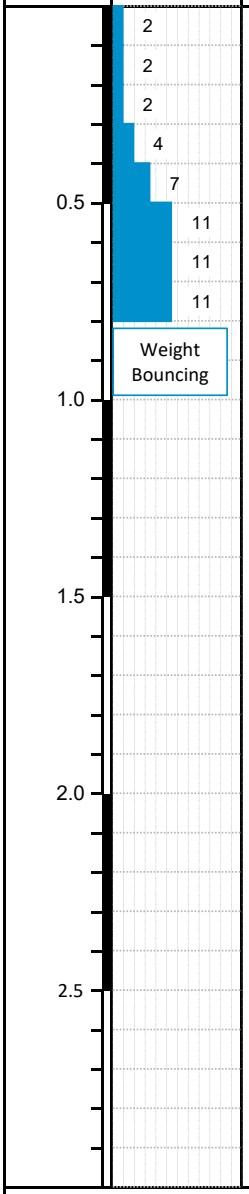
As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

TP002

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**0.8 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
				SILT; dark brown (TOPSOIL)											
				Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
				EOH (TARGET DEPTH REACHED - GRAVELS)											
		NOT ENCOUNTERED													

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

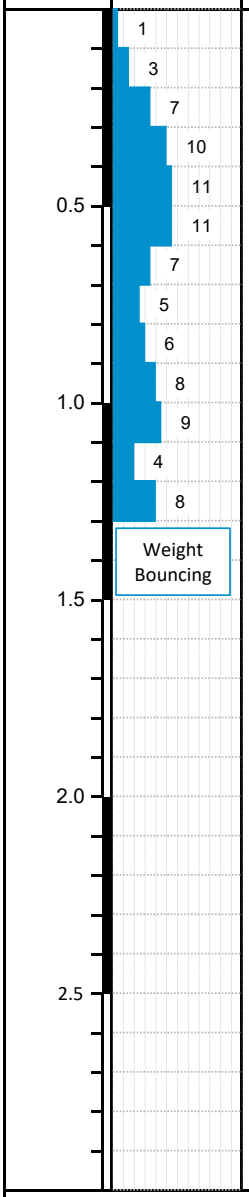
As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

TP003

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**1.3 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0		NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
0.5				Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
1.0				EOH (TARGET DEPTH REACHED - GRAVELS)											
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

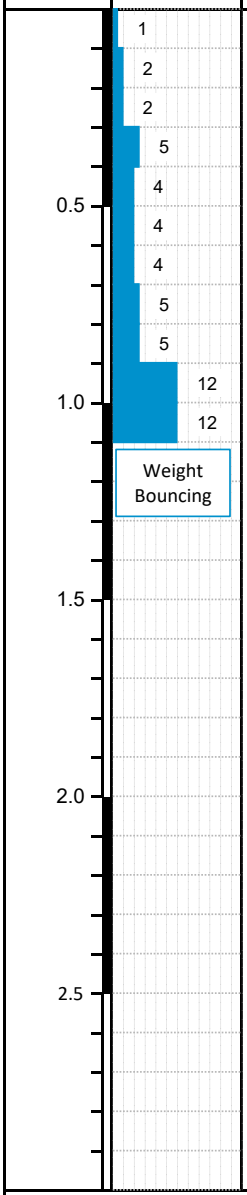
As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

TP004

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**1.5 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0		NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
0.5				Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
1.0				Sandy GRAVEL; fine to coarse, moist, brown, with minor cobbles and boulders (up to 350mm wide), sand is fine to coarse											
1.5				**EOH (TARGET DEPTH REACHED - GRAVELS)**											
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

TP005

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**1.1 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0	1 1 8 12 Weight Bouncing	NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
0.5				Sandy GRAVEL; fine to coarse, moist, brown, with minor cobbles and boulders (up to 350mm wide), sand is fine to coarse											
1.0				**EOH (TARGET DEPTH REACHED - GRAVELS)**											
1.5															
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

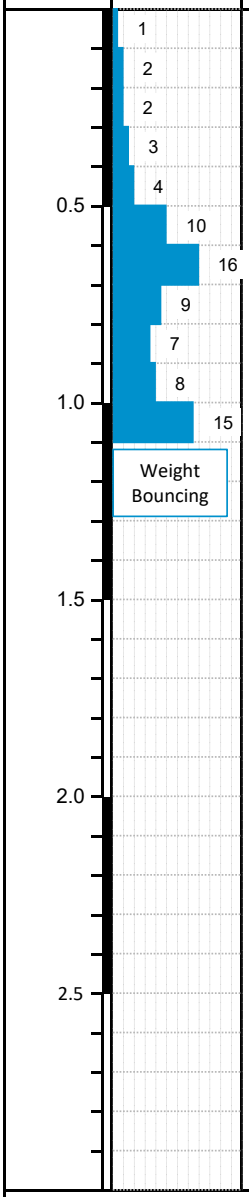
As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

TP006

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**1.1 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
				SILT; dark brown (TOPSOIL)											
				Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
				EOH (TARGET DEPTH REACHED - GRAVELS)											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

TP007

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**1.2 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	

Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0	1 5 7 10 Weight Bouncing	NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
0.5				Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
1.0				Sandy GRAVEL; fine to coarse, moist, brown, with minor cobbles and boulders (up to 350mm wide), sand is fine to coarse											
1.5				**EOH (TARGET DEPTH REACHED - GRAVELS)**											
2.0															
2.5															

