Geotechnical Investigation Report

182 and 200 Hamptons Road Development, Prebbleton

Suburban Estates Ltd

Document Number: 230634-RPT-G-001-A

Date: 14 December 2023

Prepared by	Prepared/Reviewed by	Reviewed/Approved by
Ryan Crosbie	Alex McCaw	Robert Smith
Graduate Engineering Geologist BSc	Senior Engineering Geologist BDc, PGDip, MEngNZ	Principal Geotechnical Engineer CMEngNZ, CPEng IntPE(NZ) / APEC Engineer

Consulting Civil, Structural, Environmental & Geotechnical Engineers
Directors: V.J. Anderson BE C&M • R.A. Puklowski NZCE (Civil) REA MEngNZ • C.F. Short BBS PG Dip Man • A.R. Wilton BE CMEngNZ CPEng IntPE DipMS

Cameron Gibson & Wells Limited
Nelson Office Level 4, 241 Hardy Street, PO Box 711, Nelson • Tel: +64 3 548 8259
Christchurch Office Level 1, 167 Victoria Street, Christchurch • Tel: +64 3 348 1000
Wanaka Office 4 Helwick St, PO Box 169, Wanaka • Tel: +64 3 443 6209
office@cgwl.co.nz • www.cgwl.co.nz

Contents

1. Executive Summary

Table 1: Report Summary			
Project	Site		182 and 200 Hamptons Road Development, Prebbleton
	CGW Project Number		230634
Site Assessment	Geotechnical Hazard Assessment	MBIE Land Classification and Land Performance	Rural and Unmapped (N/A).
		Liquefaction	Assessed as TC1 equivalent.
		Lateral Spreading	N/A
		Flooding	Partially mapped within a flood zone.
		Soil Contamination	Not listed on LLUR
		Groundwater Level	>5.0 m bgl.
		Site Subsoil Classification	Class D.
	Site suitability for redevelopment		The site is suitable for redevelopment subject to the recommendations of this report being undertaken.
Ground Conditions	Summary of site geology encountered		Topsoil overlying Alluvial Deposits; silt overlying predominantly gravel soil.
	Depth where 300kPa available		0.2 m – 0.6 m bgl beneath the topsoil layer.
Foundation Assessment	Foundation Recommendations		TC1 Slab on Grade or NZ3604 Foundations To be confirmed with site specific testing.
	Available CBR for Pavement and Roading		Unsoaked CBR value of 4%
	Additional Key Considerations		Site subgrade inspections to be undertaken by a geotechnical engineer familiar with the findings in this report.

2. Introduction

CGW Consulting Engineers have been engaged by the Suburban Estates Ltd (client) to undertake a geotechnical investigation and report for 182 and 200 Hamptons Road Development, Prebbleton.

The purpose of this investigation and report is to assess the suitability of the site for residential development and provide a geotechnical report suitable for a subdivision consent application to Selwyn District Council (SDC). This report will also provide preliminary foundations recommendations. Our geotechnical report will provide preliminary information on the site wide bearing capacity, ground conditions and a quantitative assessment of the liquefaction risk for the site. Our geotechnical limitations are attached in Appendix A.

This report has been prepared in accordance with the Ministry of Building, Innovation and Employment document "Revised Guidance on Repairing and Rebuilding Houses Affected by the Canterbury Earthquake Sequence", version 3, dated December 2012, and subsequent updates, hereafter referred to as the MBIE Guidance.

3. Scope of Works

Our scope of works, as per the Short Form Agreement (SFA) dated 6 November 2023, is as follows:

- Site walkover assessment.
- Desktop review of geological and geotechnical information for the site.
- Engagement of a service clearance contractor.
- Geotechnical investigations to include at least 10x Test Pit Excavations to 4.0 m depth and at least 2x Cone Penetrometer Tests to a target depth of 15 m.
- 2x Soakage Testing with 100 mm Hand Augured Borehole to confirm site soakage.
- A geotechnical investigation report and Statement of Professional Opinion by a Chartered Professional Geotechnical Engineer, suitable for submission to council for Consenting purposes.

4. Site Description

The subject site, located at 182 and 200 Hamptons Road Development, Prebbleton is situated approximately 1.0 km southwest of Prebbleton township. The site is made up of two parcels of land that are legally described as:

- LOT 1 DP 25129
- LOT 1 DP 404189

The two parcels of land have a combined area of approximately 15.41 ha. The site is currently grassed fields used for cattle and sheep grazing. Lot 1 DP 25129 has one existing property towards the southern extent and Lot 1 DP 404189 has two existing properties along the eastern extent of the allotment. Topographically, the site and surrounding area is generally flat with a small depression located towards the centre of Lot 1 DP 25129, representing a possible historic river channel. The nearest significant waterway is Dawson Creek, located approximately 3.0 km east of the site.

Figure 1: Site location (sourced ECan Canterbury Maps)

4.1 Proposed development

At the time of compiling this report, CGW were not in receipt of any development plans for the site, however, we understand the client is proposing develop the site into a residential subdivision.

5. Desktop Study

5.1 MBIE Technical Category Zoning

The site is located within an area classified as MBIE Technical Category Rural & Unmapped. According to the MBIE Technical Category, rural and unmapped zones are assigned to properties in rural areas or areas beyond the extent of land damage mapping.

The sites liquefaction susceptibility is mapped as “liquefaction damage is possible” in the 2012, Eastern Canterbury Liquefaction susceptibility mapping completed by Brackley et al.

5.2 Flood Hazard

According to the online Selwyn's flooding and coastal hazards Interactive Viewer, part of the site is at risk of up to 1 m of inundation during a 200-year and 500-year ARI rainfall flood event. These areas are generally confined to the obvious depression towards the middle of the site that runs from the northwest to the southeast of the site.

We recommend, SDC are approached for confirmation of the required finished floor levels.

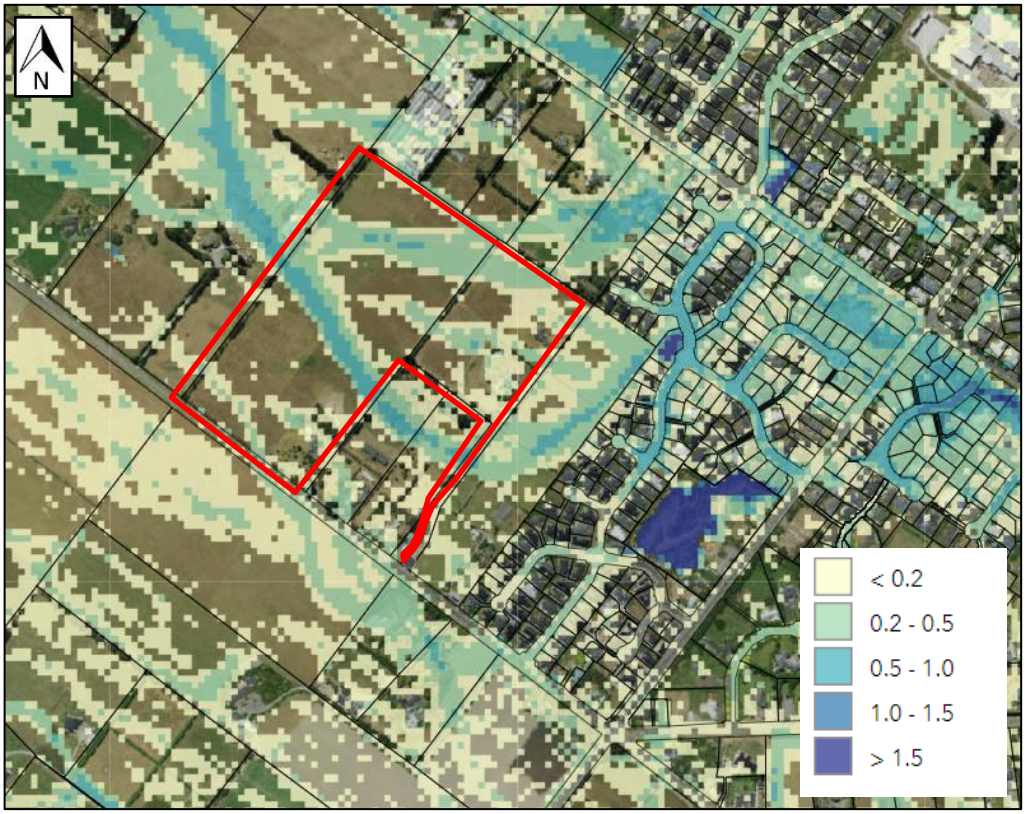


Figure 2: Flooding risk – 500-year ARI rainfall flood event. (sourced Selwyn's flooding and coastal hazards Interactive Viewer)

5.3 Hazardous Activities and Industries List (HAIL)

Based on a review of the Listed Land Use Register (LLUR), the site is not registered as a HAIL site. As described by Environment Canterbury (ECan), this does not mean that an activity with the potential to cause contamination has never occurred or is currently occurring at the site and as such will need to be assessed during the site walkover assessment and site investigations.

Our site walkover and investigations did not encounter any obvious evidence of site contamination or hazardous activities.

5.4 Nearby Existing Geotechnical Data

Existing geotechnical data available on the NZGD website and ECan Well logs has been reviewed as part of our assessment. The review was limited to relevant geotechnical testing within 400 m of the site, and nearby testing has been summarised in Table 2 below and presented in Appendix B.

Table 2 - Site Specific Investigation Information		
Test ID	**Distance to Site**	**Termination Depth (m)**
TP_140392	368m (NW)	3.4 m
TP_140389	350m (NW)	3.6 m
ECan Well: M36/8265	Northeast corner of site.	36 m

6. Geological Model

6.1 Published Geology

The soils across the Canterbury Plains comprise interbedded alluvial formations deposited by eastward flowing rivers emanating from the Southern Alps and draining towards the coast along Pegasus Bay. These alluvial soils, interlayered with marine deposits associated with previous fluctuations of sea level, comprise variable gravels, sand, silts and occasional peat, and can change markedly over relatively short distances, both horizontally and vertically. The sandy and silty soil types are considered susceptible to liquefaction, dependent upon grain size distribution, saturation and in-situ density.

The 1:250,000 scale online GNS geological map indicates the site is underlain by Holocene river deposits described as a 'modern river floodplain/low-level degradation terrace. Unweathered, variably sorted gravel/sand/silt/clay. Surfaces <2-degree slope.'

According to the GNS New Zealand Active Faults database the site is mapped near the following active faults:

- The Greendale Fault, with a recurrence interval of V (>10,000 to <=20,000 years), located approximately 10 km to the west.

6.2 Site Subsoil Classification

We consider that the site subsoil category in terms of NZS 1170.5 Clause 3.1.3 is Class D (deep or soft soil sites) based on the following:

- Forsyth et al (2008) indicates that rock in Canterbury is likely to be in the order of hundreds of metres.
- Investigations encountered river deposits, likely to extend to beyond 10 m depth.
- Clause 3.1.3 and Table 3.2 of NZS 1170.5:2004.

6.3 Site Walkover

A site walkover was undertaken during the geotechnical investigation on the 20th November 2023. Relevant observations are listed below:

- The site is generally flat, covered in grass and currently used for cattle and sheep grazing.
- No obvious boggy areas were observed underfoot.
- A slight drop in elevation is present through the centre of the site.
- A small drainage ditch is present alongside Hamptons Road.

