

INITIA

GEOTECHNICAL SPECIALISTS

ASP BEI LAND CO

# AUCKLAND SURF PARK COMMUNITY STAGE 2 FAST TRACK CONSENT

## GEOTECHNICAL FACTUAL REPORT

INITIA REF P-001537 REV F

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# 1. Introduction

## 1.1 General

This Geotechnical Factual Report (GFR) presents the results of geotechnical investigations undertaken for the proposed Auckland Surf Park Community (ASPC), including the surrounding solar farms, neighbourhood precincts, data centres and light industrial precinct. The proposed project area encompasses 1320 & 1350 Dairy Flat Highway, 237 & 253 Postman Road and 89 & 105 Lascelles Drive, Dairy Flat.

This GFR (rev F) has been updated to include supplementary investigations undertaken by Initia in August 2025 to support preliminary design and consent application under the Fast Track Approvals Act 2024 (FTAA) of the proposed Stage 2 Development Masterplan[1]. Investigations were also previously undertaken by Initia in March-April 2023 to support the Stage 1 Masterplan. In addition, geotechnical investigations were completed by Aurecon in April 2023 to support the design of the western Data Centre and by Tonkin & Taylor Ltd in May 2022 to support the pre-purchase assessment of 1350 Dairy Flat Highway and 237 & 253 Postman Road. The results and details of the Aurecon and Tonkin & Taylor geotechnical investigations are also in this GFR for completeness. However, reference should be made to Aurecon Geotechnical Investigation Report[2] and Tonkin & Taylor Pre-purchase Report[3] for further detail.

Geotechnical interpretation of the investigation results is presented in a separate Geotechnical Assessment Report (GAR) for the Stage 2 Fast Track Consent Application. The GAR describes the ground and groundwater conditions of the site and provides preliminary geotechnical design and construction advice for the development. Initia also previously prepared a Geotechnical Interpretative Report (GAR)[4] to support the Stage 1 Fast Track Consent Application.

Supplementary geotechnical investigations, analysis and reporting will be required to support the detailed design of all stages of the project.

## 1.2 Proposed Development

The Masterplan for the ASPC Development is presented in Figure 1-1 below. It shows the development will include the following core elements across the 54ha development:

1. **Surf Lagoon:** A proposed 2.3ha, 1 to 3 m deep body of water arrayed around a curved 'beach'. The lagoon will be formed largely below existing ground levels and will include a central bulkhead structure and a servicing building at the northern end of the lagoon.
2. **Surf Amenity Precinct**: The Surf Amenity Precinct supports the Surf Lagoon operations and includes 5 No. single storey buildings and 1 No. two storey restaurant located to the south and west of the surf lagoon. An 8 storey hotel building is also proposed to the south-east of the lagoon. On-grade carparking will be provided around the southern and western perimeters of the precinct.
3. **Accommodation Precinct**: The accommodation precinct is located to the north of the lagoon and includes a two storey clubhouse building and approximately 60 No. single storey accommodation villas. The villas are proposed to include terraced units, duplexes and

[1] Studio Pacific Architecture (9/12/2025). *Auckland Surf Park Community. Masterplan. Illustrative Masterplan.* Layout ID RC_1.3 Job No. 4663.
[2] Aurecon (1 June 2023). *Spark Dairy Flat Campus. Geotechnical Investigation report.* Ref: 523573. Revision A.
[3] Tonkin & Talor Ltd (8/06/2022). *1350 Dairy Flat Highway – Geotechnical report to support Due Diligence & Concept Design. Geotechnical Factual Report.* Rev V01. Ref: 1016501.1000.
[4] Initia Ltd (23/06/2023). *Auckland Surf Park Community. Geotechnical Interpretative Report.* Rev B. Ref: P-001537.

standalone units. The northern most villas are proposed to be elevated on posts above a low-lying flood storage area. The remaining buildings are proposed to be founded on-grade on higher ground.

4. **Village Centre Precinct**: The Village Centre is proposed to include 3 No. four storey apartment buildings, 4 No. three storey apartment buildings and single storey market, food & beverage, wellness centre and early childhood buildings. The precinct also includes on-grade parking and internal roading.
5. **Neighbourhood Precincts (North-West, North-East and South):** Three separate residential neighbourhood precincts are proposed, totalling approximately 13ha. It is understood the residential neighbourhoods will include 1 – 3 storey standalone and duplex dwellings with associated roading and green space.
6. **Live-Work Precinct:** The Live-Work Precinct is to include approximately 25 No. two storey terraced units with both home-office and living spaces. On-grade parking is also proposed. The southern end of the Live-Work precinct is reserved for Water and Wastewater infrastructure to support the wider development.
7. **Solar Farms (North, Centre and South):** Three separate solar farms are proposed in disparate locations, with a total area of approximately 8.5ha.
8. **Data Centres:** Two separate Data Centre Buildings are proposed at the eastern end of the project. It is understood these will likely comprise Importance Level 4 structures.
9. **Light Industrial Precinct:** A light industrial precinct is proposed adjacent to Postman Road totalling approximately 1.5 ha. It is understood this will facilitate light-industrial buildings with typical footprints of approximately 550 $m^2$.
10. **Stream Park:** A green space including walking trails, stormwater ponds and flood storage areas is proposed through the centres of the site. A vehicle bridge is to provide access across the existing creek.

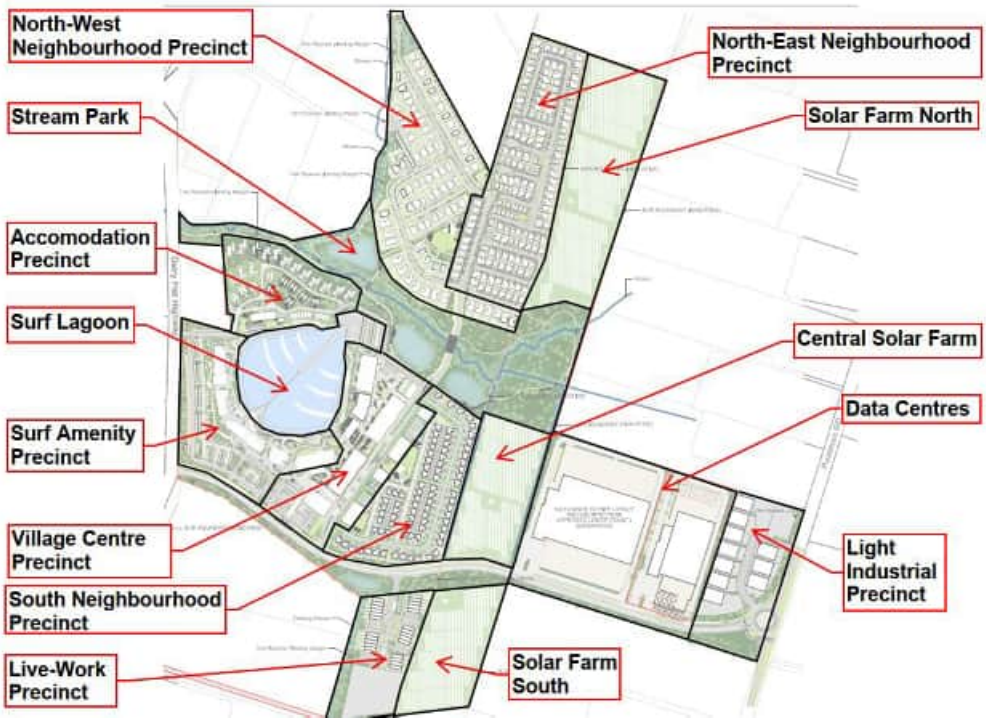



**Figure 1-1: Proposed Stage 2 Masterplan (Reference: Studio Pacific Architecture 9/12/2025)**

# 2. Geotechnical Investigations

## 2.1 Historical Investigations

### Pre-Purchase Stage

A geotechnical investigation was undertaken by Tonkin & Taylor[5] (T&T) in May 2022 as part of a pre-purchase assessment for due diligence of 1350 Dairy Flat Highway, 237 Postman Road and 253 Postman Road. The geotechnical investigations included:

- 23 No. hand auger boreholes with Scala Penetrometer (DCP) testing advanced from the base of the holes; and
- 6 No. machine excavated test pits

Standpipe piezometers were installed within 6 No. of the hand auger boreholes. These piezometers have either been destroyed or are unable to be located.

A summary of the T&T investigations is provided in Table 2-1 below and the locations of all T&T investigations are presented on Figure 1537-001 attached in Appendix A. Investigation logs are presented in Appendix C.

### Spark Data Centre Investigations

A geotechnical investigation was undertaken by Aurecon[6] in April 2023 to support the design of the proposed Spark Western Data at 237 Postman Road and 253 Postman Road. The investigations included:

- 15 No. Cone Penetration Tests
- 3 No. Seismic Dilatometer Tests
- 8 No. Hand Auger Boreholes;
- 8 No. Machine Drilled Boreholes; and

Standpipe piezometers were installed within 6 No. of the machine boreholes. Groundwater monitoring undertaken by Aurecon is summarised in Section 2.4.

A summary of the Aurecon investigations is provided in Table 2-1 below and investigation locations are presented on Figure 1537-001 in Appendix A. Investigation logs are attached in Appendix C.

It is noted that the coordinates and elevations of the Aurecon investigations were presented in a different coordinate system on the logs but have been converted into project coordinate and datum using the LINZ online coordinate convertor.

**Table 2-1: Summary of Historical Investigations by others**

| Investigation ID | Investigation Type | Supervising Company | Coordinates (NZTM) | | Ground Surface Elevation (m RL) | Termination Depth (m BGL) |
|---|---|---|---|---|---|---|
| | | | Easting (mE) | Northing (mN) | | |
| HA01P | Hand Auger + DCP | T&T | 1746998 [1] | 5942131 [1] | 55 [2] | 6.0 |
| HA02 | Hand Auger + DCP | T&T | 1746956 [1] | 5942106 [1] | 55 [2] | 6.0 |
| HA03P | Hand Auger + DCP | T&T | 1746900 [1] | 5942063 [1] | 55 [2] | 6.0 |
| HA04P | Hand Auger + DCP | T&T | 1746836 [1] | 5942039 [1] | 55 [2] | 6.0 |
| HA05 | Hand Auger + DCP | T&T | 1746857 [1] | 5942122 [1] | 55 [2] | 8.0 |

[5] Tonkin & Taylor, June 2022 – 1350 Dairy Flat Highway – Geotechnical report to support Due Diligence & Concept Design. Rev 1, Job Number: 1016502.1000.v01

[6] Aurecon (1 June 2023). *Spark Dairy Flat Campus. Geotechnical Investigation report.* Ref: 523573. Revision A.

| Investigation ID | Investigation Type | Supervising Company | Coordinates (NZTM) | | Ground Surface Elevation (m RL) | Termination Depth (m BGL) |
|---|---|---|---|---|---|---|
| | | | Easting (mE) | Northing (mN) | | |
| HA06 | Hand Auger + DCP | T&T | 1746939 [1] | 5941998 [1] | 55 [2] | 3.7 |
| HA07 | Hand Auger + DCP | T&T | 1746807 [1] | 5942260 [1] | 52 [2] | 4.0 |
| HA08 | Hand Auger + DCP | T&T | 1746733 [1] | 5942005 [1] | 57 [2] | 8.8 |
| HA09 | Hand Auger + DCP | T&T | 1746981 [1] | 5941829 [1] | 54 [2] | 5.9 |
| HA10 | Hand Auger + DCP | T&T | 1747128 [1] | 5942113 [1] | 53 [2] | 6.0 |
| HA11P | Hand Auger + DCP | T&T | 1747132 [1] | 5941928 [1] | 54 [2] | 6.0 |
| HA12 | Hand Auger + DCP | T&T | 1747372 [1] | 5941925 [1] | 54 [2] | 6.0 |
| HA13 | Hand Auger + DCP | T&T | 1747290 [1] | 5941778 [1] | 54 [2] | 5.1 |
| HA14 | Hand Auger + DCP | T&T | 1747521 [1] | 5941828 [1] | 59 [2] | 2.4 |
| HA15P | Hand Auger + DCP | T&T | 1747566 [1] | 5941713 [1] | 63 [2] | 1.8 |
| HA16 | Hand Auger + DCP | T&T | 1747325 [1] | 5942168 [1] | 54 [2] | 6.0 |
| HA17 | Hand Auger + DCP | T&T | 1747193 [1] | 5942250 [1] | 60 [2] | 1.6 |
| HA18 | Hand Auger + DCP | T&T | 1747274 [1] | 5942356 [1] | 63 [2] | 2.0 |
| HA19 | Hand Auger + DCP | T&T | 1747408 [1] | 5942451 [1] | 62 [2] | 1.5 |
| HA20P | Hand Auger + DCP | T&T | 1747320 [1] | 5942542 [1] | 67 [2] | 1.5 |
| HA21 | Hand Auger + DCP | T&T | 1746998 [1] | 5942147 [1] | 55 [2] | 7.0 |
| HA22 | Hand Auger + DCP | T&T | 1746943 [1] | 5942119 [1] | 55 [2] | 9.6 |
| HA23 | Hand Auger + DCP | T&T | 1746903 [1] | 5942077 [1] | 55 [2] | 7.0 |
| TP01 | Test Pit | T&T | 1746978 [1] | 5942115 [1] | 55 [2] | 4.0 |
| TP02 | Test Pit | T&T | 1746846 [1] | 5942017 [1] | 55 [2] | 4.0 |
| TP03 | Test Pit | T&T | 1747124 [1] | 5941893 [1] | 54 [2] | 3.9 |
| TP04 | Test Pit | T&T | 1747486 [1] | 5941794 [1] | 59 [2] | 3.0 |
| TP05 | Test Pit | T&T | 1747244 [1] | 5942097 [1] | 53 [2] | 3.8 |
| TP06 | Test Pit | T&T | 1747338 [1] | 5942423 [1] | 64 [2] | 2.4 |
| CPT01 | Cone Penetration Test | Aurecon | 1747324.7 [3] | 5941951.7 [3] | 53.7 [4] | 10.0 |
| CPT02 | Cone Penetration Test | Aurecon | 1747388.5 [3] | 5941919.5 [3] | 53.8 [4] | 11.9 |
| CPT03 | Cone Penetration Test | Aurecon | 1747387.5 [3] | 5941906.9 [3] | 54.2 [4] | 9.8 |
| CPT04 | Cone Penetration Test | Aurecon | 1747333.6 [3] | 5941920.4 [3] | 53.7 [4] | 10.8 |
| CPT05 | Cone Penetration Test | Aurecon | 1747438.5 [3] | 5941876.1 [3] | 53.6 [4] | 10.5 |
| CPT06 | Cone Penetration Test | Aurecon | 1747284.4 [3] | 5941893.7 [3] | 54.3 [4] | 10.5 |
| CPT07 | Cone Penetration Test | Aurecon | 1747434.7 [3] | 5941839.1 [3] | 53.9 [4] | 9.4 |
| CPT08 | Cone Penetration Test | Aurecon | 1747363.4 [3] | 5941840.4 [3] | 53.8 [4] | 10.0 |
| CPT09 | Cone Penetration Test | Aurecon | 1747318.9 [3] | 5941841.6 [3] | 53.8 [4] | 10.1 |
| CPT10 | Cone Penetration Test | Aurecon | 1747262.6 [3] | 5941839.3 [3] | 54.0 [4] | 9.6 |
| CPT11 | Cone Penetration Test | Aurecon | 1747345.7 [3] | 5941802.4 [3] | 54.0 [4] | 9.9 |
| CPT12 | Cone Penetration Test | Aurecon | 1747278.0 [3] | 5941793.3 [3] | 54.0 [4] | 6.1 |
| CPT13 | Cone Penetration Test | Aurecon | 1747404.6 [3] | 5941747.8 [3] | 55.1 [4] | 10.2 |

| Investigation ID | Investigation Type | Supervising Company | Coordinates (NZTM) | | Ground Surface Elevation (m RL) | Termination Depth (m BGL) |
|---|---|---|---|---|---|---|
| | | | Easting (mE) | Northing (mN) | | |
| CPT14 | Cone Penetration Test | Aurecon | 1747552.5 [3] | 5941802.9 [3] | 60.6 [4] | 11.5 |
| CPT15 | Cone Penetration Test | Aurecon | 1747655.1 [3] | 5941835.0 [3] | 63.3 [4] | 9.3 |
| SDMT01 | Flat Plate Dilatometer | Aurecon | 1747332.2 [3] | 5941911.9 [3] | 53.6 [4] | 10.0 |
| SDMT02 | Flat Plate Dilatometer | Aurecon | 1747362.2 [3] | 5941864.5 [3] | 53.8 [4] | 9.6 |
| SDMT03 | Flat Plate Dilatometer | Aurecon | 1747413.2 [3] | 5941797.7 [3] | 54.5 [4] | 9.8 |
| HA01 | Hand Auger | Aurecon | 1747295.1 [3] | 5941930.6 [3] | 53.4 [4] | 3.1 |
| HA02 | Hand Auger | Aurecon | 1747386.7 [3] | 5941924.3 [3] | 53.8 [4] | 4.0 |
| HA03 | Hand Auger | Aurecon | 1747336.1 [3] | 5941884.0 [3] | 53.8 [4] | 4.5 |
| HA04 | Hand Auger | Aurecon | 1747412.9 [3] | 5941851.5 [3] | 54.1 [4] | 2.4 |
| HA05 | Hand Auger | Aurecon | 1747412.5 [3] | 5941804.1 [3] | 54.5 [4] | 2.4 |
| HA06 | Hand Auger | Aurecon | 1747259.2 [3] | 5941836.8 [3] | 53.7 [4] | 2.1 |
| HA07 | Hand Auger | Aurecon | 1747343.9 [3] | 5941797.1 [3] | 54.1 [4] | 2.4 |
| HA08 | Hand Auger | Aurecon | 1747606.5 [3] | 5941819.4 [3] | 62.3 [4] | 1.5 |
| BH01 | Machine Borehole | Aurecon | 1747327.5 [3] | 5941943.3 [3] | 53.6 [4] | 12.2 |
| BH02 | Machine Borehole | Aurecon | 1747459.7 [3] | 5941898.5 [3] | 54.3 [4] | 10.7 |
| BH03 | Machine Borehole | Aurecon | 1747377.4 [3] | 5941885.7 [3] | 53.9 [4] | 15.2 |
| BH04 | Machine Borehole | Aurecon | 1747301.4 [3] | 5941886.4 [3] | 53.7 [4] | 12.3 |
| BH05 | Machine Borehole | Aurecon | 1747358.5 [3] | 5941838.2 [3] | 53.9 [4] | 12.2 |
| BH06 | Machine Borehole | Aurecon | 1747438.2 [3] | 5941836.9 [3] | 54.4 [4] | 10.6 |
| BH07 | Machine Borehole | Aurecon | 1747277.1 [3] | 5941799.2 [3] | 53.9 [4] | 7.6 |
| BH08 | Machine Borehole | Aurecon | 1747397.4 [3] | 5941753.6 [3] | 54.9 [4] | 10.6 |

Note [1]: Coordinate system NZTM2000. Test location survey method and accuracy not noted in T&T reporting.
Note [2]: Datum – AUCKHT1946. Ground surface elevations survey method and accuracy not noted in T&T reporting.
Note [3]: Coordinate system NZTM2000. Test locations were surveyed using a GPS rover with a reported accuracy greater than +/- 200 mm. Locations have been converted from Mt Eden 2000 coordinate system using LINZ online coordinate converter.
Note [4]: Datum – AUCKHT1946. Ground surface elevations were surveyed using a GPS rover with a reported accuracy greater than +/- 100 mm. Elevations have been converted from NZVD 2016 to AUCKHT 1946 using LINZ online coordinate converter.

## 2.2 Initia Investigations

### 2.2.1 General

An initial stage of geotechnical investigations was undertaken by Initia between 20th March 2023 and 5th April 2023 to support the preliminary design and Fast Track Consent of the "Stage 1" Surf Park Community Masterplan. The 2023 field investigations (referred to herein as the Initia Stage 1 investigations) included 5 No. machine boreholes, 25 No. Cone Penetration Tests, 11 No. hand auger boreholes and 31 No. machine excavated test pits. Locations were selected based on the proposed development plans at the time of the investigation.

Supplementary geotechnical field investigations were undertaken by Initia between 5th August 2025 and 22nd August 2025 to support the preliminary design and Fast Track Consent of the "Stage 2" Masterplan. The August 2025 field investigations (referred to herein as the Initia Stage 2 investigations) included 39 No. Cone Penetration Tests, 43 No. hand auger boreholes and 10 No.

machine excavated test pits. Locations were selected based on the development plans at the time of the investigation and access constraints.

A summary of the investigations is provided in Table 2-2, Table 2-3, Table 2-4 and Table 2-5 below. Investigation locations for both stages were surveyed using a GPS rover unit and are presented on Figure 1537-G01.

The sub-sections below present an aggregated summary of the machine boreholes, test pits, hand auger boreholes, CPTs and laboratory testing completed by Initia over both stages of investigation.

### 2.2.2 Machine Boreholes – Stage 1

Five (5 No.) rotary cored boreholes were drilled by DCN Drilling between the 21st and 28th March 2023 under the full-time supervision of an Initia Engineering Geologist. The boreholes were drilled to depths of between 12.1 and 15.1 m bgl. The boreholes were positioned under the proposed lagoon central bulkhead and side wall locations (at the time of the investigation) to confirm the depth of rock and to enable undisturbed sampling of the upper soils.

Standard Penetration Tests (SPTs) and or push tube sampling was undertaken at regular 1.5 m intervals. Standpipe piezometers were installed to monitor groundwater levels in all 5 No. boreholes as outlined in Section 2.4.1.

The recovered core was logged in general accordance with the NZGS logging guidelines[7]. Borehole logs are presented in Appendix B.

**Table 2-2: Summary of Initia Machine Borehole Investigations (Stage 1 only).**

| Investigation ID | Coordinates (NZTM)[1] | | Ground Surface Elevation (m RL)[2] | Termination Depth (m bgl) |
|---|---|---|---|---|
| | Easting (mE) | Northing (mN) | | |
| MBH01 | 1746801.2 | 5942120.0 | 55.3 | 15.0 |
| MBH02 | 1746978.3 | 5942156.8 | 54.7 | 15.1 |
| MBH03 | 1746937.3 | 5942113.6 | 55.2 | 12.1 |
| MBH04 | 1746898.2 | 5942073.6 | 54.9 | 15.0 |
| MBH05 | 1746945.6 | 5942009.4 | 54.8 | 15.0 |

Note 1: Coordinate system NZTM2000. Test location coordinates are determined via precise survey and are expected to be accurate to ± 100 mm.
Note 2: Datum – AUCKHT1946. Ground surface elevations are determined via precise survey and are expected to be accurate to ± 100 mm.

### 2.2.3 Cone Penetration Tests – Stage 1 and 2

25 No. Cone Penetration Tests (CPT01 to CPT25) were carried out by WSP between the 3rd and 5th April 2023 to support the Stage 1 Fast Track Consent. The CPTs were completed by an anchored CPT rig. All CPTs terminated due to refusal between 6.7 – 13.0 m depth on a hard/dense stratum or due to accumulation of rod friction.

An additional 39 No. Cone Penetration Tests (CPT101 to CPT140) were carried out by WSP between the 18th and 22nd August 2025 to support the Stage 2 Fast Track Consent. The Stage 2 CPTs were completed by a 10-tonne tracked dead weight rig. All CPTs terminated due to refusal between 1.7 - 14.9 m depth on a hard/dense stratum or due to accumulation of rod friction.

A summary of the Stage 1 and 2 CPTs is presented in Table 2-3 below and logs are attached in Appendix B.

[7] New Zealand Geotechnical Society Inc (December 2005). *Field Description of Soils and Rock.*

**Table 2-3: Summary of Initia Cone Penetration Tests.**

| Investigation ID | Initia Investigation Stage | Coordinates (NZTM)[1] | | Ground Surface Elevation (m RL)[2] | Termination Depth (m bgl) |
|---|---|---|---|---|---|
| | | Easting (mE) | Northing (mN) | | |
| CPT01 | Stage 1 | 1746957.1 | 5942132.8 | 54.8 | 11.3 |
| CPT02 | Stage 1 | 1746921.2 | 5942141.2 | 55.3 | 11.9 |
| CPT03 | Stage 1 | 1746972.5 | 5942154.8 | 54.7 | 11.0 |
| CPT04 | Stage 1 | 1746807.2 | 5942119 | 55.3 | 9.2 |
| CPT05 | Stage 1 | 1746870.3 | 5942140.5 | 54.8 | 10.1 |
| CPT06 | Stage 1 | 1746941.6 | 5942115.1 | 55.2 | 12.4 |
| CPT07 | Stage 1 | 1746960.3 | 5942089.0 | 55.3 | 13.0 |
| CPT08 | Stage 1 | 1747046.3 | 5942103.8 | 54.7 | 11.2 |
| CPT09 | Stage 1 | 1746756.1 | 5942092.0 | 55.4 | 9.0 |
| CPT10 | Stage 1 | 1746828.3 | 5942074.1 | 55.2 | 11.0 |
| CPT11 | Stage 1 | 1746893.8 | 5942065.8 | 54.9 | 10.5 |
| CPT12 | Stage 1 | 1746951.4 | 5942054.7 | 55.0 | 12.3 |
| CPT13 | Stage 1 | 1746765.5 | 5942035.3 | 55.2 | 10.0 |
| CPT14 | Stage 1 | 1746869.9 | 5942041.9 | 54.9 | 8.5 |
| CPT15 | Stage 1 | 1746886.1 | 5942010.1 | 54.9 | 9.0 |
| CPT16 | Stage 1 | 1746946.5 | 5942014.6 | 54.7 | 11.8 |
| CPT17 | Stage 1 | 1746793.5 | 5942000.3 | 55.1 | 10.7 |
| CPT18 | Stage 1 | 1746917.5 | 5941966.3 | 54.7 | 11.2 |
| CPT19 | Stage 1 | 1747039.4 | 5941971.6 | 54.3 | 6.7 |
| CPT20 | Stage 1 | 1746821.3 | 5941969.1 | 55.2 | 8.0 |
| CPT21 | Stage 1 | 1746832 | 5942007.5 | 55.0 | 7.3 |
| CPT22 | Stage 1 | 1746902.5 | 5941941.3 | 54.6 | 12.2 |
| CPT23 | Stage 1 | 1746951.9 | 5941928.2 | 54.6 | 12.0 |
| CPT24 | Stage 1 | 1747007 | 5941890.1 | 54.3 | 8.8 |
| CPT25 | Stage 1 | 1746974.1 | 5941801.5 | 54.1 | 11.8 |
| CPT101 | Stage 2 | 1747025.4 | 5942338.8 | 51.4 | 2.3 |
| CPT102 | Stage 2 | 1747026.9 | 5942293.4 | 53.4 | 3.5 |
| CPT103 | Stage 2 | 1747039.7 | 5942256.2 | 53.6 | 7.7 |
| CPT104 | Stage 2 | 1747061.7 | 5942207.3 | 52.2 | 4.4 |
| CPT105 | Stage 2 | 1747114.0 | 5942167.3 | 54.0 | 1.7 |
| CPT106 | Stage 2 | 1747022.7 | 5941564.9 | 56.1 | 3.1 |
| CPT107 | Stage 2 | 1746969.8 | 5941567.1 | 53.9 | 9.4 |
| CPT108 | Stage 2 | 1746982.3 | 5941615.5 | 54.0 | 4.6 |
| CPT109 | Stage 2 | 1747030.5 | 5941694.3 | 54.3 | 8.5 |
| CPT110 | Stage 2 | 1747022.2 | 5941731.4 | 54.1 | 5.8 |
| CPT111 | Stage 2 | 1747067.2 | 5941736.9 | 54.3 | 8.3 |
| CPT112 | Stage 2 | 1747198.3 | 5941749.6 | 54.5 | 4.6 |
| CPT113 | Stage 2 | 1746809.6 | 5942296.7 | 51.2 | 12.5 |
| CPT114 | Stage 2 | 1746871.4 | 5942288.2 | 51.0 | 11.2 |
| CPT115 | Stage 2 | 1746860.6 | 5942236.4 | 55.0 | 12.3 |

| Investigation ID | Initia Investigation Stage | Coordinates (NZTM)[1] | | Ground Surface Elevation (m RL)[2] | Termination Depth (m bgl) |
|---|---|---|---|---|---|
| | | Easting (mE) | Northing (mN) | | |
| CPT116 | Stage 2 | 1746816.6 | 5942199.7 | 54.3 | 10.3 |
| CPT117 | Stage 2 | 1746931.8 | 5942220.6 | 53.4 | 10.2 |
| CPT118 | Stage 2 | 1746976.4 | 5942229.3 | 51.7 | 8.2 |
| CPT119 | Stage 2 | 1747213.7 | 5942144.4 | 54.4 | 6.0 |
| CPT120 | Stage 2 | 1747221.6 | 5942095.8 | 53.1 | 7.5 |
| CPT121 | Stage 2 | 1746999.6 | 5942009.4 | 54.7 | 11.8 |
| CPT122 | Stage 2 | 1746955.3 | 5941976.3 | 54.8 | 14.2 |
| CPT123 | Stage 2 | 1746891.6 | 5941855.7 | 55.9 | 13.7 |
| CPT124 | Stage 2 | 1746952.8 | 5941876.3 | 56.1 | 13.5 |
| CPT125 | Stage 2 | 1746876.3 | 5941905.9 | 56.5 | 14.3 |
| CPT126 | Stage 2 | 1746999.6 | 5941930.6 | 55.0 | 13.2 |
| CPT127 | Stage 2 | 1747040.0 | 5941845.0 | 54.9 | 12.6 |
| CPT128 | Stage 2 | 1747040.1 | 5941797.5 | 54.8 | 10.1 |
| CPT129 | Stage 2 | 1747118.2 | 5941962.3 | 53.8 | 10.7 |
| CPT131 | Stage 2 | 1747093.1 | 5942015.2 | 53.3 | 9.6 |
| CPT132 | Stage 2 | 1747163.0 | 5942019.2 | 53.6 | 10.5 |
| CPT133 | Stage 2 | 1747002.7 | 5942046.7 | 54.7 | 11.7 |
| CPT134 | Stage 2 | 1746992.5 | 5942133.6 | 54.8 | 11.0 |
| CPT135 | Stage 2 | 1747168.4 | 5941967.1 | 54.4 | 14.0 |
| CPT136 | Stage 2 | 1746876.1 | 5942179.6 | 54.5 | 12.7 |
| CPT137 | Stage 2 | 1747077.0 | 5941904.5 | 54.7 | 10.8 |
| CPT138 | Stage 2 | 1747300.3 | 5942128.2 | 54.2 | 10.8 |
| CPT139 | Stage 2 | 1746907.0 | 5942273.3 | 50.9 | 10.1 |
| CPT140 | Stage 2 | 1746771.7 | 5942136.9 | 55.4 | 14.9 |

Note 1: Coordinate system NZTM2000. Test location coordinates are determined via precise survey and are expected to be accurate to ± 100 mm.
Note 2: Datum – AUCKHT1946. Ground surface elevations are determined via precise survey and are expected to be accurate to ± 100 mm.

### 2.2.4 Hand Auger Boreholes – Stage 1 and 2

11 No. hand augered boreholes were drilled by an Initia Geotechnical Engineer between the 20th and 30th March 2023 to support the Stage 1 Masterplan. The hand augers were terminated due to effective refusal, or at a target depth of 4.0 m.

An additional 43 No. hand augered boreholes were drilled by Geotechnical Technicians under the direction of an Initia Geotechnical Engineer between the 5th and 18th August 2025, to support the Stage 2 Masterplan. The hand augers were terminated due to effective refusal, excess water suction, lack of soil recovery or at a target depth of 4.0 – 5.0 m. Scala Penetrometer Tests were advanced from the base of 41 of the 43 the hand auger holes until effective refusal of to a target depth of 4.8 – 5.0 m.

In-situ shear vane testing was undertaken at 0.3 – 0.4 m intervals in fine-grained soils within all hand augers, and soil samples recovered for laboratory testing (refer Section 2.3). Groundwater, where

encountered, was recorded at the completion of drilling. The soil arisings were logged in general accordance with the NZGS logging guidelines[8].

A summary of the hand augers from the Stage 1 and 2 investigations is presented below in Table 2-4 and logs are attached in Appendix B.