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

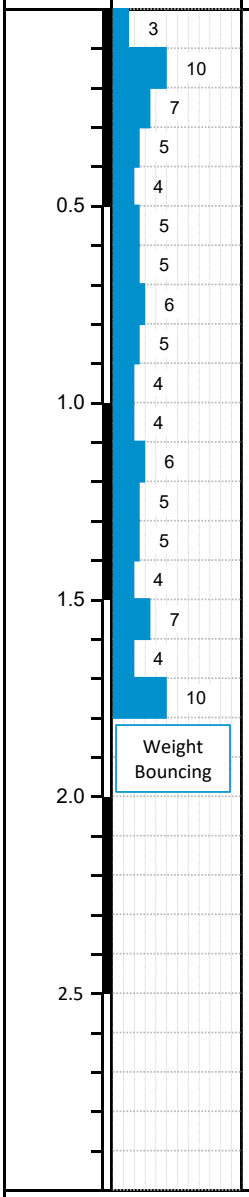
As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**GW Wilfield**
	TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

TP008

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**1.8 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
				SILT; dark brown (TOPSOIL)											
				Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
				EOH (TARGET DEPTH REACHED - GRAVELS)											

LEGEND

ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

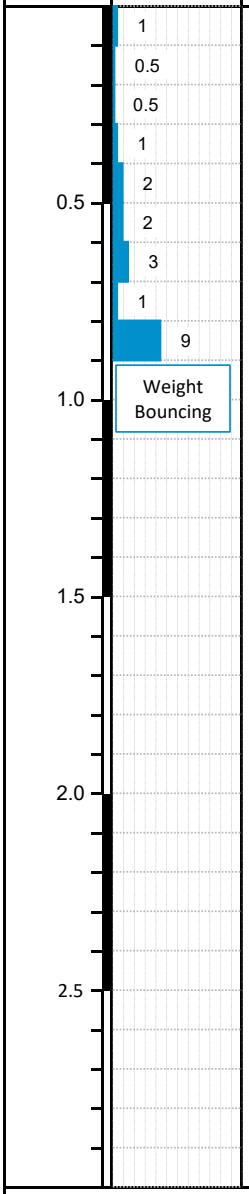
miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS

PROJECT NUMBER:	**200509**
CLIENT:	**GW Wilfield**
TESTING COMPLETED:	**9 November 2020**

SHALLOW GROUND INVESTIGATION LOG

TP009

PROJECT:	**Wilfield Subdivision, West Melton**				
LOGGED BY:	**CG/CMD**	*TOTAL TESTING DEPTH:*	**0.9 mbgl**	*HOLE DIAMETER:*	**50 mm**
PROCESSED BY:	**CG**	*TESTING METHOD:*	**TP + DCP**	*SHEAR VANE NUMBER:*	**-**
LOCATION:	**REFER TO SITE PLAN**	*GROUNDWATER LEVEL:*	**N/E**	This report may only be reproduced in full	



Depth (m)	*DCP Test Results (Blows per 100mm)*	*GWL*	*Soil Description*			*Sample Taken*	*Lab Testing*								*Shear Vane Reading (kPa) peak/remoulded*
							Atterberg Limits			*Grain Size*			*WC (%)*	*UW*	
			USC	*Soil Characteristics*	*Graphic Log*		*LL*	*PL*	*PI*	*GR*	*SA*	*FC*			
0.0	1	NOT ENCOUNTERED		SILT; dark brown (TOPSOIL)											
0.5	0.5			Sandy SILT; low plasticity, yellow-brown, moist, sand is fine											
1.0	0.5														
1.5	1														
2.0	2														
2.5	2														
	3														
	1														
	9														
	Weight Bouncing			**EOH (TARGET DEPTH REACHED - GRAVELS)**											