6.4 Site Specific Investigation

Following an initial site walkover and services locate, the field investigations comprised of:

- 10 machine excavated test pits (TP) to a target depth of 3.0 m bgl; and
- 4 Hand Auger boreholes (AH) to a target depth of 3.0 m bgl; and
- 22 Dynamic Cone Penetrometer (DCP) tests to a target depth of 3.0 m bgl; and
- 2 Soakage tests (ST) completed within 100 mm auger holes.
- 2 Dynamic Probe Super Heavy (DPSH) tests to a target depth of 15 m bgl. The DPSH was undertaken in lieu of the CPT testing as a result of the ground conditions encountered during the shallow investigations.

A visual-tactile field classification of the subsoils encountered during test pit excavations was carried out in accordance with 'Guidelines for the Field Classification and Description of Soil and Rock for Engineering Purposes' (NZGS, 2005) and Dynamic Cone Penetrometer testing was carried out in accordance with NZS 4402.1988, Test 6.5.2, 'Dynamic Cone Penetrometer'.

Investigation details are provided in Table 3. All test locations are presented in Appendix C. Machine excavator test pit logs and Dynamic Cone Penetrometer test logs are presented in Appendix D.

Table 3 - Site Specific Investigation Information			
Test ID	**Elevation (R.L)***	**Termination Depth (m bgl)**	**Further Information (Groundwater, piezometer, etc)**
TP/DCP01	24	TP: 2.85 DCP: 1.1	No groundwater encountered. Target depth achieved.
TP/DCP02	24	TP: 2.80 DCP: 1.2	
TP/DCP03	24	TP: 2.90 DCP: 0.9	
TP/DCP04	23	TP: 3.00 DCP: 1.2	
TP/DCP05	24	TP: 2.80 DCP: 1.2	
TP/DCP06	23	TP: 2.90 DCP: 1.2	
TP/DCP07	24	TP: 2.90 DCP: 1.0	
TP/DCP08	23	TP: 2.80 DCP: 1.1	
TP/DCP09	23	TP: 2.85 DCP: 0.8	
TP/DCP10	22	TP 2.80 DCP: 07	
HA/DCP01 – 04	22	HA: 0.35 – 0.50 DCP: 0.4 – 1.2	No groundwater encountered. Tests refused on inferred gravel.
ST01- 02	23	0.90 – 1.00	Soakage test
DPSH01	24	0.8	Refusal on inferred dense gravel.
DPSH02	23	1.4	

7. Ground Model

7.1 Site Subsurface Conditions

Subsurface conditions based on those encountered within the test pits are presented in Table 4 below.

Table 4 - Site Ground Model

Soil Type	Depth to bottom of Layer (m)	Layer Thickness (m)	DCP (Blows/100mm)	Relative Density / Consistency
SILT, minor fine sand, (TOPSOIL)	0.2 – 0.6[1]	0.2 – 0.6[1]	1 - 5	Firm
SILT, Silty Fine SAND (LOESS/ ALLUVIAL DEPOSITS)[1]	0.6 – 1.3[1]	0.3 – 0.8	3 – 1-	Firm to Stiff Silts Medium Dense to Dense Sands
Sandy GRAVEL (ALLUVIAL DEPOSITS)	>36[3]	Not determined	8 – 25+	Medium dense to very dense

Note 1: Average topsoil depth 0.3 m. Deeper topsoil only encountered within TP08
Note 2: SILT/Silty SAND Silt layer was not encountered within TP01 and TP10. Gravel was encountered immediately below the topsoil.
Note 3: Depth of gravel deposits inferred based on ECan well log M36/8265

7.2 Groundwater

Groundwater was not encountered within the test pits or hand auger boreholes during the investigation, where soil moisture descriptions at the base of each pit were described as 'moist and/or wet'.

Nearby ECan well M36/8265 and BX23/1451 located within the site indicates that groundwater is present at a depth of approximately between 6.5 m and 7.0 m bgl.

It should be noted that groundwater conditions and levels may vary in response to environmental factors including seasonal variations or weather events.

8. Geotechnical Assessment

8.1 Liquefaction Assessment

The soils encountered within the geotechnical testing were qualitatively assessed for liquefaction potential. Based on our desktop review of the site geology and our experience with similar soils in the Canterbury region, we consider soils prone to liquefaction are typically saturated silts and sands located below the groundwater table.

The geotechnical testing generally encountered a veneer of silt deposits overlying gravelly soils to depths of 2.9m bgl. Dynamic Cone Penetrometer (DCP) and Dynamic Probing Super Heavy (DPSH) testing indicates the gravel deposits are dense to very dense. ECan well records on the site indicate these soils are likely to be underlain by similar soils to at least 36 m bgl. Additionally, groundwater is presumed to exist at depths below 5.0 m bgl.

Based on the site investigation testing and the liquefaction mapping presented in Section 5.1, we consider the liquefaction risk to be low, consistent with a MBIE Technical Category TC1 categorisation.

8.2 Geotechnical Ultimate Bearing Capacity

With reference to the Dynamic Cone Penetrometer results and Shear Vane results, in accordance with NZS3604:2011 and the MBIE Guidance, a preliminary Ultimate Bearing Capacity (UBC) of 300 kPa is available within the natural soil beneath the topsoil at a depth of between 0.2 m and 0.6 m bgl.

In accordance with the principles of AS/NZS1170.0:2002 Section 3.2, a Strength Reduction Factor of $\Phi = 0.5$, as per B1/VM4 Section 3.5, should be applied to the Ultimate Bearing Capacity, which should then equal or exceed the factored Ultimate Limit State design actions.

8.3 Infiltration and Permeability

Stormwater disposal testing was completed as per NZBC E1/VM1. Two 100 mm diameter hand auger boreholes were excavated to depths of 0.9 m and 1.0 m bgl into the underlying natural silty soils, as this represented the most likely conditions for suitable infiltration above the groundwater table. The tests were performed in the location of the likely stormwater basins. Logs for this borehole are presented in Appendix F.

The borehole sides were scoured out by running a length of metal up and down the sides. The boreholes were soaked and topped up for the prescribed 2 hours prior to testing. The boreholes were then re-filled with water and the change in head

measured over time. The tests were concluded after four hours. The results are summarised in Table 5 below and presented in Appendix F.

Table 5 - Soakage Hole Testing Results Summary

Test ID	Test Depth (m bgl)	Material	Pre-soak time (minutes)	Test time (minutes)	Flow rate (mm/hr) (Average and Minimum)
SH01	1.0	SILT and fine SAND	120	180	Average: 390 Minimum: 70
SH02	0.9	SILT and fine SAND	120	240	Average: 360 Minimum: 90

Based on the results of the falling head test, correlated with published data for similar materials, a minimum permeability of 180 mm/hr (factored 0.5) can be adopted for the natural silt material encountered within the upper 1.0 m of soils at the site. Gravelly soils, which are potentially more permeable, underlie site at variable depths. A greater (> 200 mm/hr) permeability can be allowed for within the granular material.

9. Assessment Against RMA Section 106

9.1 Criteria

In accordance with the Resource Management Act 1991 (RMA), the site has been assessed in accordance with Section 106 for natural hazards. Section 106 states:

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

For the purpose of subsections 1a, an assessment of the risk from natural hazards requires a combined assessment of:

- *The likelihood of natural hazards occurring;*
- *The material damage to land in respect of which consent is sought, other land or structures that would results from natural hazards;*
- *Any likely subsequent use of 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.*

9.2 RMA Section 106 Assessment

The site has been assessed, based on site mapping, site investigations and research of local information, for the following natural hazards:

- Fault Rupture – the site is not located within an identified active fault hazard zone and geological mapping indicates there are no mapped active faults within 10 km.
- Slope Stability – The site and surrounding areas are generally flat and low lying. Consequently, slope instability risk can be discounted.
- Inundations (soil, rock debris) – the site is not located at the base of a major slope and debris inundation can be discounted.
- Liquefaction induced settlement – Our liquefaction assessment of the site in its current state indicates there is a low risk of liquefaction induced ground damage consistent with a TC1 classification.

However, we consider the site may be subject to the following hazards, which will need to be mitigated as part of the development design:

- Inundations (flooding) – The Selwyn District Council natural hazards flooding map indicates that a proportion of the site is mapped in a flood area. We recommend the council is a contacted for further information.

In our opinion, under Section 106 of the RMA, there are no geotechnical reasons preventing the development, provided the developer takes the appropriate measures as recommended in this report and follows appropriate industry standards for erosion control.

10. Recommendations

In this section we will present the criteria for new foundations for the site based on our geotechnical analysis and assessment.

10.1 Foundation Options

We understand the client is proposing to develop the site into a residential subdivision. Based on our assessment and analysis we have identified the site to be consistent with a Technical Category TC1 categorisation with regards to liquefaction induced settlement risk. We recommend either TC1 waffle slab foundations or NZS3604 foundations be considered, relying on an Ultimate Bearing Capacity of 300 kPa at a depth of between 0.2 m and 0.6 m immediately below the topsoil.

We recommend lot specific testing is carried out as per NZS3604 requirements to confirm lot specific founding conditions.

10.2 Earthworks

Earthworks across the site should be undertaken in accordance with NZS4431:2022.

It is understood that cut and fill excavations will likely be required to form foundation subgrades. Any topsoil, organic matter and deleterious material underlying any proposed foundations should be stripped and removed from site.

Site preparation should generally include the following procedures:

- Remove vegetation, topsoil and soil containing significant amounts of organic material from beneath building footprints, foundations and proposed fill areas;
- Excavate where required to the foundation levels;
- Proof roll and compact the exposed subgrade materials using a heavy roller to reveal soft or loose areas and to densify the subgrade soils, where required. Soft or loose areas which do not improve with compaction should be over excavated and replaced with compacted engineered fill; and
- If fill is required, backfill where required to the design foundation levels with compacted engineered fill.

Fill should be placed in layers not exceeding 200 mm loose thickness and compacted to the recommended level prior to placing the next layer.

The recommended compaction level is a density ratio of at least 95% Standard Compaction MDD (Maximum Dry Density) as specified by NZS4431. If required, additional imported fill materials will need to be tested for geotechnical suitability/compaction criteria and be approved by CGW prior to use.

Earthworks should be supervised by a suitably qualified person and compaction levels checked and certified by field density (Nuclear Density – ND) testing or Clegg hammer testing, at appropriate spacings and lift intervals. Further testing including soil sampling and laboratory testing will be required to inform an earthwork specification document.

11. Construction Considerations

11.1 Pavement and Roading

All topsoil and soft organic soils should be removed from any proposed pavement areas. Following topsoil/non-engineered fill striping we consider the existing ground provides a suitable material for the base of any proposed pavement area. We recommend that the pavement design be carried out using an unsoaked CBR value of around 4%, which is applicable for the underlying soils across the site.

12. Further Geotechnical Involvement

12.1 Lot Specific Geotechnical Testing

For further lot-specific testing required to pass a building consent, it is recommended that geotechnical site-specific testing is undertaken to accurately determine and confirm the bearing capacity for each lot. CGW recommends machine excavated test pits (TP) and Dynamic Cone Penetrometer (DCP) testing.