**Table 2-4: Summary of Initia Hand Auger Borehole Investigations**

| Investigation ID | Initia Investigation Stage | Coordinates (NZTM)[1] | | Ground Surface Elevation (m RL)[2] | Hand Auger Termination Depth (m bgl) | Scala Penetrometer Termination Depth (m bgl) |
|---|---|---|---|---|---|---|
| | | Easting (mE) | Northing (mN) | | | |
| HA01 | Stage 1 | 1747157.1 | 5942145.4 | 54.0 | 2.4 | N/A |
| HA03 | Stage 1 | 1747032.4 | 5942080.2 | 54.6 | 4.0 | N/A |
| HA04 | Stage 1 | 1747085.0 | 5942069.3 | 54.1 | 4.0 | N/A |
| HA06 | Stage 1 | 1747107.3 | 5941991.5 | 54.0 | 4.0 | N/A |
| HA07 | Stage 1 | 1747022.6 | 5941927.5 | 54.4 | 4.0 | N/A |
| HA09 | Stage 1 | 1746920.6 | 5941924.4 | 54.5 | 4.0 | N/A |
| HA10 | Stage 1 | 1746870.1 | 5941871.3 | 54.5 | 4.0 | N/A |
| HA11 | Stage 1 | 1746918.0 | 5941827.2 | 54.4 | 4.0 | N/A |
| HA12 | Stage 1 | 1746841.2 | 5941891.5 | 54.7 | 4.0 | N/A |
| HA13 | Stage 1 | 1746745.4 | 5941941.2 | 56.8 | 4.0 | N/A |
| HA14 | Stage 1 | 1746745.1 | 5942160.6 | 55.8 | 4.0 | N/A |
| HA101 | Stage 2 | 1747099.5 | 5942556.0 | 56.0 | 1.5 | 1.9 |
| HA102 | Stage 2 | 1747129.9 | 5942501.5 | 59.8 | 1.4 | 2.0 |
| HA103 | Stage 2 | 1747163.5 | 5942442.6 | 62.8 | 1.5 | 2.3 |
| HA104 | Stage 2 | 1747185.8 | 5942405.4 | 63.7 | 1.4 | 1.8 |
| HA105 | Stage 2 | 1747234.6 | 5941910.8 | 53.4 | 1.2 | 5.0 |
| HA106 | Stage 2 | 1747134.2 | 5942404.0 | 61.2 | 1.2 | 1.7 |
| HA107 | Stage 2 | 1747113.1 | 5942451.9 | 59.1 | 1.4 | 1.8 |
| HA108 | Stage 2 | 1747094.3 | 5942491.7 | 56.5 | 1.9 | 2.6 |
| HA109 | Stage 2 | 1747060.8 | 5942450.3 | 53.1 | 1.3 | 1.9 |
| HA110 | Stage 2 | 1747043.2 | 5942386.6 | 52.0 | 1.2 | 1.5 |
| HA111 | Stage 2 | 1747023.9 | 5942326.5 | 52.0 | 1.8 | 2.0 |
| HA112 | Stage 2 | 1746772.1 | 5942103.9 | 55.3 | 2.4 | 5.0 |
| HA113 | Stage 2 | 1747061.0 | 5942233.4 | 54.2 | 4.0 | 4.9 |
| HA114 | Stage 2 | 1747110.8 | 5942202.7 | 56.1 | 1.1 | 1.3 |
| HA115 | Stage 2 | 1747086.8 | 5942386.9 | 58.0 | 1.4 | 1.7 |
| HA116 | Stage 2 | 1747102.0 | 5942359.1 | 59.4 | 1.2 | 1.5 |
| HA117 | Stage 2 | 1747060.0 | 5942350.3 | 56.1 | 1.6 | 1.9 |
| HA118 | Stage 2 | 1747089.1 | 5942268.4 | 57.5 | 1.1 | 1.6 |
| HA119 | Stage 2 | 1747126.8 | 5942308.9 | 60.2 | 1.5 | 1.9 |
| HA120 | Stage 2 | 1747136.1 | 5942235.1 | 58.2 | 1.2 | 1.6 |
| HA121 | Stage 2 | 1747052.1 | 5942291.2 | 55.5 | 4.8 | 5.1 |

[8] New Zealand Geotechnical Society Inc (December 2005). *Field Description of Soils and Rock.*

| Investigation ID | Initia Investigation Stage | Coordinates (NZTM)[1] | | Ground Surface Elevation (m RL)[2] | Hand Auger Termination Depth (m bgl) | Scala Penetrometer Termination Depth (m bgl) |
|---|---|---|---|---|---|---|
| | | Easting (mE) | Northing (mN) | | | |
| HA122 | Stage 2 | 1746968.4 | 5941564.3 | 53.9 | 2.5 | 4.1 |
| HA123 | Stage 2 | 1747021.1 | 5941572.7 | 55.9 | 1.1 | 1.6 |
| HA124 | Stage 2 | 1747076.8 | 5941701.4 | 55.2 | 1.7 | 2.1 |
| HA125 | Stage 2 | 1746979.3 | 5941601.5 | 54.0 | 1.8 | 2.1 |
| HA126 | Stage 2 | 1746987.1 | 5941630.7 | 54.0 | 1.8 | 1.9 |
| HA127 | Stage 2 | 1747012.3 | 5941730.5 | 54.1 | 4.0 | 4.8 |
| HA128 | Stage 2 | 1747027.3 | 5941699.0 | 54.2 | 1.8 | 4.8 |
| HA129 | Stage 2 | 1747061.3 | 5941734.4 | 54.1 | 2.3 | 2.8 |
| HA130 | Stage 2 | 1747111.3 | 5941673.1 | 57.1 | 1.1 | 1.5 |
| HA131 | Stage 2 | 1747145.8 | 5941574.3 | 60.3 | 1.2 | 1.8 |
| HA132 | Stage 2 | 1747086.5 | 5941623.1 | 58.1 | 1.4 | 1.5 |
| HA133 | Stage 2 | 1747167.9 | 5941651.7 | 58.8 | 1.4 | 1.9 |
| HA134 | Stage 2 | 1747203.4 | 5941741.6 | 54.8 | 2.0 | 3.2 |
| HA135 | Stage 2 | 1747127.9 | 5941731.9 | 55.1 | 1.6 | 2.2 |
| HA136 | Stage 2 | 1746778.0 | 5942060.8 | 55.2 | 2.2 | 4.8 |
| HA137 | Stage 2 | 1746880.5 | 5942178.5 | 54.6 | 4.0 | 4.9 |
| HA138 | Stage 2 | 1746857.1 | 5942280.9 | 51.6 | 4.0 | 4.9 |
| HA139 | Stage 2 | 1746925.3 | 5942255.5 | 50.6 | 5.0 | N/A |
| HA140 | Stage 2 | 1746969.7 | 5942225.1 | 52.0 | 5.0 | N/A |
| HA141 | Stage 2 | 1746805.7 | 5942022.2 | 55.2 | 2.2 | 5.0 |
| HA142 | Stage 2 | 1746979.2 | 5941984.1 | 55.3 | 4.0 | 5.0 |
| HA143 | Stage 2 | 1747028.8 | 5942020.7 | 53.9 | 4.0 | 5.0 |

Note 1: Coordinate system NZTM2000. Test location coordinates are determined via precise survey and are expected to be accurate to ± 100 mm.
Note 2: Datum – AUCKHT1946. Ground surface elevations are determined via precise survey and are expected to be accurate to ± 100 mm.

### 2.2.5 Test Pits – Stage 1 and 2

31 No. machine excavated test pits (TP01 to TP31) were excavated on 27th and 28th March 2023 to support the Stage 1 Masterplan. The test pits were excavated by Wilkinson Civil Ltd using a 12 tonne excavator, under the full time supervision of an Initia Geotechnical Engineer. The test pits were terminated at depths between 1.5 – 4.2 m below ground level due to refusal on a hard/dense stratum or from maximising excavator reach.

10 No. additional machine excavated test pits (TP101 to TP112) were excavated on 7th August 2025 to support the Stage 2 Masterplan. The test pits were excavated by McKenzie Civil Contracting using a 12 tonne excavator, under the full time supervision of an Initia Geotechnical Engineer. The test pits were terminated at depths between 3.0 – 3.7 m.

In-situ shear vane tests were undertaken in fine-grained soils at regular intervals in all test pits and excavated soils were logged in general accordance with the NZGS guidelines[9]. Bulk samples were

[9] New Zealand Geotechnical Society Inc (December 2005). *Field Description of Soils and Rock.*

collected from selected test pits for the purpose of laboratory testing for earthworks. A summary of the test pit investigations is presented in Table 2-5 below and the logs are attached in Appendix B.

**Table 2-5: Summary of Test Pit Investigations.**

| Investigation ID | Initia Investigation Stage | Coordinates (NZTM)[1] | | Ground Surface Elevation (m RL)[2] | Termination Depth (m bgl) |
|---|---|---|---|---|---|
| | | Easting (mE) | Northing (mN) | | |
| TP01 | Stage 1 | 1747452.0 | 5942523.0 | 64.0 | 1.9 |
| TP02 | Stage 1 | 1747275.2 | 5942472.3 | 66.2 | 1.8 |
| TP03 | Stage 1 | 1747231.6 | 5942385.8 | 64.3 | 1.8 |
| TP04 | Stage 1 | 1747391.8 | 5942348.0 | 61.0 | 2.2 |
| TP05 | Stage 1 | 1747207.2 | 5942296.6 | 61.4 | 1.8 |
| TP06 | Stage 1 | 1747361.9 | 5942284.6 | 59.8 | 2.1 |
| TP07 | Stage 1 | 1747272.8 | 5942229.6 | 58.9 | 2.0 |
| TP08 | Stage 1 | 1747356.3 | 5942217.5 | 56.7 | 2.3 |
| TP09 | Stage 1 | 1747163.5 | 5942207.8 | 57.7 | 1.5 |
| TP10 | Stage 1 | 1747251.7 | 5942150.7 | 54.7 | 4.0 |
| TP11 | Stage 1 | 1747176.5 | 5942041.1 | 53.0 | 4.1 |
| TP12 | Stage 1 | 1747279.2 | 5942032.9 | 52.9 | 4.0 |
| TP13 | Stage 1 | 1746809.9 | 5942216.7 | 53.8 | 3.8 |
| TP14 | Stage 1 | 1746914.9 | 5942211.6 | 55.0 | 3.8 |
| TP15 | Stage 1 | 1746826.1 | 5942153.9 | 55.0 | 4.0 |
| TP16 | Stage 1 | 1746749.0 | 5942119.6 | 55.4 | 3.7 |
| TP17 | Stage 1 | 1746896.6 | 5942113.9 | 54.9 | 4.0 |
| TP18 | Stage 1 | 1746951.3 | 5942133.7 | 55.0 | 4.2 |
| TP19 | Stage 1 | 1746824.2 | 5942088.9 | 55.3 | 3.6 |
| TP20 | Stage 1 | 1746879.8 | 5942075.4 | 54.9 | 3.3 |
| TP21 | Stage 1 | 1746944.1 | 5942056.3 | 55.0 | 4.1 |
| TP22 | Stage 1 | 1747055.0 | 5942085.5 | 54.4 | 4.0 |
| TP23 | Stage 1 | 1746869.7 | 5942034.2 | 54.9 | 3.8 |
| TP24 | Stage 1 | 1746885.5 | 5941987.7 | 55.0 | 4.2 |
| TP25 | Stage 1 | 1747046.8 | 5941988.3 | 54.5 | 3.7 |
| TP26 | Stage 1 | 1747072.3 | 5941902.8 | 54.2 | 3.5 |
| TP27 | Stage 1 | 1746943.2 | 5941865.3 | 54.6 | 3.6 |
| TP28 | Stage 1 | 1747016.4 | 5941829.2 | 54.1 | 3.6 |
| TP29 | Stage 1 | 1746858.8 | 5941880.5 | 54.6 | 4.0 |
| TP30 | Stage 1 | 1746995.8 | 5941883.1 | 54.3 | 3.3 |
| TP31 | Stage 1 | 1747112.3 | 5942063.4 | 53.9 | 3.9 |
| TP101 | Stage 2 | 1746861.9 | 5942228.9 | 54.9 | 3.3 |
| TP102 | Stage 2 | 1746943.2 | 5942173.2 | 54.3 | 3.5 |
| TP104 | Stage 2 | 1746947.8 | 5941946.8 | 54.8 | 3.0 |
| TP105 | Stage 2 | 1746993.1 | 5942066.7 | 54.1 | 3.3 |

| Investigation ID | Initia Investigation Stage | Coordinates (NZTM)[1] | | Ground Surface Elevation (m RL)[2] | Termination Depth (m bgl) |
|---|---|---|---|---|---|
| | | Easting (mE) | Northing (mN) | | |
| TP107 | Stage 2 | 1747087.3 | 5941780.3 | 54.2 | 3.7 |
| TP108 | Stage 2 | 1747156.2 | 5941964.5 | 53.9 | 3.3 |
| TP109 | Stage 2 | 1747205.7 | 5941815.3 | 54.9 | 3.5 |
| TP110 | Stage 2 | 1746843.0 | 5941995.8 | 54.5 | 3.0 |
| TP111 | Stage 2 | 1746776.6 | 5941948.1 | 55.6 | 3.5 |
| TP112 | Stage 2 | 1746747.6 | 5942038.9 | 55.4 | 3.5 |

Note 1: Coordinate system NZTM2000. Test location coordinates are determined via precise survey and are expected to be accurate to ± 100 mm.
Note 2: Datum – AUCKHT1946. Ground surface elevations are determined via precise survey and are expected to be accurate to ± 100 mm.

## 2.3 Laboratory Testing

### 2.3.1 Initia Stage 1 and 2

Laboratory testing has been undertaken on a select number of soil samples obtained from machine boreholes, test pits and hand auger boreholes as part of both the Initia Stage 1 (2023) and Stage 2 (2025) Initia Investigations. Testing completed across both investigation stages has included the following:

- 6 No. Standard Compaction Tests (NZS 4402:1986 Test 4.1.1)
- 8 No. Soaked CBR Tests (NZS 4402:1986 Test 6.1.1)
- 32 No. Atterberg Limits Tests (NZS 4402:1986 Tests 2.1, 2.2, 2.3 and 2.4)
- 22 No. Linear Shrinkage Tests (NZS 4402:1986 Test 2.6)
- 8 No. One Dimensional $T_{90}$ Consolidation Tests (NZS4402:1986 Test 7.1)
- 1 No. Water Content Test (NZS4402:1986 Test 2.1)
- 3 No. Organic Matter Content Test (NZS 4402:1986 Test 3.1.1)

A summary of the Initia Stage 1 and 2 laboratory tests and results are detailed in Table 2-6, Table 2-7, Table 2-8 and Table 2-9 below. The full laboratory results are attached in Appendix D.

All laboratory tests (Initia and Aurecon) were completed by the IANZ Accredited Babbage Geotechnical Laboratory, except for the organic content tests which were completed by Hill Labs.

**Table 2-6: Standard Compaction Test Summary.**

| Investigation ID | Sample ID | Depth | | Maximum Dry Density (t/m³) | Natural Water Content (%) | Optimum Water Content (%) |
|---|---|---|---|---|---|---|
| | | From | To | | | |
| TP18 | TP18-01 | 1.0 | 1.5 | 1.3 | 51.3 | 35 |
| TP19 | TP19-01 | 0.5 | 1.0 | 1.44 | 37.1 | 27 |
| TP20 | TP20-01 | 1.5 | 2.0 | 1.26 | 46.9 | 36 |
| TP21 | TP21-01 | 0.5 | 1.0 | 1.3 | 56.4 | 33 |
| TP24 | TP24-01 | 1.0 | 1.5 | 1.28 | 60.7 | 34 |
| TP101 | TP101-01 | 0.5 | 1.0 | 1.40 | 34.5 | 29 |

**Table 2-7: Soaked CBR Test Summary.**

| Investigation ID | Sample ID | Depth | | Application rate of lime/cement (% of dry weight) | Soaked CBR (%) |
|---|---|---|---|---|---|
| | | From | To | | |
| TP15 | TP15-01 | 1.5 | 2.0 | 2% Lime, 2% Cement | 13 % |
| TP26 | TP26-01 | 1.0 | 1.5 | Natural | 3 % |
| TP29 | T29-01 | 1.0 | 1.5 | Natural | 1 % |
| TP29 | TP29-01 | 1.0 | 1.5 | 1% Lime, 3% Cement | 30 % |
| TP30 | TP30-01 | 1.5 | 2.0 | 3% Lime, 1 % Cement | 20 % |
| TP31 | TP31-01 | 0.7 | 1.2 | 2% Lime, 2% Cement | 30 % |
| TP101 | TP101-01 | 0.5 | 1.0 | Natural | 2.5 % |
| TP112 | TP112-01 | 1.0 | 1.5 | Natural | 1 % |

**Table 2-8: Atterberg Limit, Linear Shrinkage, Water Content and Organic Content Test Summary**

| Investigation ID | Sample ID | Depth | | Natural Water Content (%) | Plastic Limit | Liquid Limit | Plasticity Index | Linear Shrinkage (%) | Organic Content (%) |
|---|---|---|---|---|---|---|---|---|---|
| | | From | To | | | | | | |
| MBH02 | MBH02-01 | 1.0 | 1.5 | 42.8 | 22 | 67 | 45 | 16 | - |
| MBH03 | MBH03-01 | 1.5 | 2.0 | 42.7 | 30 | 94 | 64 | - | - |
| MBH05 | MBH05-01 | 1.0 | 1.5 | 60.1 | 33 | 93 | 60 | 16 | - |
| HA03 | HA03-01 | 1.0 | 1.3 | 29.8 | 22 | 55 | 33 | 14 | - |
| HA04 | HA04-01 | 1.0 | 1.4 | 46.8 | 36 | 81 | 45 | 17 | - |
| HA09 | HA09-01 | 1.0 | 1.3 | 56.3 | 29 | 73 | 44 | - | - |
| HA10 | HA10-01 | 1.0 | 1.3 | 36.9 | 24 | 54 | 30 | - | - |
| HA13 | HA13-01 | 2.0 | 2.2 | 51.2 | 29 | 104 | 75 | - | - |
| HA14 | HA14-01 | 1.0 | 1.3 | 46.1 | 30 | 107 | 77 | - | - |
| TP16 | TP16-01 | 1.0 | 1.5 | 78.5 | 44 | 123 | 79 | 22 | - |
| TP17 | TP17-01 | 1.0 | 1.5 | 55.6 | 34 | 106 | 72 | - | - |
| TP19 | TP19-01 | 0.5 | 1.0 | 35.2 | 22 | 65 | 43 | 17 | - |
| TP20 | TP20-01 | 1.5 | 2.0 | 32.3 | 27 | 84 | 57 | - | - |
| TP21 | TP21-01 | 0.5 | 1.0 | 56.5 | 32 | 106 | 74 | 18 | - |
| TP22 | TP22-01 | 1.9 | 2.5 | 92.7 | 42 | 146 | 104 | - | - |
| TP23 | TP23-01 | 2.0 | 2.5 | 45.0 | 25 | 63 | 38 | - | - |
| TP24 | TP24-01 | 1.0 | 1.5 | 64.1 | 34 | 104 | 70 | 18 | - |
| TP26 | TP26-01 | 1.0 | 1.5 | 33.4 | 19 | 43 | 24 | 12 | - |
| TP27 | TP27-01 | 1.0 | 1.5 | 44.9 | 28 | 73 | 45 | 14 | - |
| TP28 | TP28-01 | 1.5 | 2.0 | 34.0 | 18 | 39 | 21 | - | - |
| TP101 | TP101-01 | 0.5 | 1.0 | 37.0 | 25 | 78 | 53 | 19 | - |
| TP107 | TP107-01 | 1.0 | 1.5 | 88.0 | 35 | 99 | 64 | 18 | 9.7 |
| TP108 | TP108-01 | 0.5 | 1.0 | 127 | 53 | 148 | 95 | 22 | 12.7 |
| TP108 | TP108-02 | 2.0 | 2.5 | 112 | - | - | - | - | 11.8 |
| HA102 | HA102-01 | 1.2 | 1.4 | 35.3 | 19 | 74 | 55 | 17 | - |
| HA104 | HA104-01 | 0.5 | 0.8 | 63.0 | 29 | 146 | 117 | 28 | - |
| HA114 | HA114-01 | 0.4 | 0.7 | 59.6 | 28 | 144 | 116 | 24 | - |
| HA116 | HA116-01 | 1.1 | 1.4 | 46.4 | 20 | 88 | 68 | 22 | - |
| HA121 | HA121-01 | 0.3 | 0.6 | 51.7 | 19 | 131 | 112 | 25 | - |
| HA122 | HA122-01 | 0.5 | 0.8 | 43.4 | 17 | 104 | 87 | 23 | - |
| HA128 | HA128-01 | 0.5 | 0.8 | 33.8 | 22 | 62 | 40 | 14 | - |
| HA133 | HA133-01 | 1.2 | 1.4 | 31.9 | 21 | 66 | 45 | 16 | - |
| HA140 | HA140-01 | 0.3 | 0.5 | 28.4 | 33 | 55 | 22 | 12 | - |

**Table 2-9: One Dimensional Consolidation Test Summary.**

| Investigation ID | Sample ID | Depth | | Modulus of volume compressibility (Mv) at in situ stress ) $m^2/MN$) | Coefficient of consolidation at in situ stress (Cv), $m^2/yr$ |
|---|---|---|---|---|---|
| | | From | To | | |
| MBH01 | MBH01-01 | 4.5 | 5.0 | 0.08 | 12 |
| MBH02 | MBH02-02 | 3.0 | 3.5 | 0.2 | 5 |
| MBH02 | MBH02-03 | 6.0 | 6.5 | 0.04 | 31 |
| MBH02 | MBH02-03 | 7.5 | 8.0 | 0.1 | 11 |
| MBH03 | MBH03-02 | 1.5 | 2.0 | 0.01 | 26 |
| MBH04 | MBH04-01 | 4.5 | 5.0 | 0.57 | 0.6 |
| MBH05 | MBH05-02 | 3.0 | 3.5 | 0.25 | 11 |
| MBH05 | MBH05-03 | 6.0 | 6.5 | 0.59 | 11 |

### 2.3.2 Aurecon – Data Centre

In addition to the Initia Stage 1 and 2 investigations, a suite of laboratory tests was also completed for the Spark Data Centre investigation, by Aurecon. The Aurecon testing included the following:

- 6 No. Atterberg Limits Tests (NZS 4402:1986 Tests 2.1, 2.2, 2.3 and 2.4)
- 3 No. Linear Shrinkage Tests (NZS 4402:1986 Test 2.6)
- 3 No. Particle Size Distribution Tests (NZS4402:1986 Tests 2.8.1 and 2.8.4)
- 2 No. Shrink-Swell Index Tests (AS1289 Test 7.1.1)
- 1 No. Soaked CBR Test (NZS 4402:1986 Test 6.1.1)
- 3 No. Consolidated Undrained Triaxial Tests (BS EN ISO 17892-9:2018, Part 9)
- 2 No. One Dimensional Consolidation Tests (NZS4402:1986 Test 7.1)

The laboratory results for the Aurecon managed laboratory tests are summarised in the Aurecon Investigation Report[10] for the Data Centres. The full laboratory test reports have been attached in Appendix E.

## 2.4 Groundwater Monitoring

### 2.4.1 Piezometers

Standpipe piezometers were installed by Tonkin & Taylor, Aurecon and Initia within hand auger boreholes and machine boreholes respectively. Installation details are summarised in Table 2-10 below and are presented on the investigation logs in Appendix B and C.

**Table 2-10: Piezometer Details**

| Borehole ID | Supervising Company | Piezometer Type | Screen Depth (m bgl) | Geological Units Over Screen Depth |
|---|---|---|---|---|
| MBH01 | Initia | Standpipe (32 mm PVC) | 5.0 – 8.0 | Tauranga Group |
| MBH02 | Initia | Standpipe (32 mm PVC) | 2.0 – 5.0 | Tauranga Group |
| MBH03 | Initia | Standpipe (32 mm PVC) | 2.0 – 5.0 | Tauranga Group |
| MBH04 | Initia | Standpipe (32 mm PVC) | 2.0 – 5.0 | Tauranga Group |
| MBH05 | Initia | Standpipe (32 mm PVC) | 2.0 – 5.0 | Tauranga Group |
| HA01P | Tonkin & Taylor | Standpipe | 0.2 – 3.5 | Tauranga Group |
| HA03P | Tonkin & Taylor | Standpipe | 0.2 – 4.0 | Tauranga Group |
| HA04P | Tonkin & Taylor | Standpipe | 0.2 – 3.5 | Tauranga Group |

[10] Aurecon (1 June 2023). *Spark Dairy Flat Campus. Geotechnical Investigation report.* Ref: 523573. Revision A.

| Borehole ID | Supervising Company | Piezometer Type | Screen Depth (m bgl) | Geological Units Over Screen Depth |
|---|---|---|---|---|
| HA11P | Tonkin & Taylor | Standpipe | 0.2 – 4.0 | Tauranga Group |
| HA15P | Tonkin & Taylor | Standpipe | 0.2 – 0.8 | Tauranga Group |
| HA20P | Tonkin & Taylor | Standpipe | 0.2 – 0.7 | Tauranga Group |
| BH01 | Aurecon | Standpipe (32 mm PVC) | 2.0 – 6.0 | Tauranga Group |
| BH02 | Aurecon | Standpipe (32 mm PVC) | 2.0 – 6.0 | Tauranga Group |
| BH03 | Aurecon | Standpipe (32 mm PVC) | 11.0 – 15.0 | Tauranga Group |
| BH06 | Aurecon | Standpipe (32 mm PVC) | 1.0 – 4.0 | Tauranga Group |
| BH07 | Aurecon | Standpipe (32 mm PVC) | 1.0 – 4.0 | Tauranga Group |
| BH08 | Aurecon | Standpipe (32 mm PVC) | 1.0 – 4.0 | Tauranga Group |

### 2.4.2 Groundwater Levels

Groundwater level monitoring, involving manual measurements and/or continuous measurements using electronic level loggers (recording at 15 minute intervals) was undertaken within the standpipe piezometers outlined in Table 2-10. Results from the groundwater monitoring within the standpipe piezometers are presented in Table 2-11 below. Plots of groundwater measurements over time from the Initia level logger measurements are presented in Appendix F.

**Table 2-11: Summary of Groundwater Measurements in Piezometers**

| Investigation ID | Monitoring By | Dates of Measurement | Measurement Type | Groundwater depth (m bgl) | Groundwater elevation (m RL) [AUCKHT1946] |
|---|---|---|---|---|---|
| MBH01 | Initia | 21/04/2023 to 7/06/2023 | Continuous (Level Logger) | 0.1 – 0.8 | 54.5 – 55.2 |
| MBH02 | Initia | 21/04/2023 to 7/06/2023 | Continuous (Level Logger) | 0.3 – 1.8 | 52.9 – 54.4 |
| MBH03 | Initia | 01/05/2023 | Manual Measurement | 0.8 | 54.4 |
| MBH04 | Initia | 21/04/2023 to 7/06/2023 | Continuous (Level Logger) | 0.1 – 0.6 | 54.3 – 54.8 |
| MBH05 | Initia | 21/04/2023 to 7/06/2023 | Continuous (Level Logger) | 0.2 – 0.6 | 54.2 – 54.6 |
| HA01P | Tonkin & Taylor | 6/05/2022<br>17/05/2022<br>24/05/2022 | Manual Measurements | 2.6 – >3.5[1] | <51.5 – 52.4 |
| HA03P | Tonkin & Taylor | 6/05/2022<br>17/05/2022<br>24/05/2022 | Manual Measurements | 0.8 – 3.8 | 51.0 – 54.0 |
| HA04P | Tonkin & Taylor | 6/05/2022<br>17/05/2022<br>24/05/2022 | Manual Measurements | 1.9 – 3.0 | 52.3 – 53.4 |
| HA11P | Tonkin & Taylor | 6/05/2022<br>17/05/2022<br>24/05/2022 | Manual Measurements | 0.9 – 1.1 | 53.0 – 53.2 |
| HA15P | Tonkin & Taylor | 6/05/2022<br>17/05/2022<br>24/05/2022 | Manual Measurements | >0.8 [1] | <62.0 |
| HA20P | Tonkin & Taylor | 6/05/2022<br>17/05/2022<br>24/05/2022 | Manual Measurements | >0.7 [1] | <66.0 |
| BH01 | Aurecon | 1/05/2023 to 17/05/2023 | Continuous (Level Logger) | 0.2 – 3.2 | 50.4 – 53.4 |
| BH02 | Aurecon | 1/05/2023<br>17/05/2023 | Manual Measurements | 0.2 – 0.6 | 53.7 – 54.1 |

| Investigation ID | Monitoring By | Dates of Measurement | Measurement Type | Groundwater depth (m bgl) | Groundwater elevation (m RL) [AUCKHT1946] |
|---|---|---|---|---|---|
| BH03 | Aurecon | 1/05/2023 to 17/05/2023 | Continuous (Level Logger) | 0[2] – 0.4 | 53.5 – 54.3 |
| BH06 | Aurecon | 1/05/2023 17/05/2023 | Manual Measurements | 0.1 – 0.4 | 54.0 – 54.3 |
| BH07 | Aurecon | 1/05/2023 17/05/2023 | Manual Measurements | 0.1 – 0.2 | 53.7 – 53.8 |
| BH08 | Aurecon | 1/05/2023 to 17/05/2023 | Continuous (Level Logger) | 0.3 – 3.4 | 51.5 – 54.6 |

Note [1] : Piezometer dry on measurement
Note [2] : Groundwater readings provided by Aurecon indicate groundwater was measured above ground surface level in the standpipe upstand.

Where encountered, groundwater inflows were recorded in the test pit excavations and standing groundwater levels were recorded in the hand auger boreholes at the completion of drilling. It is noted that the groundwater within test pits had initial significant inflow with a rapid attenuation of flow rates.

A summary of the groundwater inflows and levels (where encountered) at the completion of drilling is summarised in Table 2-12 below. Where hand auger holes were dry on the completion of drilling, this is noted on the investigation logs.

**Table 2-12: Test Pit Inflow Observations and Groundwater Measurements in Hand Augers at the Completion of Drilling**

| Investigation ID | Investigation by | Date of Measurement | Measurement Type | Groundwater depth (m bgl) | Groundwater elevation (m RL) [AUCKHT1946] |
|---|---|---|---|---|---|
| HA01 | Initia | 21/03/2023 | Level at Completion of Drilling | 2.0 | 52.0 |
| HA03 | Initia | 23/03/2023 | Level at Completion of Drilling | 3.4 | 51.2 |
| HA06 | Initia | 20/03/2023 | Level at Completion of Drilling | 1.6 | 52.4 |
| HA09 | Initia | 24/03/2023 | Level at Completion of Drilling | 0.9 | 53.6 |
| HA10 | Initia | 22/03/2023 | Level at Completion of Drilling | 1.0 | 53.5 |
| HA11 | Initia | 23/03/2023 | Level at Completion of Drilling | 1.0 | 53.4 |
| HA12 | Initia | 22/03/2023 | Level at Completion of Drilling | 1.1 | 53.6 |
| HA14 | Initia | 24/03/2023 | Level at Completion of Drilling | 3.6 | 52.2 |
| HA103 | Initia | 6/08/2025 | Level at Completion of Drilling | 1.3 | 61.5 |
| HA105 | Initia | 18/08/2025 | Level at Completion of Drilling | 0.1 | 53.3 |
| HA108 | Initia | 6/08/2025 | Level at Completion of Drilling | 1.6 | 54.9 |
| HA111 | Initia | 6/08/2025 | Level at Completion of Drilling | 1.7 | 50.3 |
| HA112 | Initia | 18/08/2025 | Level at Completion of Drilling | 0.1 | 55.1 |
| HA113 | Initia | 6/08/2025 | Level at Completion of Drilling | 2.3 | 51.9 |
| HA121 | Initia | 6/08/2025 | Level at Completion of Drilling | 2.2 | 53.3 |
| HA122 | Initia | 6/08/2025 | Level at Completion of Drilling | 1.5 | 52.4 |
| HA124 | Initia | 6/08/2025 | Level at Completion of Drilling | 1.6 | 53.6 |
| HA125 | Initia | 5/08/2025 | Level at Completion of Drilling | 0.7 | 53.3 |
| HA126 | Initia | 5/08/2025 | Level at Completion of Drilling | 0.8 | 53.2 |
| HA127 | Initia | 6/08/2025 | Level at Completion of Drilling | 1.1 | 53.0 |
| HA128 | Initia | 5/08/2025 | Level at Completion of Drilling | 0.3 | 53.9 |
| HA129 | Initia | 6/08/2025 | Water Inflow | 1.5 | 52.6 |
| HA134 | Initia | 6/08/2025 | Level at Completion of Drilling | 0.2 | 54.6 |
| HA136 | Initia | 11/08/2025 | Level at Completion of Drilling | 0.1 | 55.1 |
| HA137 | Initia | 11/08/2025 | Level at Completion of Drilling | 0.4 | 54.3 |

| Investigation ID | Investigation by | Date of Measurement | Measurement Type | Groundwater depth (m bgl) | Groundwater elevation (m RL) [AUCKHT1946] |
|---|---|---|---|---|---|
| HA138 | Initia | 11/08/2025 | Level at Completion of Drilling | 2.9 | 48.7 |
| HA139 | Initia | 11/08/2025 | Level at Completion of Drilling | 1.4 | 49.2 |
| HA140 | Initia | 11/08/2025 | Level at Completion of Drilling | 0.6 | 51.4 |
| HA141 | Initia | 11/08/2025 | Level at Completion of Drilling | 0.3 | 54.9 |
| TP11 | Initia | 28/03/2023 | Water Inflow | 0.7 | 52.4 |
| TP12 | Initia | 28/03/2023 | Water Inflow | 0.6 | 52.3 |
| TP16 | Initia | 27/03/2023 | Water Inflow | 1.3 | 54.1 |
| TP22 | Initia | 28/03/2023 | Water Inflow | 2.0 | 52.4 |
| TP23 | Initia | 27/03/2023 | Water Inflow | 0.8 | 54.1 |
| TP24 | Initia | 27/03/2023 | Water Inflow | 0.9 | 54.1 |
| TP28 | Initia | 27/03/2023 | Water Inflow | 0.7 | 53.4 |
| TP29 | Initia | 27/03/2023 | Water Inflow | 1.0 | 53.6 |
| TP30 | Initia | 27/03/2023 | Water Inflow | 0.6 | 53.7 |
| TP31 | Initia | 27/03/2023 | Water Inflow | 0.6 | 53.3 |
| TP112 | Initia | 7/08/2025 | Water Inflow | 0.5 | 54.9 |
| TP107 | Initia | 7/08/2025 | Water Inflow | 2.7 | 51.5 |
| TP108 | Initia | 7/08/2025 | Water Inflow | 1.5 | 52.4 |
| TP109 | Initia | 7/08/2025 | Water Inflow | 1.7 | 53.2 |
| HA06 | T&T | 3/05/2022 | Level 1 day after Drilling | 0.9 | 53.7 |
| HA07 | T&T | 3/05/2022 | Level at Completion of Drilling | 0.9 | 50.9 |
| HA10 | T&T | 6/05/2022 | Level at Completion of Drilling | 1.1 | 52.2 |
| HA12 | T&T | 2/05/2022 | Water Inflow | 1.1 | 52.6 |
| HA13 | T&T | 2/05/2022 | Level at Completion of Drilling | 3.0 | 51.2 |
| HA14 | T&T | 9/05/2022 | Level at Completion of Drilling | 1.0 | 58.1 |
| HA16 | T&T | 2/05/2022 | Level at Completion of Drilling | 2.2 | 52.0 |
| HA01 | Aurecon | 11/04/2023 | Level at Completion of Drilling | 0.5 | 52.9 |
| HA02 | Aurecon | 11/04/2023 | Level at Completion of Drilling | 0.5 | 53.3 |
| HA03 | Aurecon | 11/04/2023 | Level at Completion of Drilling | 0.5 | 53.3 |
| HA04 | Aurecon | 12/04/2023 | Level at Completion of Drilling | 0.7 | 53.4 |
| HA05 | Aurecon | 12/04/2023 | Level at Completion of Drilling | 1.4 | 53.1 |
| HA06 | Aurecon | 12/04/2023 | Level at Completion of Drilling | 0.6 | 53.1 |
| HA07 | Aurecon | 12/04/2023 | Level at Completion of Drilling | 0.8 | 53.3 |

# 3. Applicability

This report has been prepared for our client, ASP Bei Land Co, with respect to the brief provided to us. The results of this investigation should not be applied to any other project or used in any other context without prior written approval from Initia Limited.