LEGEND

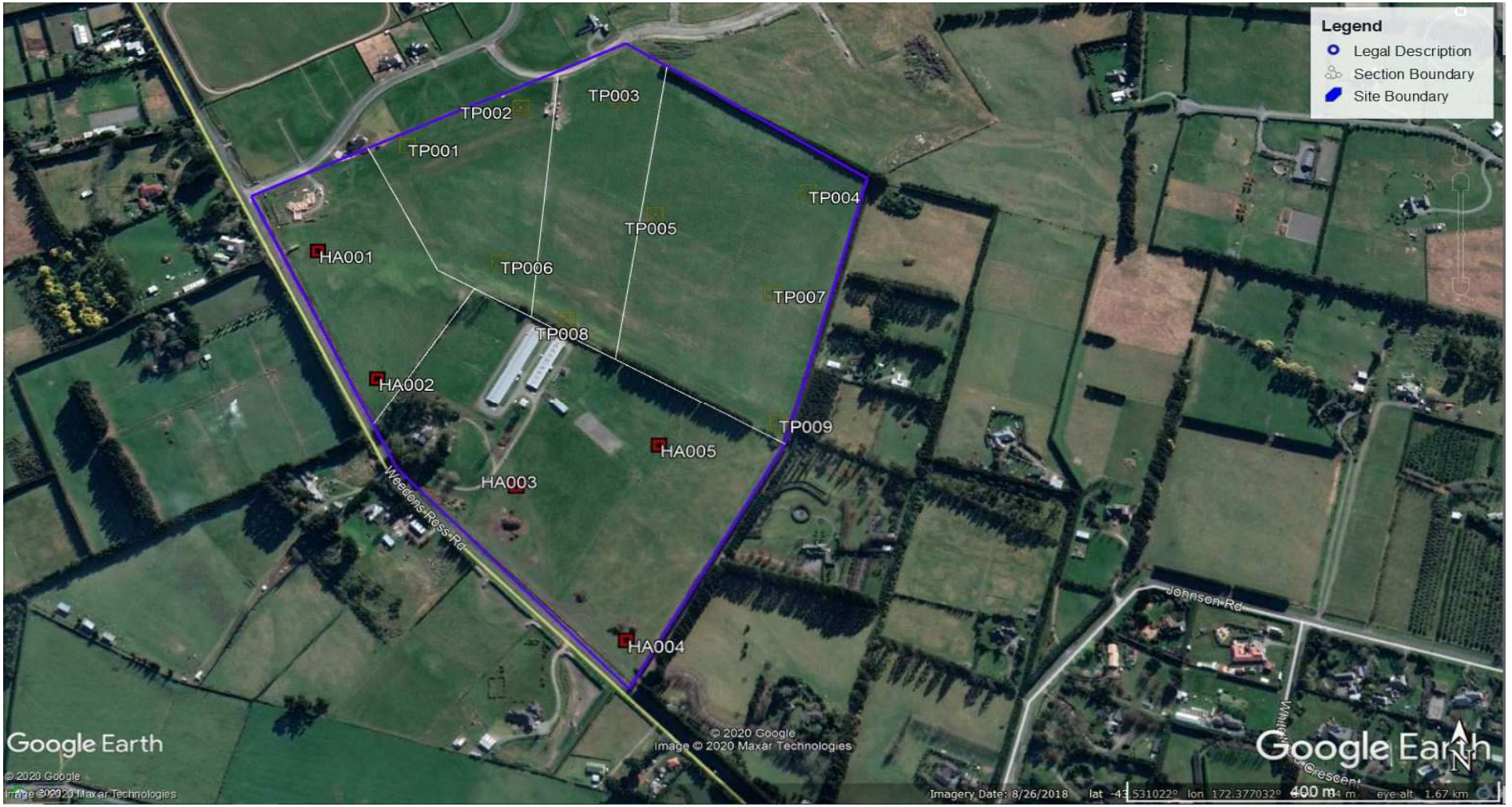
ABBREVIATIONS

DCP	DYNAMIC CONE PENETROMETER	N/E	NOT ENCOUNTERED	LL	LIQUID LIMIT	GR	GRAVEL
HA	HAND AUGER	UTP	UNABLE TO PENETRATE	PL	PLASTIC LIMIT	SA	SAND
SV	SHEAR VANE	EOH	END OF HOLE	PI	PLASTICITY INDEX	FC	FINES CONTENT
TP	TEST PIT	UW	UNIT WEIGHT (kN/m^3)	WC	WATER CONTENT	▽	STANDING GWL
GWL	GROUNDWATER LEVEL	mbgl	METERS BELOW GROUND LEVEL				

NOTES

As per MINZ policy, the DCP was transferred to the base of the hand auger borehole at 1.9m depth

miyamoto. ENGINEERS+ CONSTRUCTION CONSULTANTS	*PROJECT NUMBER:*	**200509**
	CLIENT:	**Yoursection Ltd**
	TESTING COMPLETED:	**9 November 2020**
SITE INVESTIGATION PLAN	**Wilfield Subdivision, West Melton**	