12.2 Geotechnical Drawing Review

A geotechnical engineer familiar with the findings of this report should be engaged to review the final working drawings for each lots proposed development prior to submission to the Building Consent Authority, to ensure the geotechnical recommendations of this report have been implemented correctly. Further geotechnical analysis may be warranted at this stage subject to the specifics of the development proposal.

12.3 Construction Considerations

A Geotechnical Engineer familiar with the findings of this report should be engaged to carry out observations during foundation excavations to confirm soil and foundation conditions are consistent with the design criteria recommended within

this report. Inspections will not be carried out prior to Council issuing the required Resource and/or Building Consents, and unconsented works will not be inspected.

The recommendations given in this report are based on limited site data from discrete locations. Variations in ground conditions may exist across the site. It is in the interests of all parties that we be retained to observe excavations and foundation conditions exposed during construction, so that ground conditions can be compared with those assumed in formulating this report. In any event, we should be notified of any variations in ground conditions from those described or assumed to exist.

Without sufficient observations during the subgrade preparation prior to placement of fill or concrete, CGW Consulting Engineers will not be in a position to provide engineering signoff (i.e. Producer Statement PS4). We recommend once a Building Consent is issued, it be forwarded to us for review. We will then on-forward a schedule of inspections required by us in order to meet the consent conditions. Areas where concrete or fill are placed without prior geotechnical observation will be specifically excluded from completion documentation.

13. References

1. Brackley Et Al (2012). Eastern Canterbury liquefaction susceptibility.
2. BS 1377: Part 9:1990. Methods for test of soils for civil engineering purposes, In-situ tests.
3. Forsyth, P. J.; Barrell, D.J.A.; Jongens, R. (compilers) 2008. Geology of the Christchurch Area, Scale 1:250,000, GNS Science, Institute of Geological & Nuclear Sciences, Lower Hutt. Geological Map 16.
4. GNS, 2011. Geological Map of New Zealand 1,250:000 (online), available at https://data.gns.cri.nz/geology/ (accessed 08/12/23).
5. GNS, 2011. New Zealand Active Faults Database (online), available at http://maps.gns.cri.nz/website/af/ (accessed 08/12/23).).
6. Idriss, I.M., and Boulanger, R.W., 2008. Soil liquefaction during earthquakes, Earthquake Engineering Research Institute Monograph, MN012.
7. Ministry of Business, Innovation and Employment, 2012. Repairing and rebuilding house affected by the Canterbury earthquake sequence, Christchurch, New Zealand.
8. Ministry of Business, Innovation and Employment, 2014a. Acceptable Solutions and Verification Methods for New Zealand Building Code Clause B1 Structure, Verification Method B1/VM4, Foundations, New Zealand.
9. Ministry of Business, Innovation and Employment, 2014b. Clarifications and updates to the Guidance 'Repairing and rebuilding houses affected by the Canterbury earthquakes', Issue 7, October 2014.
10. New Zealand Geotechnical Database (NZGD) online map viewer (accessed 08/12/23).
11. NZGS, 2005. Field Description of Soil and Rock. Guideline for the Filed Classification and Description of Soil and Rock for Engineering Purposes, NZ Geotechnical Society Inc, Wellington, New Zealand.
12. Selwyn District Council, Selwyn's flooding and coastal hazards interactive viewer, available at https://apps.canterburymaps.govt.nz/SelwynNaturalHazards/ 3 (accessed 10/12/23).

Appendix A: Limitations

This report has been prepared solely for the benefit of our client, Suburban Estates Ltd, as per our brief and an agreed consultancy agreement. The reliance by any other parties on the information or opinions contained in this report shall, without our prior agreement in writing, be at such parties' sole risk.

The conclusions and recommendations contained within this report are based on the investigations as described in detail above. The nature and continuity of subsoil conditions are inferred and it must be appreciated that actual conditions could vary considerably. Defects and unforeseen ground conditions may remain undetected which might adversely affect the stability of the site and the recommendation made herein.

This report has been prepared solely to address the issues raised in our brief, and shall not be relied on for any other purpose.

Where we have provided comments on aesthetic issues these need to be confirmed by an architect or other expert in the field.

In the event the third party investigation data has been provided to us, the client acknowledges that we have placed reliance on this information to produce our report and CGW will accept no liability resulting from any errors or defect in the third party data provided to us.

Appendix B: Nearby Geotechnical Data

CGW Consulting Engineers

Project Title: Stirling Park Subdivision, Hamptons Road, Prebbleton

TP01

Project Number: 18258

Client: Suburban Estates Ltd

Sheet 1 Of 1

GL (mAOD): 21.00

N Coord: -43.589403

E Coord: 172.502075

Date: 19/07/2018

Method: Digger

Logged By: JF

Scale: 1:30

Depth (m)	Type	Blows per 100mm 0 5 10 15 20	Level	Legend	Depth (m)	Description	Water
			20.70		0.30	SILT, some fine to medium sand, trace rootlets and fine to coarse, sub rounded gravels; dark brown. Soft, moist, low plasticity (TOPSOIL).	
						Sandy SILT, trace fine to coarse gravels; brown mottled orange-brown. Soft, moist, non plastic.	
			20.20		0.80		
			20.00		1.00	Sandy GRAVEL with minor cobbles; brown. Medium Dense to dense; moist; well graded. Sand is coarse. Gravel is fine to coarse, sub rounded.	
			19.00		2.00	2.00 Becomes with some cobbles. Dense.	
			18.00		3.00		
			17.40		3.60	End Of Hole At 3.60 m	

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

AGS

REMARKS

No Groundwater Encountered
End of Hole at 3.6m. Hole Collapsing.

NZGD ID: TP_140389

CGW Consulting Engineers

Project Title: Stirling Park Subdivision, Hamptons Road, Prebbleton

TP04

Project Number: 18258

Client: Suburban Estates Ltd

Sheet 1 Of 1

GL (mAOD): 21.00

N Coord: -43.590029

E Coord: 172.501671

Date: 19/07/2018

Method: Digger

Logged By: JF

Scale: 1:30

Depth (m)	Type	Blows per 100mm 0 5 10 15 20	Level	Legend	Depth (m)	Description	Water
			20.80		0.20	SILT, minor fine sand, trace rootlets and fine to coarse, sub rounded gravels; dark brown. Soft, moist, low plasticity (TOPSOIL).	
			20.20		0.80	Silty SAND with trace fine to coarse, sub rounded gravels; light brown. Loose to medium; moist; poorly graded. Sand is medium to coarse.	
			20.00		1.00	Sandy GRAVEL with minor cobbles; brown. Medium Dense to dense; moist; well graded. Sand is fine to coarse. Gravel is fine to coarse, sub rounded.	
						1.40 Becomes with some cobbles.	
			19.00		2.00		
			18.00		3.00		
			17.60		3.40	End Of Hole At 3.40 m	

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

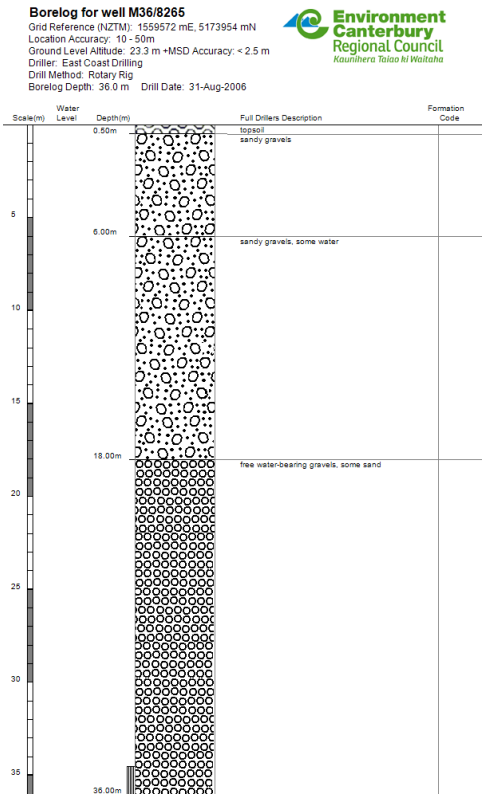
AGS

REMARKS

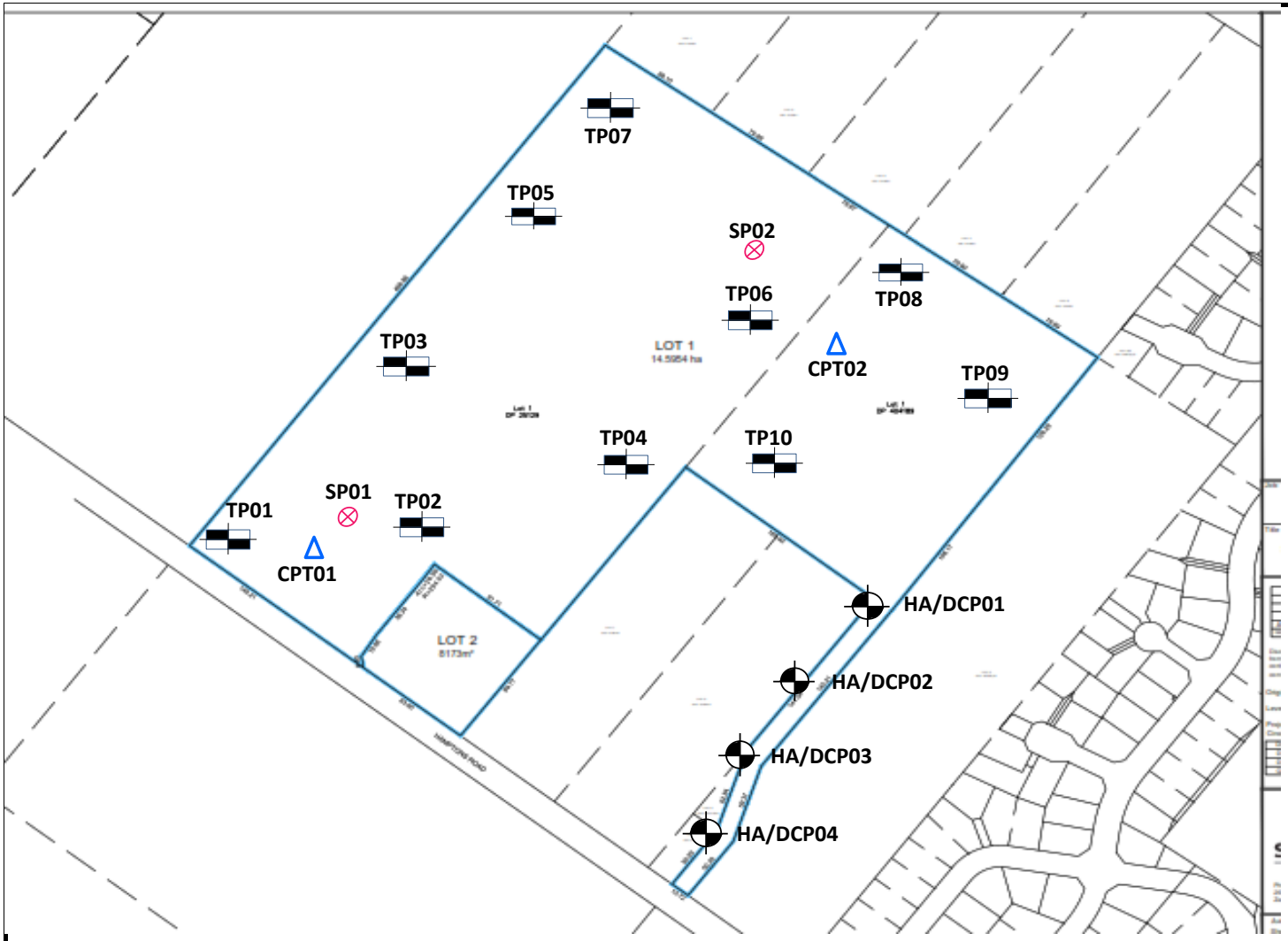
No Groundwater Encountered
End of Hole at 3.4m. Hole Collapsing.