Report prepared by:



Kieran Bursell
**Geotechnical Engineer**

Report reviewed by:



Nick Speight
**Senior Geotechnical Engineer, Director**

**Document control record**

| Report Title | | Auckland Surf Park Community<br>Geotechnical Factual Report | | | |
|---|---|---|---|---|---|
| Initia Project Reference | | P-001537 | | | |
| Client | | ASP Bei Land Co | | | |
| Revision | Date | Revision detail | Author | Reviewer | Approved by |
| A | 03-05-2023 | Draft Issue (awaiting laboratory results) | Q. Sorensen | N. Speight | N. Speight |
| B | 13-06-2023 | For Resource Consent | Q. Sorensen | N. Speight | N. Speight |
| C | 23-06-2023 | Minor revision | Q. Sorensen | N. Speight | N. Speight |
| D | 5-09-2025 | Stage 2 Investigations added. Draft Issue (awaiting laboratory results) | K. Bursell | N. Speight | N. Speight |
| E | 7-11-2025 | For Stage 2 Substantive Application | K. Bursell | N. Speight | N. Speight |
| F | 18-12-2025 | Minor revisions for Stage 2 Substantive Application | K. Bursell | N. Speight | N. Speight |
| Current Revision | | F | | | |

# Appendix A Figures

## LEGEND

**INITIA INVESTIGATION (AUG 2025)**

- CPT118 — CONE PENETRATION TEST
- TP101 — TEST PIT
- HA112 — HAND AUGER

**INITIA INVESTIGATION (MAR - APR 2023)**

- CPT01 — CONE PENETRATION TEST
- MBH01 — MACHINE BOREHOLE
- HA01 — HAND AUGER
- TP01 — TEST PIT

**HISTORICAL INVESTIGATION**

- HA01P — HAND AUGER WITH PEIZOMETER ( T&T - MAY 2022 )
- HA10 — HAND AUGER ( T&T - MAY 2022 )
- TP01 — TEST PIT ( T&T - MAY 2022 )
- CPT06 — FLAT PLATE DILATOMETER (AURECON - APRIL 2023)
- BH04 — MACHINE BOREHOLE (AURECON - APRIL 2023)
- HA03 — HAND AUGER (AURECON - APRIL 2023)
- SITE BOUNDARY
- 0.5 — EXISTING GROUND CONTOUR (0.5m INTEVAL) TOPOGRAPHICAL SURVEY (DATED 24/03/2023)
- 0.5 — EXISTING GROUND CONTOUR (0.5m INTEVAL) AUCKLAND COUNCIL LIDAR (DATED 2016)

SCALE A3 1:5000

0 50 100 150 200 250m

NOTES

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
2. PROPERTY BOUNDARY AND EXISTING SERVICES TAKEN FROM AUCKLAND COUNCIL DATE 2017.
3. CONTOURS FOR 1350 DAIRY FLAT HIGHWAY, 237 POSTMAN ROAD AND 253 POSTMAN ROAD SOURCED FROM MCKENZIE & CO TOPOGRAPHICAL SURVEY, DATED 24/03/2023, DATUM AUCKHT1946
4. CONTOURS FOR 89 LASCELLES DRIVE, 105 LASCELLES DRIVE AND 1320 DAIRY FLAT HIGHWAY SOURCED FROM AUCKLAND COUNCIL LIDAR SURVEY, DATED 2016. CONTOURS LEVELS HAVE BEEN TRANSPOSED FROM NZVD2016 TO AUCKHT1946
5. COORDINATE DATUM: MOUNT EDEN 2000
6. LEVEL ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946(MSL).
   ORIGIN OF LEVELS - MARK:BACV DAIRY FLAT
   RL: 46.107m (LINZ NZVD2016 CONVERSION)
7. SITE DEVELOPMENT PLAN SUPPLIED BY STUDIO PACIFIC ARCHITECTURE. LAYOUT ID RP_1.3. DATED 9-12-2025
8. AERIAL SHOWN TAKEN FROM NEARMAP DATE MAY 2025

INFORMATION ONLY

| Rev | Revision Description | Designed | Drawn | Checked |
|---|---|---|---|---|
| C | UPDATED SITE DEVELOPMENT PLAN (17/12/2025) | KB | GG | KB |
| B | UPDATED SITE DEVELOPMENT PLAN (03/11/2025) | KB | JG | KB |
| A | FIRST ISSUE (05/09/2025) | KB | JG | KB |

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Initia Project ref: P-001537

Figure Number 1537-1-G01

Revision C

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Figure Number 1537-1-G02

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## LEGEND

**INITIA INVESTIGATION (AUG 2025)**

- CPT118 — CONE PENETRATION TEST
- TP101 — TEST PIT
- HA112 — HAND AUGER

**INITIA INVESTIGATION (MAR - APR 2023)**

- CPT01 — CONE PENETRATION TEST
- MBH01 — MACHINE BOREHOLE
- HA01 — HAND AUGER
- TP01 — TEST PIT

**HISTORICAL INVESTIGATION**

- HA01P — HAND AUGER WITH PEIZOMETER ( T&T - MAY 2022 )
- HA10 — HAND AUGER ( T&T - MAY 2022 )
- TP01 — TEST PIT ( T&T - MAY 2022 )

- SITE BOUNDARY
- 0.5 — EXISTING GROUND CONTOUR (0.5m INTEVAL) TOPOGRAPHICAL SURVEY (DATED 24/03/2023)
- 0.5 — EXISTING GROUND CONTOUR (0.5m INTEVAL) AUCKLAND COUNCIL LIDAR (DATED 2016)

KEY PLAN

SCALE A3 1:1250

0 12.5 25 37.5 50 62.5m

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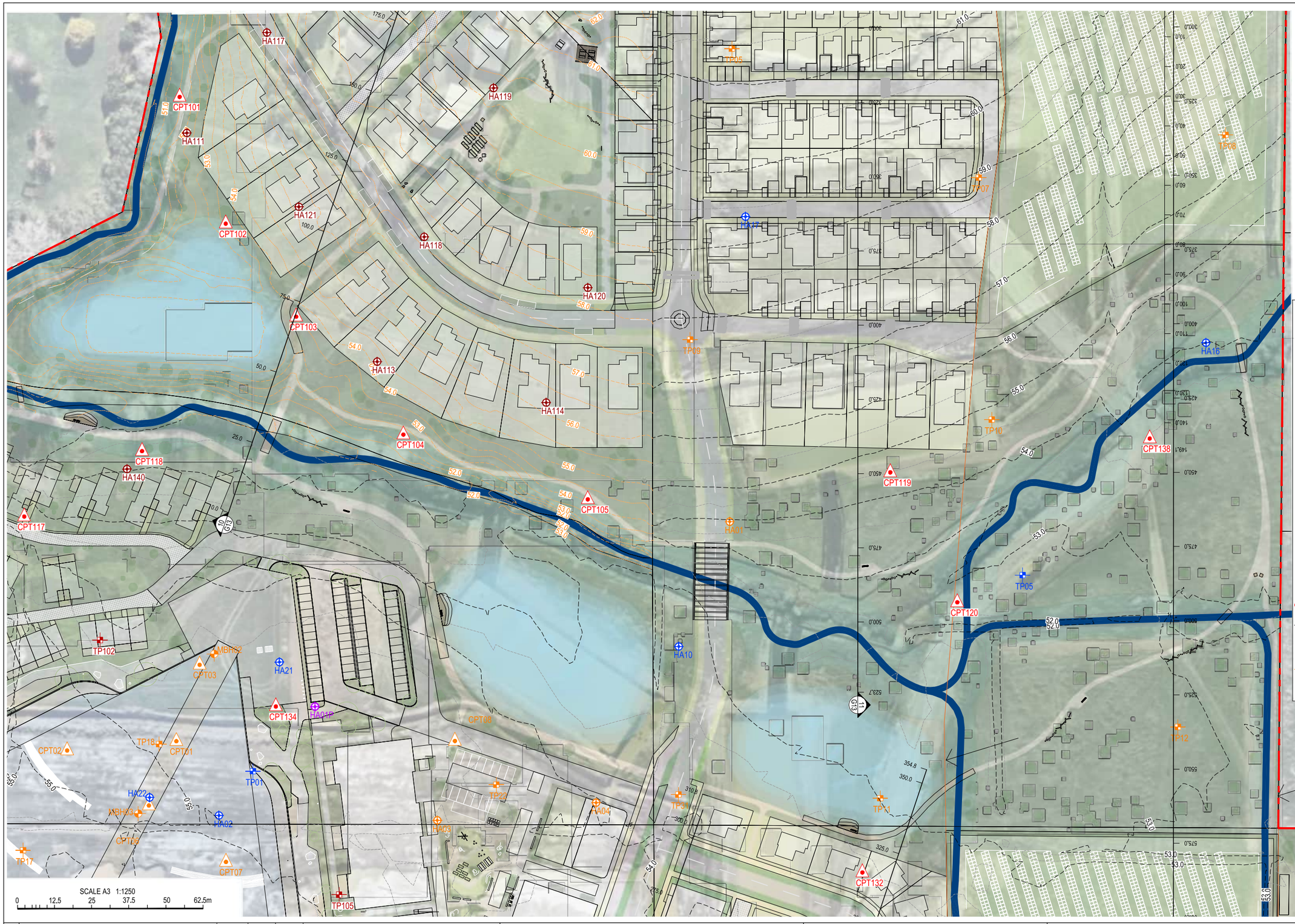
Initia Project ref: P-001537

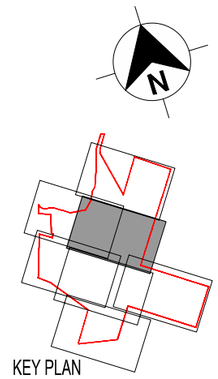
Figure Number 1537-1-G03

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- TP101 — TEST PIT
- HA112 — HAND AUGER

INITIA INVESTIGATION (MAR - APR 2023)

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- MBH01 — MACHINE BOREHOLE
- HA01 — HAND AUGER
- TP01 — TEST PIT

HISTORICAL INVESTIGATION

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- HA10 — HAND AUGER ( T&T - MAY 2022 )
- TP01 — TEST PIT ( T&T - MAY 2022 )
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GEOTECHNICAL INVESTIGATION LOCATION PLAN (SHEET 3 OF 7)

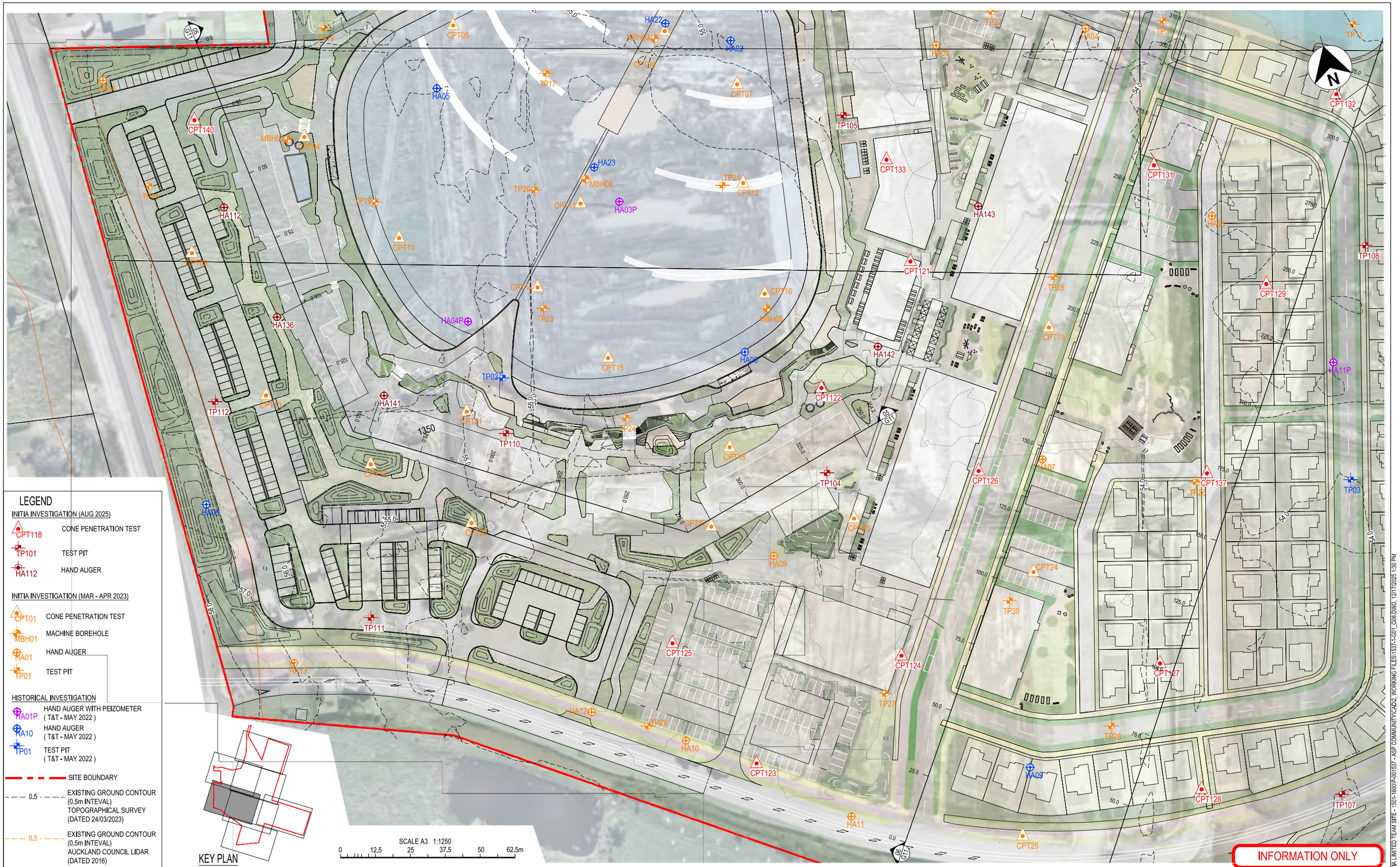
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Figure Number 1537-1-G04

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**INITIA INVESTIGATION (MAR - APR 2023)**

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- HA01 — HAND AUGER
- TP01 — TEST PIT

**HISTORICAL INVESTIGATION**

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KEY PLAN

## LEGEND

INITIA INVESTIGATION (AUG 2025)

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- TP101 — TEST PIT
- HA112 — HAND AUGER

INITIA INVESTIGATION (MAR - APR 2023)

- CPT01 — CONE PENETRATION TEST
- MBH01 — MACHINE BOREHOLE
- HA01 — HAND AUGER
- TP01 — TEST PIT

HISTORICAL INVESTIGATION

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- TP01 — TEST PIT ( T&T - MAY 2022 )

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AUCKLAND SURF PARK

GEOTECHNICAL INVESTIGATION LOCATION PLAN (SHEET 5 OF 7)

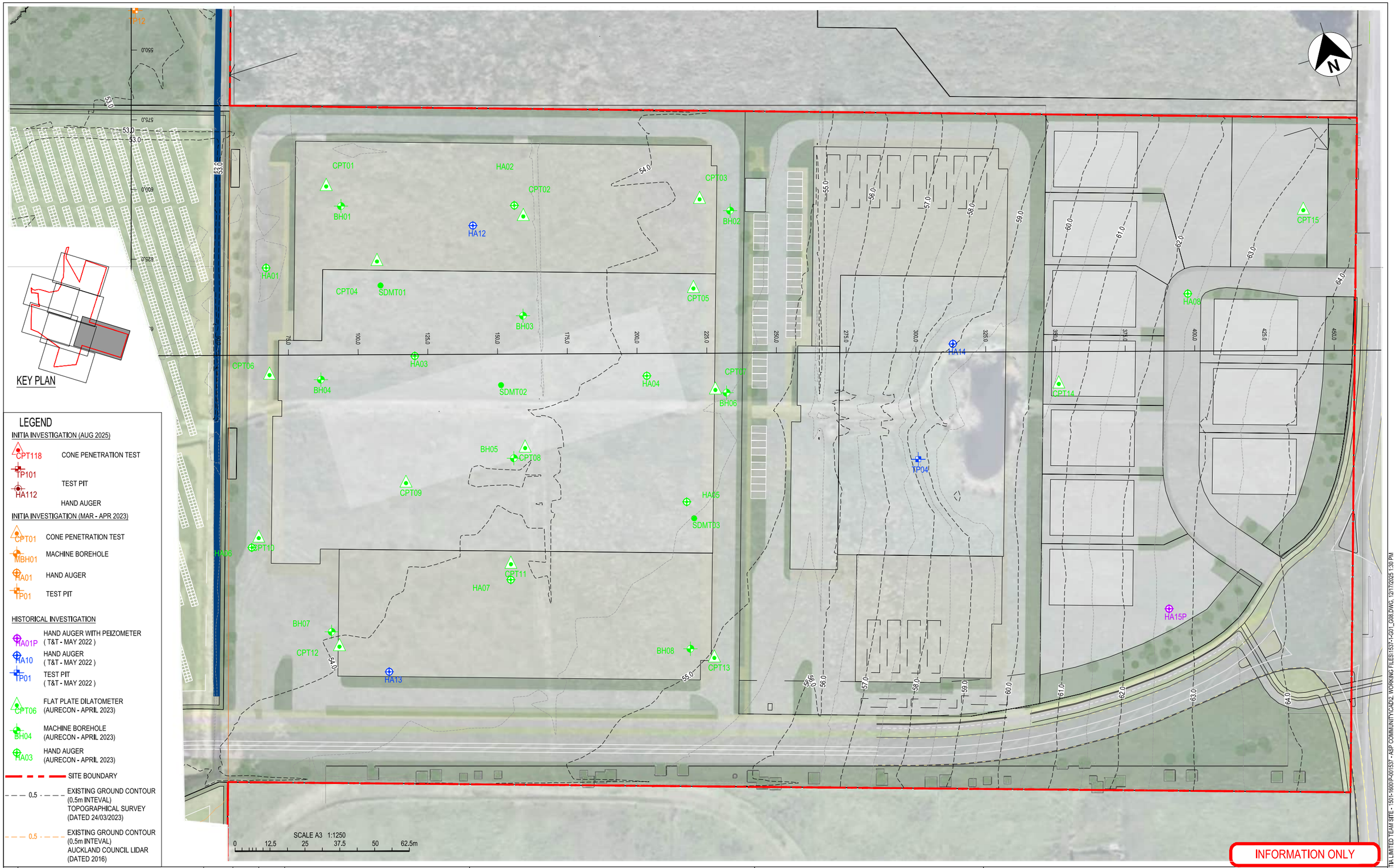
Initia Project ref: P-001537

Figure Number 1537-1-G06

Revision C

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| Rev | Revision Description | Designed | Drawn | Checked |
|---|---|---|---|---|
| C | UPDATED SITE DEVELOPMENT PLAN (17/12/2025) | KB | GG | KB |
| B | UPDATED SIRE DEVELOPMENT PLAN (03/11/2025) | KB | JG | KB |
| A | FIRST ISSUE (05/09/2025) | KB | JG | KB |

NOT FOR CONSTRUCTION

THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED AS APPROVED

APPROVED:

DATE:

Scale AS SHOWN Original Size A3

INITIA GEOTECHNICAL SPECIALISTS

Unit 6, Level 1, 114 St Georges Bay Road Parnell, Auckland, 1052

Phone: +64 09 977 0460
Email: enquiries@initia.co.nz

ASP BEI LAND CO

AUCKLAND SURF PARK

GEOTECHNICAL INVESTIGATION
LOCATION PLAN
(SHEET 6 OF 7)

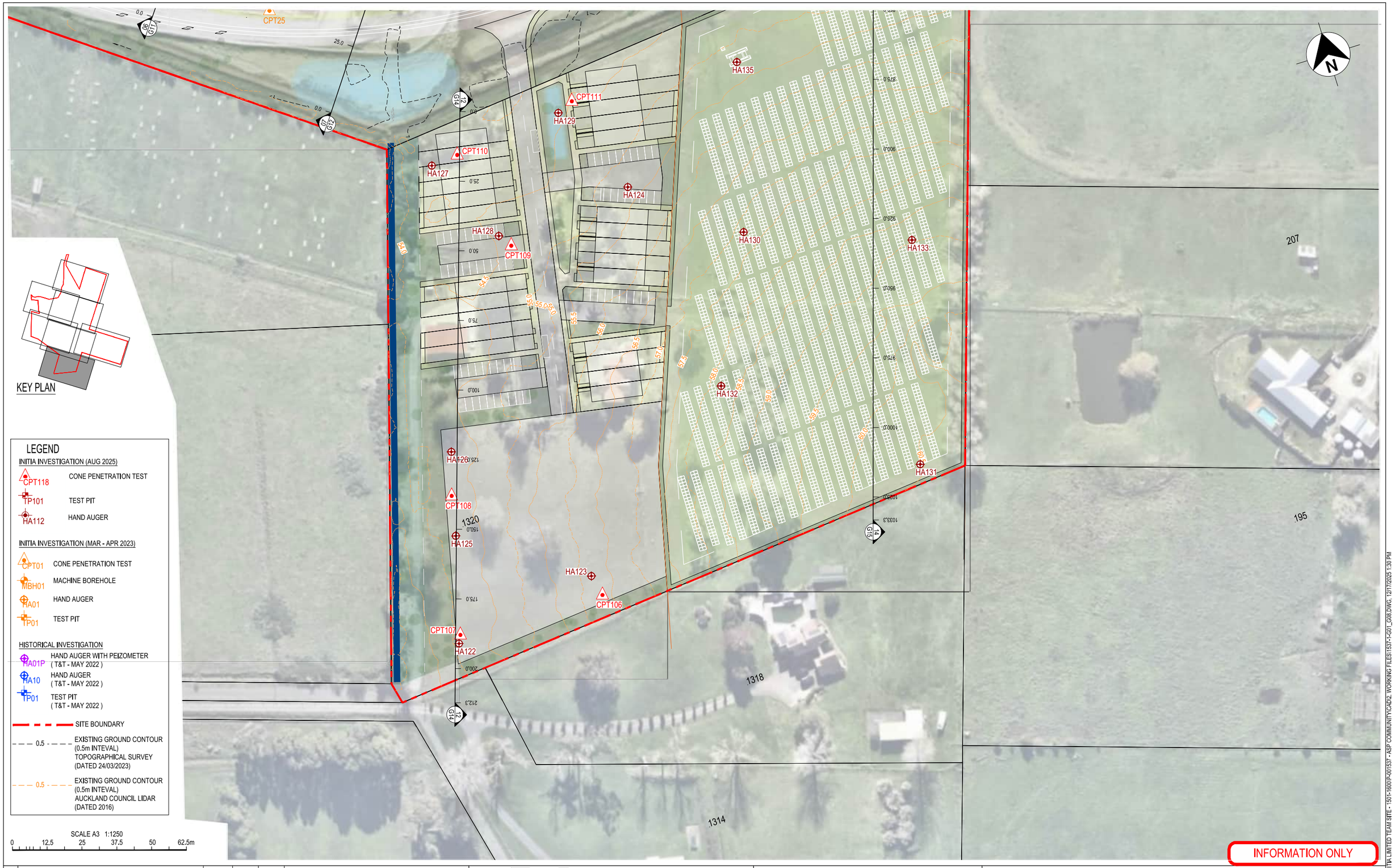
Initia Project ref: P-001537

Figure Number 1537-1-G07

Revision C

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## LEGEND

**INITIA INVESTIGATION (AUG 2025)**

- CPT118 — CONE PENETRATION TEST
- TP101 — TEST PIT
- HA112 — HAND AUGER

**INITIA INVESTIGATION (MAR - APR 2023)**

- CPT01 — CONE PENETRATION TEST
- MBH01 — MACHINE BOREHOLE
- HA01 — HAND AUGER
- TP01 — TEST PIT

**HISTORICAL INVESTIGATION**

- HA01P — HAND AUGER WITH PEIZOMETER ( T&T - MAY 2022 )
- HA10 — HAND AUGER ( T&T - MAY 2022 )
- TP01 — TEST PIT ( T&T - MAY 2022 )

- SITE BOUNDARY
- 0.5 — EXISTING GROUND CONTOUR (0.5m INTEVAL) TOPOGRAPHICAL SURVEY (DATED 24/03/2023)
- 0.5 — EXISTING GROUND CONTOUR (0.5m INTEVAL) AUCKLAND COUNCIL LIDAR (DATED 2016)

SCALE A3 1:1250

0 12.5 25 37.5 50 62.5m

| Rev | Revision Description | Designed | Drawn | Checked |
|---|---|---|---|---|
| C | UPDATED SITE DEVELOPMENT PLAN (17/12/2025) | KB | GG | KB |
| B | UPDATED SIRE DEVELOPMENT PLAN (03/11/2025) | KB | JG | KB |
| A | FIRST ISSUE (05/09/2025) | KB | JG | KB |

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APPROVED:

DATE:

Scale AS SHOWN | Original Size A3

INITIA GEOTECHNICAL SPECIALISTS

Unit 6, Level 1, 114 St Georges Bay Road Parnell, Auckland, 1052

Phone: +64 09 977 0460
Email: enquiries@initia.co.nz

ASP BEI LAND CO

AUCKLAND SURF PARK

GEOTECHNICAL INVESTIGATION LOCATION PLAN (SHEET 7 OF 7)

Initia Project ref: P-001537

Figure Number 1537-1-G08

Revision C

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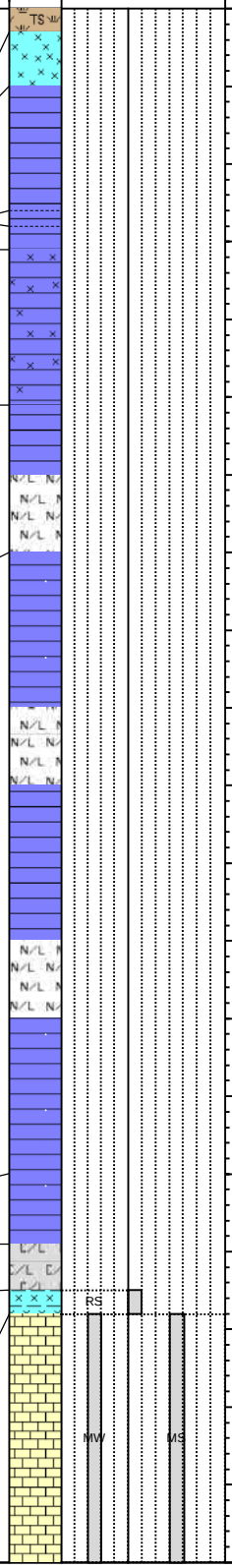
# Appendix B Initia Investigation Logs

# DRILLHOLE LOG

INITIA
GEOTECHNICAL SPECIALISTS

| | | |
|---|---|---|
| **HOLE NO.:** MBH01 | | |
| **CLIENT:** AW Holdings | **SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat | **Project Ref.:** P-001537 |
| **PROJECT:** ASP Community | | |
| **CO-ORDINATES:** 1746801.2mE, 5942120.0mN | **ELEVATION:** 55.3m | **CONTRACTOR:** DCN Drilling |
| **START DATE:** 20/03/2023 | | |
| **Co-ordinate system:** NZTM | **Datum:** AUCKHT1946 | **RIG:** Morooka |
| **END DATE:** 21/03/2023 | | |
| **Location method:** SURVEY | **Level method:** SURVEY | **DRILLER:** Corey |
| **LOGGED BY:** QS | | |
| **ORIENTATION (°):** Vertical | **INCLINATION (°):** 90 | **CHECKED BY:** BPR |

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | DEPTH | RL |
|---|---|---|---|
| Tauranga Group Alluvium | SILT, with some clay, with minor rootlets; dark brown. Firm; non-plastic; moist; [Topsoil]. | 0.0 | |
| | SILT, with minor clay; brown. Firm; low plasticity; moist. | 0.3 | |
| | CLAY, with some silt; light grey. Stiff; high plasticity; moist. | 0.5 | |
| | 1.30m - 1.40m: some wood | 1.3 | |
| | Silty CLAY, with minor organics; grey. Stiff; high plasticity; moist; organics, amorphous. | 1.4 | |
| | CLAY, with some silt; brownish grey. Stiff; high plasticity; moist. | 2.8 | |
| | 3.0 m - 3.5 m: Push Tube | 3.0 | |
| | 3.50m: grades to light grey, trace amorphous organics | 3.5 | |
| | 4.5 m - 5.0 m: Push Tube | 4.5 | |
| | 6.0 m - 6.5 m: Push Tube | 6.0 | |
| | 7.50m: grades to very stiff | 7.5 | |
| | 7.95 m - 8.25 m: No Recovery | 7.95 | |
| Mahurangi Limestone | Clayey SILT, with minor gravel; grey. Very stiff; low plasticity; moist; [Residually Weathered Limestone]. | 8.25 | |
| | Moderately weathered; light grey; LIMESTONE; moderately strong; highly fractured, extremely closely spaced defects, Limestone in a muddy matrix. (Recovered as gravel). | | |



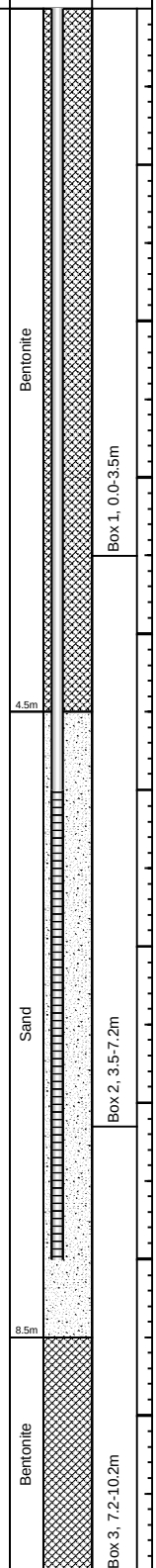

| INSITU TESTING (SPT 'N' Vane shear strength) |
|---|
| 0, 1 / 0, 0, 2, 2 N=4 |
| 22, 28 for 65mm N=50+ |

**DISCONTINUITIES**

| DESCRIPTION |
|---|

**WATER**

01/05/2023




**REMARKS:**
Target Depth Reached

Ver 3.0, Generated with CORE-GS by Geroc - Drillhole_Initia - 2/05/2023 6:43:44 pm

# DRILLHOLE LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** MBH01

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746801.2mE, 5942120.0mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ORIENTATION (°):** Vertical
**ELEVATION:** 55.3m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**INCLINATION (°):** 90
**CONTRACTOR:** DCN Drilling
**RIG:** Morooka
**DRILLER:** Corey
**START DATE:** 20/03/2023
**END DATE:** 21/03/2023
**LOGGED BY:** QS
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | GRAPHIC | WEATHERING (LW SW MW HW CW EW) | STRENGTH (VW W MS S VS ES) | DEPTH | RL | SAMPLES | METHOD | TCR (%) (25 50 75) | RQD (%) (25 50 75) | INSITU TESTING (SPT 'N' Vane shear strength) | DISCONTINUITIES DESCRIPTION | WATER | INSTALLATION | CORE BOXES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mahurangi Limestone | Moderately weathered; light grey; LIMESTONE; moderately strong; highly fractured, extremely closely spaced defects, Limestone in a muddy matrix. (Recovered as gravel). | | | | | 45.0 | | SPT | 100 | | 25, 25 for 45mm N=50+ | | | | |
| | 10.50m - 12.00m: grades to very closely spaced defects | | MW | MS | 11 | 44.0 | | HQTT | 100 | | | | | | |
| | EOH: 12.35m | | | | 12 | 43.0 | | SPT | 100 | | 10, 15 / 16, 21, 13 for 45mm N=50+ for 195mm | | | 12.35m | Box 4, 10.2-12.4m |

42.0
41.0
40.0
39.0
38.0
37.0
36.0

**REMARKS:**
Target Depth Reached

Ver 3.0, Generated with CORE-GS by Geroc - Drillhole_Initia - 2/05/2023 6:43:44 pm

# CORE PHOTOS

**HOLE NO.:** MBH01

**JOB NO.:** P-001537

Box 1, 0.0-3.5m




Box 2, 3.5-7.2m




Box 3, 7.2-10.2m




Generated with CORE-GS by Geroc - Drillhole_Initia - 2/05/2023 6:43:44 pm

# CORE PHOTOS

**HOLE NO.:** MBH01

**JOB NO.:** P-001537

Box 4, 10.2-12.4m




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# DRILLHOLE LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** MBH02

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746978.3mE, 5942156.8mN
**ELEVATION:** 54.7m
**CONTRACTOR:** DCN Drilling
**START DATE:** 21/03/2023

**Co-ordinate system:** NZTM
**Datum:** AUCKHT1946
**RIG:** Morooka
**END DATE:** 22/03/2023

**Location method:** SURVEY
**Level method:** SURVEY
**DRILLER:** Corey
**LOGGED BY:** FPT

**ORIENTATION (°):** Vertical
**INCLINATION (°):** 90
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | GRAPHIC | WEATHERING (UW SW MW HW CW EW) | STRENGTH (VW W MS S VS ES) | DEPTH | RL | SAMPLES | METHOD | TCR (%) (25 50 75) | RQD (%) (25 50 75) | INSITU TESTING SPT 'N' Vane shear strength | DISCONTINUITIES DESCRIPTION | WATER | INSTALLATION | CORE BOXES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Topsoil | 0.00m - 0.60m: Core Loss (inferred as topsoil) | | | | 0 | 54.0 | | HQTT | 60 | | | | | | |
| | SILT, with minor clay, with trace rootlets; dark brown. Firm; low plasticity; moist; [Topsoil]. | | | | | | | | | | | | | | |
| Tauranga Group Alluvium | Silty CLAY; light grey, with occasional orange brown streaks. Stiff; high plasticity; moist. | | | | 1 | 53.0 | | DPT | 100 | | | | | | |
| | 1.50 m - 2.00 m: Push Tube (note push tube was discarded due to large piece of wood being stuck in the tube) | | | | | | | | | | | | | | |
| | Wood | | | | 2 | 52.0 | | HQTT | 60 | | | | | | |
| | 2.60 m - 3.00 m: No Recovery | | | | | | | | | | | | | | |
| | 3.0 m - 3.5 m: Push Tube | | | | 3 | 51.0 | | DPT | 100 | | | | | | |
| | CLAY, with some silt; light grey, speckled black. Stiff; high plasticity; moist; minor fibrous organics. | | | | | | | HQTT | 100 | | | | | | |
| | 4.40m: Grades to trace fibrous organics. | | | | 4 | 50.0 | | | | | | | | | |
| | 4.5 m - 5.0 m: Push Tube | | | | 5 | 49.0 | | DPT | 100 | | | | | | |
| | | | | | | | | HQTT | 100 | | | | | | |
| | 6.0 m - 6.5 m: Push Tube | | | | 6 | 48.0 | | DPT | 100 | | | | | | |
| | | | | | 7 | 47.0 | | HQTT | 100 | | | | | | |
| | 7.5 m - 8.0 m: Push Tube | | | | | | | DPT | 100 | | | | | | |
| | | | | | 8 | 46.0 | | HQTT | 100 | | | | | | |
| | Clayey SILT, with trace sand; grey, speckled black. Stiff; high plasticity; moist; sand, fine; trace fibrous organics. | | | | 9 | 45.0 | | SPT | 100 | | 0, 1 / 1, 0, 1, 1 N=3 | | 01/05/2023 | Bentonite 2m; Sand 5.5m; Bentonite | Box 1, 0.0-5.0m; Box 2, 5.0-8.8m; Box 3, 8.8-12.1m |
| | | | | | | | | HQTT | 100 | | | | | | |

**REMARKS:**
Target Depth Reached

Ver 3.0, Generated with CORE-GS by Geroc - Drillhole_Initia - 2/05/2023 6:43:50 pm