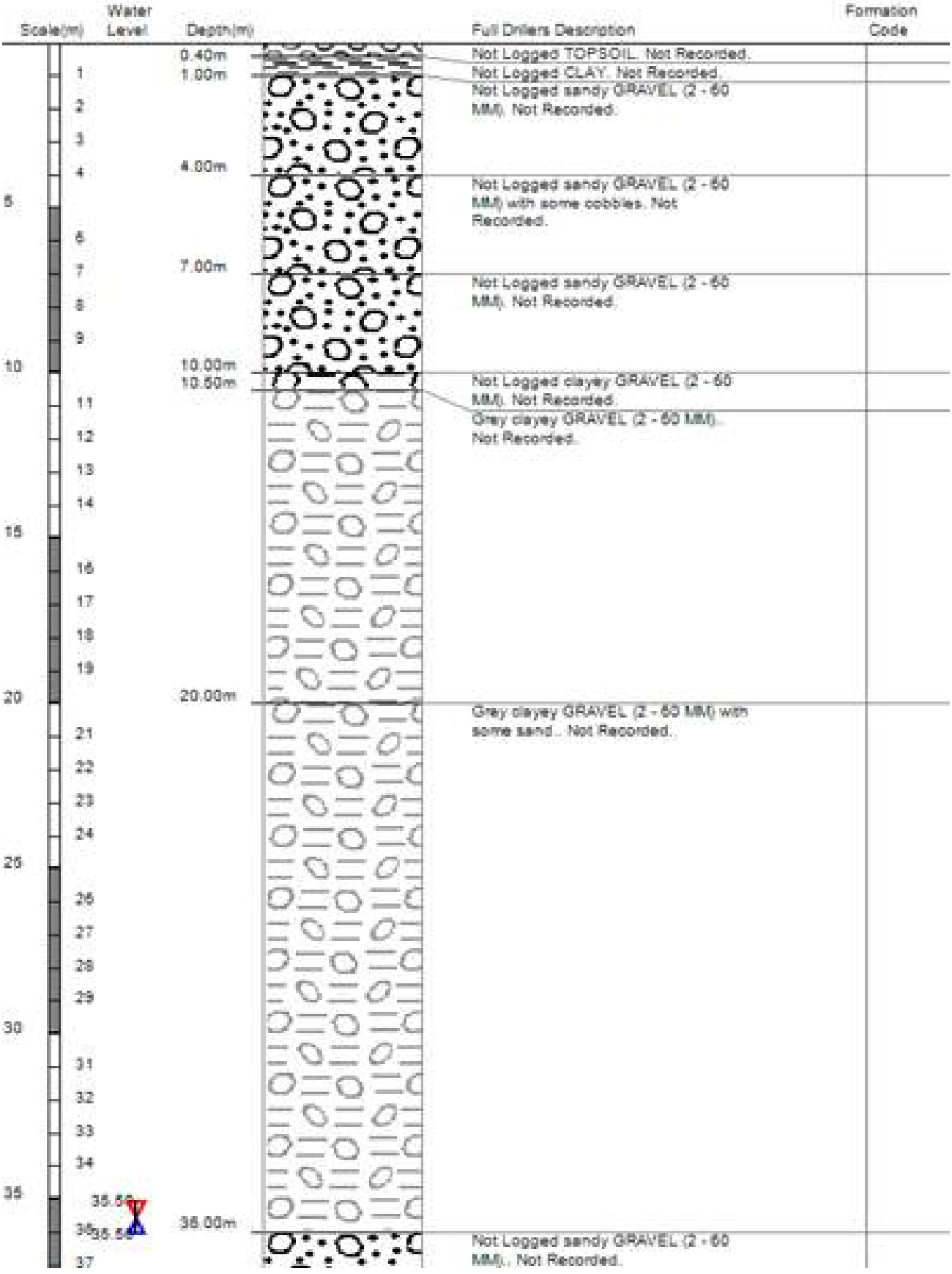


Borelog for well BX23/0829

Grid Reference (NZTM): 1549894 mE, 5180029 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: m +MSD Accuracy:
Driller: McMillan Drilling Ltd
Drill Method: Rotary/Percussion
Borelog Depth: 202.0 m Drill Date: 01-Sep-2018

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha

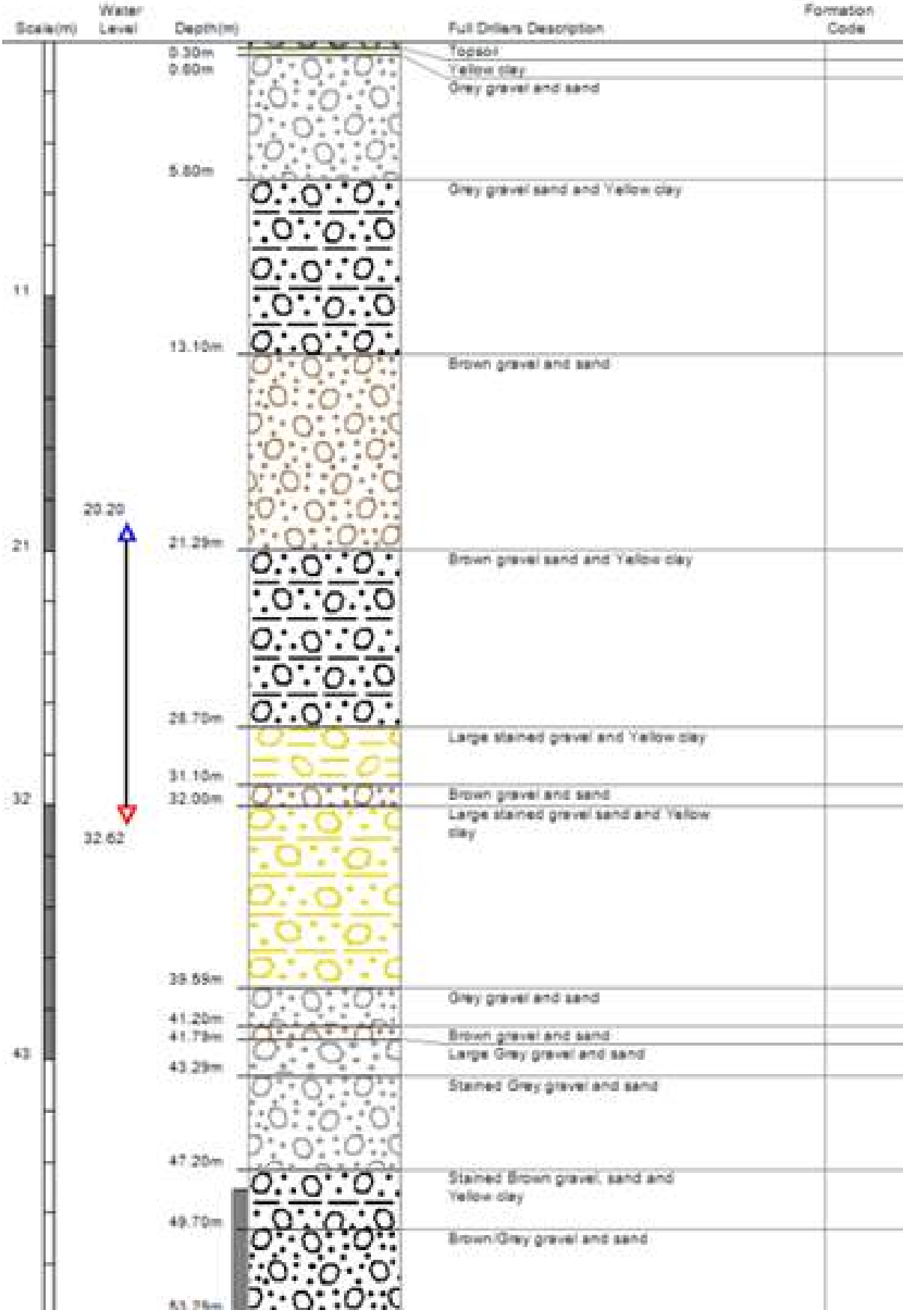
miyamoto.