NZGD ID: TP_140392

Bore Log


Borelog for well M36/8265
Grid Reference (NZTM): 1559572 mE, 5173954 mN
Location Accuracy: 10 - 50m
Ground Level Altitude: 23.3 m +MSD Accuracy: < 2.5 m
Driller: East Coast Drilling
Drill Method: Rotary Rig
Borelog Depth: 36.0 m Drill Date: 31-Aug-2006
Environment Canterbury Regional Council
Kaunihera Taiao ki Waitaha
Scale(m)
Water Level
Depth(m)
Full Drillers Description
Formation Code
0.50m
topsoil
sandy gravels
6.00m
sandy gravels, some water
18.00m
free water-bearing gravels, some sand
36.00m
5
10
15
20
25
30
35

Appendix C: Test Location Plan



N

Approximate True North

LEGEND

- TP/DCP
- HA/DCP
- SP
- CPT

Notes:

1. CGW Consulting Engineers Test Location Plan adapted from Top of the South Maps.
2. It should be borne in mind that locations of features are approximate only.
3. Original plan size A4.

CGW CONSULTING ENGINEERS

Civil Structural Environmental Geotechnical

Nelson Ph: 548 - 8259

Christchurch Ph: 348 - 1000

DATE:	November 2023
DRAWN:	TVD
SCALE:	NTS
CAD REF:	

Test Location Plan

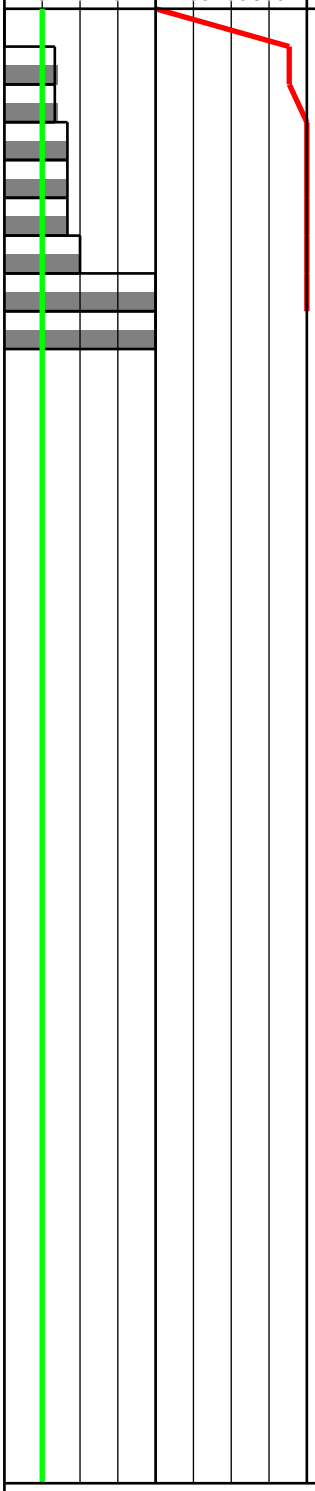
182-200 Hamptons Road, Prebbleton

DRAWING NO: **230634**

SHEET 1 OF 1

Appendix D: CGW Investigation Logs

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	HA/DCP01
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: Hand Auger/DCP	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
			0.20	SILT; brown. Stiff, dry, non plastic, trace rootlets. (TOPSOIL)	
			0.50	SILT; light grey. Stiff, dry, non plastic. (LOESS/ALLUVIAL DEPOSITS.)	
			1.00	End Of Hole At 0.50 m	
			2.00		
			3.00		

KEY

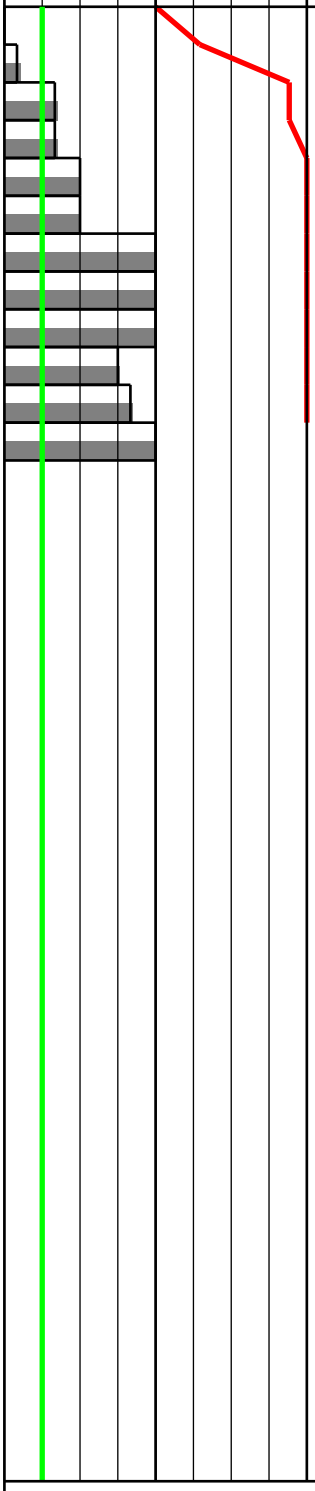
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at refusal.
3x attempts.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	HA/DCP02
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: Hand Auger/DCP	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
			0.40	SILT; trace fine sand, light brown. Firm, dry, non plastic, trace rootlets. (TOPSOIL)	
			0.50	SILT; minor fine sand, light greyish brown. Stiff, dry, non plastic. (LOESS/ALLUVIAL DEPOSITS.)	
				End Of Hole At 0.50 m	
			1.00		
			2.00		
			3.00		

KEY

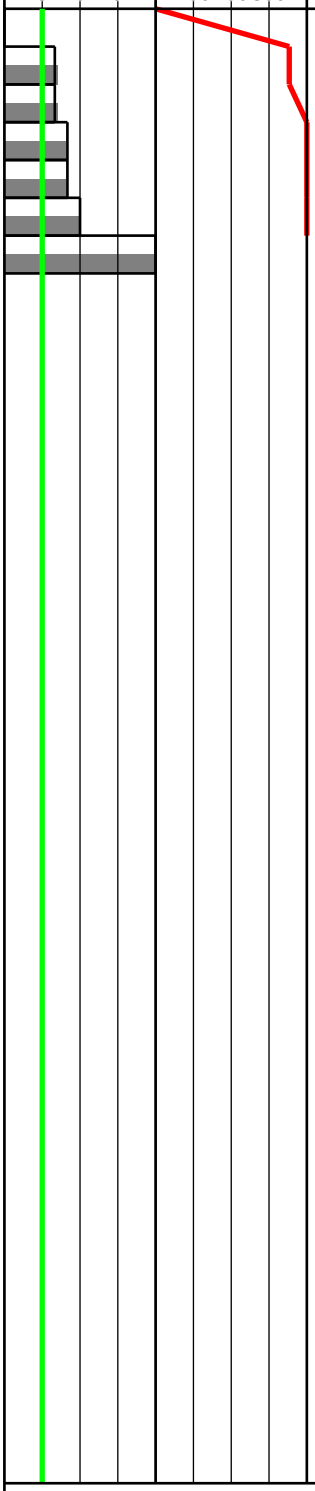
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at refusal.
3x attempts.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	HA/DCP03
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: Hand Auger/DCP	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Legend	Depth (m)	Description	Water
	0.45	SILT; minor fine to coarse gravel, trace fine sand, brown. Stiff, dry, non plastic, trace rootlets. Gravel: sub rounded to rounded, SW. (TOPSOIL)	
		End Of Hole At 0.45 m	
	1.00		
	2.00		
	3.00		

Samples / Testing

Level mAHD

KEY

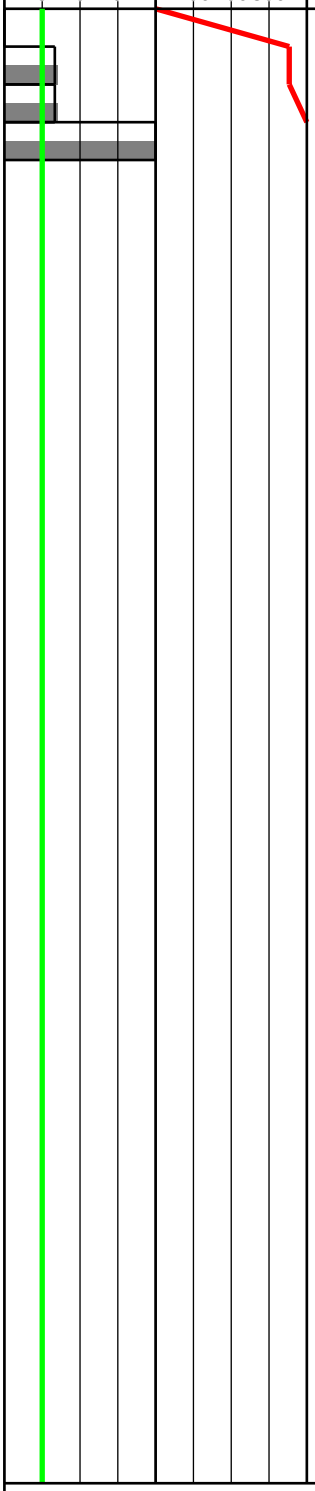
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at refusal.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	HA/DCP04
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: Hand Auger/DCP	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Level mAHD	Legend	Depth (m)	Description	Water
		0.35	SILT; trace fine sand, trace fine to coarse gravel, brown. Stiff to very stiff, dry, non plastic. Gravel: angular. (TOPSOIL)	
			End Of Hole At 0.35 m	
		1.00		
		2.00		
		3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at refusal.
3x attempts.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	SP01
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: Hand Auger	Logged By: TP	Scale: 1:20 Sheet 1 Of 1

Blows (per 100mm) 3 6 9	UBC (kPa) (Stockwell) 100 200 300	Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
						SILT; trace gravel, brown. Dry to moist, non plastic, trace rootlets. Gravel: rounded. (TOPSOIL)	
					0.70	0.60 Trace sand.	
						SAND; light brown. Moist, non plastic. (ALLUVIAL DEPOSITS.)	
					1.00	End Of Hole At 1.00 m	
					2.00		
					3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at refusal.
3x attempts.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	SP02
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: Hand Auger	Logged By: TP	Scale: 1:20 Sheet 1 Of 1