# DRILLHOLE LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** MBH02

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746978.3mE, 5942156.8mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ORIENTATION (°):** Vertical
**ELEVATION:** 54.7m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**INCLINATION (°):** 90
**CONTRACTOR:** DCN Drilling
**RIG:** Morooka
**DRILLER:** Corey
**START DATE:** 21/03/2023
**END DATE:** 22/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | GRAPHIC | WEATHERING (UW SW MW HW CW EW) | STRENGTH (VW W MS S VS ES) | DEPTH | RL | SAMPLES | METHOD | TCR (%) (25 50 75) | RQD (%) (25 50 75) | INSITU TESTING SPT 'N' Vane shear strength | DISCONTINUITIES DESCRIPTION | WATER | INSTALLATION | CORE BOXES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tauranga Group Alluvium | [CONT] Clayey SILT, with trace sand; grey, speckled black. Stiff; high plasticity; moist; sand, fine; trace fibrous organics. | | | | | | | HQTT | 100 | | | | | | |
| Mahurangi Limestone | SILT, with some gravel, with minor clay and sand. Hard; low plasticity; moist; sand, fine to coarse; [Residually Weathered Limestone]. | | RS | | 11 | 44.0 | | SPT | 100 | | 0, 0 / 10, 1, 2, 6 N=19 | | | | |
| | Moderately weathered; light grey; LIMESTONE; moderately strong; highly fractured, extremely closely spaced defects, Limestone in a muddy matrix. | | | | | 43.0 | | HQTT | 100 | | | | | | |
| | 11.50m - 12.20m: recovered as gravels, very closely spaced defects | | | | 12 | | | | | | 37, 13 for 7mm N=50+ | | | | Box 3, 8.8-12.1m |
| | | | MW | MS | | 42.0 | | HQTT | 100 | | | | | | |
| | 13.40m - 14.00m: recovered as gravels, extremely closely spaced defects | | | | 13 | 41.0 | | | | | 50 for 70mm N=50+ | | | | |
| | 14.20m - 14.30m: recovered as gravels, extremely closely spaced defects | | | | 14 | 40.0 | | HQTT | 93 | 24 | | | | | Box 4, 12.1-15.1m |
| | EOH: 15.06m | | | | 15 | | | | | | 50 for 60mm N=50+ | | | 15.06m | |
| | | | | | | 39.0 | | | | | | | | | |
| | | | | | | 38.0 | | | | | | | | | |
| | | | | | | 37.0 | | | | | | | | | |
| | | | | | | 36.0 | | | | | | | | | |
| | | | | | | 35.0 | | | | | | | | | |

**REMARKS:**
Target Depth Reached

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# CORE PHOTOS

**HOLE NO.:** MBH02

**JOB NO.:** P-001537

Box 1, 0.0-5.0m




Box 2, 5.0-8.8m




Box 3, 8.8-12.1m




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# CORE PHOTOS

**HOLE NO.:** **MBH02**

**JOB NO.:** P-001537

Box 4, 12.1-15.1m




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# DRILLHOLE LOG

INITIA
GEOTECHNICAL SPECIALISTS

| | | |
|---|---|---|
| **HOLE NO.:** MBH03 | | |
| **CLIENT:** AW Holdings | **SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat | **Project Ref.:** P-001537 |
| **PROJECT:** ASP Community | | |
| **CO-ORDINATES:** 1746937.3mE, 5942113.6mN | **ELEVATION:** 55.2m | **CONTRACTOR:** DCN Drilling |
| **START DATE:** 28/03/2023 | | |
| **Co-ordinate system:** NZTM | **Datum:** AUCKHT1946 | **RIG:** Tractor Mounted Rig |
| **END DATE:** 28/03/2023 | | |
| **Location method:** SURVEY | **Level method:** SURVEY | **DRILLER:** Evan |
| **LOGGED BY:** FPT | | |
| **ORIENTATION (°):** Vertical | **INCLINATION (°):** 90 | **CHECKED BY:** BPR |

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | GRAPHIC | WEATHERING (UW SW MW HW CW EW) | STRENGTH (VW W MS S VS ES) | DEPTH | RL | SAMPLES | METHOD | TCR (%) (25 50 75) | RQD (%) (25 50 75) | INSITU TESTING (SPT 'N' Vane shear strength) | DISCONTINUITIES DESCRIPTION | WATER | INSTALLATION | CORE BOXES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with minor clay; dark brown. Firm; low plasticity; moist; trace rootlets. | TS | | | 0 | 55.0 | | HQTT | 100 | | | | 01/05/2023 | Bentonite | |
| Tauranga Group Alluvium | Silty CLAY; light grey, streaked light orange brown. Firm; high plasticity; moist. | | | | | | | | | | | | | | |
| | 1.5 m - 2.0 m: Push Tube | N/L | | | 1 | 54.0 | | DPT | | | | | | 1.5m | |
| | Silty CLAY; organic stained brownish grey. Stiff; high plasticity; moist. | | | | 2 | 53.0 | | HQTT | 100 | | | | | | Box 1, 0.0-2.5m |
| | Peat (fibrous) CLAY, with some silt; black. Stiff; high plasticity; moist. | | | | | | | | | | | | | | |
| | Silty CLAY; organic stained brownish grey. Stiff; high plasticity; moist. | | | | | | | | | | | | | | |
| | 3.0 m - 3.5 m: Push Tube | N/L | | | 3 | 52.0 | | DPT | | | | | | Sand | |
| | | | | | 4 | 51.0 | | HQTT | 100 | | | | | | Box 2, 2.5-5.0m |
| | 4.5 m - 5.0 m: Push Tube | N/L | | | | | | DPT | | | | | | | |
| | Silty CLAY; light grey, speckled black. Firm; high plasticity; moist; trace fibrous organics. | | | | 5 | 50.0 | | HQTT | 100 | | | | | 5.5m | |
| | 6.0 m - 6.5 m: Push Tube | N/L | | | 6 | 49.0 | | DPT | | | | | | | |
| | 6.45m: Grades to stiff. | | | | | | | HQTT | 100 | | | | | | Box 3, 5.0-7.5m |
| | 7.5 m - 8.0 m: Push Tube | N/L | | | 7 | 48.0 | | DPT | | | | | | Bentonite | |
| | | | | | 8 | 47.0 | | HQTT | 100 | | | | | | |
| | 9.40m: Grades to grey. Organics absent. | | | | 9 | 46.0 | | SPT | 100 | | 1, 1 / 2, 2, 2, 2 N=8 | | | | Box 4, 7.5-10.2m |
| | | | | | | | | HQTT | 100 | | | | | | |

**REMARKS:**
Target Depth Reached

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# DRILLHOLE LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** MBH03

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746937.3mE, 5942113.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ORIENTATION (°):** Vertical
**ELEVATION:** 55.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**INCLINATION (°):** 90
**CONTRACTOR:** DCN Drilling
**RIG:** Tractor Mounted Rig
**DRILLER:** Evan
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | DEPTH | RL | METHOD | TCR (%) | RQD (%) | INSITU TESTING (SPT 'N' Vane shear strength) | DISCONTINUITIES DESCRIPTION | WATER | INSTALLATION | CORE BOXES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Group Alluvium | [CONT] Silty CLAY; grey, speckled black. stiff; high plasticity; moist. | | 45.0 | HQTT | 100 | | | | | | |
| Mahurangi Limestone | Clayey SILT, with minor gravel; grey. Hard; low plasticity; moist; [Residually Weathered Limestone]. | | | SPT | 100 | | 1, 1 / 4, 21, 25 N=50+ for 225mm | | | | |
| | Moderately weathered; grey; LIMESTONE; moderately strong; Highly fractured, very closely spaced defects. Limestone in a muddy matrix. 11.00m - 11.20m: recovered as gravel, extremely closely spaced defects | 11 | 44.0 | HQTT | 100 | | | | | | |
| | EOH: 12.12m | 12 | | | | | 21, 29 for 45mm N=50+ | | | 12.12m | Box 5, 10.2-12.1m |
| | | | 43.0 | | | | | | | | |
| | | | 42.0 | | | | | | | | |
| | | | 41.0 | | | | | | | | |
| | | | 40.0 | | | | | | | | |
| | | | 39.0 | | | | | | | | |
| | | | 38.0 | | | | | | | | |
| | | | 37.0 | | | | | | | | |
| | | | 36.0 | | | | | | | | |

GRAPHIC: RS; MW; MS
WEATHERING: UW SW MW HW CW EW
STRENGTH: VW W MS S VS ES

**REMARKS:**
Target Depth Reached

Ver 3.0, Generated with CORE-GS by Geroc - Drillhole_Initia - 2/05/2023 6:43:55 pm

# CORE PHOTOS

**HOLE NO.:** MBH03

**JOB NO.:** P-001537

Box 1, 0.0-2.5m




Box 2, 2.5-5.0m




Box 3, 5.0-7.5m




Generated with CORE-GS by Geroc - Drillhole_Initia - 2/05/2023 6:43:55 pm

# CORE PHOTOS

**HOLE NO.:** MBH03

**JOB NO.:** P-001537

Box 4, 7.5-10.2m




Box 5, 10.2-12.1m




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# DRILLHOLE LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** MBH04

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746898.3mE, 5942073.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ORIENTATION (°):** Vertical
**ELEVATION:** 54.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**INCLINATION (°):** 90
**CONTRACTOR:** DCN Drilling
**RIG:** Tractor Mounted Rig
**DRILLER:** Dave
**START DATE:** 21/03/2023
**END DATE:** 22/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | GRAPHIC | WEATHERING (UW SW MW HW CW EW) | STRENGTH (VW W MS S VS ES) | DEPTH | RL | SAMPLES | METHOD | TCR (%) (25 50 75) | RQD (%) (25 50 75) | INSITU TESTING SPT 'N' Vane shear strength | DISCONTINUITIES DESCRIPTION | WATER | INSTALLATION | CORE BOXES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with minor clay; dark brown. Firm; low plasticity; moist; trace rootlets. | TS | | | 0 | 54.9 | | | | | | | 01/05/2023 | | |
| Tauranga Group Alluvium | Silty CLAY; light grey. Firm; high plasticity; moist. | | | | 1 | 54.0 | | OB | 66 | | | | | Bentonite | |
| | 1.00 m - 1.50 m: Core Loss | C/L | | | | | | | | | | | | | |
| | 1.5 m - 2.0 m: Push Tube | N/L | | | | | | DPT | 100 | | | | | | |
| | 2.00m: Grades to organic stained grey, speckled black. Trace fibrous organics | | | | 2 | 53.0 | | OB | 80 | | | | | 2m | |
| | 2.80 m - 3.00 m: Core Loss | C/L | | | | | | | | | | | | | |
| | 3.0 m - 3.5 m: Push Tube | N/L | | | 3 | 52.0 | | DPT | 100 | | | | | | |
| | 3.70m: Grades to light grey, absence of organic fragments. | | | | | | | OB | 60 | | | | | Sand | |
| | 4.10 m - 4.50 m: Core Loss | C/L | | | 4 | 51.0 | | | | | | | | | Box 1, 0.0-5.0m |
| | 4.5 m - 5.0 m: Push Tube | N/L | | | | | | DPT | 100 | | | | | | |
| | | | | | 5 | 50.0 | | OB | 100 | | | | | 5m | |
| | 6.0 m - 6.5 m: Push Tube | N/L | | | | | | DPT | 100 | | | | | | |
| | 6.60m - 6.75m: Clayey SILT, with trace sand and gravel; brownish grey, mottled grey. Hard; high plasticity; moist. | | | | 6 | 49.0 | | OB | 100 | | | | | Bentonite | |
| | 7.5 m - 8.0 m: Push Tube | N/L | | | 7 | 48.0 | | DPT | 100 | | | | | | |
| | 8.30m: Grades to light grey, speckled black. Trace fibrous organics. | | | | | | | OB | 100 | | | | | | Box 2, 5.0-8.6m |
| | Clayey SILT; organic stained grey, mottled black. Stiff; high plasticity; moist; Some fibrous organic material. | | | | 8 | 47.0 | | | | | | | | | |
| | Clayey SILT, with trace sand; light grey, with occasional orange brown streaks. Very stiff; high plasticity; moist; sand, fine. | | | | 9 | 46.0 | | SPT | 100 | | 1, 1 / 1, 1, 2, 1 N=5 | | | | Box 3, 8.6-10.7m |
| Gl Li | Silty SAND, with minor clay; grey. | | RS | | | 45.0 | | OB | 100 | | | | | | |

**REMARKS:**
Target Depth Reached

Checked By: BPR



Ver 3.0, Generated with CORE-GS by Geroc - Drillhole_Initia - 2/05/2023 6:44:01 pm

# DRILLHOLE LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** MBH04

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746898.3mE, 5942073.6mN
**ELEVATION:** 54.9m
**CONTRACTOR:** DCN Drilling
**START DATE:** 21/03/2023

**Co-ordinate system:** NZTM
**Datum:** AUCKHT1946
**RIG:** Tractor Mounted Rig
**END DATE:** 22/03/2023

**Location method:** SURVEY
**Level method:** SURVEY
**DRILLER:** Dave
**LOGGED BY:** FPT

**ORIENTATION (°):** Vertical
**INCLINATION (°):** 90
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | GRAPHIC | WEATHERING (UW SW MW HW CW EW) | STRENGTH (VW W MS S VS ES) | DEPTH | RL | SAMPLES | METHOD | TCR (%) (25 50 75) | RQD (%) (25 50 75) | INSITU TESTING (SPT 'N' Vane shear strength) | DISCONTINUITIES DESCRIPTION | WATER | INSTALLATION | CORE BOXES |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mahurangi Limestone | CLAY, with some silt; light grey. Hard; high plasticity; moist; [Residually Weathered Limestone]. | | | | | 44.0 | | OB | 100 | | 19, 31 N=50+ | | | | |
| | Moderately weathered; light grey; LIMESTONE; moderately strong; highly fractured, very closely spaced defects. Limestone in a muddy matrix. | | | | 11 | | | SPT | | | | | | | |
| | 11.00m - 11.90m: recovered as gravels, extremely closely spaced defects | | MW | MS | | 43.0 | | HQTT | 100 | 0 | | | | | |
| | | | | | 12 | | | HQTT | 100 | | 50 for 70mm N=50+ | | | | |
| | 12.70m - 12.95m: recovered as gravels, extremely closely spaced defects | | | | | 42.0 | | HQTT | 100 | 27 | | | | | Box 4, 10.7-13.6m |
| | EOH: 13.57m | | | | 13 | | | | | | 50 for 70mm N=50+ | | | 13.57m | |
| | | | | | | 41.0 | | | | | | | | | |
| | | | | | | 40.0 | | | | | | | | | |
| | | | | | | 39.0 | | | | | | | | | |
| | | | | | | 38.0 | | | | | | | | | |
| | | | | | | 37.0 | | | | | | | | | |
| | | | | | | 36.0 | | | | | | | | | |
| | | | | | | 35.0 | | | | | | | | | |

**REMARKS:**
Target Depth Reached

Ver 3.0, Generated with CORE-GS by Geroc - Drillhole_Initia - 2/05/2023 6:44:02 pm

# CORE PHOTOS

**HOLE NO.:** MBH04

**JOB NO.:** P-001537

Box 1, 0.0-5.0m




Box 2, 5.0-8.6m




Box 3, 8.6-10.7m




Generated with CORE-GS by Geroc - Drillhole_Initia - 2/05/2023 6:44:02 pm

# CORE PHOTOS

**HOLE NO.:** MBH04

**JOB NO.:** P-001537

Box 4, 10.7-13.6m




Generated with CORE-GS by Geroc - Drillhole_Initia - 2/05/2023 6:44:02 pm

# DRILLHOLE LOG

INITIA
GEOTECHNICAL SPECIALISTS

| | | |
|---|---|---|
| **CLIENT:** AW Holdings | **SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat | **HOLE NO.:** MBH05 |
| **PROJECT:** ASP Community | | **Project Ref.:** P-001537 |
| **CO-ORDINATES:** 1746945.6mE, 5942009.4mN | **ELEVATION:** 54.8m **CONTRACTOR:** DCN Drilling | **START DATE:** 28/03/2023 |
| **Co-ordinate system:** NZTM | **Datum:** AUCKHT1946 **RIG:** Tractor Mounted Rig | **END DATE:** 28/03/2023 |
| **Location method:** SURVEY | **Level method:** SURVEY **DRILLER:** Evan | **LOGGED BY:** FPT |
| **ORIENTATION (°):** Vertical | **INCLINATION (°):** 90 | **CHECKED BY:** BPR |

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | DEPTH | RL | METHOD | TCR (%) | RQD (%) | INSITU TESTING (SPT 'N' Vane shear strength) | DISCONTINUITIES DESCRIPTION | WATER | INSTALLATION | CORE BOXES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with minor clay; dark brown. Firm; low plasticity; moist. | 0 | 54.8 | HQTT | 90 | | | | 01/05/2023 | Bentonite 0.0m–1.5m | |
| Tauranga Group Alluvium | Silty CLAY; light grey. Stiff; high plasticity; moist. | 1 | 54.0 | | | | | | | | |
| | 1.20 m - 1.95 m: Core Loss | | | SPT | | | 1, 0 / 1, 1, 1, 1, 1 N=4 | | | | |
| | 1.95m: Grades to light grey, speckled black. Trace fibrous organics. | 2 | 53.0 | HQTT | 100 | | | | | | |
| | 2.50m: Grades to brownish grey, speckled black. | | | | | | | | | | |
| | Silty CLAY, with trace organics; organic stained brownish grey, speckled black. Firm; high plasticity; moist; organics, fibrous. | 3 | 52.0 | DPT | | | | | | Sand 1.5m–5.5m | Box 1, 0.0-3.5m |
| | 3.0 m - 3.5m: Push Tube | | | HQTT | 100 | | | | | | |
| | Silty CLAY; light grey, speckled black. Firm; high plasticity; moist; trace fibrous organics. | 4 | 51.0 | | | | | | | | |
| | 4.5 m - 5.0m: Push Tube | 5 | 50.0 | DPT | | | | | | | Box 2, 3.5-6.0m |
| | | | | HQTT | 100 | | | | | | |
| | 6.0 m - 6.5 m: Push Tube | 6 | 49.0 | DPT | | | | | | | |
| | SILT, with some clay and sand; dark grey, speckled black. Stiff; low plasticity; moist; sand, fine to medium; Minor fibrous organics. | 7 | 48.0 | HQTT | 100 | | | | | | |
| | 7.20m: Grades to some fibrous organics. | | | | | | | | | | |
| | Silty CLAY; light grey, speckled black. Firm; high plasticity; moist; trace fibrous organics. | 8 | 47.0 | SPT | | | 1, 1 / 1, 1, 1, 1, 0 N=3 | | | Bentonite 5.5m–end | |
| | 9.0 m - 9.5 m: Push Tube | 9 | 46.0 | HQTT | 100 | | | | | | Box 3, 6.0-9.0m |
| | | | 45.0 | DPT | | | | | | | |
| | | | | HQTT | 100 | | | | | | Box 4, 9.0-10.7m |

**REMARKS:**
Target Depth Reached

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# DRILLHOLE LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** MBH05

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746945.6mE, 5942009.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ORIENTATION (°):** Vertical
**ELEVATION:** 54.8m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**INCLINATION (°):** 90
**CONTRACTOR:** DCN Drilling
**RIG:** Tractor Mounted Rig
**DRILLER:** Evan
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | DEPTH | RL | METHOD | TCR (%) | RQD (%) | INSITU TESTING (SPT 'N' Vane shear strength) | DISCONTINUITIES DESCRIPTION | WATER | INSTALLATION | CORE BOXES |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Tauranga Group Alluvium | [CONT] Silty CLAY; light grey, speckled black. Firm; high plasticity; moist; trace fibrous organics. | | | HQTT | 100 | | | | | | |
| Tauranga Group Alluvium | SILT, with some clay and sand; dark grey. Very stiff; low plasticity; moist; sand, fine to medium. | | 44.0 | SPT | 100 | | 0, 0 / 0, 0, 0, 0 N=0 | | | | |
| Mahurangi Limestone | Clayey SILT, with minor gravel; dark grey. Hard; low plasticity; moist; [Residually Weathered Limestone). RS | 11 | | HQTT | 100 | | | | | | |
| Mahurangi Limestone | Highly weathered; grey; LIMESTONE; very weak; extremely closely spaced defects, breaks down to silt some clay, low plasticity.. HW VW | 12 | 43.0 | SPT | | | 22, 28 N=50+ | | | | |
| Mahurangi Limestone | Core Loss: 12.15m - 12.50m | | | | | | | | | | |
| Mahurangi Limestone | Moderately weathered; grey; LIMESTONE; moderately strong; highly fractured, extremely closely spaced defects, recovered as gravels. Limestone in a muddy matrix. MW MS | 13 | 42.0 | HQTT | 85 | | | | | | |
| | EOH: 13.55m | | | | | | 50 for 50mm N=50+ | | | 13.55m | Box 5, 10.7-13.6m |
| | | | 41.0 | | | | | | | | |
| | | | 40.0 | | | | | | | | |
| | | | 39.0 | | | | | | | | |
| | | | 38.0 | | | | | | | | |
| | | | 37.0 | | | | | | | | |
| | | | 36.0 | | | | | | | | |
| | | | 35.0 | | | | | | | | |

**REMARKS:**
Target Depth Reached

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# CORE PHOTOS

**HOLE NO.:** MBH05

**JOB NO.:** P-001537

Box 1, 0.0-3.5m



Box 2, 3.5-6.0m



Box 3, 6.0-9.0m



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# CORE PHOTOS

**HOLE NO.:** MBH05

**JOB NO.:** P-001537

Box 4, 9.0-10.7m



Box 5, 10.7-13.6m



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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP01

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747452.0mE, 5942523.0mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 63.4m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|
| Topsoil: SILT, with minor clay; dark brown. Firm; low plasticity; moist; Trace rootlets. | | 0.0 |
| Tauranga Group Alluvium: Clayey SILT; light brownish grey. Stiff; high plasticity; moist. | | 0.2 – 0.4 |
| Mahurangi Limestone: Silty CLAY; light brownish grey. Stiff; high plasticity; moist; [Residual Soil Limestone]. | D | 0.6 – 1.0 |
| Clayey SILT, with some gravel; light brownish grey. Hard; low plasticity; moist; [Completely Weathered]. | | 1.2 – 1.4 |
| Highly weathered; bluish grey; LIMESTONE; very weak; highly fractured. | | 1.6 – 1.8 |
| EOH: 1.90m | | 2.0 – 4.8 |

LEGEND

SCALA PENETROMETER (Blows / 0mm): 2, 4, 6, 8, 10, 12, 14, 16, 18

VANE SHEAR STRENGTH (kPa) Vane: 2503A: 50, 100, 150, 200

| Values |
|---|
| 60 |
| 29 |
| 72 |
| 33 |

WATER: Groundwater Not Encountered



**REMARKS**

Refusal on Limestone Rock

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [ ] Hand Auger
- [x] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia - 2/05/2023 1:05:09 pm

Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP02

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747275.2mE, 5942472.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 66.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; Trace rootlets. | | 0.0 | | | | |
| **Tauranga Group Alluvium**<br>Clayey SILT; light grey.<br>Stiff; high plasticity; moist. | D | 0.6 | | | 72<br>40 | |
| **Mahurangi Limestone**<br>SILT, with some clay and sand, with minor gravel; light brownish grey.<br>Hard; low plasticity; moist; sand, fine to coarse; gravel, fine to coarse; [Residual Soil Limestone]. | | 1.0 | | | UTP<br>- | Groundwater Not Encountered |
| Highly weathered; bluish grey; LIMESTONE; very weak; highly fractured. | | 1.6 | | | | |
| EOH: 1.80m | | 1.8 | | | | |



**REMARKS**

Refusal on Limestone Rock

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP03

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747231.6mE, 5942385.8mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 64.3m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; Trace rootlets. | | 0.0 | TS | | | |
| **Tauranga Group Alluvium**<br>Clayey SILT; light brownish grey.<br>Stiff; high plasticity; moist. | | 0.4 | | | 67<br>26 | |
| | | 1.0 | | | 86<br>29 | |
| **Mahurangi Limestone**<br>Highly weathered; brownish grey; LIMESTONE; very weak; highly fractured.<br>1.5m: Grades to bluish grey. | | 1.5 | | | | |
| EOH: 1.80m | | 1.8 | | | | |

Groundwater Not Encountered



**REMARKS**

Refusal on Limestone Rock

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP04

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747391.8mE, 5942348.0mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 61m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|
| Topsoil: SILT, with minor clay; dark brown. Firm; low plasticity; moist; Trace rootlets. | | 0.0 – 0.2 | TS | | | | |
| Tauranga Group Alluvium: Silty CLAY; light grey. Stiff; high plasticity; moist. | | 0.2 – 0.8 | | | 69, 20 | 69<br>20 | |
| | | 0.8 – 1.0 | | | 57, 23 | 57<br>23 | |
| Mahurangi Limestone: SILT, with some clay and gravel, with minor sand and cobbles; light orange brown. Very stiff; low plasticity; moist; gravel, fine to coarse; sand, fine to coarse; [Residual Soil Limestone]. | | 1.0 – 1.6 | | | | | |
| Highly weathered; brownish grey; LIMESTONE; very weak; highly fractured. | | 1.6 – 1.9 | | | | | |
| 1.9m: Grades to bluish grey. | | 1.9 – 2.2 | | | | | |
| EOH: 2.20m | | 2.2 – 4.8 | | | | | |

Scala penetrometer scale: 2, 4, 6, 8, 10, 12, 14, 16, 18 (Blows / 0mm)
Vane shear strength scale: 50, 100, 150, 200 (kPa)

Groundwater Not Encountered



## REMARKS

Refusal on Limestone Rock

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia - 2/05/2023 1:05:17 pm

Checked By: APK

# TEST PIT LOG

**HOLE NO.:** TP05

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747207.2mE, 5942296.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 61.4m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; Trace rootlets. | | 0.2 | TS | | | |
| **Tauranga Group Alluvium**<br>Clayey SILT; light brownish grey.<br>Stiff; high plasticity; moist. | | 0.4<br>0.6<br>0.8 | | | 57<br>29<br>89<br>54 | |
| **Mahurangi Limestone**<br>Sandy SILT, with some gravel; greyish brown.<br>Hard; non-plastic; moist; [Residual Soil Limestone]. | | 1.0<br>1.2<br>1.4 | | | | |
| Highly weathered; bluish grey; LIMESTONE; very weak; highly fractured. | | 1.6 | | | | |
| EOH: 1.80m | | 1.8 | | | | |
| | | 2.0<br>2.2<br>2.4<br>2.6<br>2.8<br>3.0<br>3.2<br>3.4<br>3.6<br>3.8<br>4.0<br>4.2<br>4.4<br>4.6<br>4.8 | | | | |

Scala Penetrometer: 2 4 6 8 10 12 14 16 18
Vane Shear Strength (kPa): 50 100 150 200
Values

Groundwater Not Encountered



## REMARKS

Refusal on Limestone Rock

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia - 2/05/2023 1:05:18 pm

Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP06

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747361.9mE, 5942284.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 59.8m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; Trace rootlets. | | 0.0 – 0.2 | | | | |
| **Tauranga Group Alluvium**<br>SILT, with some clay; orange brown.<br>Stiff; high plasticity; moist. | | 0.2 – 0.4 | | | | |
| Silty CLAY; light brownish grey.<br>Stiff; high plasticity; moist. | | 0.4 – 0.6 | | | 54<br>34 | |
| **Mahurangi Limestone**<br>Sandy SILT, with some gravel; greyish brown.<br>Hard; moist; [Residual Soil Limestone]. | | 0.6 – 0.8 | | | 63<br>29 | |
| | | 0.8 – 1.8 | | | | |
| Highly weathered; bluish grey; LIMESTONE; very weak; highly weathered. | | 1.8 – 2.0 | | | | |
| EOH: 2.10m | | 2.0 – 4.8 | | | | |

Scala Penetrometer axis: 2, 4, 6, 8, 10, 12, 14, 16, 18
Vane Shear Strength axis: 50, 100, 150, 200; Values

Groundwater Not Encountered



## REMARKS

Refusal on Limestone Rock

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP07

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747272.8mE, 5942229.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 58.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|
| Topsoil: SILT, with minor clay; dark brown. Firm; low plasticity; moist; Trace rootlets. | | 0.0 – 0.2 | TS | | | | |
| Tauranga Group Alluvium: Clayey SILT; light orange brown. Stiff; high plasticity; moist. | | 0.2 – 1.2 | | | | 79<br>40<br>80<br>43 | |
| Mahurangi Limestone: Sandy SILT, with some gravel; greyish brown. Hard; non-plastic; moist; [Residual Soil Limestone]. | | 1.2 – 1.8 | | | | UTP<br>- | Groundwater Not Encountered |
| Highly weathered; bluish grey; LIMESTONE; very weak; highly fractured. EOH: 2.00m | | 1.8 – 2.0 | | | | | |



**REMARKS**

Refusal on Limestone Rock

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

**HOLE NO.:** TP08

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747356.3mE, 5942217.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 56.7m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil** SILT, with minor clay; dark brown. Firm; low plasticity; moist; Trace rootlets. | | 0.0 | TS | | | |
| **Tauranga Group Alluvium** Silty CLAY; light grey. Firm; high plasticity; moist. | | 0.2 | | | | |
| 0.7m: grades to light brown | | 0.4 | | | | |
| | | 0.6 | | | 46 | |
| | | 0.8 | | | 29 | |
| | | 1.0 | | | 43 | |
| | | 1.2 | | | 29 | |
| | | 1.4 | | | 49 | |
| | | 1.6 | | | 31 | |
| | | 1.8 | | | 31 | |
| | | 2.0 | | | 17 | |
| **Waiuarangi Limestone** Highly weathered; bluish grey; LIMESTONE; very weak; highly fractured. | | 2.2 | | | | |
| EOH: 2.30m | | 2.4 | | | | |
| | | 2.6 | | | | |
| | | 2.8 | | | | |
| | | 3.0 | | | | |
| | | 3.2 | | | | |
| | | 3.4 | | | | |
| | | 3.6 | | | | |
| | | 3.8 | | | | |
| | | 4.0 | | | | |
| | | 4.2 | | | | |
| | | 4.4 | | | | |
| | | 4.6 | | | | |
| | | 4.8 | | | | |

Groundwater Not Encountered



## REMARKS

Refusal on Limestone Rock

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP09

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747163.5mE, 5942207.8mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 57.7m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; Trace rootlets. | | 0.0 | TS | | | |
| **Tauranga Group Alluvium**<br>Clayey SILT; light grey brown.<br>Stiff; high plasticity; moist. | | 0.2 | | | | |
| | | 0.4 | | | | |
| | | 0.6 | | | 74 | |
| | | 0.8 | | | 43 | |
| 1.0m: Grades to very stiff. | | 1.0 | | | 107 | |
| **Mahurangi Limestone**<br>Sandy SILT, with some gravel; greyish brown.<br>Hard; non-plastic; moist; [Residual Soil Limestone]. | | 1.2 | | | 72 | |
| | | 1.4 | | | | |
| Highly weathered; bluish grey; LIMESTONE; very weak; highly fractured. | | 1.6 | | | | |
| EOH: 1.50m | | 1.8 | | | | |
| | | 2.0 | | | | |
| | | 2.2 | | | | |
| | | 2.4 | | | | |
| | | 2.6 | | | | |
| | | 2.8 | | | | |
| | | 3.0 | | | | |
| | | 3.2 | | | | |
| | | 3.4 | | | | |
| | | 3.6 | | | | |
| | | 3.8 | | | | |
| | | 4.0 | | | | |
| | | 4.2 | | | | |
| | | 4.4 | | | | |
| | | 4.6 | | | | |
| | | 4.8 | | | | |

Scala Penetrometer scale: 2 4 6 8 10 12 14 16 18
Vane Shear Strength scale: 50 100 150 200
Values: 74, 43, 107, 72

Groundwater Not Encountered



## REMARKS

Refusal on Limestone Rock

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP10

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747251.7mE, 5942150.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.7m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; Trace rootlets. | | 0.0 – 0.4 | TS | | | |
| **Tauranga Group Alluvium**<br>Clayey SILT; light grey.<br>Firm; high plasticity; moist. | | 0.4 – 1.2 | | | 47<br>31 | |
| Silty CLAY; organic stained brownish grey.<br>Firm; high plasticity; moist. | | 1.2 – 2.6 | | | 26<br>14<br>43<br>19 | Groundwater Not Encountered |
| Clayey SILT; light greenish grey.<br>Firm; high plasticity; moist. | | 2.6 – 4.0 | | | 31<br>26 | |
| EOH: 4.00m | | 4.0 | | | | |

Scala Penetrometer (Blows / 0mm): 2, 4, 6, 8, 10, 12, 14, 16, 18
Vane Shear Strength (kPa): 50, 100, 150, 200; Values



## REMARKS

Target Depth Reached

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

**HOLE NO.:** TP11

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747176.5mE, 5942041.1mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 53m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; Trace rootlets. | | 0.0 – 0.6 | TS | | 26<br>11 | |
| **Tauranga Group Alluvium**<br>Clayey SILT; light grey.<br>Firm; high plasticity; moist. | | 0.6 – 2.4 | | | 43<br>17<br>31<br>17 | |
| Clayey SILT; light greenish grey.<br>Firm; high plasticity; moist. | | 2.4 – 4.1 | | | 37<br>17<br>40<br>17 | |
| EOH: 4.10m | | 4.1 | | | | |



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [ ] Hand Auger
- [x] Test Pit

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# TEST PIT LOG

**HOLE NO.:** TP12

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747279.2mE, 5942032.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 52.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|
| Topsoil: SILT, with minor clay; dark greyish brown. Firm; low plasticity; moist; Trace rootlets. | | 0.0 – 0.4 | TS | | | | |
| Tauranga Group Alluvium: Clayey PEAT (FIBROUS); black. Firm; high plasticity; moist. | B | 0.4 – 0.8 | | | | 29<br>11 | |
| Silty CLAY; organic stained brownish grey. Firm; high plasticity; moist. | | 0.8 – 3.4 | | | | 31<br>14<br>34<br>14<br>46<br>17<br>46<br>20<br>49<br>17 | |
| Clayey SILT; greenish grey. Firm; high plasticity; moist. | | 3.4 – 4.0 | | | | | |
| EOH: 4.00m | | | | | | | |



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP13

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746809.9mE, 5942216.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 53.8m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 | TS | | | |
| | | 0.2 | TS | | | |
| | | 0.4 | TS | | | |
| | | 0.6 | TS | | | |
| | | 0.8 | TS | | | |
| **Tauranga Group Alluvium**<br>SILT; grey.<br>Hard; low plasticity; dry. | | 1.0 | | | 200+ | |
| Silty CLAY; brownish grey.<br>Stiff; high plasticity; moist. | B | 1.2 | | | | |
| | | 1.4 | | | 50 | |
| 1.7m: grades to grey | | 1.6 | | | 31 | |
| | | 1.8 | | | | |
| | | 2.0 | | | | |
| | | 2.2 | | | 63 | |
| | | 2.4 | | | 29 | |
| | | 2.6 | | | | |
| | | 2.8 | | | | |
| | | 3.0 | | | | |
| | | 3.2 | | | | |
| | | 3.4 | | | | |
| | | 3.6 | | | | |
| EOH: 3.80m | | 3.8 | | | | |
| | | 4.0 | | | | |
| | | 4.2 | | | | |
| | | 4.4 | | | | |
| | | 4.6 | | | | |
| | | 4.8 | | | | Groundwater Not Encountered |