Borelog for well M35/0976

Grid Reference (NZTM): 1549884 mE, 5180026 mN
Location Accuracy: 2 - 15m
Ground Level Altitude: 82.7 m +MSD Accuracy: < 0.1 m
Driller: A M Bisley & Co
Drill Method: Cable Tool
Borelog Depth: 53.3 m Drill Date: 30-Jun-1971

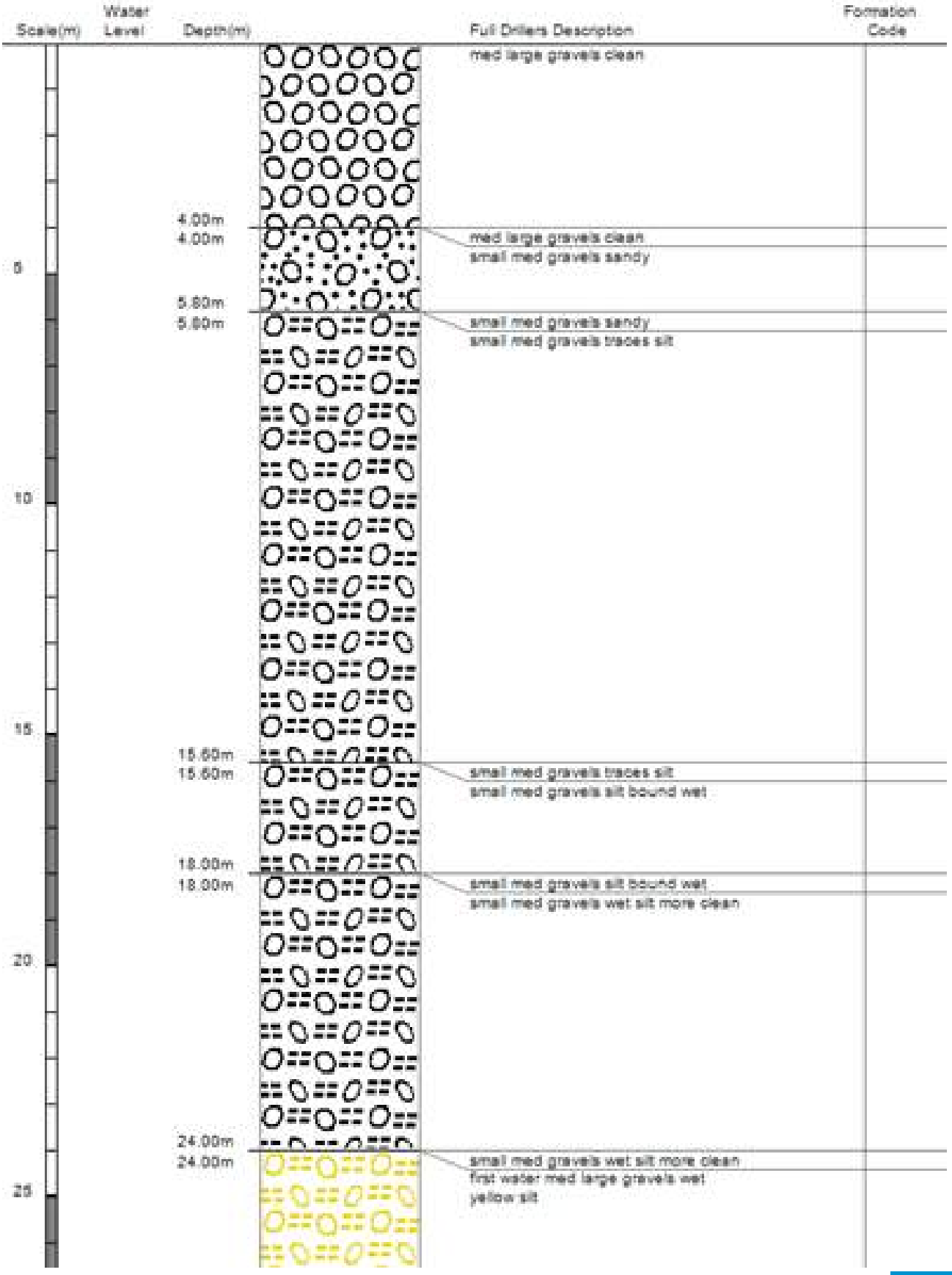
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Borelog for well M35/11167