Blows (per 100mm) 3 6 9	UBC (kPa) (Stockwell) 100 200 300	Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
						SILT; trace gravel, brown. Dry to moist, non plastic, trace rootlets. Gravel: rounded. (TOPSOIL)	
						0.50 Trace sand.	
					0.70		
						SAND; light brown. Moist, non plastic. (ALLUVIAL DEPOSITS.)	
					0.90		
						End Of Hole At 0.90 m	
					1.00		
					2.00		
					3.00		

KEY

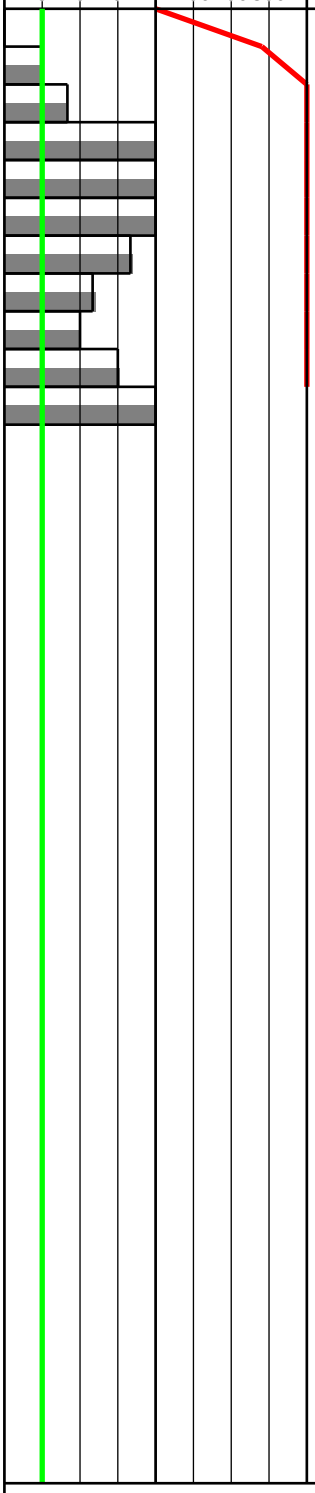
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at refusal.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	TP01
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: 8T Excavator	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Level mAHD	Legend	Depth (m)	Description	Water
		0.20	SILT; light brown. Firm, dry, non plastic, trace rootlets. (TOPSOIL)	
		0.80	Fine to coarse GRAVEL; minor silt, minor cobbles, trace fine sand, light brown. Stiff to very stiff, moist, non plastic. (ALLUVIAL DEPOSITS.)	
		1.00	Fine SAND; some fine to coarse gravel and boulders, greyish brown. Very stiff, moist, non plastic. (ALLUVIAL DEPOSITS.)	
		1.65	Fine sandy fine to coarse GRAVEL/BOULDERS; greyish brown. Very stiff, wet, non plastic. (ALLUVIAL DEPOSITS.)	
		2.00		
		2.85	End Of Hole At 2.85 m	
		3.00		

KEY

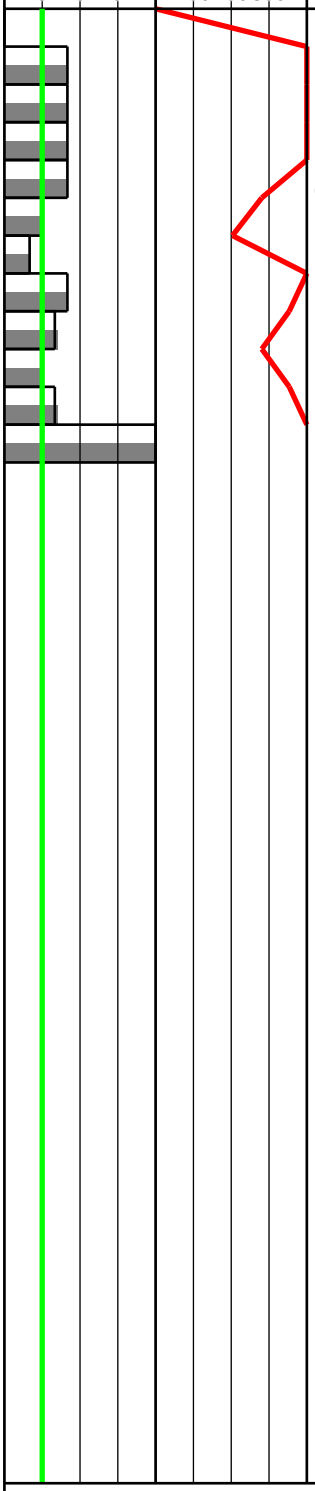
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at refusal.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	TP02
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: 8T Excavator	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
			0.25	SILT; brown. Stiff, dry to moist, non plastic, some rootlets. (TOPSOIL)	
0.5 V-UTP			0.80	Silty SAND; light brown. Stiff, dry to moist, non plastic. (LOESS/ALLUVIAL DEPOSITS.)	
			1.00	Fine SAND; some fine gravels/minor cobbles/ boulders, trace silt, greyish brown. Firm to very stiff, moist, non plastic. (ALLUVIAL DEPOSITS.)	
			1.50	Fine sandy fine to coarse GRAVEL/BOULDERS; greyish brown. Very stiff, wet, non plastic. (ALLUVIAL DEPOSITS.)	
			2.00		
			2.80	End Of Hole At 2.80 m	
			3.00		

KEY

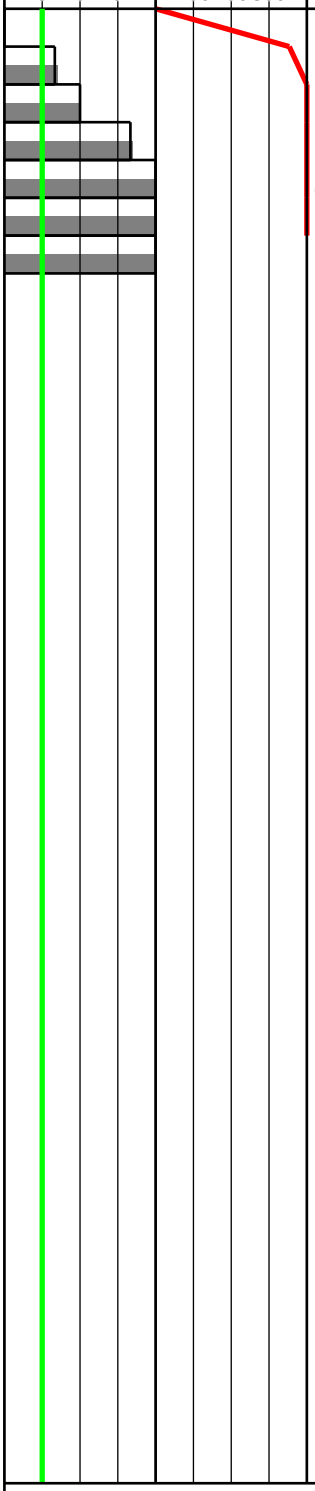
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at target depth.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	TP03
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: 8T Excavator	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
0.5 V-UTP			0.30	SILT; trace fine sand, brown. Firm to very stiff, dry, non plastic, trace rootlets. (TOPSOIL)	
			0.80	SILT; minor fine sand, trace clay, brown. Very stiff, dry to moist, slightly plastic. (LOESS/ALLUVIAL DEPOSITS.)	
			1.00	Fine SAND; some fine to coarse gravel and boulders, minor silt, greyish brown. Very stiff, moist to wet, non plastic. (ALLUVIAL DEPOSITS.)	
			1.70	Fine sandy fine to coarse GRAVEL/BOULDERS; greyish brown. Very stiff, wet, non plastic. (ALLUVIAL DEPOSITS.)	
			2.90	End Of Hole At 2.90 m	
			3.00		

KEY

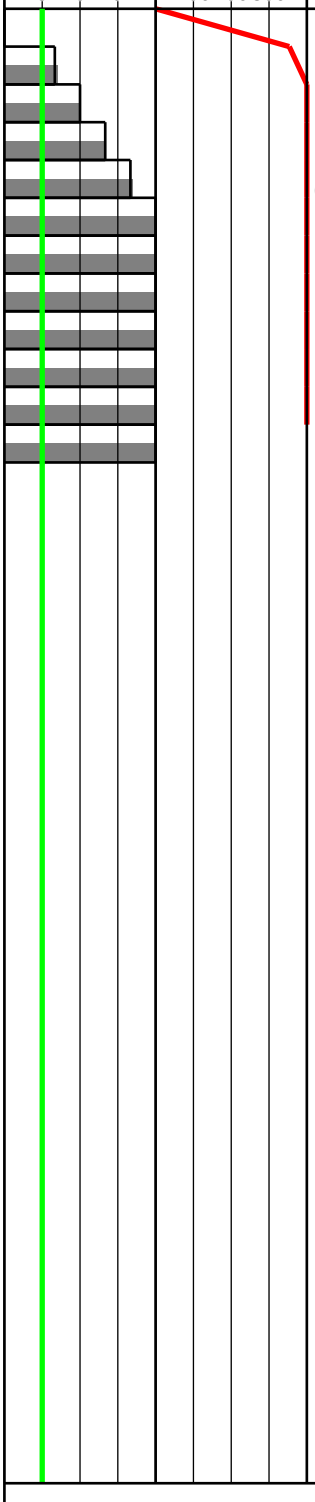
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at target depth.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	TP04
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: 8T Excavator	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
				SILT; brown. Firm to very stiff, dry to moist, non plastic, trace rootlets. (TOPSOIL)	
			0.40		
0.5 V-101/34kPa				SILT; trace fine sand, light brown. Very stiff, dry to moist, non plastic. (LOESS/ALLUVIAL DEPOSITS.)	
			0.80		
			1.00	Fine SAND; some fine to coarse gravel/boulders, some silt, light brown. Firm to very stiff, moist to wet, non plastic. (ALLUVIAL DEPOSITS.)	
				1.50 No Silt.	
			2.00		
			2.30	Fine sandy fine to coarse GRAVEL/BOULDERS; brownish grey. Very stiff, wet, non plastic. (ALLUVIAL DEPOSITS.)	
			3.00		
				End Of Hole At 3.00 m	