SCALA PENETROMETER (Blows / 0mm): 2 4 6 8 10 12 14 16 18
VANE SHEAR STRENGTH (kPa) Vane: 2503A: 50 100 150 200
Values



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

**HOLE NO.:** TP14

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746914.9mE, 5942211.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**: SILT, with minor rootlets; dark brown. Stiff; non-plastic; dry. | | 0.0 – 0.4 | TS | | | |
| **Fill**: Clayey SILT; yellowish brown. Very stiff; low plasticity; dry. | | 0.4 – 0.6 | | | 120, 31 | |
| **Tauranga Group Alluvium**: Silty CLAY; yellowish brown. Stiff; high plasticity; moist. | | 0.6 – 1.8 | | | 93, 43 | Groundwater Not Encountered |
| Silty CLAY; grey. Stiff; high plasticity; moist. | | 1.8 – 2.6 | | | 72, 31 | |
| 2.6m: grades to firm | | 2.6 – 3.8 | | | 40, 26 | |
| EOH: 3.80m | | | | | | |



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP15

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746826.1mE, 5942153.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist. | | 0.0 – 0.6 | TS | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY; light grey, speckled black.<br>Stiff; high plasticity; moist; Trace fibrous organics. | | 0.6 – 1.2 | | | 77, 26 | |
| Silty CLAY; greyish brown.<br>Stiff; high plasticity; moist. | B | 1.2 – 2.8 | | | 63, 37; 57, 17 | Groundwater Not Encountered |
| Clayey SILT; greenish grey.<br>Stiff; high plasticity; moist. | | 2.8 – 4.0 | | | 50, 20 | |
| EOH: 4.00m | | 4.0 | | | | |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP16

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746749.0mE, 5942119.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.4m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 | TS | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY; greyish brown.<br>Firm; high plasticity; moist. | | 0.6 | | | 46<br>21 | |
| 1.2m: grades to grey and stiff | B | 1.0 | | | 50<br>31 | |
| 1.6m: grades to firm | | 1.6 | | | 46<br>29 | |
| 2.1m: grades to stiff | | 2.0 | | | 63<br>31 | |
| EOH: 3.70m | | 3.7 | | | | |

Scala Penetrometer: 2 4 6 8 10 12 14 16 18
Vane Shear Strength (kPa): 50 100 150 200 | Values



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP17

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746896.6mE, 5942113.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 | TS | | | |
| **Tauranga Group Alluvium**<br>Clayey SILT; greyish brown.<br>Firm; low plasticity; moist. | | 0.6 | | | 46<br>23 | |
| 1.2m: grades to stiff | B | 1.2 | | | 57<br>36 | |
| Silty CLAY; grey.<br>Stiff; high plasticity; moist. | | 1.4 | | | | |
| 1.8m: grades to firm | | 1.8 | | | 46<br>17 | |
| | | 2.4 | | | 34<br>14 | |
| Organic CLAY; dark grey.<br>Firm; high plasticity; moist. | | 3.6 | | | | |
| EOH: 4.00m | | 4.0 | | | | Groundwater Not Encountered |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- Hand Auger
- Test Pit

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# TEST PIT LOG

**HOLE NO.:** TP18

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746951.3mE, 5942133.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; trace rootlets. | | 0.0 | TS | | 57<br>23 | |
| Clayey SILT; light grey, streaked orange brown.<br>Stiff; low plasticity; moist. | | 0.6 | | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY; light grey.<br>Stiff; high plasticity; moist. | B | 1.0 | | | 60<br>26 | |
| | | 1.4 | | | 69<br>34 | |
| 2.0m: Grades to organic stained greyish brown. | | 2.0 | | | 60<br>29 | |
| 2.6m: grades to very stiff | | 2.6 | | | 110<br>43 | |
| 3.5m: Grades to greenish grey. | | 3.5 | | | | |
| EOH: 4.20m | | 4.0 | | | | Groundwater Not Encountered |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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Checked By: APK

# TEST PIT LOG

**HOLE NO.:** TP19

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746824.2mE, 5942088.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.3m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 – 0.4 | TS | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY; greyish brown.<br>Stiff; high plasticity; moist. | B | 0.4 – 1.0 | | | 80<br>43 | |
| 1.0m: grades to grey and firm | | 1.0 – 1.2 | | | 43<br>26 | |
| 1.8m: grades to stiff | | 1.2 – 1.8 | | | 86<br>50 | |
| | | 1.8 – 2.2 | | | 64<br>43 | |
| | | 2.2 – 2.8 | | | 54<br>21 | |
| EOH: 3.60m | | 2.8 – 3.6 | | | | Groundwater Not Encountered |

Scala Penetrometer scale: 2, 4, 6, 8, 10, 12, 14, 16, 18
Vane Shear Strength scale: 50, 100, 150, 200
Values



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Checked By: APK



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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP20

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746879.8mE, 5942075.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 – 0.4 | TS | | | | |
| **Tauranga Group Alluvium**<br>Clayey SILT, with trace rootlets; grey.<br>Firm; low plasticity; dry. | | 0.4 – 1.4 | | | | 43<br>14<br>40<br>20 | |
| Silty CLAY; grey.<br>Stiff; high plasticity; moist. | B | 1.4 – 2.0 | | | | 72<br>31 | |
| Organic CLAY; dark grey.<br>Stiff; high plasticity; moist; some wood present. | | 2.0 – 2.2 | | | | 60<br>21 | |
| Silty CLAY; grey.<br>Firm; high plasticity; moist. | | 2.2 – 3.2 | | | | 46<br>17 | |
| EOH: 3.30m | | 3.2 | | | | | Groundwater Not Encountered |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

**HOLE NO.:** TP21

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746944.1mE, 5942056.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.6m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 – 0.4 | TS | | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY; greyish brown.<br>Firm; high plasticity; moist. | B | 0.4 – 1.4 | | | | 40<br>21 | |
| 1.4m: grades to stiff<br>Silty CLAY, with trace organics; grey.<br>Stiff; high plasticity; moist. | | 1.4 – 1.9 | | | | 60<br>29 | |
| 1.9m: grades to firm | | 1.9 – 2.8 | | | | 40<br>21<br>49<br>26 | |
| EOH: 4.10m | | 2.8 – 4.10 | | | | 29<br>14 | Groundwater Not Encountered |



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia - 2/05/2023 1:05:45 pm

Checked By: APK

# TEST PIT LOG

**HOLE NO.:** TP22

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747055.0mE, 5942085.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.5m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay, with trace rootlets; dark brown.<br>Firm; low plasticity; moist. | | 0.0 | | | | |
| **Tauranga Group Alluvium**<br>Clayey SILT, with trace organics; light grey, speckled black.<br>Stiff; moist; organics, fibrous. | | 0.6 | | | 82<br>26 | |
| Silty CLAY; organic stained light grey.<br>Stiff; high plasticity; moist. | B | 1.2 | | | 76<br>31 | |
| Clayey SILT; light greenish grey.<br>Stiff; high plasticity; moist. | | 2.4 | | | 37<br>14 | |
| EOH: 4.00m | | 4.0 | | | | |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP23

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746869.7mE, 5942034.2mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with some wood and tree stumps; dark brown.<br>Firm; low plasticity; saturated. | | 0.0 | | | 29<br>14 | |
| **Tauranga Group Alluvium**<br>Silty CLAY; greyish brown.<br>Firm; high plasticity; moist. | | 0.8 | | | 43<br>21 | |
| CLAY, with some organics; dark grey and grey.<br>Firm; high plasticity; moist. | B | 2.0 | | | 43<br>17 | |
| 2.6m: grades to stiff | | 2.6 | | | 50<br>29 | |
| EOH: 3.80m | | 3.8 | | | | 27/03/2023 |



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP24

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746885.5mE, 5941987.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| Topsoil / Fill: SILT; dark brown. Stiff; non-plastic; dry. | | 0.0 | TS | 2 4 6 8 10 12 14 16 18 | 50 100 150 200 Values | |
| Clayey SILT; yellowish brown. Stiff; low plasticity; dry. | | 0.2 | TS | | | |
| Topsoil: SILT; dark brown. Firm; non-plastic; dry. | | 0.4 | TS | | 31 | |
| | | 0.6 | TS | | 17 | |
| Tauranga Group Alluvium: Silty CLAY; greyish brown. Firm; high plasticity; moist. | | 0.8 | TS | | | |
| 1.2m: grades to stiff | B | 1.0 | | | 52 | |
| | | 1.2 | | | 29 | |
| Silty CLAY, with minor wood; grey. Stiff; high plasticity; moist. | | 1.4 | | | | |
| | | 1.6 | | | 52 | |
| | | 1.8 | | | 36 | |
| | | 2.0 | | | | |
| | | 2.2 | | | 57 | |
| | | 2.4 | | | 29 | |
| | | 2.6 | | | | |
| | | 2.8 | | | | |
| | | 3.0 | | | | |
| | | 3.2 | | | | |
| | | 3.4 | | | | |
| 3.7m - 3.9m: Organic CLAY; dark grey. Firm; high plasticity; moist. | | 3.6 | | | | |
| | | 3.8 | | | | |
| EOH: 4.20m | | 4.0 | | | | 27/03/2023 |
| | | 4.2 | | | | |
| | | 4.4 | | | | |
| | | 4.6 | | | | |
| | | 4.8 | | | | |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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Checked By: APK

# TEST PIT LOG

**HOLE NO.:** TP25

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747046.8mE, 5941988.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.5m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 – 0.6 | TS | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY, with trace organics; greyish brown.<br>Stiff; high plasticity; moist. | B | 0.6 – 1.2 | | | 57<br>26 | |
| 1.2m: grades to firm | | | | | 46<br>29 | |
| Silty CLAY, with trace organics; grey.<br>Firm; high plasticity; moist. | | 1.2 – 2.8 | | | 46<br>29<br>43<br>29 | |
| 2.8m: grades to stiff | | 2.8 – 3.6 | | | 60<br>26 | |
| EOH: 3.70m | | 3.6 | | | | |



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Checked By: APK



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# TEST PIT LOG

**HOLE NO.:** TP26

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747072.3mE, 5941902.8mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

INITIA
GEOTECHNICAL SPECIALISTS

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 – 0.4 | TS | | | |
| **Taurnga Group Alluvium**<br>Silty CLAY, with trace organics; greyish brown.<br>Firm; high plasticity; moist. | | 0.4 – 1.0 | | | 43, 29 | |
| 1.2m: grades to stiff | B | 1.0 – 1.4 | | | 60, 17 | |
| Organic CLAY; dark grey.<br>Firm; high plasticity; moist. | | 1.4 – 2.2 | | | 26, 14 | |
| 2.3m: grades to stiff | | 2.2 – 2.4 | | | 69, 14 | |
| SILT, with some clay; grey.<br>Stiff; low plasticity; moist. | | 2.4 – 2.8 | | | 83, 29 | |
| Silty CLAY; grey.<br>Stiff; high plasticity; moist. | | 2.8 – 3.4 | | | | |
| EOH: 3.50m | | 3.4 – 4.8 | | | | |

Values

Groundwater Not Encountered



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia - 2/05/2023 1:05:52 pm

Checked By: APK

# TEST PIT LOG

**HOLE NO.:** TP27

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746943.2mE, 5941865.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.8m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 | TS | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY, with trace organics; greyish brown.<br>Stiff; moist.<br>0.8m - 0.9m: Wood fragments up to 100 mm diameter | B | 0.8 | | | 57<br>29 | |
| Silty CLAY; grey.<br>Stiff; high plasticity; moist. | | 1.4 | | | 50<br>29 | |
| | | 1.6 | | | 54<br>31 | |
| | | 2.2 | | | 60<br>29 | |
| | | 2.6 | | | 72<br>31 | |
| EOH: 3.60m | | 3.6 | | | | 27/03/2023 ▼ |



## REMARKS

Target Depth Reached

**WATER**

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia - 2/05/2023 1:05:54 pm

Checked By: APK

# TEST PIT LOG

**HOLE NO.:** TP28

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747016.4mE, 5941829.2mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 – 0.6 | TS | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY, with minor wood fragments; greyish brown.<br>Firm; high plasticity; moist. | | 0.6 – 1.4 | | | 46<br>20<br>49<br>26 | |
| Silty CLAY; grey.<br>Stiff; high plasticity; moist. | B | 1.4 – 2.8 | | | 77<br>19 | |
| 2.8m: grades to firm | | 2.8 – 3.6 | | | 34<br>20 | 27/03/2023 |
| EOH: 3.60m | | 3.6 – 4.8 | | | | |



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2 Generated with CORE-GS by Geroc - Test Pit_Initia - 2/05/2023 1:05:55 pm

Checked By: APK

# TEST PIT LOG

**HOLE NO.:** TP29

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746858.8mE, 5941880.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.6m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 | TS | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY, with trace organics; greyish brown.<br>Firm; high plasticity; moist. | B | 1.0 | | | 34 / 9 | |
| 1.3m: grades to stiff | | 1.2 | | | 63 / 29 | |
| 1.5m: grades to grey | | 1.4 | | | | |
| | | 1.8 | | | 72 / 34 | |
| | | 2.4 | | | 60 / 31 | |
| 3.7m: grades to with minor wood | | 3.8 | | | | |
| EOH: 4.00m | | 4.0 | | | | |



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia - 2/05/2023 1:05:57 pm

Checked By: APK

# TEST PIT LOG

**HOLE NO.:** TP30

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746995.8mE, 5941883.1mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.3m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 27/03/2023
**END DATE:** 27/03/2023
**LOGGED BY:** QS
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor rootlets; dark brown.<br>Stiff; non-plastic; dry. | | 0.0 – 0.6 | TS | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY, with trace wood; greyish brown.<br>Firm; high plasticity; moist. | | 0.6 – 1.4 | | | 31<br>11<br>46<br>29 | |
| Silty CLAY, with trace organics; grey.<br>Firm; high plasticity; moist. | B | 1.4 – 3.3 | | | 40<br>14<br>49<br>14 | |
| EOH: 3.30m | | 3.3 | | | | |

Scala Penetrometer scale: 2, 4, 6, 8, 10, 12, 14, 16, 18
Vane Shear Strength scale: 50, 100, 150, 200; Values

27/03/2023



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia - 2/05/2023 1:05:58 pm

Checked By: APK

# TEST PIT LOG

**HOLE NO.:** TP31

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747112.3mE, 5942063.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 53.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** Wilkinson Civil LTD
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** David Wilkinson
**START DATE:** 28/03/2023
**END DATE:** 28/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|
| **Topsoil**<br>SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; Trace rootlets. | | 0.0 – 0.6 | TS | | Values: 46, 17 | |
| **Tauranga Group Alluvium**<br>Silty CLAY; light grey.<br>Firm; high plasticity; moist. | B | 0.6 – 1.2 | | | Values: 50, 31 | |
| 1.2m: grades to firm | | 1.2 – 2.8 | | | Values: 43, 11 | |
| Clayey SILT; light greenish grey.<br>Firm; high plasticity; moist. | | 2.8 – 3.9 | | | Values: 60, 31 | 28/03/2023 |
| 2.8m: Grades to stiff. | | | | | | |
| EOH: 3.90m | | | | | | |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia - 2/05/2023 1:06:00 pm

Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP101

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746861.9mE, 5942228.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** McKenzie Contractors
**MACHINE:** 12T excavator
**OPERATOR:** Mel
**START DATE:** 07/08/2025
**END DATE:** 07/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | Values | WATER |
|---|---|---|---|---|---|---|---|
| **Topsoil**<br>Clayey SILT, with trace rootlets; dark brown.<br>Firm; low plasticity; moist. | | 0.2 | | | | | |
| **Tauranga Group Alluvium**<br>Clayey SILT; light grey with dark brown streaks.<br>Very stiff; low plasticity; moist. | | 0.4 | | | | 101<br>31 | |
| CLAY, with minor silt; light grey with orange streaks.<br>Very stiff; high plasticity; moist. | B | 0.6<br>0.8<br>1.0 | | | | 138<br>38 | |
| 1.2m: Grades to stiff | | 1.2<br>1.4<br>1.6<br>1.8 | | | | 92<br>49 | |
| CLAY, with minor organics and silt; dark grey.<br>Firm; high plasticity; moist; organics, amorphous. | | 2.0<br>2.2<br>2.4<br>2.6<br>2.8 | | | | 58<br>31<br>43<br>26 | |
| 3.3m: Grades to stiff<br>EOH: 3.30m | | 3.0<br>3.2<br>3.4<br>3.6<br>3.8 | | | | 46<br>31<br>57<br>34 | Groundwater Not Encountered |



**REMARKS**

Test pit terminated at target depth.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [ ] Hand Auger
- [x] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia_v1 - 5/09/2025 1:12:13 pm

Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP102

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746943.2mE, 5942173.2mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.3m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** McKenzie Contractors
**MACHINE:** 12T excavato
**OPERATOR:** Mel
**START DATE:** 07/08/2025
**END DATE:** 07/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | Values | WATER |
|---|---|---|---|---|---|---|---|
| Topsoil: Clayey SILT, with trace rootlets; grey brown. Firm; low plasticity; moist. | | 0.2 | | 2 4 6 8 10 12 14 16 18 | 50 100 150 200 | | |
| Tauranga Group Alluvium: CLAY, with minor silt; light grey with orange streaks. Stiff; high plasticity; moist. | | 0.4 | | | | 84 | |
| | | 0.6 | | | | 23 | |
| | | 0.8 | | | | | |
| | | 1.0 | | | | 89 | |
| | B | 1.2 | | | | 23 | |
| | | 1.4 | | | | 89 | |
| | | 1.6 | | | | 61 | |
| | | 1.8 | | | | | |
| 2.0m: Grades to firm | | 2.0 | | | | 38 | |
| | | 2.2 | | | | 23 | |
| CLAY, with minor organics and silt; dark grey. Firm; high plasticity; moist; organics, amorphous. | | 2.4 | | | | | |
| | | 2.6 | | | | 49 | |
| | | 2.8 | | | | 43 | |
| | | 3.0 | | | | | |
| | | 3.2 | | | | 50 | |
| | | 3.4 | | | | 38 | |
| EOH: 3.50m | | 3.6 | | | | | |
| | | 3.8 | | | | | Groundwater Not Encountered |



**REMARKS**

Test pit terminated at target depth.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [ ] Hand Auger
- [x] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia_v1 - 5/09/2025 1:12:15 pm

Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP104

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746947.8mE, 5941946.8mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.8m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** McKenzie Contractors
**MACHINE:** 12T excavato
**OPERATOR:** Mel
**START DATE:** 07/08/2025
**END DATE:** 07/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | Values | WATER |
|---|---|---|---|---|---|---|---|
| **Fill**<br>SILT, with minor gravel, with trace clay; light grey. Hard; low plasticity; moist; gravel, fine to coarse; [Limestone fill]. | | 0.2, 0.4, 0.6, 0.8 | | 2 4 6 8 10 12 14 16 18 | 50 100 150 200 | UTP<br>- | Groundwater Not Encountered |
| **Tauranga Group Alluvium**<br>CLAY, with minor silt, with trace organics; brownish grey with dark streaks. Stiff; high plasticity; moist; organics, fibrous. | | 1.0, 1.2, 1.4, 1.6, 1.8, 2.0, 2.2, 2.4, 2.6, 2.8, 3.0, 3.2, 3.4, 3.6, 3.8 | | | | 61<br>18 | |
| 1.5m: Grades to firm | | | | | | 46<br>23 | |
| 2.0m: Grades to dark brown with minor organics, stiff | | | | | | 73<br>21 | |
| | | | | | | 54<br>31 | |
| EOH: 3.00m | | | | | | 69<br>46 | |



**REMARKS**

Test pit terminated at target depth.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP105

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746993.1mE, 5942066.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** McKenzie Contractors
**MACHINE:** 12T excavato
**OPERATOR:** Mel
**START DATE:** 07/08/2025
**END DATE:** 07/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | Values | WATER |
|---|---|---|---|---|---|---|---|
| **Fill**<br>Clayey SILT, with minor gravel; light grey with brown streaks.<br>Stiff; low plasticity; moist; gravel, fine to coarse; [Limestone fill]. | | 0.2 | | | | | |
| **Tauranga Group Alluvium**<br>CLAY, with minor silt; light grey.<br>Firm; high plasticity; moist. | | 0.4<br>0.6<br>0.8 | | | | 46<br>23 | |
| 1.0m: Grades to stiff | | 1.0<br>1.2<br>1.4 | | | | 61<br>49<br>46<br>23 | Groundwater Not Encountered |
| CLAY, with minor organics and silt; dark grey.<br>Firm; high plasticity; moist; organics, fibrous. | | 1.6<br>1.8<br>2.0 | | | | | |
| 2.1m: Grades to stiff | | 2.2<br>2.4 | | | | 54<br>18<br>40 | |
| 2.5m: Grades to firm | | 2.6<br>2.8<br>3.0 | | | | 28<br>43<br>28 | |
| EOH: 3.30m | | 3.2<br>3.4<br>3.6<br>3.8 | | | | 46<br>31 | |



## REMARKS

Test pit terminated at target depth.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

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# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP107

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747087.3mE, 5941780.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** McKenzie Contractors
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** Mel
**START DATE:** 07/08/2025
**END DATE:** 07/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | WATER |
|---|---|---|---|---|---|---|
| TS / Fill: Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 | | | | |
| Buried Topsoil: Clayey SILT; dark brown. Very stiff; low plasticity; moist. | | 0.2 | | | 176 | |
| Clayey SILT, with trace rootlets; dark brown. Very stiff; low plasticity; moist. | | 0.4 | | | 31 | |
| Fill: Clayey SILT; brown with orange streaks. Stiff; low plasticity; moist. | | 0.6 | | | | |
| Tauranga Group Alluvium: CLAY, with minor organics and silt; dark grey. Firm; high plasticity; moist; organics, fibrous. | | 0.8 | | | | |
| | B | 1.0 | | | 49 | |
| | | 1.2 | | | 24 | |
| | | 1.4 | | | 49 | |
| 2.0m - 2.3m: Wood logs up to 300mm diameter | | 1.6 | | | 31 | |
| | | 1.8 | | | | |
| | | 2.0 | | | 34 | |
| | | 2.2 | | | 24 | |
| | | 2.4 | | | | |
| Organic CLAY, with minor silt; dark grey. Firm; high plasticity; moist; organic, fibrours. | | 2.6 | | | 46 | |
| | | 2.8 | | | 23 | |
| | | 3.0 | | | | |
| | | 3.2 | | | 31 | |
| | | 3.4 | | | 23 | |
| | | 3.6 | | | | |
| EOH: 3.70m | | 3.8 | | | 40 | |
| | | | | | 24 | |



## REMARKS

Test pit terminated at target depth.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia_v1 - 5/09/2025 1:12:27 pm

Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP108

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747156.2mE, 5941964.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 53.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** McKenzie Contractors
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** Mel
**START DATE:** 07/08/2025
**END DATE:** 07/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | Values | WATER |
|---|---|---|---|---|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.2 | | | | | |
| Tauranga Group Alluvium | Silty CLAY, with some organics; brown grey. Stiff; high plasticity; moist. | | 0.4 | | | | 61 | |
| | | | 0.6 | | | | 18 | |
| | 0.8m: Grades to firm | B | 0.8 | | | | 46 | |
| | | | 1.0 | | | | 15 | |
| | | | 1.2 | | | | | |
| | Organic CLAY, with minor silt; dark grey. Firm; high plasticity; moist; organic, fibrous. | | 1.4 | | | | 31 | |
| | | | 1.6 | | | | 15 | |
| | | | 1.8 | | | | 49 | |
| | CLAY, with minor organics and silt; darkish grey. Stiff; high plasticity; moist; organics, fibrous. | | 2.0 | | | | 31 | |
| | | B | 2.2 | | | | 64 | |
| | Organic CLAY, with minor silt; dark grey. Firm; high plasticity; moist; organic, fibrous. | | 2.4 | | | | 18 | |
| | | | 2.6 | | | | 34 | |
| | | | 2.8 | | | | 18 | |
| | CLAY, with minor organics and silt; darkish grey. Firm; high plasticity; moist; organics, fibrous. | | 3.0 | | | | 43 | |
| | | | 3.2 | | | | 28 | |
| | EOH: 3.30m | | 3.4 | | | | | |
| | | | 3.6 | | | | | |
| | | | 3.8 | | | | | |



**REMARKS**

Test pit terminated at target depth.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [ ] Hand Auger
- [x] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia_v1 - 5/09/2025 1:12:39 pm

Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP109

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747205.7mE, 5941815.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** McKenzie Contractors
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** Mel
**START DATE:** 07/08/2025
**END DATE:** 07/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | Values | WATER |
|---|---|---|---|---|---|---|---|
| **Topsoil**<br>Clayey SILT, with trace rootlets; dark brown.<br>Firm; low plasticity; moist. | | 0.0 | | | | | |
| **Fill**<br>Clayey SILT; dark brown with grey mottles.<br>Stiff; low plasticity; moist. | | 0.2 | | | | | |
| Silty CLAY; grey with orange and dark grey streaks.<br>Stiff; high plasticity; moist. | | 0.4 | | | | 92<br>49 | |
| | | 0.6 | | | | 64<br>46 | |
| 1.2m: Grades to firm | | 0.8<br>1.0<br>1.2 | | | | 49<br>21 | |
| **Buried Topsoil**<br>SILT, with minor clay, with trace rootlets; dark brown.<br>Firm; low plasticity; moist. | | 1.4 | | | | | |
| **Tauranga Group Alluvium**<br>Silty CLAY, with minor organics; darkish grey.<br>Stiff; high plasticity; moist; organics, fibrous. | | 1.6 | | | | 69<br>17 | |
| Organic CLAY, with minor silt; dark grey.<br>Firm; high plasticity; moist; organic, fibrous. | | 1.8<br>2.0 | | | | 47<br>31 | |
| 2.5m: Grades to stiff | | 2.2<br>2.4<br>2.6 | | | | 61<br>34 | |
| | | 2.8<br>3.0 | | | | 61<br>38 | |
| EOH: 3.50m | | 3.2<br>3.4 | | | | 73<br>61 | |
| | | 3.6<br>3.8 | | | | | |



## REMARKS

Test pit terminated at target depth.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia_v1 - 5/09/2025 1:12:51 pm

Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP110

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746843.0mE, 5941995.8mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.4m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** McKenzie Contractors
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** Mel
**START DATE:** 07/08/2025
**END DATE:** 07/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | Values | WATER |
|---|---|---|---|---|---|---|---|
| **Fill**<br>SILT, with minor gravel, with trace clay; grey.<br>Hard; low plasticity; moist; gravel, fine to coarse;<br>[Limestone fill]. | | 0.2<br>0.4 | | | | | |
| **Tauranga Group Alluvium**<br>CLAY, with minor silt, with trace organics; brown grey.<br>Stiff; high plasticity; moist; organics, fibrous. | | 0.6<br>0.8<br>1.0<br>1.2 | | | | 73<br>46<br>57<br>26 | |
| 1.5m: Grades to darkish grey with minor organics | | 1.4<br>1.6<br>1.8<br>2.0<br>2.2 | | | | 92<br>46<br>69<br>31 | Groundwater Not Encountered |
| Organic CLAY, with minor silt; dark grey.<br>Stiff; high plasticity; moist; organic, fibrous. | | 2.4<br>2.6<br>2.8 | | | | 89<br>43<br>73<br>34 | |
| EOH: 3.00m | | 3.0<br>3.2<br>3.4<br>3.6<br>3.8 | | | | | |



## REMARKS

Test pit terminated at target depth.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [ ] Hand Auger
- [x] Test Pit

Checked By: APK



Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia_v1 - 5/09/2025 1:13:02 pm

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP111

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746776.6mE, 5941948.1mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.6m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** McKenzie Contractors
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** Mel
**START DATE:** 07/08/2025
**END DATE:** 07/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | Values | WATER |
|---|---|---|---|---|---|---|---|
| **Fill**<br>0.0m - 0.2m : ASPHALT | | 0.0 | | | | | |
| Silty GRAVEL, with minor concrete fragments; grey. Dry; gravel, fine to coarse; [Tightly packed]. | | 0.2 | | | | | |
| | | 0.4 | | | | | |
| | | 0.6 | | | | | |
| | | 0.8 | | | | | |
| SILT, with some gravel, with minor clay; greyish brown. Stiff; low plasticity; moist; gravel, fine to coarse. | | 1.0 | | | | 46 | |
| **Buried Topsoil**<br>Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 1.2 | | | | 18 | |
| **Tauranga Group Alluvium**<br>CLAY, with minor silt, with trace organics; grey with black speckles. Stiff; high plasticity; moist; organics, fibrous. | | 1.4 | | | | 61 | |
| | | 1.6 | | | | 46 | |
| | | 1.8 | | | | | |
| 2.0m: Grades to firm | | 2.0 | | | | 46 | |
| | | 2.2 | | | | 40 | |
| | | 2.4 | | | | | |
| | | 2.6 | | | | 46 | |
| | | 2.8 | | | | 18 | |
| 3.0m: Grades to stiff | | 3.0 | | | | 73 | |
| | | 3.2 | | | | 40 | |
| | | 3.4 | | | | | |
| EOH: 3.50m | | 3.6 | | | | 73 | |
| | | 3.8 | | | | 55 | |

Groundwater Not Encountered



**REMARKS**

Test pit terminated at target depth.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- ☐ Hand Auger
- ☑ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia_v1 - 5/09/2025 1:13:13 pm

Checked By: APK

# TEST PIT LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** TP112

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746747.6mE, 5942038.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.4m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**CONTRACTOR:** McKenzie Contractors
**MACHINE:** 12 Tonne Excavator
**OPERATOR:** Mel
**START DATE:** 07/08/2025
**END DATE:** 07/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | Values | WATER |
|---|---|---|---|---|---|---|---|
| **Topsoil**<br>Clayey SILT, with trace rootlets; dark brown.<br>Firm; low plasticity; moist. | | 0.0 | | 2 4 6 8 10 12 14 16 18 | 50 100 150 200 | | |
| **Tauranga Group Alluvium**<br>Clayey SILT; brown with grey streaks.<br>Firm; low plasticity; moist. | | 0.2 | | | | 28<br>9 | |
| CLAY, with minor silt; brownish grey.<br>Stiff; high plasticity; moist. | | 0.4 | | | | 61<br>23 | |
| 2.1m: Grades to bluish grey | | 0.6 | | | | 61<br>28 | |
| CLAY, with minor organics and silt; darkish grey.<br>Stiff; high plasticity; moist; organics, fibrous. | | 0.8 | | | | 54<br>38 | |
| 3.0m: Grades to firm | | 1.0 | | | | 73<br>46 | |
| 3.5m: Grades to stiff | | 1.2 | | | | 76<br>34 | |
| EOH: 3.50m | | 1.4 | | | | 46<br>34 | |
| | | 1.6 | | | | 52<br>34 | |
| | | 1.8 | | | | | |
| | | 2.0 | | | | | |
| | | 2.2 | | | | | |
| | | 2.4 | | | | | |
| | | 2.6 | | | | | |
| | | 2.8 | | | | | |
| | | 3.0 | | | | | |
| | | 3.2 | | | | | |
| | | 3.4 | | | | | |
| | | 3.6 | | | | | |
| | | 3.8 | | | | | |



## REMARKS

Test pit terminated at target depth.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [ ] Hand Auger
- [x] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Test Pit_Initia_v1 - 5/09/2025 1:13:25 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA01

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747157.1mE, 5942145.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 21/03/2023
**END DATE:** 21/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| to ps oil | SILT, with minor clay, with trace rootlets; dark brown. Firm; low plasticity; moist; [Topsoil]. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY, with trace sand; organic stained grey. Firm; high plasticity; moist; sand, medium. | | 0.4 |
| | 0.6m: Grades to stiff. | | 0.6 |
| | Silty CLAY; brownish grey. Stiff; high plasticity; wet. | | 0.8 |
| | 1.2m: Grades to firm. Trace fibrous organics. | | 1.2 |
| | 1.5m: Grades to stiff. | | 1.6 |
| | 1.8m: Grades to firm. | | 1.8 |
| | SILT, with some clay, with trace sand; bluish grey. Hard; high plasticity; moist; sand, fine. | | 2.2 |
| | EOH: 2.40m | | 2.4 |

LEGEND

SCALA PENETROMETER (Blows / 0mm): 2, 4, 6, 8, 10, 12, 14, 16, 18

VANE SHEAR STRENGTH (kPa) Vane: 2503A: 50, 100, 150, 200

| Values |
|---|
| 43 |
| 26 |
| 50 |
| 31 |
| 52 |
| 34 |
| 43 |
| 29 |
| 52 |
| 43 |
| 43 |
| 29 |
| 129 |
| 46 |

WATER: 13/03/2023



## REMARKS

Practical refusal at 2.4 m - Inferred interface to underlying limestone/rock

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia - 2/05/2023 6:47:26 pm

# HAND AUGER LOG

**HOLE NO.:** HA03

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747032.4mE, 5942080.2mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.6m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 23/03/2023
**END DATE:** 23/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; Trace rootlets. | | 0.0 | TS | | | |
| | 0.3m: grades to soft | | 0.2 | | | 20 | |
| | | | 0.4 | | | 14 | |
| Tauranga Group Alluvium | Silty CLAY; grey, with occasional orange brown streaks.<br>Stiff; high plasticity; moist. | | 0.6 | | | 29 | |
| | | | 0.8 | | | 17 | |
| | | | 1.0 | | | 79 | |
| | | | 1.2 | | | 20 | |
| | | | 1.4 | | | 74 | |
| | | | 1.6 | | | 16 | |
| | | | 1.8 | | | 69 | |
| | 1.8m: Grades to organic stained dark grey.<br>Grades to very stiff. | | 2.0 | | | 29 | |
| | | | 2.2 | | | 110 | |
| | | | 2.4 | | | 57 | |
| | | | 2.6 | | | 155 | |
| | 2.7m: Grades to stiff. | | 2.8 | | | 40 | |
| | | | 3.0 | | | 52 | |
| | 3.0m: Grades to firm. | | 3.2 | | | 29 | |
| | 3.1m: grades to poor sample recovery | | 3.4 | | | 49 | |
| | | | 3.6 | | | 26 | |
| | | | 3.8 | | | 57 | |
| | EOH: 4.00m | | 4.0 | | | 50 | |
| | | | 4.2 | | | 50 | |
| | | | 4.4 | | | 40 | |
| | | | 4.6 | | | | |
| | | | 4.8 | | | | |