Grid Reference (NZTM): 1549957 mE, 5179668 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 82.7 m +MSD Accuracy: < 0.5 m
Driller: Dynes Road Drilling
Drill Method: Cable Tool
Borelog Depth: 58.0 m Drill Date: 01-Feb-2006

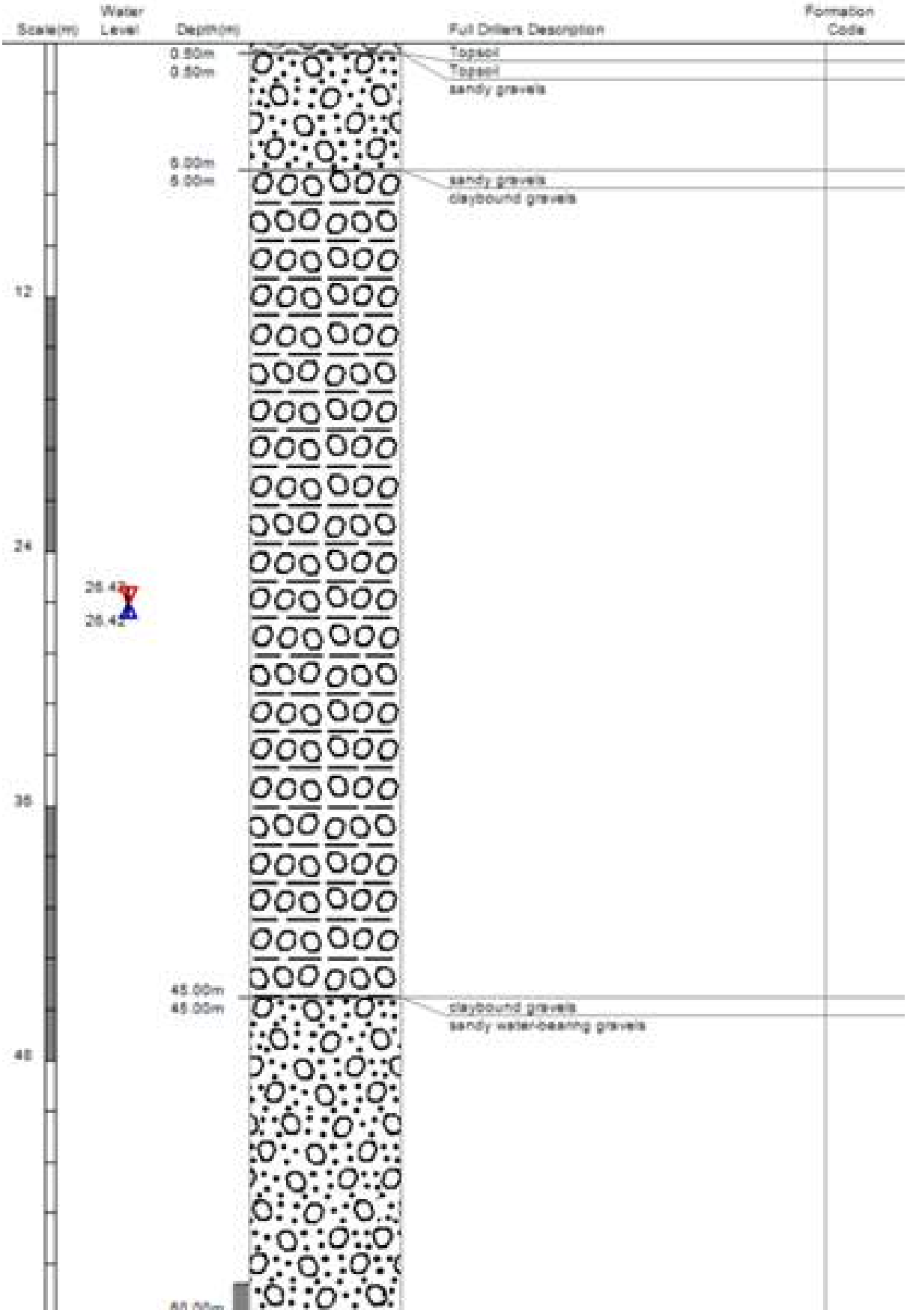
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Borelog for well M35/11169

Grid Reference (NZTM): 1550203 mE, 5179439 mN
Location Accuracy: 2 - 15m
Ground Level Altitude: 61.4 m +MSD Accuracy: < 0.5 m
Driller: East Coast Drilling
Drill Method: Rotary/Percussion
Borelog Depth: 60.0 m Drill Date: 13-Feb-2006