KEY

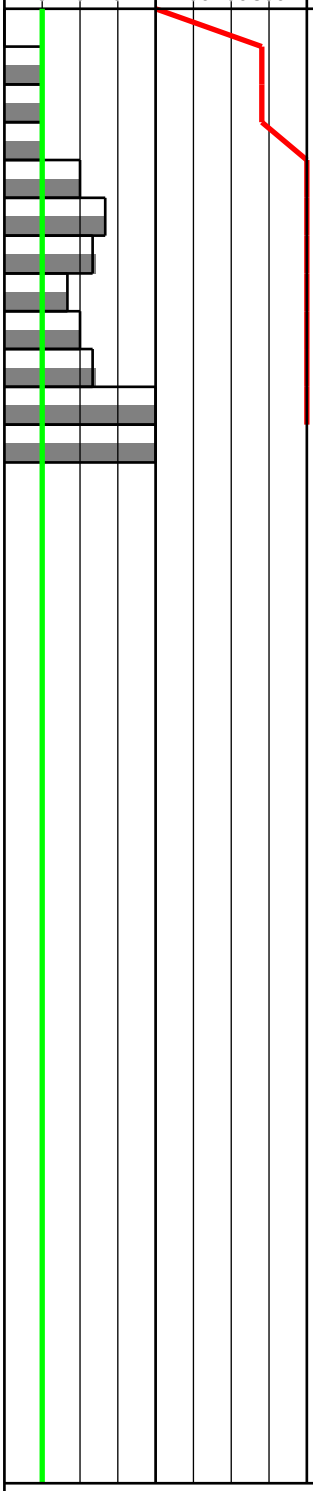
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at target depth.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	TP05
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: 8T Excavator	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
0.5 V-107/31kPa			0.30	SILT; trace fine sand, brown. Firm, moist, non plastic, minor rootlets. (TOPSOIL)	
			0.80	SILT; minor fine sand, trace clay, light brown. Stiff to very stiff, dry to moist, slightly plastic. (LOESS/ALLUVIAL DEPOSITS.)	
			1.00	Fine SAND; some silt, some fine coarse gravel/boulders, greyish brown. Stiff to very stiff, moist to wet, non plastic. Gravel: rounded, SW. (ALLUVIAL DEPOSITS.)	
			2.00		
			2.10	Fine to coarse gravelly/bouldery fine SAND; trace silt, greyish brown. Very stiff, wet, non plastic. Gravel: rounded, SW. (ALLUVIAL DEPOSITS.)	
			2.80	End Of Hole At 2.80 m	
			3.00		

KEY

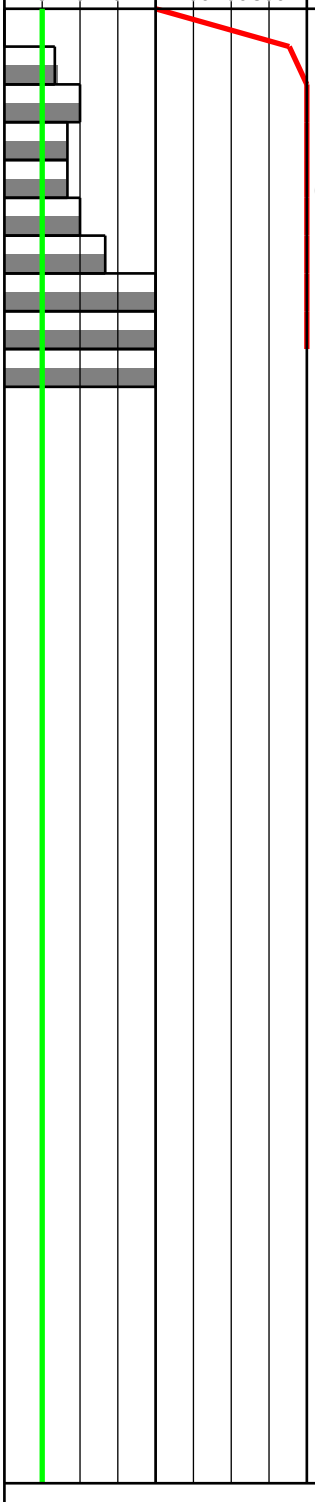
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at target depth.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	TP06
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: 8T Excavator	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
0.5 V-128/41kPa			0.30	SILT; trace fine sand, light brown. Firm to stiff, dry to moist, non plastic, trace rootlets. (TOPSOIL)	
			0.70	SILT; minor fine sand, trace clay, light brown. Stiff, moist, slightly plastic. (LOESS/ALLUVIAL DEPOSITS.)	
			1.00	Fine to coarse gravelly/bouldery fine SAND; greyish brown. Very stiff. dry to moist, non plastic. Gravel/boulders: rounded, SW. (ALLUVIAL DEPOSITS.)	
			1.90		
			2.00	Fine sandy fine to coarse GRAVEL/BOULDERS; brownish grey. Very stiff. moist to wet, non plastic. (ALLUVIAL DEPOSITS.)	
			2.90		
			3.00	End Of Hole At 2.90 m	

KEY

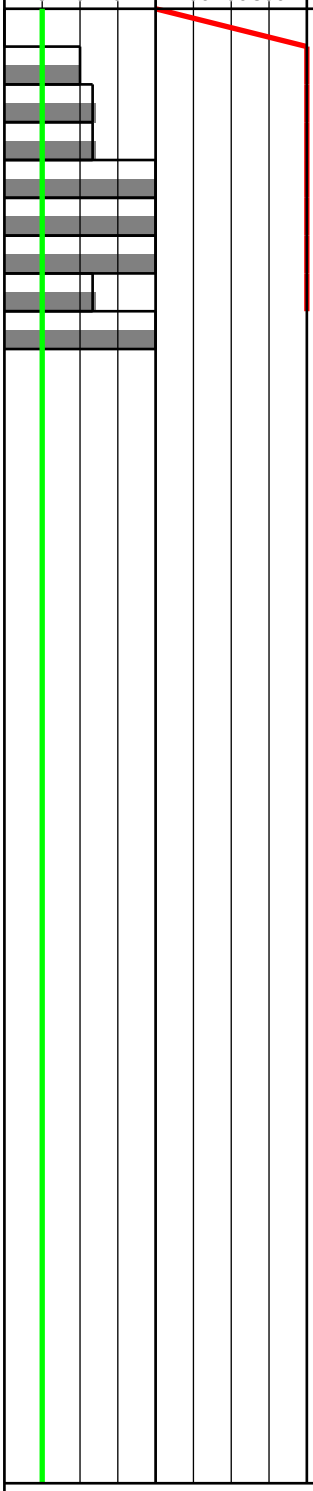
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at target depth.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	TP07
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: 8T Excavator	Logged By:	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
0.5 V-123/42kPa			0.30	SILT; minor fine sand brown. Firm to stiff, dry to moist, non plastic, some rootlets. (TOPSOIL)	
			0.60	SILT; trace fine sand, light brown. Very stiff, moist, non plastic. (LOESS/ALLUVIAL DEPOSITS.)	
			1.00	Fine to coarse gravelly/bouldery fine SAND; brownish grey. Very stiff, dry to moist, non plastic. (ALLUVIAL DEPOSITS.)	
			2.00	Fine SAND; some fine to coarse gravel/boulders, greyish brown. Very stiff, moist to wet, non plastic. Gravel: rounded, SW. (ALLUVIAL DEPOSITS.)	
			2.90	End Of Hole At 2.90 m	
			3.00		

KEY

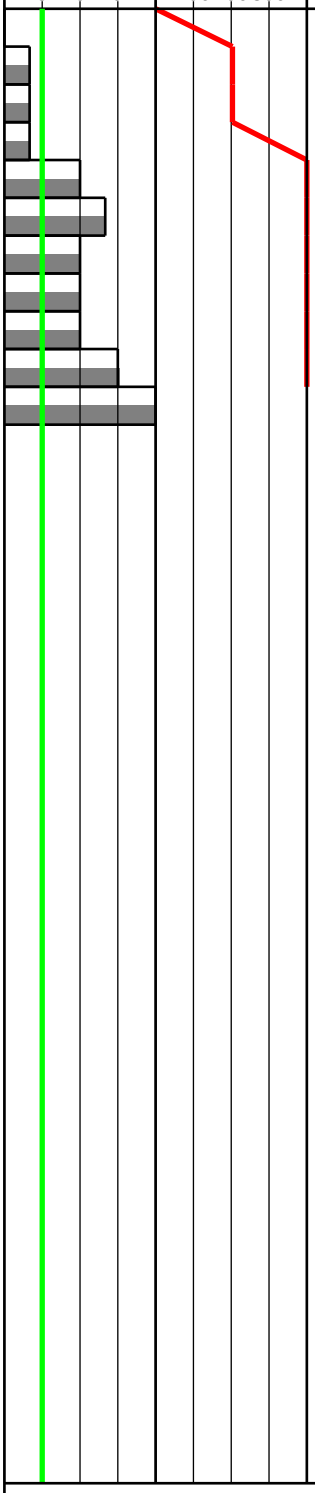
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	TP08
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: 8T Excavator	Logged By: TVD	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
			0.60	SILT; brown. Firm to stiff, dry to moist, non plastic, trace rootlets. (TOPSOIL)	
			1.00	SILT; light brown. Very stiff, moist, low plasticity. (LOESS/ALLUVIAL DEPOSITS.) 1.00 Greyish brown mottled orange.	
			1.30	Fine to coarse gravelly medium to coarse SAND; trace cobbles and boulders, brownish grey. Very stiff, moist. Gravel: rounded to sub rounded. (ALLUVIAL DEPOSITS.) 1.80 Some cobbles to boulders, wet. 2.00 Greyish brown.	
			2.00		
			2.80	End Of Hole At 2.80 m	
			3.00		

KEY

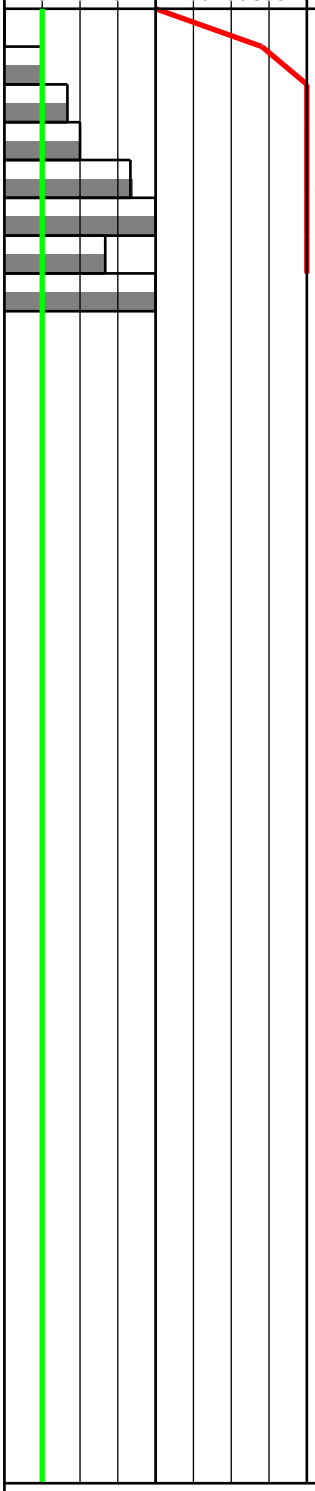
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at target depth.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	TP09
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method:	Logged By: RC	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
				SILT; dark brown. Firm to stiff, dry to moist, non plastic, trace rootlets. (TOPSOIL)	
0.5 V-193/51kPa			0.40	SILT; light brown. Very stiff, moist, non plastic. (LOESS/ALLUVIAL DEPOSITS.)	
			0.60	Fine to coarse gravelly medium to coarse SAND; trace cobbles to boulders, brown. Very stiff, moist. (ALLUVIAL DEPOSITS.)	
			1.00		
			2.00	2.00 Trace cobble, wet.	
			2.85	End Of Hole At 2.85 m	
			3.00		

KEY

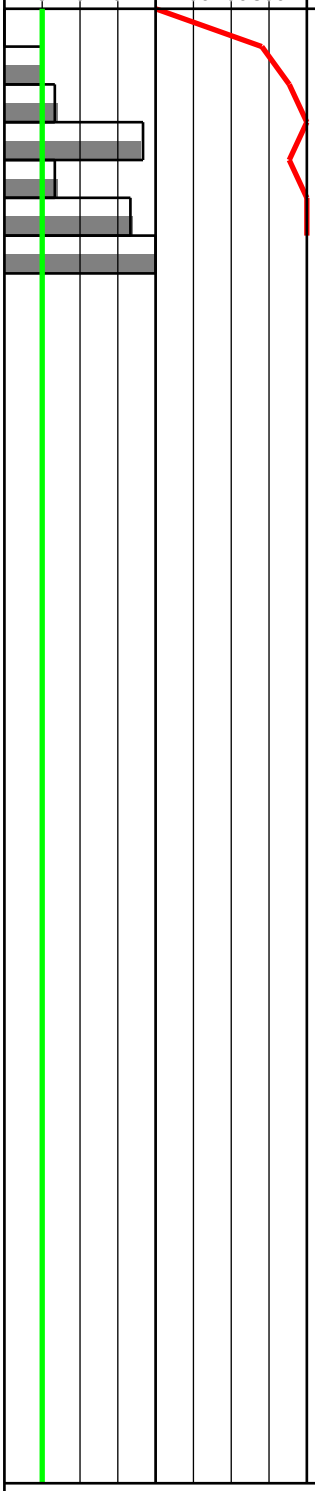
D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at target depth.