23/03/2023



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

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Checked By: BPR

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA04

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747085.0mE, 5942069.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 23/03/2023
**END DATE:** 23/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with minor clay; dark brown.<br>Stiff; low plasticity; moist. | | 0.0 | TS | 2 4 6 8 10 12 14 16 18 | 50 100 150 200 | 72<br>20 | Groundwater Not Encountered |
| | 0.6m: Grades to firm. | | 0.6 | | | | 46<br>29 | |
| Tauranga Group Alluvium | Silty CLAY; light brownish grey.<br>Stiff; high plasticity; moist. | | 0.8 | | | | 72<br>17 | |
| | 1.3m: Grades to brownish grey. | | 1.3 | | | | 69<br>43 | |
| | | | 1.4 | | | | 60<br>31 | |
| | 2.2m: Grades to grey. | | 2.2 | | | | 57<br>34 | |
| | | | 2.4 | | | | 63<br>37 | |
| | | | 2.6 | | | | 63<br>43 | |
| | 3.5m: Grades to wet. | | 3.5 | | | | 69<br>46 | |
| | | | 3.6 | | | | 80<br>52 | |
| | | | 3.8 | | | | 77<br>57 | |
| | | | 4.0 | | | | 83<br>62 | |
| | EOH: 4.00m | | 4.2 | | | | 80<br>63 | |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

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# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA06

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747107.3mE, 5941991.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 20/03/2023
**END DATE:** 20/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist; trace rootlets.<br>0.4m - 0.7m: Some wood fragments | | 0.0 | TS | | 37<br>20 | |
| Tauranga Group Alluvium | Silty CLAY; greyish brown.<br>Very stiff; high plasticity; moist.<br>1.2m: Grades to hard. | | 0.8 | | | 72<br>14<br>200+<br>- | |
| | Silty CLAY; organic stained greyish brown.<br>Firm; high plasticity; saturated; trace wood fragments, poor sample recovery.<br>2.4m: Grades to stiff. | | 1.6 | | | 37<br>17<br>29<br>14<br>49<br>23<br>86<br>31 | 20/03/2023 |
| | Silty CLAY; light greenish grey.<br>Stiff; high plasticity; wet.<br>3.3m: Grades to very stiff. | | 2.4 | | | 86<br>72<br>86<br>66<br>103<br>72<br>126<br>79 | |
| | EOH: 4.00m | | 4.0 | | | | |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

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# HAND AUGER LOG

**HOLE NO.:** HA07

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747022.6mE, 5941927.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.4m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 30/03/2023
**END DATE:** 30/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

INITIA
GEOTECHNICAL SPECIALISTS

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | WATER |
|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with minor clay; dark brown.<br>Firm; low plasticity; Trace rootlets & fibrous organics. | | 0.0 – 0.4 | TS | | Values: 40, 14 | |
| Tauranga Group Alluvium | Silty CLAY; brownish grey, speckled black.<br>Firm; high plasticity; wet; Trace fibrous organics. | | 0.4 – 1.0 | TS | | 43, 11 | |
| | 1.5m: Grades to stiff. | | 1.0 – 1.2 | | | 46, 14 | |
| | 1.8m: Grades to firm. | | 1.2 – 1.8 | | | 46, 26 | |
| | 2.0m: Grades to saturated. | | 1.8 – 2.0 | | | 69, 31 | |
| | 2.1m - 2.3m: Poor sample recovery | | 2.0 – 2.2 | | | 46, 17 | |
| | Clayey SILT; grey.<br>Firm; high plasticity; saturated. | | 2.2 – 2.4 | | | 66, 34 | |
| | 2.7m: Grades to stiff. | | 2.4 – 3.6 | | | 43, 20 | |
| | EOH: 4.00m | | 3.6 – 4.0 | | | 63, 34 | |
| | 3.9m: Grades to firm | | 4.0 – 4.8 | | | 94, 57 | |
| | | | | | | 79, 52 | |
| | | | | | | 50, 29 | |
| | | | | | | 49, 23 | |

Groundwater Not Encountered



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia - 2/05/2023 6:47:33 pm

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# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA09

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746920.6mE, 5941924.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.5m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 24/03/2023
**END DATE:** 24/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with minor clay; dark brown.<br>Firm; low plasticity; moist. | | 0.0 | TS | 2 4 6 8 10 12 14 16 18 | 50 100 150 200 | 29<br>14 | |
| | 0.5m: Minor woody fragments. | | 0.5 | TS | | | | |
| Tauranga Group Alluvium | Clayey SILT, with trace organics; greyish brown.<br>Stiff; low plasticity; moist; organics, fibrous. | | 0.8 | | | | 31<br>17 | 24/03/2023 |
| | 0.9m: Grades to wet. | | 1.0 | | | | | |
| | 1.2m: Grades to stiff. | | 1.2 | | | | 54<br>20 | |
| | 1.4m: Grades to poor sample recovery. | | 1.4 | | | | 43<br>14 | |
| | 1.5m: Grades to firm. | | 1.6 | | | | | |
| | | | 1.8 | | | | 46<br>17 | |
| | | | 2.0 | | | | 46<br>17 | |
| | | | 2.2 | | | | | |
| | | | 2.4 | | | | 43<br>31 | |
| | | | 2.6 | | | | 44<br>29 | |
| | | | 2.8 | | | | | |
| | | | 3.0 | | | | 49<br>30 | |
| | | | 3.2 | | | | | |
| | 3.3m: Grades to stiff. | | 3.4 | | | | 63<br>37 | |
| | | | 3.6 | | | | 86<br>57 | |
| | | | 3.8 | | | | | |
| | EOH: 4.00m | | 4.0 | | | | 83<br>60 | |
| | | | 4.2 | | | | | |
| | | | 4.4 | | | | | |
| | | | 4.6 | | | | | |
| | | | 4.8 | | | | | |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia - 2/05/2023 6:47:35 pm

Checked By: BPR

# HAND AUGER LOG

**HOLE NO.:** HA10

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746870.1mE, 5941871.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.5m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 22/03/2023
**END DATE:** 22/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

INITIA
GEOTECHNICAL SPECIALISTS

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|---|
| Topsoil | Clayey SILT; dark brown.<br>Firm; high plasticity; moist; trace rootlets. | | 0.0 – 0.6 | TS | | | 43<br>20<br>46<br>20 | |
| Tauranga Group Alluvium | Silty CLAY; organic stained greyish brown.<br>Stiff; moist. | | 0.6 – 3.0 | | | | 63<br>26<br>92<br>43<br>122<br>43<br>110<br>34<br>89<br>31 | 21/03/2023 |
| | 1.1m: Grades to light grey | | | | | | | |
| | 1.5m: Grades to very stiff. | | | | | | | |
| | 2.1m: Grades to stiff. | | | | | | | |
| | 2.4m: Grades to saturated. | | | | | | | |
| | 2.8m: Grades to poor sample recovery.<br>3.0m: Grades to firm. | | | | | | | |
| | EOH: 4.00m | | 3.0 – 4.0 | | | | 47<br>29<br>43<br>31<br>49<br>37<br>59<br>36 | |



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

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Checked By: BPR

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA11

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746918.0mE, 5941827.2mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.4m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 23/03/2023
**END DATE:** 23/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with some clay; dark brown.<br>Firm; high plasticity; moist; trace rootlets. | | 0.0 | TS | 2 4 6 8 10 12 14 16 18 | 50 100 150 200 | 43<br>17 | |
| | | | 0.2 | | | | 49<br>20 | |
| | | | 0.4 | | | | | |
| | | | 0.6 | | | | 56<br>29 | 23/03/2023 |
| Tauranga Group Alluvium | Silty CLAY, with trace organics; light grey.<br>Stiff; high plasticity; moist; organics, fibrous. | | 0.8 | | | | 89<br>57 | |
| | | | 1.0 | | | | | |
| | | | 1.2 | | | | 79<br>52 | |
| | | | 1.4 | | | | | |
| | 1.8m: Absence of organics | | 1.6 | | | | 67<br>43 | |
| | | | 1.8 | | | | | |
| | | | 2.0 | | | | 84<br>43 | |
| | | | 2.2 | | | | | |
| | | | 2.4 | | | | 52<br>29 | |
| | 2.6m: Grades to saturated. | | 2.6 | | | | | |
| | | | 2.8 | | | | 54<br>29 | |
| | | | 3.0 | | | | | |
| | | | 3.2 | | | | | |
| | 3.3m: Grades to firm. | | 3.4 | | | | 41<br>23 | |
| | 3.5m: Grades to greenish grey. | | 3.6 | | | | 46<br>20 | |
| | | | 3.8 | | | | | |
| | EOH: 4.00m<br>3.9m: Grades to stiff. | | 4.0 | | | | 60<br>43 | |
| | | | 4.2 | | | | | |
| | | | 4.4 | | | | | |
| | | | 4.6 | | | | | |
| | | | 4.8 | | | | | |

## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

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Checked By: BPR

# HAND AUGER LOG

**HOLE NO.:** HA12

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746841.2mE, 5941891.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.7m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 22/03/2023
**END DATE:** 22/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with minor clay; dark brown.<br>Stiff; high plasticity; moist. | | 0.0 | TS | 2 4 6 8 10 12 14 16 18 | 50 100 150 200 | 74<br>20 | |
| | | | 0.2 | TS | | | 63<br>29 | |
| | | | 0.4 | TS | | | 54<br>26 | |
| | | | 0.6 | TS | | | 89<br>43 | |
| | | | 0.8 | TS | | | 72<br>46 | |
| Tauranga Group Alluvium | Silty CLAY; organic stained light grey.<br>Stiff; high plasticity; moist; trace fibrous organics. | | 1.0 | | | | 74<br>49 | 21/03/2023 |
| | 1.0m: Grades to wet. | | 1.2 | | | | 72<br>29 | |
| | 1.9m: Grades to grey, absence of fibrous organics. | | 1.4 | | | | | |
| | | | 1.6 | | | | 69<br>37 | |
| | | | 1.8 | | | | 74<br>46 | |
| | | | 2.0 | | | | 86<br>60 | |
| | | | 2.2 | | | | 129<br>57 | |
| | | | 2.4 | | | | | |
| | 2.8m: Grades to saturated | | 2.6 | | | | | |
| | 3.0m: Grades to poor sample recovery. | | 2.8 | | | | | |
| | | | 3.0 | | | | | |
| | | | 3.2 | | | | | |
| | | | 3.4 | | | | | |
| | | | 3.6 | | | | | |
| | | | 3.8 | | | | | |
| | EOH: 4.00m<br>3.9m: Grades to very stiff. | | 4.0 | | | | | |
| | | | 4.2 | | | | | |
| | | | 4.4 | | | | | |
| | | | 4.6 | | | | | |
| | | | 4.8 | | | | | |



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia - 2/05/2023 6:47:41 pm

Checked By: BPR

# HAND AUGER LOG

**HOLE NO.:** HA13

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746745.4mE, 5941941.2mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 56.8m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 23/03/2023
**END DATE:** 23/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

INITIA
GEOTECHNICAL SPECIALISTS

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|---|
| Top soil | SILT, with minor clay; dark brown. Firm; low plasticity; Trace rootlets. | | 0.0 | TS | 2 4 6 8 10 12 14 16 18 | 50 100 150 200 | | |
| Tauranga Group Alluvium | Silty CLAY; light grey, steaked orange brown. Stiff; high plasticity; moist. | | 0.2 | | | | 74 | |
| | | | 0.4 | | | | 43 | |
| | | | 0.6 | | | | 89 | |
| | | | 0.8 | | | | 40 | |
| | | | 1.0 | | | | 79 | |
| | | | 1.2 | | | | 46 | |
| | | | 1.4 | | | | 80 | |
| | | | 1.6 | | | | 43 | |
| | | | 1.8 | | | | 86 | |
| | 2.0m: Grades to grey. | | 2.0 | | | | 57 | |
| | | | 2.2 | | | | 83 | |
| | | | 2.4 | | | | 40 | |
| | | | 2.6 | | | | 67 | |
| | Clayey SILT; grey. Stiff; low plasticity; moist. | | 2.8 | | | | 41 | |
| | | | 3.0 | | | | 94 | |
| | Silty CLAY; grey. Stiff; high plasticity; moist. | | 3.2 | | | | 49 | |
| | | | 3.4 | | | | 77 | |
| | 3.6m: Grades to wet. | | 3.6 | | | | 52 | |
| | | | 3.8 | | | | 83 | |
| | EOH: 4.00m | | 4.0 | | | | 43 | |
| | | | 4.2 | | | | 72 | |
| | | | 4.4 | | | | 43 | |
| | | | 4.6 | | | | 77 | |
| | | | 4.8 | | | | 43 | |
| | | | | | | | 69 | |
| | | | | | | | 29 | |

Groundwater Not Encountered



## REMARKS

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia - 2/05/2023 6:47:43 pm

Checked By: BPR

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA14

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746745.1mE, 5942160.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.8m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 24/03/2023
**END DATE:** 24/03/2023
**LOGGED BY:** FPT
**CHECKED BY:** BPR

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 0mm) | VANE SHEAR STRENGTH (kPa) Vane: 2503A | Values | WATER |
|---|---|---|---|---|---|---|---|---|
| Top soil | SILT, with minor clay; dark brown. Firm; low plasticity; moist; Trace rootlets. | | 0.0 | TS | | | | |
| Tauranga Group Alluvium | Silty CLAY; light grey, with occasional orange brown streaks. Stiff; high plasticity; moist. | | 0.2 | | | | 129 | |
| | | | 0.4 | | | | 74 | |
| | | | 0.6 | | | | 89 | |
| | | | 0.8 | | | | 60 | |
| | | | 1.0 | | | | 86 | |
| | | | 1.2 | | | | 60 | |
| | | | 1.4 | | | | 66 | |
| | 1.4m - 1.6m: Very stiff. | | 1.6 | | | | 43 | |
| | | | 1.8 | | | | 152 | |
| | 1.8m: Grades to grey, streaked black. Trace fibrous organics. Grades to stiff. | | 2.0 | | | | 69 | |
| | | | 2.2 | | | | 83 | |
| | 2.3m: Grades to greenish grey, streaked black. | | 2.4 | | | | 54 | |
| | | | 2.6 | | | | 62 | |
| | 2.7m: Grades to very stiff. | | 2.8 | | | | 37 | |
| | | | 3.0 | | | | 63 | |
| | SILT, with some clay, with minor sand; greenish grey. Very stiff; low plasticity; moist; sand, fine to medium. | | 3.2 | | | | 40 | |
| | | | 3.4 | | | | 103 | |
| | | | 3.6 | | | | 43 | |
| | | | 3.8 | | | | 137 | |
| | SILT, with some clay and sand; grey, speckled black. Very stiff; low plasticity; moist; sand, fine to medium; minor fibrous organics. | | 4.0 | | | | 52 | |
| | EOH: 4.00m | | 4.2 | | | | 120 | |
| | | | 4.4 | | | | 47 | |
| | | | 4.6 | | | | 110 | 24/03/2023 |
| | | | 4.8 | | | | 46 | |
| | | | | | | | 100 | |
| | | | | | | | 40 | |



**REMARKS**

Target Depth Reached

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2 Generated with CORE-GS by Geroc - Hand Auger_Initia - 2/05/2023 6:47:45 pm

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA101

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747099.5mE, 5942556.0mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 56m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** RJF
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| TS | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; orange with mottled brownish grey. Firm; high plasticity; moist; organics, amorphous. | | 0.4 |
| Mahurangi Limestone | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.2 |
| | EOH: 1.50m | | 1.5 |

LEGEND

SCALA PENETROMETER (Blows / 50mm)

VANE SHEAR STRENGTH (kPa) Vane:

| Values |
|---|
| 33 |
| 9 |
| 29 |
| 11 |
| UTP |
| - |
| UTP |
| - |

WATER: Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.1m bgl.

Scala penetrometer practical refusal at 1.9m bgl.

No groundwater was encountered.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:18 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA102

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747129.9mE, 5942501.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 59.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** RJF
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY; brownish orange with grey mottles. Firm; high plasticity; moist. | | 0.4 |
| | 0.7m: Grades to brownish grey with minor decomposing wood inclusions. | | 0.8 |
| angi Limes | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.2 |
| | EOH: 1.40m | | 1.4 |

LEGEND

SCALA PENETROMETER (Blows / 50mm): 2 4 4 4 6 8 10 10 11 11 11 12

VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200

| Values |
|---|
| 30 |
| 14 |
| 35 |
| 5 |
| 48 |
| 8 |
| UTP |
| - |

WATER: Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.2m bgl.

Scala penetrometer practical refusal at 2.0m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:21 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA103

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747163.5mE, 5942442.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 62.8m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** RJF
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 – 0.2 |
| Tauranga Group Alluvium | Silty CLAY; brownish orange with grey mottles. Stiff; high plasticity; moist. | | 0.2 – 1.4 |
| | 0.9m: Moist to wet. | | |
| rangi Limes | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone. | | 1.4 – 1.50 |
| | EOH: 1.50m | | |

LEGEND

SCALA PENETROMETER (Blows / 50mm)

| Depth (m) | Blows / 50mm |
|---|---|
| 1.4 – 1.6 | 5, 6, 6, 6 |
| 1.6 – 1.8 | 7, 5, 6 |
| 1.8 – 2.0 | 5, 5, 3, 6 |
| 2.0 – 2.2 | 8, 8, 8, 13, 25 >> |

VANE SHEAR STRENGTH (kPa) Vane:

| Depth (m) | Values |
|---|---|
| 0.2 – 0.4 | 93 |
| 0.4 – 0.6 | 44 |
| 0.6 – 0.8 | 59 |
| 0.8 – 1.0 | 26 |
| 1.0 – 1.2 | 86 |
| 1.2 – 1.4 | 27 |
| 1.4 – 1.6 | UTP |
| 1.6 – 1.8 | - |

WATER: 06/08/2025




## REMARKS

Hand auger practical refusal at 1.5m bgl.

Scala penetrometer practical refusal at 2.25m bgl.

Groundwater measured at 1.3m bgl at the completion of drilling.

**WATER**

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

**INVESTIGATION TYPE**

- ☑ Hand Auger
- ☐ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:23 pm

# HAND AUGER LOG

**HOLE NO.:** HA104

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747185.9mE, 5942405.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 63.7m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** RJF
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 50mm) | VANE SHEAR STRENGTH (kPa) Vane: Values | WATER |
|---|---|---|---|---|---|---|---|
| Fill | Clayey SILT, with trace topsoil; orange brown with dark brown mottles. Firm; low plasticity; moist. | | 0.0 – 0.2 | | | | Groundwater Not Encountered |
| d To | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist; [Buried topsoil]. | | 0.2 – 0.4 | | | 45 | |
| Tauranga Group Alluvium | Silty CLAY; brownish grey. Firm; high plasticity; moist. | | 0.4 – 0.8 | | | 21<br>42 | |
| | SILT, with minor clay; light grey/white. Very stiff; low plasticity; moist. | | 0.8 – 1.2 | | | 17<br>211+ | |
| angi Limes | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone]. EOH: 1.40m | | 1.2 – 1.4 | | 6, 11, 11, 12, 12, 13, 13 | -<br>UTP | |
| | | | 1.4 – 4.8 | | | - | |




## REMARKS

Hand auger practical refusal at 1.4m bgl.

Scala penetrometer practical refusal at 1.75m bgl.

No groundwater was encountered.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2: Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:26 pm

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA105

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747234.6mE, 5941910.8mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 53.4m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 18/08/2025
**END DATE:** 18/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 50mm) | VANE SHEAR STRENGTH (kPa) Vane: 3591 | Values | WATER |
|---|---|---|---|---|---|---|---|---|
| topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; wet. | | 0.0 | | | | | |
| Tauranga Group Alluvium | Organic silty CLAY; dark grey. Stiff; high plasticity; saturated; organic, amorphous. | | 0.2 | | | | 65 | |
| | | | 0.4 | | | | 17 | |
| | | | 0.6 | | | | 50 | |
| | 0.9m: Grades to firm | | 0.8 | | | | 13 | |
| | | | 1.0 | | | | 40 | |
| | 1.0m - 1.2m : No recovery | | 1.2 | N/R N/R N/R N/R N/R N/R | | | 17 | |
| | EOH: 1.20m | | 1.4 | | | | 32 | |
| | | | 1.6 | | | | 12 | |
| | | | 1.8 | | | | | |
| | | | 2.0 | | | | | |
| | | | 2.2 | | | | | |
| | | | 2.4 | | | | | |
| | | | 2.6 | | | | | |
| | | | 2.8 | | | | | |
| | | | 3.0 | | | | | |
| | | | 3.2 | | | | | |
| | | | 3.4 | | | | | |
| | | | 3.6 | | | | | |
| | | | 3.8 | | | | | |
| | | | 4.0 | | | | | |
| | | | 4.2 | | | | | |
| | | | 4.4 | | | | | |
| | | | 4.6 | | | | | |
| | | | 4.8 | | | | | |

Scala penetrometer: 2 4 6 8 10 12 14 16 18
Vane shear strength (kPa): 50 100 150 200

18/08/2025



## REMARKS

Hand auger terminated due to hole collapse.

Scala penetrometer terminated at target depth.

Groundwater measured at 0.1m bgl at the completion of drilling.

**WATER**

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

**INVESTIGATION TYPE**

- ☑ Hand Auger
- ☐ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:32 pm

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA106

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747134.2mE, 5942404.0mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 61.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** MSB
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 50mm) | VANE SHEAR STRENGTH (kPa) Vane: Values | WATER |
|---|---|---|---|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 | | | | |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; brownish grey with orange mottles. Stiff; high plasticity; moist; organics, amorphous. | | 0.6 | | | 82<br>34<br>81<br>34<br>79<br>37 | Groundwater Not Encountered |
| gi Li | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.2 | | 8, 3, 2, 2, 2, 4, 7, 5, 16, 25 >> | UTP<br>- | |
| | EOH: 1.20m | | 1.2 | | | | |



## REMARKS

Hand auger practical refusal at 1.2m bgl.

Scala penetrometer practical refusal at 1.7m bgl.

No groundwater was encountered.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:35 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA107

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747113.1mE, 5942451.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 59.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** MSB
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Top soil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Fill | Silty CLAY, with minor gravel; dark brown with orange and grey mottles. Stiff; high plasticity; moist; gravel, fine. | | 0.2 |
| Tauranga Group Alluvium | Silty CLAY, with some decomposing organics; brownish grey with orange mottles. Stiff; high plasticity; moist. | | 0.4 |
| gl Li | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.4 |
| | EOH: 1.40m | | |

LEGEND

SCALA PENETROMETER (Blows / 50mm)

| Depth (m) | Blows / 50mm |
|---|---|
| 0.4 | 4 |
| 0.6 | 5 |
| 0.8 | 8 |
| 1.0 | 10 |
| 1.2 | 10 |
| 1.4 | 16 |
| | 25 >> |

VANE SHEAR STRENGTH (kPa) Vane:

| Depth (m) | Values |
|---|---|
| 0.2 | 67 |
| 0.4 | 33 |
| 0.6 | 60 |
| 0.8 | 28 |
| 1.0 | 59 |
| 1.2 | 19 |
| 1.4 | 99 |
| | 29 |
| | UTP |
| | - |

WATER: Groundwater Not Encountered



## REMARKS

Hand auger practical refusal at 1.4m bgl.

Scala penetrometer practical refusal at 1.75m bgl.

No groundwater was encountered.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:38 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA108

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747094.3mE, 5942491.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 56.5m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** MSB
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY; grey with orange mottles. Stiff; high plasticity; moist. | | 0.0 |
| | 0.6m: Grades to firm | | 0.6 |
| | 0.9m: Grades to stiff | | 0.9 |
| | Clayey SILT, brownish grey/grey, very stiff, sensitive, moist, medium plasticity. | | 1.4 |
| gl Limeston | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.6 |
| | EOH: 1.90m | | 1.9 |

LEGEND

SCALA PENETROMETER (Blows / 50mm): 2 4 6 8 10 12 14 16 18

VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200

| Values |
|---|
| 57 |
| 22 |
| 37 |
| 14 |
| 57 |
| 26 |
| 60 |
| 29 |
| 185 |
| 19 |
| UTP |
| - |

WATER: 06/08/2025



## REMARKS

Hand auger practical refusal at 1.9m bgl.

Scala penetrometer practical refusal at 2.55m bgl.

Groundwater measured at 1.6m bgl at the completion of drilling.

**WATER**

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

**INVESTIGATION TYPE**

- ☑ Hand Auger
- ☐ Test Pit

Ver 2: Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:40 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA109

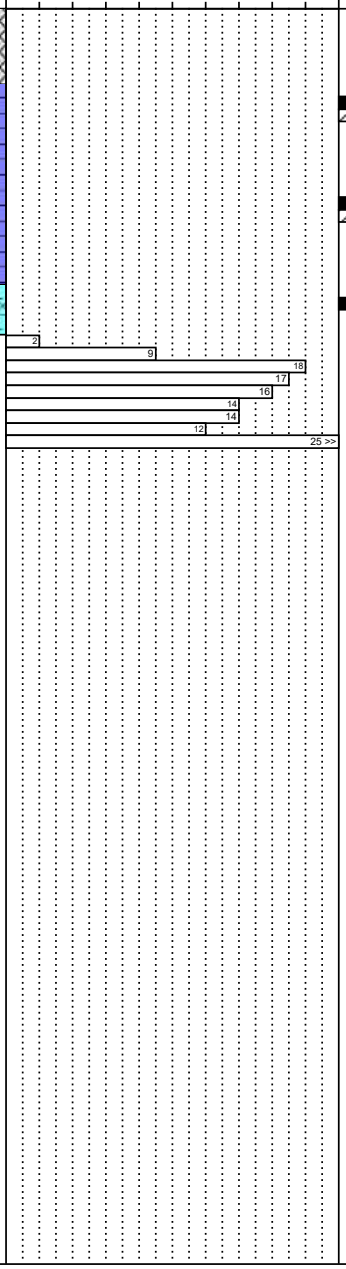
**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747060.8mE, 5942450.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 53.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

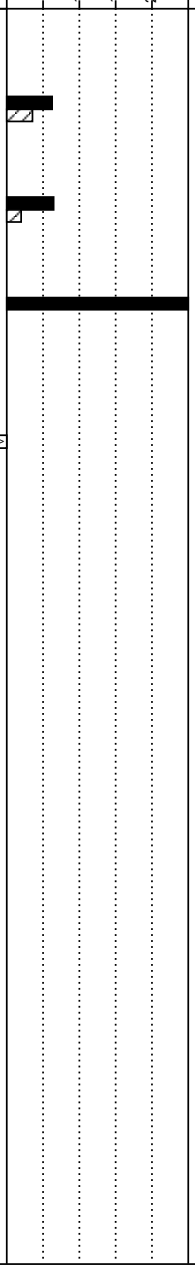
| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Fill | Clayey SILT, with trace topsoil; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY, dark brownish grey, frequent black streaks, stiff, moist to wet, high plasticity, minor limonite fragments and staining, minor carbonaceous incluisions (2-5mm). | | 0.4 |
| angl Limes | SILT, with some sand and gravel; light grey. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.2 |
| | EOH: 1.30m | | 1.3 |

LEGEND

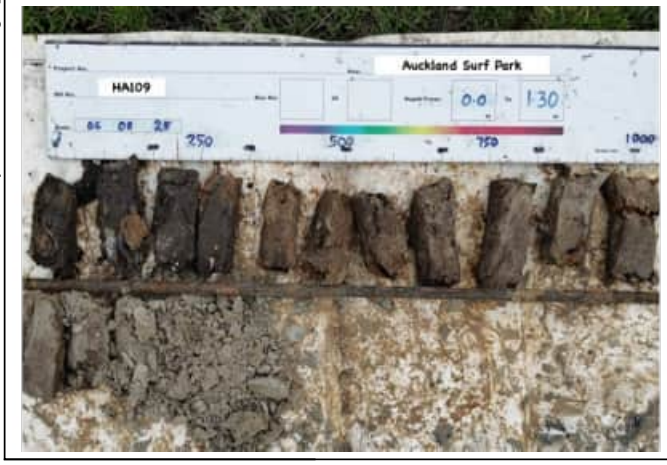
SCALA PENETROMETER (Blows / 50mm)




VANE SHEAR STRENGTH (kPa) Vane:




| Values | WATER |
|---|---|
| 62 | Groundwater Not Encountered |
| 35 | |
| 65 | |
| 20 | |
| UTP | |
| - | |




## REMARKS

Hand auger practical refusal at 1.3m bgl.

Scala penetrometer practical refusal at 1.75m bgl.

No groundwater was encountered.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:43 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA110

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747043.2mE, 5942386.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 52m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Fill | Clayey SILT, with trace topsoil; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; brownish grey. Stiff; high plasticity; moist; organics, amorphous. | | 0.4 |
| Mahurangi Limestone | Clayey SILT, light brownish grey, very stiff, sensitive, moist, low to medium plasticity, minor clasts (1-5mm). | | 0.6 |
| | SILT, with some sand and gravel; light grey. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.2 |
| | EOH: 1.20m | | |

LEGEND

SCALA PENETROMETER (Blows / 50mm)
2 4 6 8 10 12 14 16 18
8
10
17
20
20
25 >>

VANE SHEAR STRENGTH (kPa)
Vane: 50 100 150 200

| Values |
|---|
| 65 |
| 8 |
| 170 |
| 11 |
| UTP |
| - |

WATER: Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.2m bgl.

Scala penetrometer practical refusal at 1.5m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:46 pm

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA111

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747023.9mE, 5942326.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 52m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY; grey with orange mottles. Stiff; high plasticity; moist. | | 0.2 – 0.4 – 0.6 – 0.8 |
| | 0.9m: Grades to with minor clasts (1-10mm). | | 1.0 |
| | 1.2m: Grades to firm | | 1.2 |
| | Clayey SILT, with minor clasts (1-5mm); brownish grey with orange mottles. Firm; low plasticity; moist. | | 1.4 – 1.6 |
| gl Li | SILT, with some sand and gravel; light grey. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.8 |
| | EOH: 1.80m | | 2.0 – 2.2 – 2.4 – 2.6 – 2.8 – 3.0 – 3.2 – 3.4 – 3.6 – 3.8 – 4.0 – 4.2 – 4.4 – 4.6 – 4.8 |

**LEGEND**

**SCALA PENETROMETER** (Blows / 50mm)
2 4 6 8 10 12 14 16 18
6 | 18 | 25 >>

**VANE SHEAR STRENGTH (kPa)** Vane:
50 100 150 200

| Values |
|---|
| 89 |
| 35 |
| 77 |
| 41 |
| 44 |
| 14 |
| 53 |
| 8 |
| UTP |
| - |

**WATER**
06/08/2025




## REMARKS

Hand auger practical refusal at 1.8m bgl.

Scala penetrometer practical refusal at 1.95m bgl.

Groundwater measured at 1.8m bgl at the completion of drilling.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:48 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA112

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746772.1mE, 5942103.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 18/08/2025
**END DATE:** 18/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Silty CLAY, with trace rootlets; dark brown. Firm; high plasticity; wet. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY; brownish grey. Stiff; high plasticity; wet. | | 0.0 |
| | 0.9m: Grades to saturated | | 0.9 |
| | 1.4m: Grades to grey | | 1.4 |
| | EOH: 2.40m | | 2.4 |

LEGEND

SCALA PENETROMETER (Blows / 50mm)

VANE SHEAR STRENGTH (kPa) Vane: 3591

| Values |
|---|
| 50 |
| 13 |
| 100 |
| 70 |
| 88 |
| 82 |
| 100 |
| 50 |
| 70 |
| 52 |
| 83 |
| 48 |
| 82 |
| 53 |
| 100 |
| 50 |

WATER: 18/08/2025



## REMARKS

Hand auger terminated due to hole collapse.

Scala penetrometer terminated at target depth.

Groundwater measured at 0.1m bgl at the completion of drilling.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:54 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA113

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747061.0mE, 5942233.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** MSB
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT; dark brown.<br>Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY; orange with light brown mottles.<br>Stiff; high plasticity; moist. | | 0.4 |
| | 0.6m: Grades to light brownish grey with minor organics, firm. | | 0.6 |
| | 0.9m: Grades to stiff. | | 1.0 |
| | 1.2m: Grades to stiff | | 1.2 |
| | 1.5m: Grades to Stiff. | | 1.6 |
| | Clayey SILT; light brownish grey with orange mottles.<br>Stiff; low plasticity; moist to wet. | | 1.8 |
| | 2.1m: Grades to very stiff. | | 2.2 |
| | Clayey SILT; bluish grey/grey.<br>Very stiff; low plasticity; wet. | | 2.4 |
| | 3.0m: Grades to Stiff, saturated. | | 3.0 |
| | 3.3m: Grades to hard. | | 3.4 |
| | EOH: 4.00m | | 4.0 |

LEGEND

SCALA PENETROMETER (Blows / 50mm)

VANE SHEAR STRENGTH (kPa) Vane:

| Values |
|---|
| 67 |
| 37 |
| 48 |
| 16 |
| 51 |
| 37 |
| 43 |
| 16 |
| 71 |
| 17 |
| 95 |
| 19 |
| 119 |
| 26 |
| 123 |
| 22 |
| 121 |
| 20 |
| 87 |
| 20 |
| 217+ |
| - |
| UTP |
| - |
| 217+ |
| - |

WATER: 06/08/2025



## REMARKS

Hand auger terminated at target depth.

Scala penetrometer terminated at target depth.

Groundwater measured at 2.3m bgl at the completion of drilling.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2: Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:56 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA114

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747110.8mE, 5942202.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 56.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** RJF
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Top soil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; brownish grey. Firm; high plasticity; moist; organics, amorphous. | | 0.2 – 0.8 |
| rangi Limes | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.0 |
| | EOH: 1.10m | | 1.2 |

LEGEND

SCALA PENETROMETER (Blows / 50mm)
2 4 6 8 10 12 14 16 18
5
17
25 >>

VANE SHEAR STRENGTH (kPa)
Vane: 50 100 150 200

| Values |
|---|
| 42 |
| 24 |
| 47 |
| 23 |
| UTP |
| - |

WATER: Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.1m bgl.

Scala penetrometer practical refusal at 1.25m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2: Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:16:59 pm

# HAND AUGER LOG

**HOLE NO.:** HA115

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747086.8mE, 5942386.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 58m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 – 0.2 |
| Tauranga Group Alluvium | Silty CLAY; brownish grey with orange mottles. Stiff; high plasticity; moist. | | 0.2 – 0.8 |
| Tauranga Group Alluvium | Clayey SILT; dark brownish grey with black streaks. Firm; low plasticity; moist. | | 0.8 – 1.2 |
| gl Li | SILT, with some sand and gravel; grey. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] EOH: 1.40m | | 1.2 – 1.4 |

LEGEND

SCALA PENETROMETER (Blows / 50mm): 2 4 6 8 10 12 14 16 18
Scala blows: 11 | 14 | 14 | 15 | 25 >>

VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200

| Values |
|---|
| 62 |
| 23 |
| 59 |
| 17 |
| 54 |
| 15 |
| UTP |
| - |

WATER: Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.4m bgl.