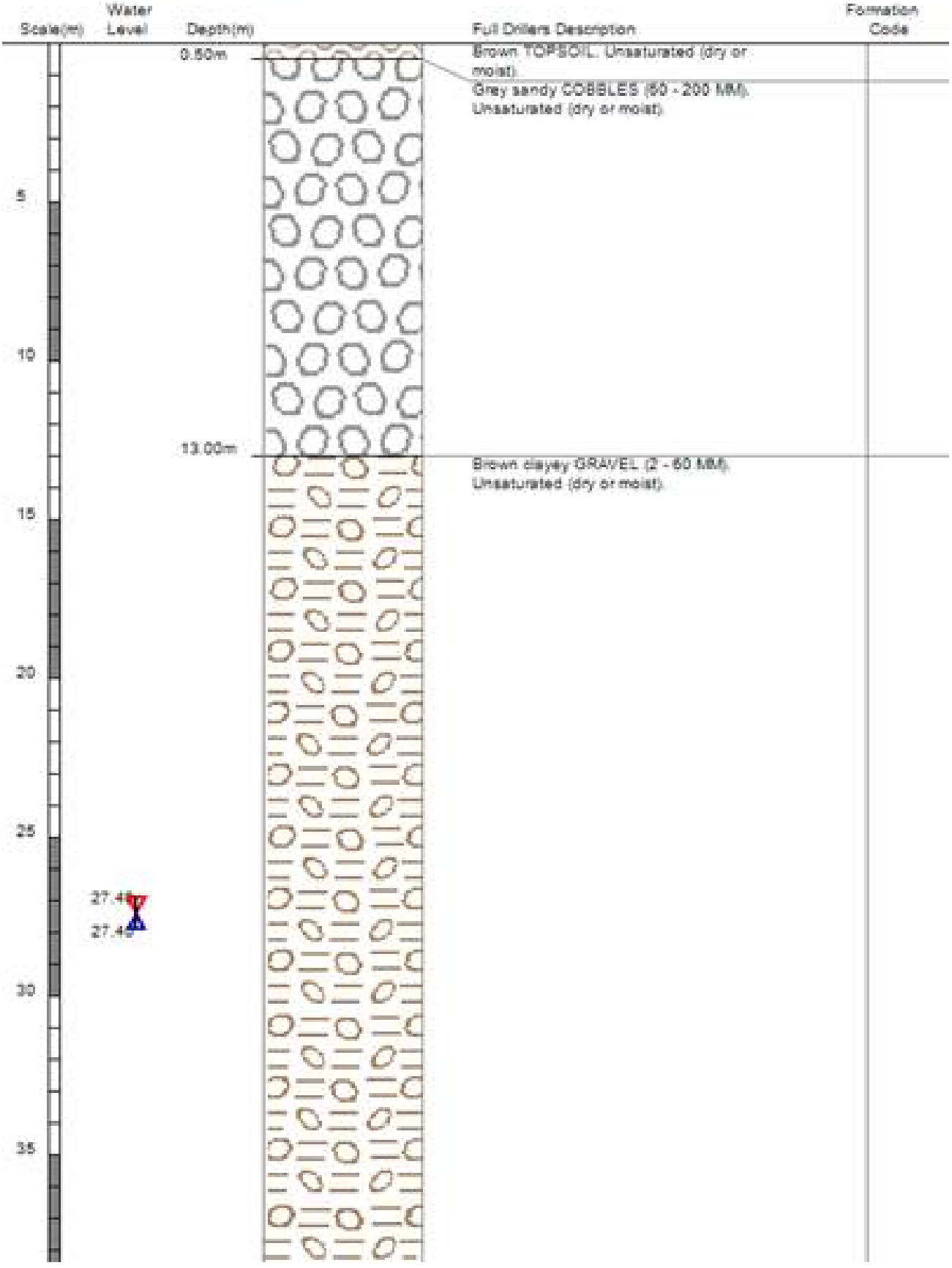
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



Borelog for well BX23/0525

Grid Reference (NZTM): 1550000 mE, 5179207 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: m +MSD Accuracy:
Driller: East Coast Drilling
Drill Method: Air Rotary
Borelog Depth: 42.0 m Drill Date: 14-Sep-2015

Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha



AMENDMENTS :

AMENDMENT	DATE	DESCRIPTION

NOTES :

1) Areas and dimensions are approximate only and are subject to final survey and deposit of plans.

2) Service easements to be created as required.

3) This plan has been prepared for subdivision consent purposes only. No liability is accepted if the plan is used for any other purposes.

DAVIE LOVELL·SMITH

PLANNING SURVEYING ENGINEERING

79 Cambridge Terrace P O Box 679 Christchurch 8140. New Zealand
Telephone: 03 379-0793 Fax: 03 379-5664 E-mail: office@dls.co.nz

JOB TITLE:

G W Wilfield Limited
Gillman Wheelans

SHEET TITLE:

Test Pit Locations

DRAWING STATUS

For Approval

SCALE : 1:2500@A1
1:5000@A3

DATE : June 2014

CAD FILE : J:\18130\ENG\Geotech Report\C18130.TPL01

REVISION :

DRAWING No : C.18130 TPL.01

SHEET No:

R1

Scala Penetrometer Log

Job No: 18130

Project: Lot 862

SPT No: TP026

Client: Gillman Wheelans

Date: 27/06/2014

Location: Wilfeild Sub Devision

Logged By: Nic Brooker

Description of Soils.

Graphic	Depth (m)	Water Level	SPT Blows	SPT Blows Average over 300mm	Soil Strength to NZS3604:1999 (kPa)
	0.00				
			1	1.50	112.50
Topsoil			2	2.00	150.00
			3	2.50	187.50
End of Bore log (Gravel hit)	0.50				
	1.00				
	1.50				
	2.00				
	2.50				
	3.00				
	3.50				
	4.00				

Scala Penetrometer Log

Job No: 18130

Project: Lot 862

SPT No: TP027

Client: Gillman Wheelans

Date: 27/06/2014

Location: Wilfeild Sub Devision

Logged By: Nic Brooker

Description of Soils.