CGW Consulting Engineers	Project Title: 182-200 Hamptons Road, Prebbleton		
	Project Number: 230634	Client: Suburban Estates Ltd	TP10
	GL (mAOD):	N Coord: 0	E Coord: 0
Date: 19/11/2023	Method: 8T Excavator	Logged By: RC	Scale: 1:20 Sheet 1 Of 1



Samples / Testing	Level mAHD	Legend	Depth (m)	Description	Water
				SILT; trace fine sand, light brown. Firm to very stiff, dry, non plastic, trace rootlets. (TOPSOIL)	
			0.45	Fine to coarse SAND; some fine to coarse gravel, minor cobbles to boulders, minor silt, light brown. Very stiff, dry. Gravel: sub angular to rounded. (ALLUVIAL DEPOSITS.) 0.65 Brown, moist.	
			1.00	1.25 Fine to coarse gravelly, medium to coarse SAND; trace silt and minor cobbles and boulders. Gravel: rounded to sub rounded.	
			2.00	1.65 Fine to coarse SAND; some fine to coarse gravel, minor cobbles to boulders, minor silt, light brown. Dense, dry. Gravel: sub angular to rounded. 2.10 Moist to wet.	
			2.80	End Of Hole At 2.80 m	
			3.00		

KEY

D - Disturbed Sample
B - Bulk Sample
W - Water Sample
V - Hand Shear Vane kPa

▽ - Groundwater Strike
▼ - Groundwater Level

REMARKS

No Groundwater Encountered
Terminated at target depth.

Appendix E: DPSH Test Results

DYNAMIC PROBE - SUPER HEAVY LOG

HOLE NO.: DPSH01

CLIENT: CGW Consulting Engineers

PROJECT: Cone Penetration Testing

JOB NO.: LTC23286

SITE LOCATION: 182 – 200 Hamptons Road, Prebbleton, Christchurch

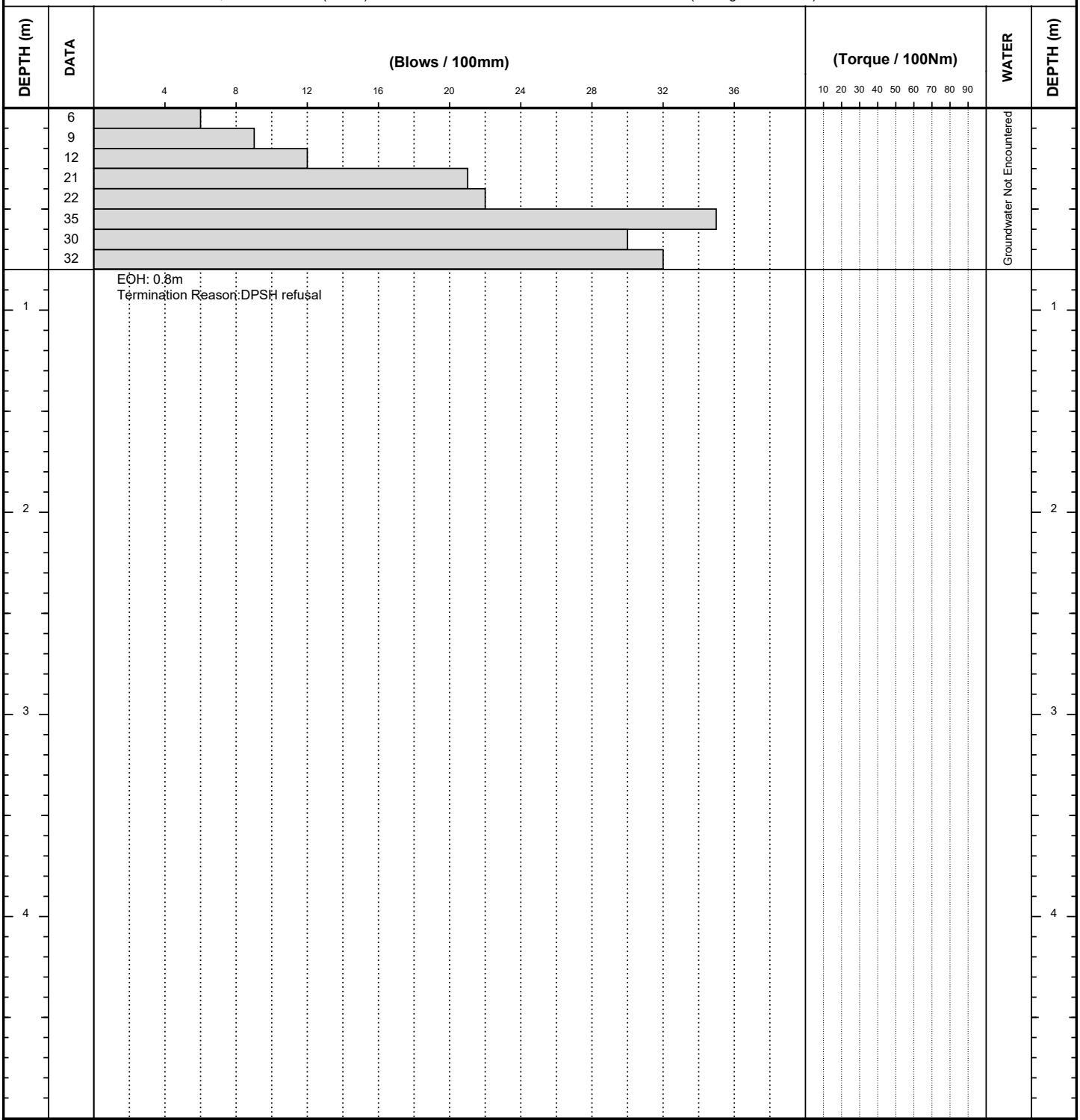
OPERATOR: JM

START DATE: 20/11/2023

CO-ORDINATES: 1559178.00mE, 5173876.00mN (NZTM)

ELEVATION: 23m (8m Digital Elevation)

END DATE: 20/11/2023



Remarks:

No groundwater recorded at 0.8m deep.
Coordinates from handheld GPS accurate to +/-4m
Pagani TG63-150 Rig

NOTES:

TEST DETAILS:

Weight	63.5 kg
Rod Mass	6.2 kg
Drop Height	750 mm
Cone Area Ratio	0.002
Predrill	0.0
Termination	DPSH refusal

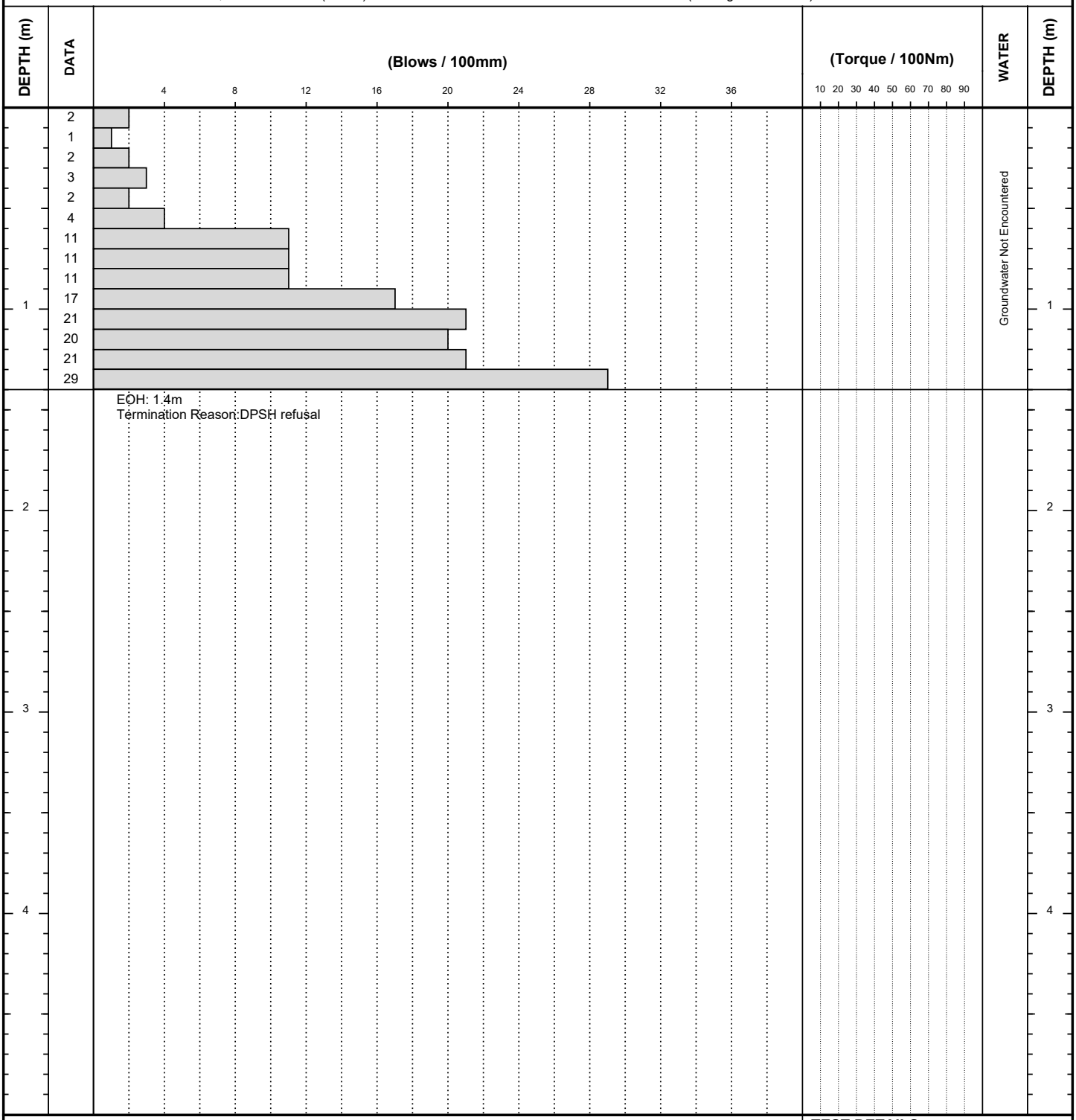
DYNAMIC PROBE - SUPER HEAVY LOG

HOLE NO.: DPSH02

CLIENT: CGW Consulting Engineers
PROJECT: Cone Penetration Testing
JOB NO.: LTC23286