Scala penetrometer practical refusal at 1.65m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:02 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA116

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747102.0mE, 5942359.1mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 59.4m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND |
|---|---|---|---|---|
| Fill | Clayey SILT, with trace topsoil; dark brown. Firm; low plasticity; moist. | | 0.0 – 0.4 | |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; brownish grey with orange mottles. Firm; high plasticity; moist; organics, amorphous. | | 0.4 – 1.2 | |
| rangi Limes | SILT, with some sand and gravel; grey. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] EOH: 1.20m | | 1.2 – 1.4 | |

**SCALA PENETROMETER** (Blows / 50mm)
2 4 6 8 10 12 14 16 18
3 3 4 4 13 25 >>

**VANE SHEAR STRENGTH (kPa)** Vane:
50 100 150 200

| Values |
|---|
| 44 |
| 17 |
| 158 |
| 8 |
| UTP |
| - |

**WATER**
Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.2m bgl.

Scala penetrometer practical refusal at 1.5m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:05 pm

# HAND AUGER LOG

**HOLE NO.:** HA117

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747060.0mE, 5942350.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 56.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** MG
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 – 0.2 |
| Tauranga Group Alluvium | Silty CLAY, with minor carbonaceous; orange with brownish grey mottles. Firm; high plasticity; moist. | | 0.2 – 0.8 |
| Tauranga Group Alluvium | Clayey SILT; brownish grey. Firm; low plasticity; moist. | | 0.8 – 1.2 |
| Mahurangi Limestone | SILT, with some sand and gravel; grey. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] EOH: 1.60m | | 1.2 – 1.6 |

LEGEND

SCALA PENETROMETER (Blows / 50mm): 3; 16; 17; 17; 25 >>

VANE SHEAR STRENGTH (kPa) Vane:

| Values |
|---|
| 39 |
| 17 |
| 36 |
| 7 |
| 33 |
| 11 |
| UTP |
| - |

WATER: Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.6m bgl.

Scala penetrometer practical refusal t 1.85m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:07 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA118

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747089.1mE, 5942268.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 57.5m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** MSB
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY; brownish grey with orange mottles. Very stiff; high plasticity; moist. | | 0.0 |
| | 0.6m: Grades to stiff. | | 0.6 |
| Li | SILT, with some sand and gravel; grey. Hard; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.0 |
| | EOH: 1.10m | | 1.1 |

LEGEND

SCALA PENETROMETER (Blows / 50mm): 6, 6, 6, 5, 3, 3, 8, 13, 19, 25 >>

VANE SHEAR STRENGTH (kPa) Vane:

| Values |
|---|
| 177 |
| 37 |
| 76 |
| 28 |
| 73 |
| 25 |
| UTP |
| - |

WATER: Groundwater Not Encountered



## REMARKS

Hand auger practical refusal at 1.1m bgl.

Scala penetrometer practical refusal at 1.6m bgl.

No groundwater was encountered

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:10 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA119

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747126.8mE, 5942308.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 60.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** RJF
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Fill | Clayey SILT, with trace topsoil; dark brown.<br>Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; orange with brownish grey mottles.<br>Stiff; high plasticity; moist; organics, amorphous. | | 0.4 |
| | 0.8m: Grades to firm. | | 0.8 |
| | 1.2m: Grades to stiff. | | 1.2 |
| rangi Limes | SILT, with some sand and gravel; light grey.<br>Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.4 |
| | EOH: 1.50m | | 1.6 |

LEGEND

SCALA PENETROMETER (Blows / 50mm)
2 4 6 8 10 12 14 16 18
8 8 12 13 15 16 18 21 >>

VANE SHEAR STRENGTH (kPa)
Vane: 50 100 150 200

| Values |
|---|
| 54 |
| 18 |
| 44 |
| 17 |
| 78 |
| 18 |
| UTP |
| - |

WATER: Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.5m bgl.

Scala penetrometer practical refusal at 1.9m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:12 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA120

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747136.1mE, 5942235.1mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 58.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** RJF
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Top soil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY, with some limonite fragments and staining; orange with grey mottles. Firm; high plasticity; moist. | | 0.2 |
| | 0.6m: Grades to brownish grey with orange mottles, with minor amorphous organics, stiff. | | 0.4 |
| | | | 0.6 |
| | | | 0.8 |
| gi Limeston | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.0 |
| | EOH: 1.20m | | 1.2 |
| | | | 1.4 |
| | | | 1.6 |
| | | | 1.8 |
| | | | 2.0 |
| | | | 2.2 |
| | | | 2.4 |
| | | | 2.6 |
| | | | 2.8 |
| | | | 3.0 |
| | | | 3.2 |
| | | | 3.4 |
| | | | 3.6 |
| | | | 3.8 |
| | | | 4.0 |
| | | | 4.2 |
| | | | 4.4 |
| | | | 4.6 |
| | | | 4.8 |

LEGEND: TS

**SCALA PENETROMETER** (Blows / 50mm)
2 4 6 8 10 12 14 16 18
9, 11, 13, 12, 12, 13, 13

**VANE SHEAR STRENGTH (kPa)** Vane:
50 100 150 200

| Values |
|---|
| 48 |
| 20 |
| 69 |
| 17 |
| UTP |
| - |

**WATER**
Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.2m bgl.

Scala penetrometer practical refusal at 1.55m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:15 pm

# HAND AUGER LOG

**HOLE NO.:** HA121

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747052.1mE, 5942291.2mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.5m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| p s | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY; orange with light brownish grey mottles. Stiff; high plasticity; moist. | | 0.4 |
| | Clayey SILT; light brownish grey with orange mottles. Stiff; low plasticity; wet. | | 1.2 |
| | 1.6m: Grades to with minor decomposing wood inclusions. | | 1.6 |
| | 1.9m: Grades to firm, saturated. | | 1.9 |
| | Clayey SILT; grey. Hard; low plasticity; wet. | | 2.8 |
| | 3.2m: Grades to stiff. | | 3.2 |
| | 3.6m: Grades to very stiff. | | 3.6 |
| | 3.9m: Grades to stiff. | | 3.9 |
| | SILT, with some clay; bluish grey. Hard; low plasticity; saturated. | | 4.6 |
| | EOH: 4.80m | | 4.8 |

SCALA PENETROMETER (Blows / 50mm): 2 4 6 8 10 12 14 16 18

VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200

| Values |
|---|
| 65 |
| 29 |
| 50 |
| 20 |
| 50 |
| 23 |
| 62 |
| 14 |
| 35 |
| 8 |
| 38 |
| 11 |
| 211+ |
| - |
| 65 |
| 17 |
| 143 |
| 20 |
| 80 |
| 23 |
| 65 |
| 14 |
| UTP |
| - |

WATER: 05/08/2025



## REMARKS

Hand auger practical refusal at 4.8m bgl.

Scala penetrometer terminated at target depth.

Groundwater measured at 2.2m bgl at the completion of drilling.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:17 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA122

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746968.4mE, 5941564.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 53.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Silty CLAY, with trace rootlets; dark brown. Firm; high plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | CLAY, with minor silt; brownish grey. Firm; high plasticity; moist. | D | 0.6 |
| | 0.9m: Grades to stiff | | 1.0 |
| | 1.2m: Grades to firm | | 1.2 |
| | 1.5m: Grades to stiff | | 1.6 |
| | 1.8m: Grades to with trace organics, firm. Organics; Fibrous | | 1.8 |
| | 2.1m: Grades to stiff | | 2.2 |
| | EOH: 2.50m | | 2.5 |

SCALA PENETROMETER (Blows / 50mm): 2, 4, 6, 8, 10, 12, 14, 16, 18

VANE SHEAR STRENGTH (kPa) Vane: 4035: 50, 100, 150, 200

| Values |
|---|
| 46 |
| 31 |
| 46 |
| 34 |
| 69 |
| 38 |
| 46 |
| 31 |
| 54 |
| 34 |
| 46 |
| 28 |
| 61 |
| 34 |
| 64 |
| 31 |

WATER: 06/08/2025



## REMARKS

Hand auger terminated due to hole collapse/excess suction.

Scala penetrometer practical refusal at 4.1m bgl.

Groundwater measured at 1.5m bgl at the completion of drilling.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:20 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA123

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747021.1mE, 5941572.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.9m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Silty CLAY, with trace rootlets; dark brown. Firm; high plasticity; moist. | | 0.0 |
| Fill | Clayey SILT; grey with orange brown mottles. Stiff; low plasticity; moist. | | 0.2 |
| Tauranga Group Alluvium | Silty CLAY; brownish grey. Firm; high plasticity; moist. | D | 0.6 |
| | 0.9m: Grades to very stiff | | 0.8 |
| gi Li | SILT, with minor clay and gravel; brownish grey. Very stiff; low plasticity; moist; gravel, fine to medium; [Inferred weathered Mahurangi Limestone interface]. EOH: 1.10m | | 1.0 |

SCALA PENETROMETER (Blows / 50mm): 6, 6, 7, 7, 8, 9, 10, 21 >>

VANE SHEAR STRENGTH (kPa) Vane: 4035

| Values |
|---|
| 84 |
| 46 |
| 46 |
| 31 |
| 115 |
| 54 |

WATER: Groundwater Not Encountered



## REMARKS

Hand auger practical refusal at 1.1m bgl.

Scala penetrometer practical refusal at 1.5m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:23 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA124

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747076.8mE, 5941701.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** RJF
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 – 0.2 |
| Tauranga Group Alluvium | Clayey SILT, with some gum fragments; brownish grey. Stiff; low plasticity; moist. | | 0.2 – 0.4 |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; orange with grey mottles. Firm; high plasticity; moist; organics, amorphous. | | 0.4 – 1.2 |
| Tauranga Group Alluvium | Clayey SILT; brownish grey. Firm; low plasticity; wet. | | 1.2 – 1.6 |
| Waitemata Limestone | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] EOH: 1.70m | | 1.6 – 1.70 |

LEGEND

SCALA PENETROMETER (Blows / 50mm)
2 4 6 8 10 12 14 16 18
7 12 13 16 18 20 23 >>

VANE SHEAR STRENGTH (kPa) Vane:
50 100 150 200

| Values |
|---|
| 84 |
| 42 |
| 39 |
| 14 |
| 47 |
| 12 |
| UTP |
| - |

WATER: 06/08/2025




## REMARKS

Hand auger practical refusal at 1.7m bgl.

Scala penetrometer practical refusal at 2.1m bgl.

Groundwater measured at 1.6m bgl at the completion of drilling.

**WATER**
- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

**INVESTIGATION TYPE**
- ☑ Hand Auger
- ☐ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:25 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA125

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746979.3mE, 5941601.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 05/08/2025
**END DATE:** 05/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Silty CLAY, with trace rootlets; dark brown. Firm; high plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | CLAY, with minor silt; brownish grey. Stiff; high plasticity; moist. | | |
| | 0.6m: Grades to firm | | 0.6 |
| angi Limes | SILT, with minor clay and gravel; grey. Hard; low plasticity; moist; gravel, fine to medium; [Inferred weathered Mahurangi Limestone interface]. | | 1.8 |
| | EOH: 1.80m | | |

SCALA PENETROMETER (Blows / 50mm): 2 4 6 8 10 12 14 16 18
Scala values: 8, 9, 14, 25 >>

VANE SHEAR STRENGTH (kPa) Vane: 4035: 50 100 150 200

| Values |
|---|
| 50 |
| 32 |
| 43 |
| 31 |
| 34 |
| 28 |
| 31 |
| 23 |
| 46 |
| 28 |
| UTP |
| - |

WATER: 05/08/2025



## REMARKS

Hand auger practical refusal at 1.8m bgl.

Scala penetrometer practical refusal at 2.0m bgl.

Groundwater measured at 0.7m bgl at the completion of drilling.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:28 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA126

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746987.1mE, 5941630.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 05/08/2025
**END DATE:** 05/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Silty CLAY, with trace rootlets; dark brown. Firm; high plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY; grey. Very stiff; high plasticity; moist. | D | 0.4 |
| | CLAY, with minor silt; brownish grey. Firm; high plasticity; moist. | | 1.0 |
| gi Limeston | SILT, with minor clay and sand; brownish grey. Hard; low plasticity; moist; sand, fine to medium; [Inferred weathered Mahurangi Limestone interface]. | | 1.6 |
| | EOH: 1.80m | | 1.8 |

SCALA PENETROMETER (Blows / 50mm): 14, 20

VANE SHEAR STRENGTH (kPa) Vane: 4035

| Values |
|---|
| 101 |
| 55 |
| 107 |
| 49 |
| 46 |
| 31 |
| 73 |
| 23 |
| 214+ |
| - |
| UTP |
| - |

WATER: 05/08/2025



## REMARKS

Hand auger practical refusal at 1.8m bgl.

Scala penetrometer practical refusal at 1.9m bgl.

Groundwater measured at 0.8m bgl at the completion of drilling.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:30 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA127

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747012.3mE, 5941730.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** MSB
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Top soil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Fill | GRAVEL; white. Dense; moist; gravel, fine, Limestone. | | 0.2 |
| Fill | Clayey SILT, with trace topsoil; dark brown. Firm; low plasticity; moist. | | 0.4 |
| Buried Topsoil | Clayey SILT; dark brown. Soft; low plasticity; moist; [Buried topsoil]. | | 1.0 |
| Tauranga Group Alluvium | Silty CLAY; brown with brownish grey mottles. Soft; high plasticity; wet. | | 1.2 |
| Tauranga Group Alluvium | 1.7m: Grades to with minor decomposing wood inclusions, firm, saturated. | | 1.6 |
| Tauranga Group Alluvium | 3.3m: Grades to stiff. | | 3.2 |
| Mahurangi Limestone | Clayey SILT, with some sand and gravel; grey. Hard; low plasticity; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface]. EOH: 4.00m | | 3.6 |

LEGEND: TS (Topsoil)

SCALA PENETROMETER (Blows / 50mm): 2 4 6 8 10 12 14 16 18

VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200

| Values |
|---|
| UTP |
| - |
| 31 |
| 8 |
| 26 |
| 5 |
| 19 |
| 8 |
| 14 |
| 3 |
| 34 |
| 8 |
| 28 |
| 16 |
| 31 |
| 17 |
| 29 |
| 12 |
| 45 |
| 6 |
| 60 |
| 17 |
| 217+ |
| - |
| UTP |
| - |

WATER: 06/08/2025




## REMARKS

Hand auger terminated at target depth.

Scala penetrometer practical refusal at 4.75m bgl.

Groundwater measured at 1.1m bgl at the completion of drilling.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:33 pm

Checked By: APK

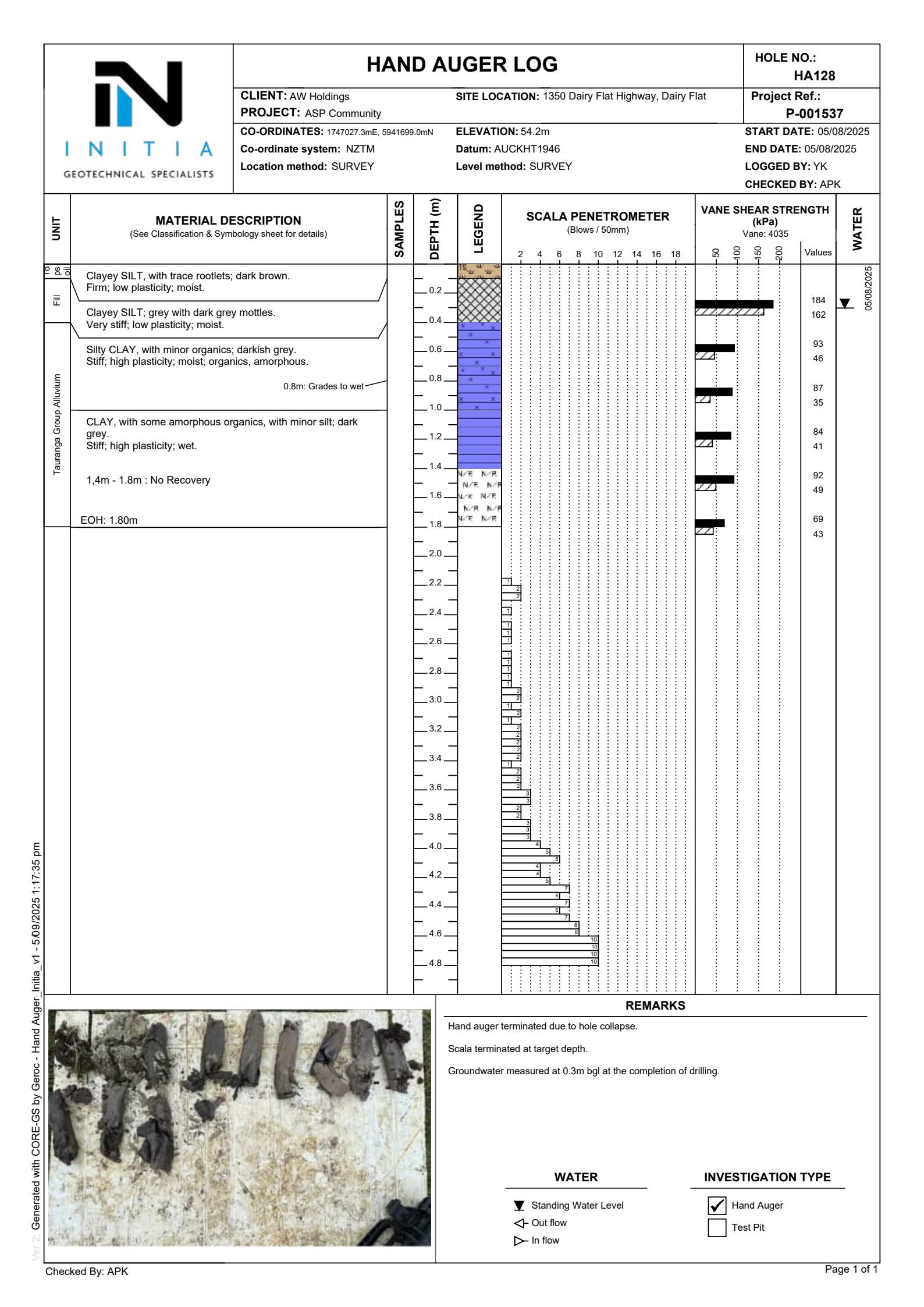
# HAND AUGER LOG

**HOLE NO.:** HA128

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747027.3mE, 5941699.0mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 05/08/2025
**END DATE:** 05/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Fill | Clayey SILT; grey with dark grey mottles. Very stiff; low plasticity; moist. | | 0.2 |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; darkish grey. Stiff; high plasticity; moist; organics, amorphous. | | 0.4 |
| | 0.8m: Grades to wet | | 0.6 |
| | CLAY, with some amorphous organics, with minor silt; dark grey. Stiff; high plasticity; wet. | | 0.8 |
| | 1,4m - 1.8m : No Recovery | | 1.0 |
| | EOH: 1.80m | | 1.2 |
| | | | 1.4 |
| | | | 1.6 |
| | | | 1.8 |
| | | | 2.0 |
| | | | 2.2 |
| | | | 2.4 |
| | | | 2.6 |
| | | | 2.8 |
| | | | 3.0 |
| | | | 3.2 |
| | | | 3.4 |
| | | | 3.6 |
| | | | 3.8 |
| | | | 4.0 |
| | | | 4.2 |
| | | | 4.4 |
| | | | 4.6 |
| | | | 4.8 |






## REMARKS

Hand auger terminated due to hole collapse.

Scala terminated at target depth.

Groundwater measured at 0.3m bgl at the completion of drilling.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:35 pm

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA129

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747061.3mE, 5941734.4mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** MSB
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; brownish grey with orange mottles. Stiff; high plasticity; moist; organics, amorphous. | | 0.2 |
| | 0.4m: Grades to light grey | | 0.4 |
| | 0.6m: Grades to firm | | 0.6 |
| | 0.9m: Grades to stiff | | 0.8 |
| | | | 1.0 |
| | | | 1.2 |
| | | | 1.4 |
| | | | 1.6 |
| Mahurangi Limestone | Clayey SILT, with minor gravel; brownish grey. Hard; low plasticity; moist; gravel, fine to medium, Limestone. | | 1.8 |
| | SILT, with some sand and gravel; grey. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 2.0 |
| | EOH: 2.30m | | 2.2 |
| | | | 2.4 |
| | | | 2.6 |
| | | | 2.8 |
| | | | 3.0 |
| | | | 3.2 |
| | | | 3.4 |
| | | | 3.6 |
| | | | 3.8 |
| | | | 4.0 |
| | | | 4.2 |
| | | | 4.4 |
| | | | 4.6 |
| | | | 4.8 |

LEGEND

SCALA PENETROMETER (Blows / 50mm)
2 4 6 8 10 12 14 16 18
7 7 8 7 12 13 15 20 22 >> 24 >>

VANE SHEAR STRENGTH (kPa)
Vane: 50 100 150 200

| Values |
|---|
| 51 |
| 17 |
| 48 |
| 19 |
| 53 |
| 20 |
| 53 |
| 14 |
| 50 |
| 5 |
| 217+ |
| - |
| UTP |
| - |

WATER



## REMARKS

Hand auger practical refusal at 2.3m bgl.

Scala penetrometer practical refusal at 2.8m bgl.

Groundwater inflow measured at 1.5m bgl.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:38 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA130

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747111.3mE, 5941673.1mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 57.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** RJF
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND |
|---|---|---|---|---|
| Fill | Clayey SILT, with trace topsoil; dark brown. Stiff; low plasticity; moist. | | 0.0 – 0.6 | |
| Tauranga Group Alluvium | Silty CLAY; brownish grey with brown mottles. Stiff; high plasticity; moist. | | 0.6 – 0.8 | |
| rangi Limes | SILT, with some sand and gravel; ligjht grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 0.8 – 1.10 | |
| | EOH: 1.10m | | 1.10 | |

**SCALA PENETROMETER** (Blows / 50mm)

| Depth (m) | Blows / 50mm |
|---|---|
| 1.0 – 1.2 | 4 |
| 1.2 – 1.4 | 5 |
| 1.4 – 1.6 | 8 |
| 1.6 – 1.8 | 9 |
| 1.8 – 2.0 | 7 |
| 2.0 – 2.2 | 11 |
| 2.2 – 2.4 | 25 >> |

**VANE SHEAR STRENGTH (kPa)** Vane:

| Depth (m) | Values |
|---|---|
| 0.4 – 0.6 | 66 |
| | 18 |
| 0.8 – 1.0 | 57 |
| | 14 |
| 1.0 – 1.2 | UTP |
| | - |

**WATER:** Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.1m bgl.

Scala penetrometer practical refusal at 1.45m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:40 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA131

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747145.8mE, 5941574.3mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 60.3m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 05/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Silty CLAY, with trace rootlets; dark brown. Firm; high plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY; brownish grey. Stiff; high plasticity; moist. | D | 0.4 |
| Mahurangi Limestone | SILT, with minor clay and gravel; grey. Very stiff; low plasticity; moist; gravel, fine to medium; [Inferred weathered Mahurangi Limestone interface]. | | 1.2 |
| | EOH: 1.20m | | |

LEGEND

SCALA PENETROMETER (Blows / 50mm)
2 4 6 8 10 12 14 16 18
3 4 6 6 6 7 6 7 9 13 22 >>

VANE SHEAR STRENGTH (kPa)
Vane: 4035
50 100 150 200

| Values |
|---|
| 76 |
| 46 |
| 84 |
| 61 |
| 184 |
| 61 |
| 199 |
| 80 |

WATER: Groundwater Not Encountered



## REMARKS

Hand auger practical refusal at 1.2m bgl.

Scala penetrometer practical refusal at 1.75m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:43 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA132

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747086.5mE, 5941623.1mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 58.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 50mm) | VANE SHEAR STRENGTH (kPa) Vane: 4035 | Values | WATER |
|---|---|---|---|---|---|---|---|---|
| Topsoil | Silty CLAY, with trace rootlets; dark brown. Firm; high plasticity; moist. | | 0.0 | | | | | |
| Tauranga Group Alluvium | Silty CLAY; brownish grey. Stiff; high plasticity; moist. | | 0.4 | | | | 61<br>44 | |
| | | | 0.6 | | | | 61<br>38 | |
| Mahurangi Limestone | SILT, with minor clay and sand; grey. Hard; low plasticity; moist; sand, fine to medium; [Inferred weathered Mahurangi Limestone interface]. | | 1.0 | | | | 214+<br>- | |
| | EOH: 1.40m | | 1.4 | | 17 / 20 | | 214+<br>- | Groundwater Not Encountered |



## REMARKS

Hand auger practical refusal at 1.4m bgl.

Scala penetrometer practical refusal at 1.5m bgl.

No groundwater was encountered.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:45 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA133

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747167.9mE, 5941651.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 58.8m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** MG
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY; brownish grey. Firm; high plasticity; moist. | | 0.4 |
| Mahurangi Limestone | SILT, with some sand and gravel; light grey/white. Very stiff; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface]. | | 1.2 |
| | EOH: 1.40m | | 1.4 |

LEGEND

SCALA PENETROMETER (Blows / 50mm)
2 4 6 8 10 12 14 16 18
5, 7, 8, 8, 9, 9, 10, 12, 22 >>, 25 >>

VANE SHEAR STRENGTH (kPa)
Vane: 50 100 150 200

| Values |
|---|
| 36 |
| 8 |
| 45 |
| 11 |
| 132 |
| 7 |
| UTP |
| - |

WATER: Groundwater Not Encountered




## REMARKS

Hand auger practical refusal at 1.4m bgl.

Scala penetrometer practical refusal at 1.9m bgl.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:48 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA134

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747203.4mE, 5941741.6mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.8m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Top soil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; brownish grey with orange mottles. Firm; high plasticity; wet; organics, amorphous. | | 0.4 |
| | 0.6m: Grades to saturated. | | 0.6 |
| | Clayey SILT; orange with light brownish grey mottles. Firm; low plasticity; saturated. | | 1.4 |
| | Silty CLAY; dark grey with brown mottles. Stiff; high plasticity; saturated. | | 1.6 |
| | EOH: 2.00m | | 2.0 |

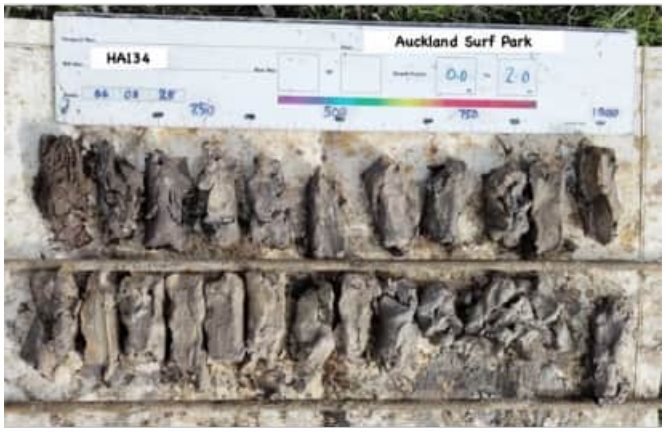
LEGEND

SCALA PENETROMETER (Blows / 50mm): 2 4 6 8 10 12 14 16 18

VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200

| Values |
|---|
| 26 |
| 11 |
| 32 |
| 9 |
| 47 |
| 17 |
| 32 |
| 20 |
| 62 |
| 17 |

WATER: 06/08/2025




## REMARKS

Hand auger terminated due to high suction and hole collapse.

Scala penetrometer practical refusal at 3.2m bgl.

Groundwater measured at 0.2m bgl at the completion of drilling

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:50 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA135

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747127.9mE, 5941731.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.1m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 06/08/2025
**END DATE:** 06/08/2025
**LOGGED BY:** RJF
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Tauranga Group Alluvium | Clayey SILT; brownish grey with orange mottles. Stiff; low plasticity; moist. | | 0.4 |
| | Silty CLAY; brownish grey with orange and brown mottles. Stiff; high plasticity; moist. | | 0.6 |
| | 1.2m: Grades to firm. | | 1.2 |
| gl Limeston | SILT, with some sand and gravel; light grey/white. Hard; non-plastic; moist; sand, coarse, gravel, fine, Limestone; [Inferred weathered Mahurangi Limestone interface] | | 1.4 |
| | EOH: 1.60m | | 1.6 |

LEGEND

SCALA PENETROMETER (Blows / 50mm): 2 4 6 8 10 12 14 16 18

VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200

| Values | WATER |
|---|---|
| 80 | Groundwater Not Encountered |
| 29 | |
| 60 | |
| 18 | |
| 48 | |
| 14 | |
| UTP | |
| - | |




## REMARKS

Hand auger practical refusal at 1.6m bgl.

Scala penetrometer practical refusal at 2.15m bgl.

Groundwater was not encountered.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:53 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA136

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746778.0mE, 5942060.8mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 11/08/2025
**END DATE:** 11/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

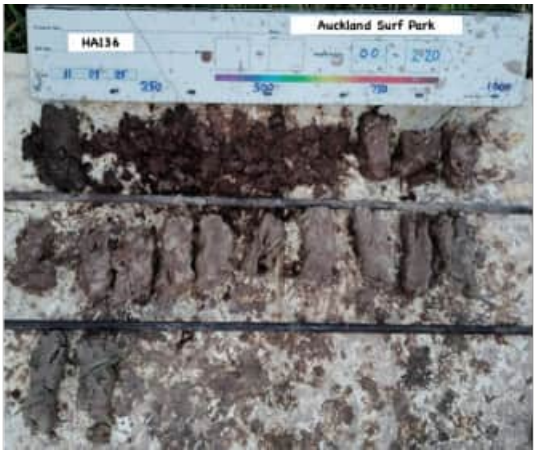
| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Fill | SILT, with some clay; reddish brown. Firm; low plasticity; wet. | | 0.2 |
| | 0.4m: Grades to with trace clay. | | 0.4 |
| Tauranga Group Alluvium | Silty CLAY, with minor organics; brownish grey/grey. Firm; high plasticity; saturated; organics, amorphous. | | 0.6 |
| | 1.2m: Grades to stiff. | | 1.2 |
| | EOH: 2.20m | | 2.2 |

SCALA PENETROMETER (Blows / 50mm): 2 4 6 8 10 12 14 16 18

VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200

| Values |
|---|
| 44 |
| 3 |
| 47 |
| 23 |
| 53 |
| 32 |
| 56 |
| 29 |
| 50 |
| 15 |

WATER: 11/08/2025




## REMARKS

Hand auger terminated due to high suction and hole collapse.

Scala penetrometer terminated at target depth.

Groundwater measured at 0.1m bgl at the completion of drilling.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:55 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA137

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746880.5mE, 5942178.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54.7m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 11/08/2025
**END DATE:** 11/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 50mm) | VANE SHEAR STRENGTH (kPa) Vane: Values | WATER |
|---|---|---|---|---|---|---|---|
| To ps oil | Clayey SILT, with trace rootlets; grey brown. Firm; low plasticity; moist. | | 0.0 | | | | |
| Tauranga Group Alluvium | Silty CLAY; brown. Stiff; high plasticity; wet. | | 0.2 | | | 65 11 | 11/08/2025 |
| | 0.8m: Grades to brownish grey with brown mottles, minor amorphous organics. | | 0.4 | | | 50 2 | |
| | 1.2m: Grades to firm. | | 0.6 | | | 44 20 | |
| | 2.1m: Grades to with some decomposing organics (1-5mm). | | 0.8 | | | 38 17 | |
| | 2.9m: Grades to saturated. | | 1.0 | | | 44 14 | |
| | 3.2m: Grades to soft. | | 1.2 | | | 29 11 | |
| | 3.6m: Grades to firm. | | 1.4 | | | 38 23 | |
| | EOH: 4.00m | | 1.6 | | | 23 11 | |
| | | | 1.8 | | | 35 14 | |
| | | | 2.0 | | | 47 17 | |
| | | | 2.2 | | | | |
| | | | 2.4 | | | | |
| | | | 2.6 | | | | |
| | | | 2.8 | | | | |
| | | | 3.0 | | | | |
| | | | 3.2 | | | | |
| | | | 3.4 | | | | |
| | | | 3.6 | | | | |
| | | | 3.8 | | | | |
| | | | 4.0 | | | | |
| | | | 4.2 | | | | |
| | | | 4.4 | | | | |
| | | | 4.6 | | | | |
| | | | 4.8 | | | | |




## REMARKS

Hand auger terminated at target depth.

Scala penetrometer terminated at target depth.

Groundwater measured at 0.4m bgl at the completion of drilling.

**WATER**

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

**INVESTIGATION TYPE**

- ☑ Hand Auger
- ☐ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:17:58 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA138

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746857.1mE, 5942280.9mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 51.6m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 11/08/2025
**END DATE:** 11/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 50mm) | VANE SHEAR STRENGTH (kPa) Vane: Values | WATER |
|---|---|---|---|---|---|---|---|
| topsoil | Clayey SILT, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 | | | | |
| Tauranga Group Alluvium | SILT, with some clay; orange with brown mottles. Stiff; low plasticity; moist. | | 0.4 | | | 59 / 8 | |
| | Clayey SILT; brownish grey. Very stiff; low plasticity; moist. | | 0.8 | | | 146 / 68 | |
| | Silty CLAY, with minor organics; brownish grey. Very stiff; high plasticity; moist; organics, amorphous. | | 1.2 | | | 113 / 59 | |
| | 1.7m: Grades to with minor carbonaceous inclusions (2-5mm), wet. | | 1.6 | | | 119 / 56 | |
| | 2.0m: Grades to very stiff. | | 2.0 | | | 89 / 47 | |
| | 2.3m: Grades to blackish grey with grey mottles, firm. | | 2.4 | | | 44 / 17 | |
| | SILT, with some clay, with minor decomposing organics; dark brown with black mottles. Firm; low plasticity; saturated. | | 3.2 | | | 32 / 11 | |
| | 3.6m: Grades to stiff, difficult recovery. | | 3.6 | | | 50 / 6 | |
| | EOH: 4.00m | | 4.0 | | | 56 / 23 | 11/08/2025 |




## REMARKS

Hand auger terminated at target depth.

Scala penetrometer terminated at target depth.

Groundwater measured at 2.9m bgl at the completion of drilling.