Graphic	Depth (m)	Water Level	SPT Blows	SPT Blows Average over 300mm	Soil Strength to NZS3604:1999 (kPa)
	0.00				
			1	1.00	75.00
Topsoil			1	1.00	75.00
			1	1.33	100.00
			2	1.33	100.00
End of Bore log (Gravel hit)	0.50		1	3.67	275.00
			8	4.50	337.50
	1.00				
	1.50				
	2.00				
	2.50				
	3.00				
	3.50				
	4.00				

Scala Penetrometer Log

Job No: 18130

Project: Lot 862

SPT No: TP028

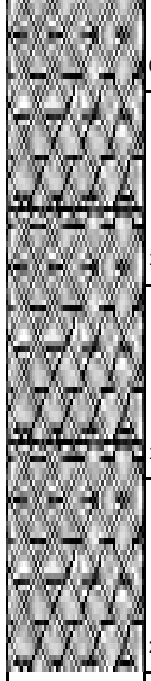
Client: Gillman Wheelans

Date: 27/06/2014

Location: Wilfeild Sub Devision

Logged By: Nic Brooker

Description of Soils.



Depth (m)	Water Level	SPT Blows	SPT Blows Average over 300mm	Soil Strength to NZS3604:1999 (kPa)
0.00				
		1	1.00	75.00
		1	1.33	100.00
		2	1.50	112.50
0.50				
1.00				
1.50				
2.00				
2.50				
3.00				
3.50				
4.00				

Topsoil

Sandy Gravel

Scala Penetrometer Log

Job No: 18130

Project: Lot 862

SPT No: TP029

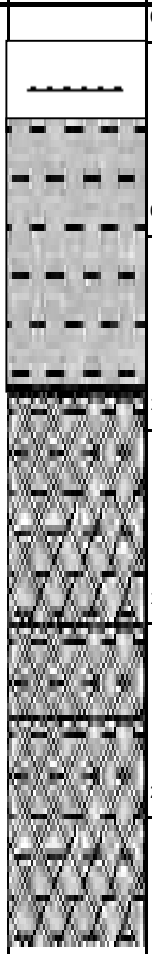
Client: Gillman Wheelans

Date: 27/06/2014

Location: Wilfeild Sub Devision

Logged By: Nic Brooker

Description of Soils.



Depth (m)	Water Level	SPT Blows	SPT Blows Average over 300mm	Soil Strength to NZS3604:1999 (kPa)
0.00				
		1	1.00	75.00
		1	1.33	100.00
		2	1.33	100.00
		1	1.67	125.00
0.50		2	2.00	150.00
		3	3.00	225.00
		4	3.00	225.00
		2	2.67	200.00
		2	3.00	225.00
1.00		5	4.00	300.00
		5	5.00	375.00
1.50				
2.00				
2.50				
3.00				
3.50				
4.00				

Topsoil

Sandy Gravel

	Scala Penetrometer Log			Job No: 18130		
	Project: Lot 862			SPT No: TP030		
Client: Gillman Wheelans	Graphic	Depth (m)	Water Level	SPT Blows	SPT Blows Average over 300mm	Soil Strength to NZS3604:1999 (kPa)
Date: 27/06/2014						
Location: Wilfeild Sub Devision						
Logged By: Nic Brooker						
Description of Soils.						
		0.00				
				1	1.00	75.00
Topsoil				1	1.00	75.00
End of Bore log (Gravel hit)		0.50				
		1.00				
		1.50				
		2.00				
		2.50				
		3.00				
		3.50				
		4.00				

Scala Penetrometer Log

Job No: 18130

Project: Lot 862

SPT No: TP031

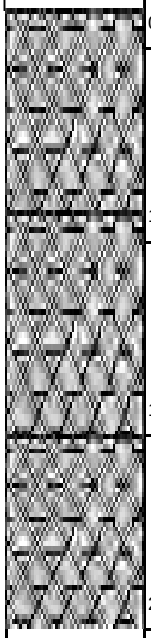
Client: Gillman Wheelans

Date: 27/06/2014

Location: Wilfeild Sub Devision

Logged By: Nic Brooker

Description of Soils.



Depth (m)	Water Level	SPT Blows	SPT Blows Average over 300mm	Soil Strength to NZS3604:1999 (kPa)
0.00				
		1	1.00	75.00
		1	1.00	75.00
		1	1.67	125.00
		3	4.33	325.00
0.50		9	8.00	600.00
		12	10.50	787.50
1.00				
1.50				
2.00				
2.50				
3.00				
3.50				

Topsoil

Sandy Gravel

	Scala Penetrometer Log			Job No: 18130		
	Project: Lot 862			SPT No: TP032		
Client: Gillman Wheelans						
Date: 27/06/2014						
Location: Wilfeild Sub Devision						
Logged By: Nic Brooker						
Description of Soils.	Graphic	Depth (m)	Water Level	SPT Blows	SPT Blows Average over 300mm	Soil Strength to NZS3604:1999 (kPa)
		0.00				
Topsoil				2	3.00	225.00
				4	4.67	350.00
Silt				8	9.67	725.00
End of Bore log (Gravel hit)				17	12.50	937.50
		0.50				
		1.00				
		1.50				
		2.00				
		2.50				
		3.00				
		3.50				
		4.00				