SITE LOCATION: 182 – 200 Hamptons Road, Prebbleton, Christchurch
OPERATOR: JM
START DATE: 20/11/2023

CO-ORDINATES: 1559614.00mE, 5174039.00mN (NZTM)
ELEVATION: 23m (8m Digital Elevation)
END DATE: 20/11/2023



Remarks:

No groundwater recorded at 1.4m deep.
Coordinates from handheld GPS accurate to +/-4m
Pagani TG63-150 Rig

NOTES:

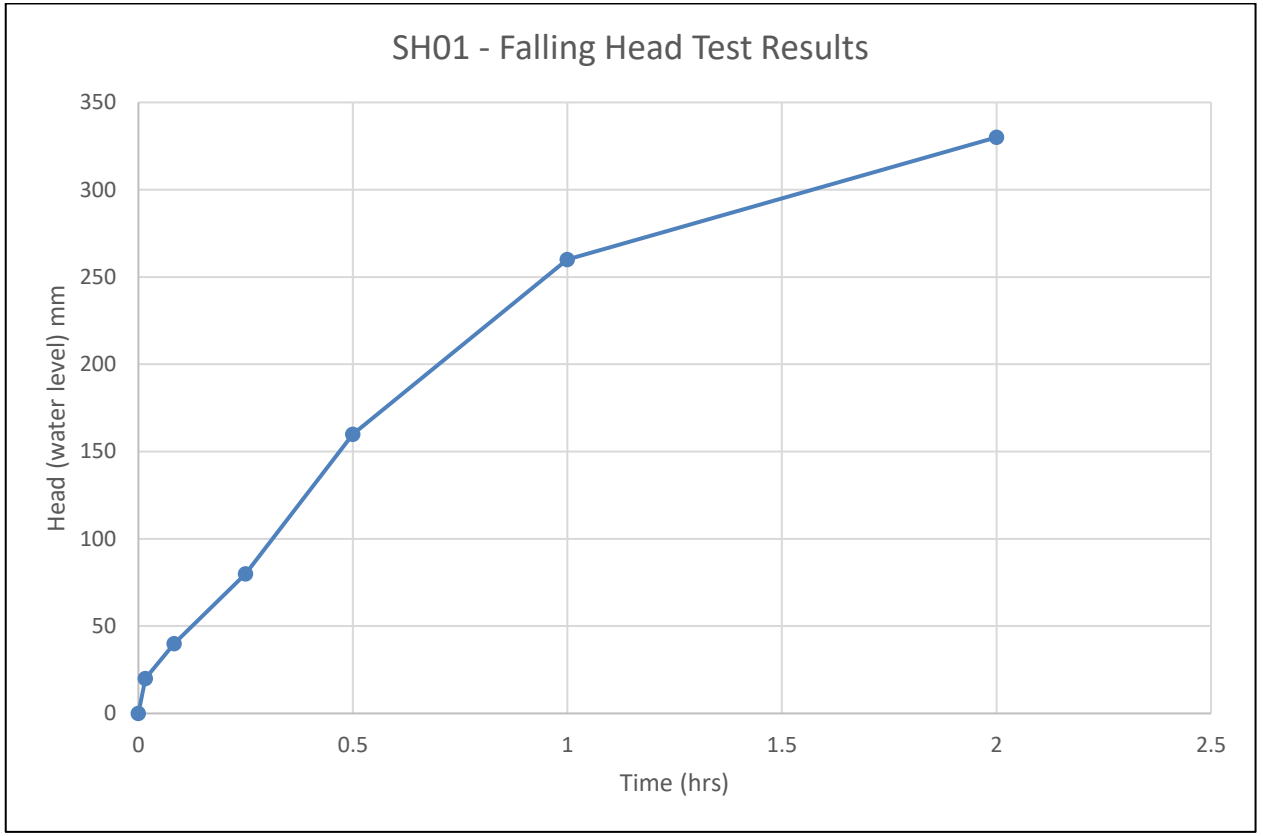
TEST DETAILS:

Weight	63.5 kg
Rod Mass	6.2 kg
Drop Height	750 mm
Cone Area Ratio	0.002
Predrill	0.0
Termination	DPSH refusal

Appendix F: Soakage testing results

SH01 – Falling Head Test Graph

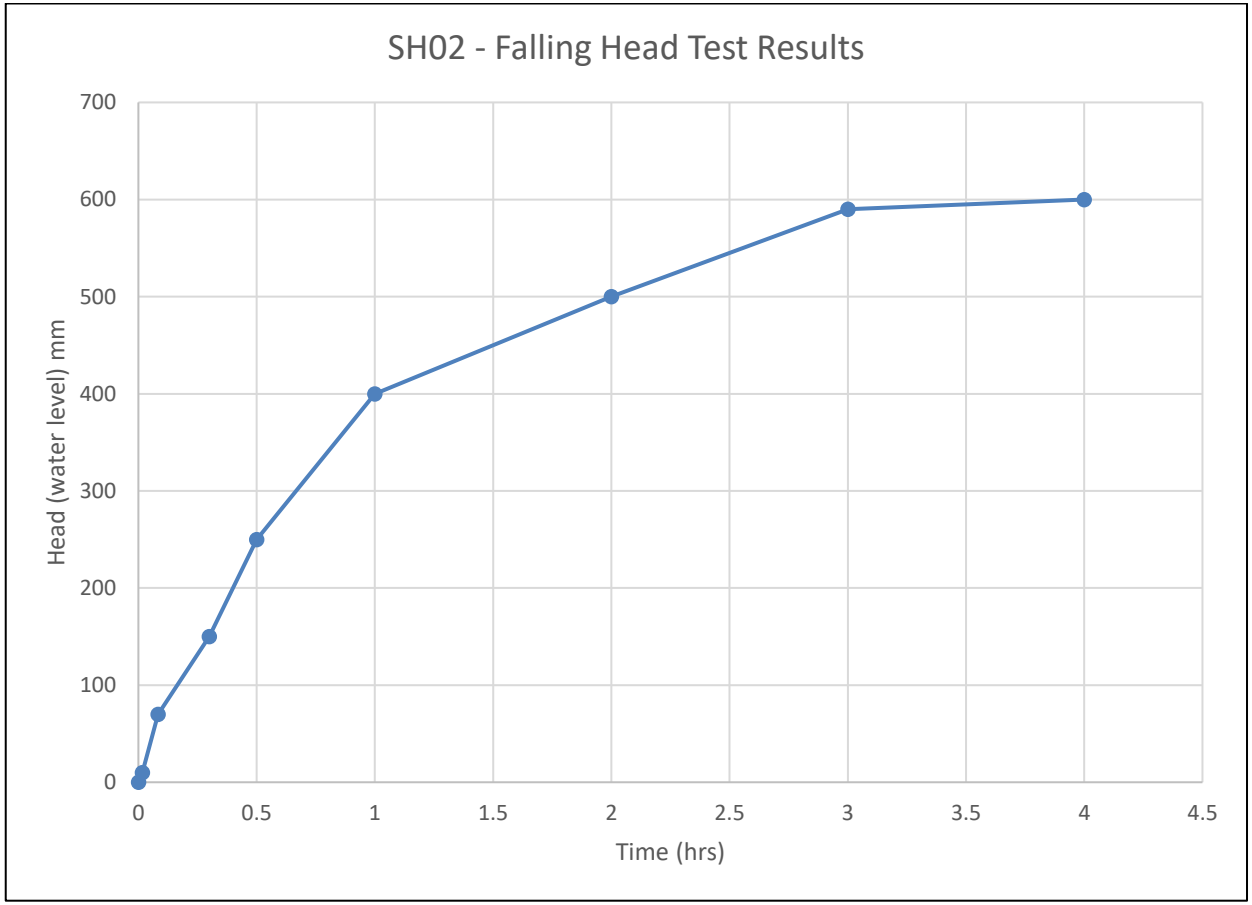
Hole Diameter = 100mm Hole Depth = 1.0 m Pre-soak = 2 hours



CGW Consulting Engineers

SH02 – Falling Head Test Graph

Hole Diameter = 100mm Hole Depth = 0.9 m Pre-soak = 2 hours



CGW Consulting Engineers

Appendix G: Statement of Professional Opinion

APPENDIX I

Statement of Professional Opinion on the Suitability of Land for Subdivision

ISSUED BY: CGW Consulting Engineers
(Geotechnical engineering firm or suitably qualified Geoprofessional)

TO: Selwyn District Council
(Territorial authority)

TO BE SUPPLIED TO: Suburban Estates Limited
(Owner/Developer)

IN RESPECT OF: Proposed Residential Subdivision
(Description of infrastructure/land development)

AT: 182 & 200 Hamptons Road, Prebbleton

(Address)

I Robert Bruce Smith on behalf of
(Geoprofessional)

CGW Consulting Engineers
(Geotechnical engineering firm)

hereby confirm:

1. I am a suitably qualified and experienced Geoprofessional employed by CGW Consulting Engineers and the geotechnical firm named above was retained by the owner/developer as the Geoprofessional on the above proposed development.

2. The geotechnical assessment report, dated 14/12/2023 has been carried out in accordance with the Ministry of Business, Innovation and Employment *Part D - Guidelines for the geotechnical investigation and assessment of subdivisions in the Canterbury region* and the Christchurch City Council *Infrastructure Design Standard – Part 4: Geotechnical Requirements* and includes:

(i) Details of and the results of my/the site investigations.

(ii) A liquefaction and lateral spread assessment.

(iii) An assessment of rockfall and slippage, including hazards resulting from seismic activity.

(iv) An assessment of the slope stability and ground bearing capacity confirming the location and appropriateness of building sites.

(v) Recommendations proposing measures to avoid, remedy or mitigate any potential hazards on the land subject to the application, in accordance with the provisions of Section 106 of the Resource Management Act 1991.

3. In my professional opinion, not to be construed as a guarantee, I consider that Council is justified in granting consent incorporating the following conditions:

(i) __The recommendations of our geotechncial report Ref. 230634 are followed.

(ii) _____

4. This professional opinion is furnished to the territorial authority and the owner/developer for their purposes alone, on the express condition that it will not be relied upon by any other person and does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any building. It is limited to those items referred to in clause 2 only.

5. This statement shall be read in conjunction with the geotechnical report referred to in clause 2 above, and shall not be copied or reproduced except in conjunction with the full geotechnical completion report.

6. Liability under this statement accrues to the geotechnical firm only and no liability shall accrue to the individual completing this statement.

7. The geotechnical engineering firm issuing this statement holds a current policy of professional indemnity insurance of no less than $_200,000.00_____

(Minimum amount of insurance shall be commensurate with the current amounts recommended by ENGINEERING NEW ZEALAND, ACENZ, NZTA, INGENIUM.)

_____R. Smith_____ Date:___14-12-23_____

(Signature of engineer, for and on behalf of CGW Consulting Engineers)

Qualifications and experience

_____CMEngNZ CPEng IntPE(NZ) / APEC Engineer_____

_____