**WATER**

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

**INVESTIGATION TYPE**

- ☑ Hand Auger
- ☐ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:18:00 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA139

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746925.3mE, 5942255.5mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 50.6m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 11/08/2025
**END DATE:** 11/08/2025
**LOGGED BY:** MG
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Fill | Clayey SILT, with trace topsoil; dark brown. Firm; low plasticity; moist. | | 0.0 |
| Fill | Clayey SILT, brownish grey, brown, orange, stiff, moist to wet, low to medium plasticity, occasional organic inclusions (1-5mm). | | 0.4 |
| Tauranga Group Alluvium | Clayey SILT, brownish grey, mottled brown, firm, moist to wet, low to medium plasticity. | | 1.0 |
| Tauranga Group Alluvium | Silty CLAY, orange, mottled light brownish grey, stiff, wet, medium plasticity. | | 1.2 |
| Tauranga Group Alluvium | 2.1m: Grades to brownish grey/grey, occasional decomposing wood inclusions, saturated. | | 2.1 |
| Tauranga Group Alluvium | 3.6m: Grades to firm. | | 3.6 |
| Tauranga Group Alluvium | 4.3m: Grades to soft, difficult recovery. | | 4.3 |
| Tauranga Group Alluvium | 4.8m: Grades to stiff. | | 4.8 |
| | EOH: 5.00m | | 5.0 |

LEGEND

SCALA PENETROMETER (Blows / 0mm): 2, 4, 6, 8, 10, 12, 14, 16, 18

VANE SHEAR STRENGTH (kPa) Vane: 50, 100, 150, 200

| Values |
|---|
| 67 |
| 3 |
| 47 |
| 3 |
| 53 |
| 14 |
| 50 |
| 11 |
| 61 |
| 19 |
| 51 |
| 11 |
| 75 |
| 31 |
| 68 |
| 19 |
| 47 |
| 11 |
| 53 |
| 14 |
| 25 |
| 11 |
| 89 |
| 49 |

WATER: 11/08/2025




## REMARKS

Hand auger extended to 5 m target depth in lieu of a Scala test from 4 - 5 m.
Groundwater measured at 1.4m bgl at the completion of drilling.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2: Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:18:03 pm

Checked By: APK

# HAND AUGER LOG

**HOLE NO.:** HA140

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746969.7mE, 5942225.1mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 52m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 11/08/2025
**END DATE:** 11/08/2025
**LOGGED BY:** MG
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| to pso II | SILT, with minor clay, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 |
| | SILT, trace of clay, orange, mottled brown, very stiff, moist, non plastic. | | 0.2 |
| | Clayey SILT, orange, mottled light brownish grey, very stiff, moist, low to medium plasticity. | | 0.4 |
| | 1.2m: Grades to stiff. | | 1.2 |
| | Silty CLAY, light brownish grey, mottled orange, very stiff, wet, medium plasticity. | | 1.6 |
| | 2.0m: Grades to stiff | | 2.0 |
| | 2.4m: Saturated, brownish grey/grey, medium to high plasticity. | | 2.4 |
| | 2.8m: Grades to very stiff. | | 2.8 |
| | Clayey SILT, brownish grey/grey, mottled brown, stiff, moist, low to medium plasticity, minor organic inclusions. | | 3.0 |
| | Silty CLAY, brownish grey/grey, mottled brown, stiff, saturated, medium plasticity, minor decomposing organic matter (1-5mm). | | 3.4 |
| Tauranga Group Alluvium | EOH: 5.00m | | 5.0 |

LEGEND

SCALA PENETROMETER (Blows / 0mm): 2 4 6 8 10 12 14 16 18

VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200

| Values |
|---|
| 160 |
| 56 |
| 156 |
| 67 |
| 75 |
| 33 |
| 103 |
| 35 |
| 64 |
| 22 |
| 75 |
| 18 |
| 100 |
| 11 |
| 56 |
| 17 |
| 72 |
| 17 |
| 53 |
| 15 |
| 77 |
| 28 |
| 72 |
| 25 |

WATER: 11/08/2025




## REMARKS

Hand auger extended to 5 m target depth in lieu of a Scala test from 4 - 5 m.

Groundwater measured at 0.6m bgl at the completion of drilling.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:18:05 pm

Checked By: APK

# HAND AUGER LOG

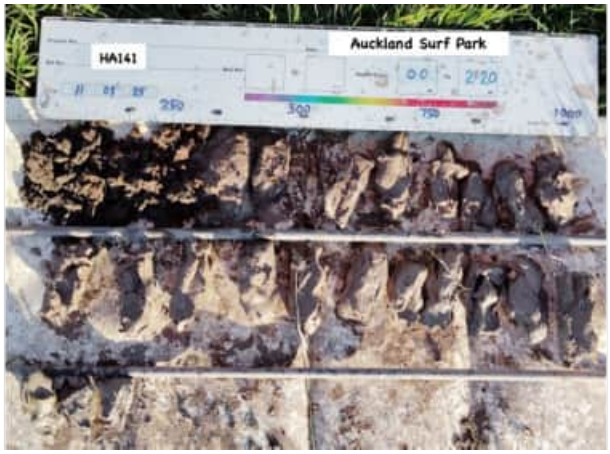
INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA141

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746805.7mE, 5942022.2mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.2m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 11/08/2025
**END DATE:** 11/08/2025
**LOGGED BY:** DJP
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) | LEGEND | SCALA PENETROMETER (Blows / 50mm) | VANE SHEAR STRENGTH (kPa) Vane: Values | WATER |
|---|---|---|---|---|---|---|---|
| Topsoil | SILT, with minor clay, with trace rootlets; dark brown. Firm; low plasticity; moist. | | 0.0 | | | | 11/08/2025 |
| Tauranga Group Alluvium | Silty CLAY, brownish grey/grey, firm, wet, high plasticity, occasional minor organic inclusions. | | 0.2 | | | 44 | |
| | | | 0.4 | | | 2 | |
| | | | 0.6 | | | 47 | |
| | | | 0.8 | | | 20 | |
| | | | 1.0 | | | 29 | |
| | | | 1.2 | | | 11 | |
| | 1.4m: Grades to stiff. | | 1.4 | | | 59 | |
| | | | 1.6 | | | 29 | |
| | 1.7m: Hole collapsing, difficult recovery. | | 1.8 | | | 59 | |
| | | | 2.0 | | | 14 | |
| | EOH: 2.20m | | 2.2 | | | | |
| | | | 2.4 | | | | |
| | | | 2.6 | | | | |
| | | | 2.8 | | | | |
| | | | 3.0 | | | | |
| | | | 3.2 | | | | |
| | | | 3.4 | | | | |
| | | | 3.6 | | | | |
| | | | 3.8 | | | | |
| | | | 4.0 | | | | |
| | | | 4.2 | | | | |
| | | | 4.4 | | | | |
| | | | 4.6 | | | | |
| | | | 4.8 | | | | |




## REMARKS

Hand auger terminated due to high suction and hole collapse.

Scala penetrometer terminated at target depth.

Groundwater measured at 0.3m bgl at the completion of drilling.

**WATER**

- ▼ Standing Water Level
- ◁ Out flow
- ▷ In flow

**INVESTIGATION TYPE**

- ☑ Hand Auger
- ☐ Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:18:08 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA142

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1746979.2mE, 5941984.1mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 55.3m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 08/08/2025
**END DATE:** 08/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Fill | Clayey SILT; brownish.<br>Hard; low plasticity; moist. | | 0.0 – 0.2 |
| Fill | SILT, with minor gravel, with trace clay; light grey.<br>Hard; low plasticity; moist; gravel, fine to medium; [Limestone fill]. | | 0.2 – 1.2 |
| Tauranga Group Alluvium | CLAY, with minor silt; brown grey.<br>Stiff; high plasticity; moist. | D | 1.2 – 1.8 |
| Tauranga Group Alluvium | 2.1m: Grades to firm | | 1.8 – 2.2 |
| Tauranga Group Alluvium | CLAY, with minor organics and silt; darkish grey.<br>Stiff; high plasticity; moist; organics, amorphous. | | 2.2 – 3.4 |
| Tauranga Group Alluvium | Organic CLAY; dark grey.<br>Firm; moist; organic, amorphous. | D | 3.4 – 3.8 |
| | EOH: 4.00m | | 3.8 – 4.0 |

**SCALA PENETROMETER** (Blows / 50mm)

| Depth (m) | Blows / 50mm |
|---|---|
| 0.0 – 0.2 | 1 |
| 0.2 – 0.4 | 1 |
| 0.4 – 0.6 | 1 |
| 0.6 – 0.8 | 1 |
| 0.8 – 1.0 | 1 |
| 1.0 – 1.2 | 2 |
| 1.2 – 1.4 | 2 |
| 1.4 – 1.6 | 2 |
| 1.6 – 1.8 | 2 |
| 1.8 – 2.0 | 2 |
| 2.0 – 2.2 | 2 |
| 2.2 – 2.4 | 3 |
| 2.4 – 2.6 | 2 |
| 2.6 – 2.8 | 3 |
| 2.8 – 3.0 | 3 |

**VANE SHEAR STRENGTH (kPa)** Vane: 4035

| Depth (m) | Values |
|---|---|
| 0.0 – 0.2 | UTP |
| 0.2 – 0.4 | - |
| 0.4 – 0.6 | 214+ |
| 0.6 – 0.8 | - |
| 0.8 – 1.0 | UTP |
| 1.0 – 1.2 | - |
| 1.2 – 1.4 | 61 |
| 1.4 – 1.6 | 38 |
| 1.6 – 1.8 | 63 |
| 1.8 – 2.0 | 43 |
| 2.0 – 2.2 | 60 |
| 2.2 – 2.4 | 29 |
| 2.4 – 2.6 | 44 |
| 2.6 – 2.8 | 31 |
| 2.8 – 3.0 | 46 |
| 3.0 – 3.2 | 38 |
| 3.2 – 3.4 | 73 |
| 3.4 – 3.6 | 43 |
| 3.6 – 3.8 | 64 |
| 3.8 – 4.0 | 46 |
| 4.0 – 4.2 | 58 |
| 4.2 – 4.4 | 44 |
| 4.4 – 4.6 | 46 |
| 4.6 – 4.8 | 31 |
| | 44 |
| | 32 |

**WATER**: Groundwater Not Encountered



## REMARKS

Hand auger terminated at target depth.

Scala penetrometer terminated at target depth.

No groundwater was encountered.

**WATER**

- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**

- [x] Hand Auger
- [ ] Test Pit

Ver 2: Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:18:10 pm

Checked By: APK

# HAND AUGER LOG

INITIA
GEOTECHNICAL SPECIALISTS

**HOLE NO.:** HA143

**CLIENT:** AW Holdings
**PROJECT:** ASP Community
**SITE LOCATION:** 1350 Dairy Flat Highway, Dairy Flat
**Project Ref.:** P-001537

**CO-ORDINATES:** 1747028.8mE, 5942020.7mN
**Co-ordinate system:** NZTM
**Location method:** SURVEY
**ELEVATION:** 54m
**Datum:** AUCKHT1946
**Level method:** SURVEY
**START DATE:** 08/08/2025
**END DATE:** 08/08/2025
**LOGGED BY:** YK
**CHECKED BY:** APK

| UNIT | MATERIAL DESCRIPTION (See Classification & Symbology sheet for details) | SAMPLES | DEPTH (m) |
|---|---|---|---|
| Fill | SILT, with minor gravel, with trace clay; light grey. Hard; low plasticity; moist; gravel, fine to medium; [Limestone fill]. | | 0.2 |
| Tauranga Group Alluvium | CLAY, with minor silt; brown grey. Stiff; high plasticity; moist. | D | 0.4, 0.6, 0.8 |
| | 1.1m: Grades to darkish grey with minor organics. organics; amorphous | | 1.0, 1.2, 1.4, 1.6, 1.8 |
| | CLAY, with some organics, with minor silt; dark grey. Stiff; high plasticity; moist; organics, amorphous. | | 2.0, 2.2 |
| | CLAY, with minor organics and silt; darkish grey. Firm; high plasticity; moist; organics, amorphous. | D | 2.4, 2.6, 2.8, 3.0 |
| | CLAY, with minor silt; grey. Firm; high plasticity; moist. | | 3.2, 3.4, 3.6, 3.8 |
| | EOH: 4.00m | | 4.0, 4.2, 4.4, 4.6, 4.8 |

LEGEND

**SCALA PENETROMETER** (Blows / 50mm)
2 4 6 8 10 12 14 16 18

**VANE SHEAR STRENGTH (kPa)**
Vane: 4035
50 100 150 200

| Values |
|---|
| 76 |
| 29 |
| 73 |
| 34 |
| 57 |
| 21 |
| 54 |
| 15 |
| 72 |
| 31 |
| 99 |
| 49 |
| 57 |
| 28 |
| 61 |
| 34 |
| 38 |
| 28 |
| 31 |
| 17 |
| 31 |
| 24 |
| 34 |
| 21 |
| 29 |
| 24 |

**WATER**
Groundwater Not Encountered



## REMARKS

Hand auger terminated at target depth.

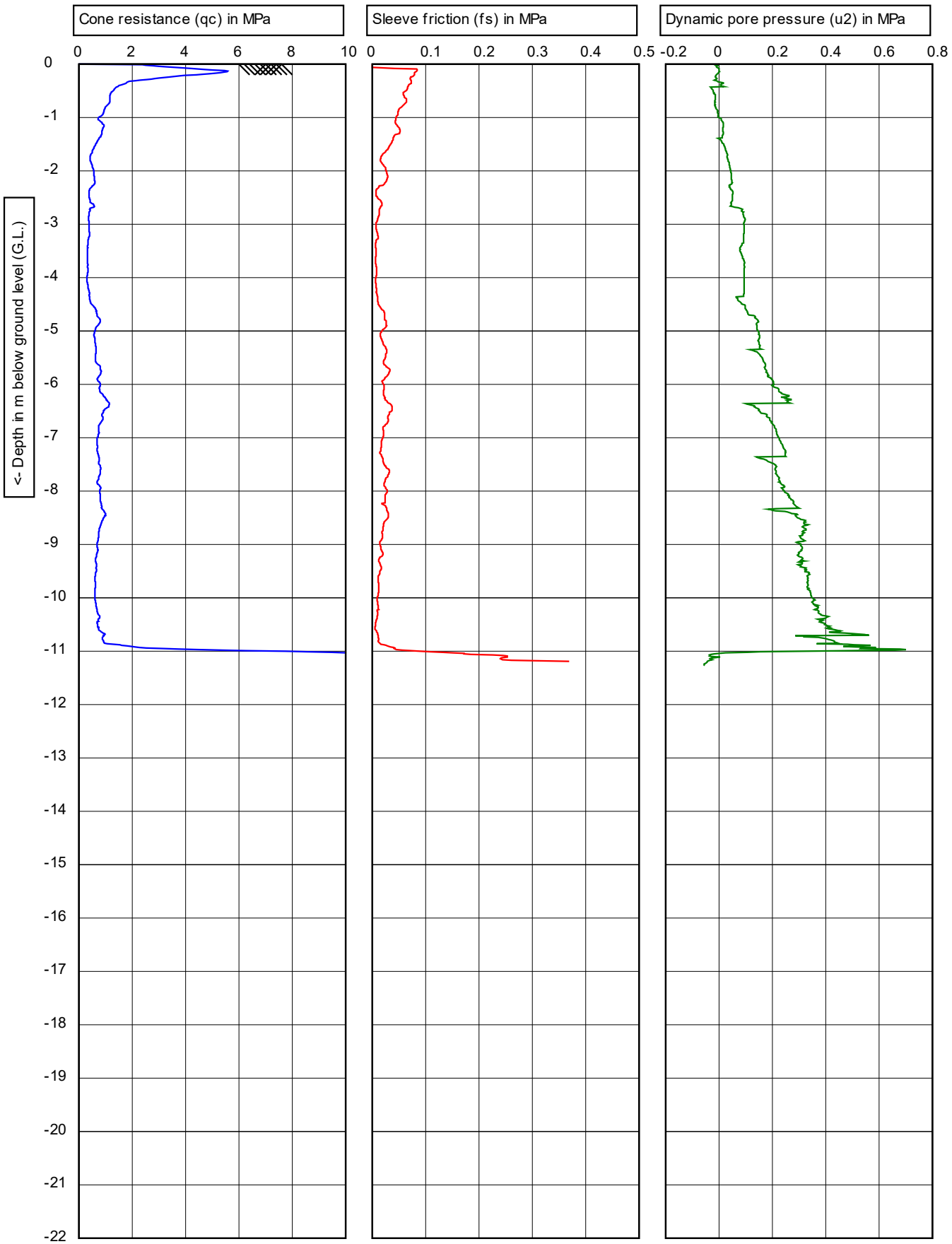
Scala penetrometer terminated at target depth.

No groundwater was encountered.

**WATER**
- Standing Water Level
- Out flow
- In flow

**INVESTIGATION TYPE**
- [x] Hand Auger
- [ ] Test Pit

Ver 2. Generated with CORE-GS by Geroc - Hand Auger_Initia_v1 - 5/09/2025 1:18:13 pm




Refusal (qc 40+ MPa.)

EOH - Dipped - Collapsed Dry @ 1.0m

WSP

ACCREDITED TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
L 150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**

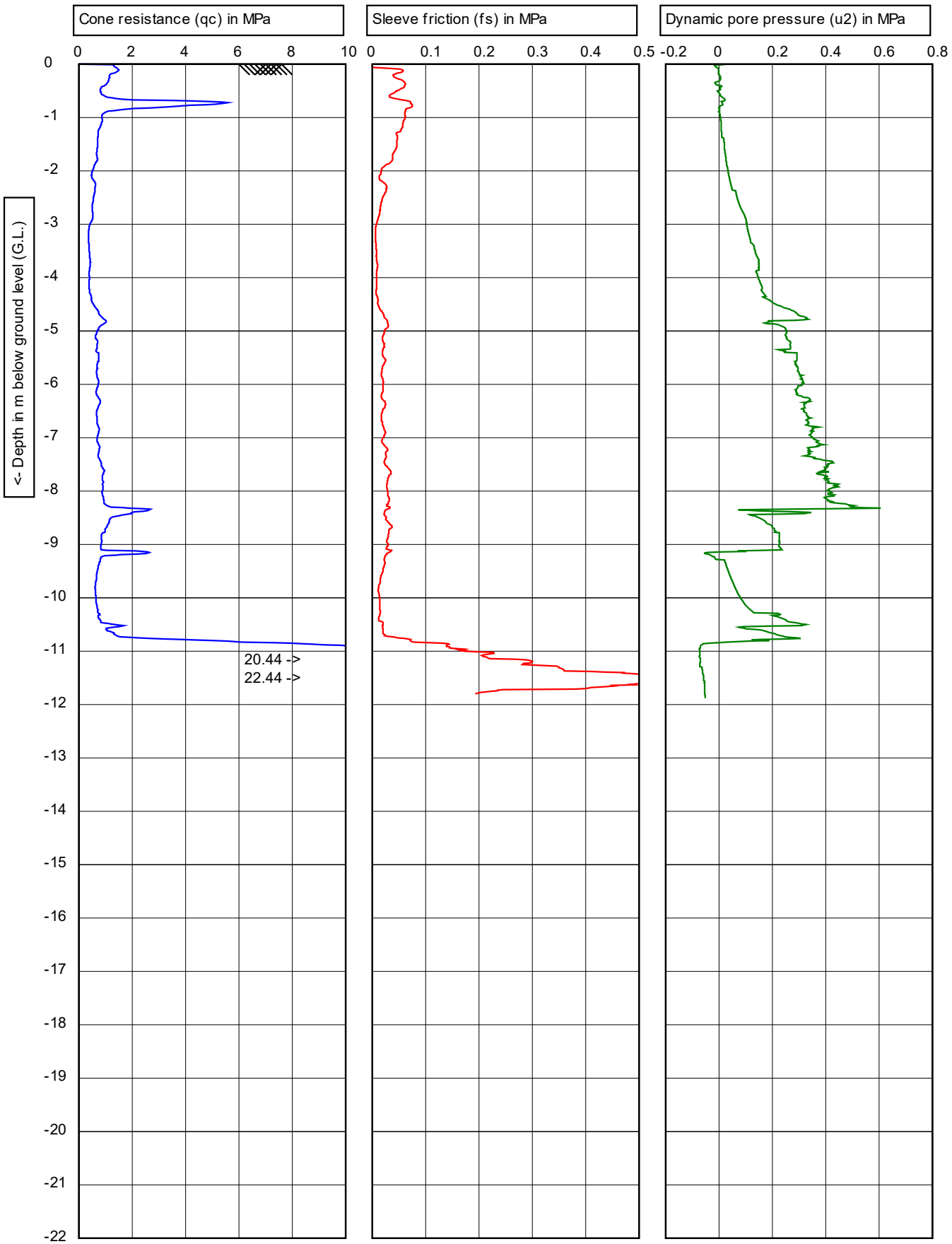
Location: **Auckland (P-001539)**

Position: **1746939, 5942134 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **5/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **01** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
L 150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**

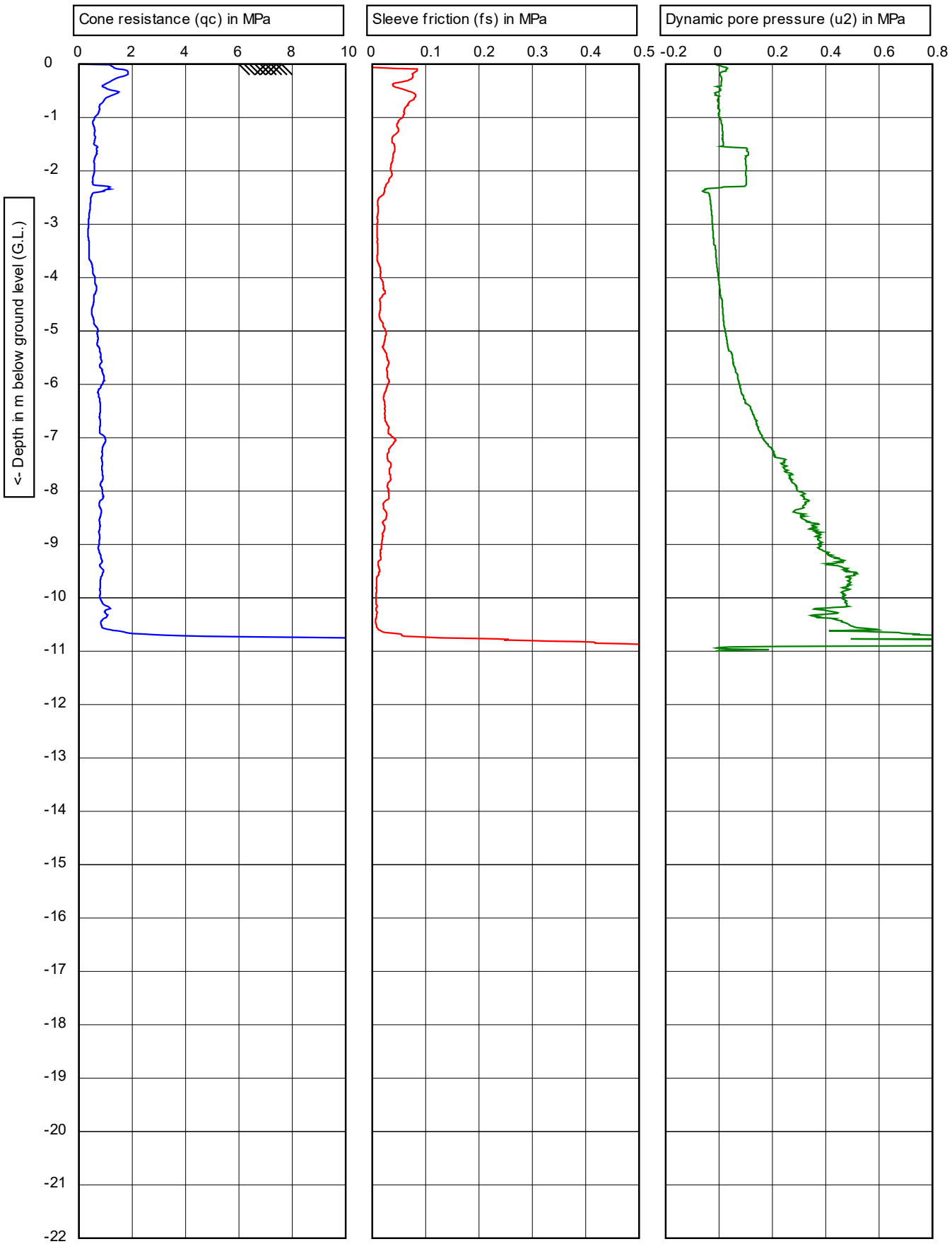
Location: **Auckland (P-001539)**

Position: **1746921, 5942143 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **5/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **02** |



1.49




Refusal (qc 40+ MPa.)

EOH - Dipped - Collapsed Dry @ 1.0m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
L 150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

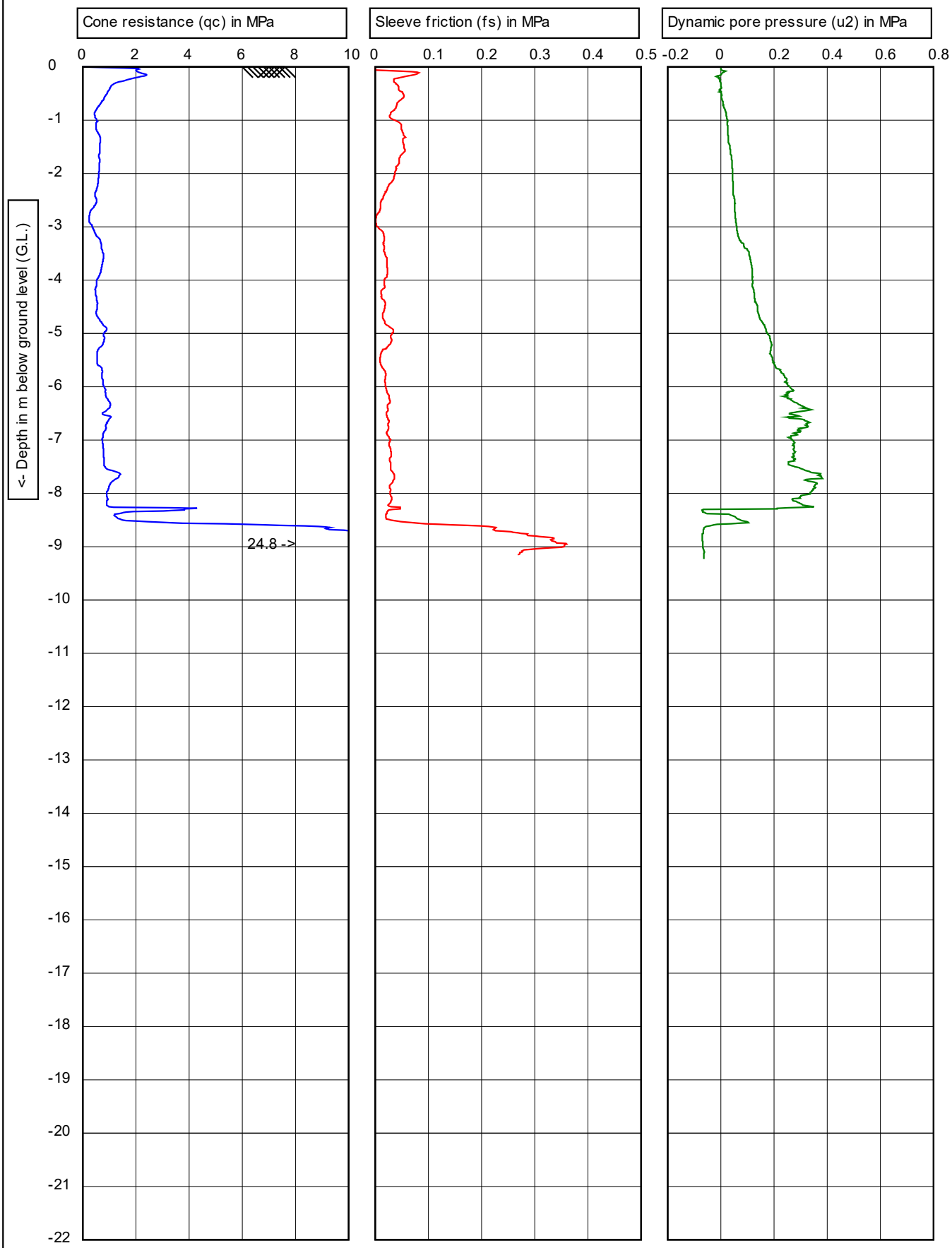
G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746974, 5942155 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **5/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **03** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**

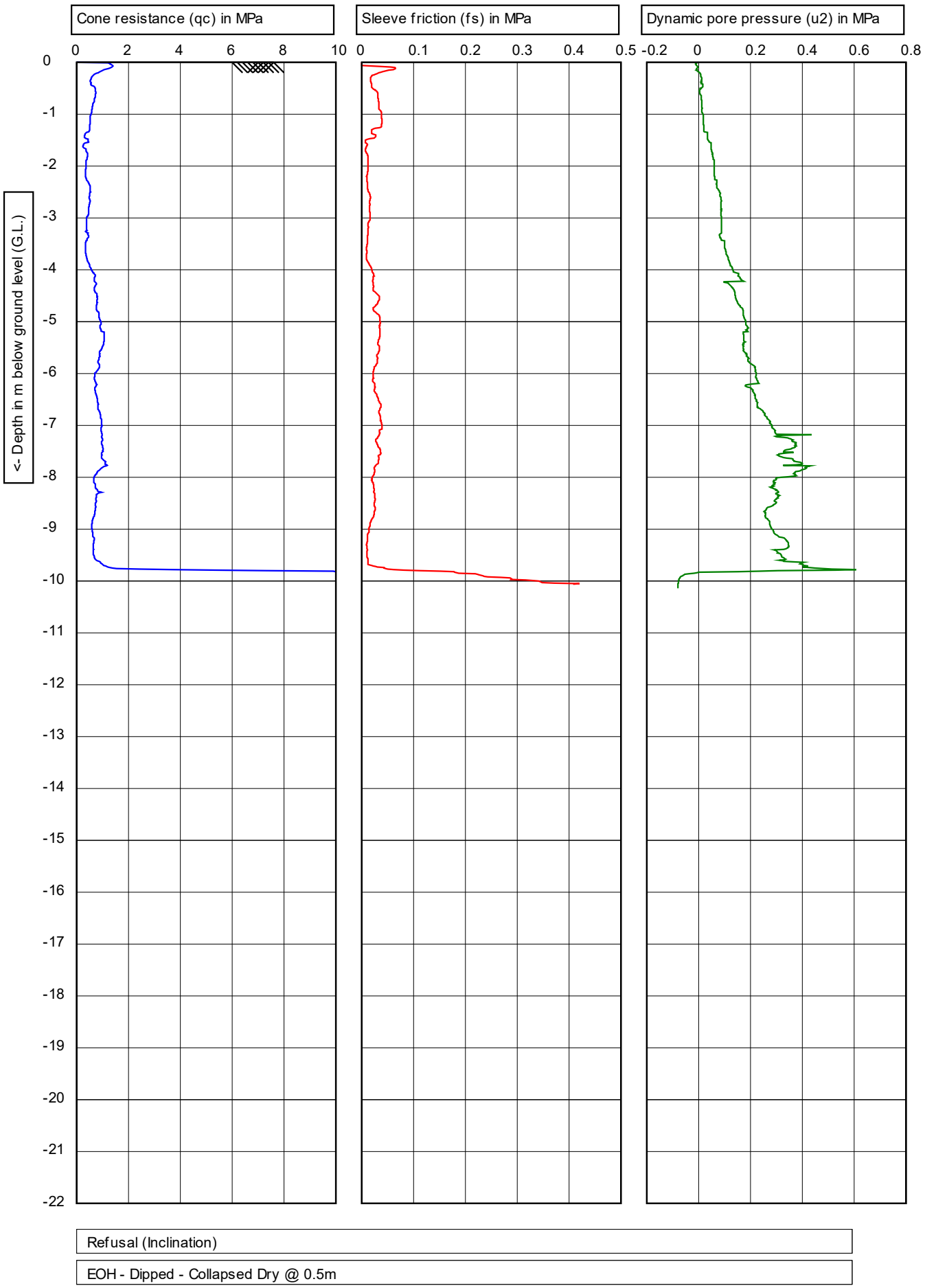
Location: **Auckland (P-001539)**

Position: **1746809, 5942119 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **3/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **04** |



1.49




Refusal (Inclination)

EOH - Dipped - Collapsed Dry @ 0.5m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
L 150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

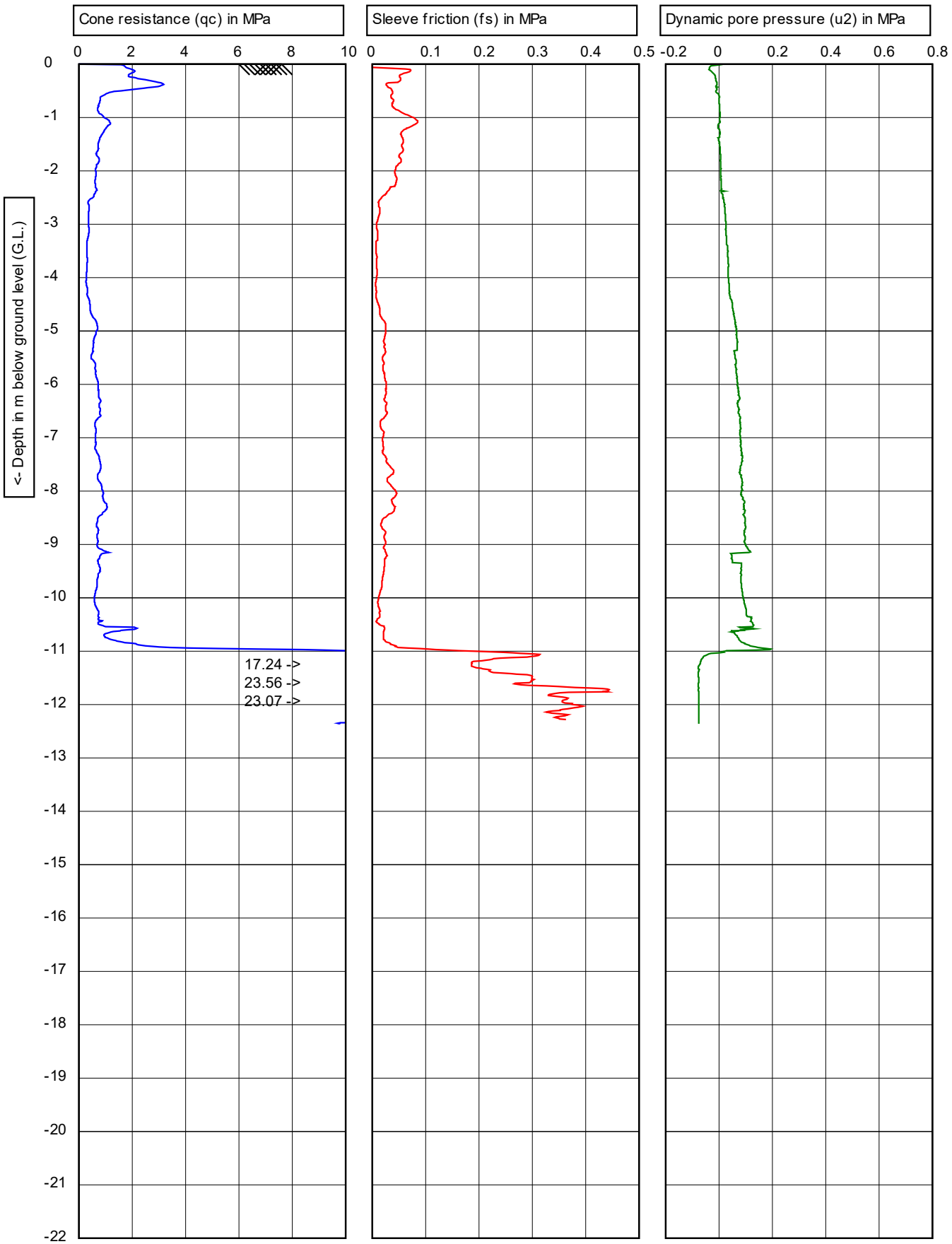
G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746869, 5942147 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **5/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **05** |

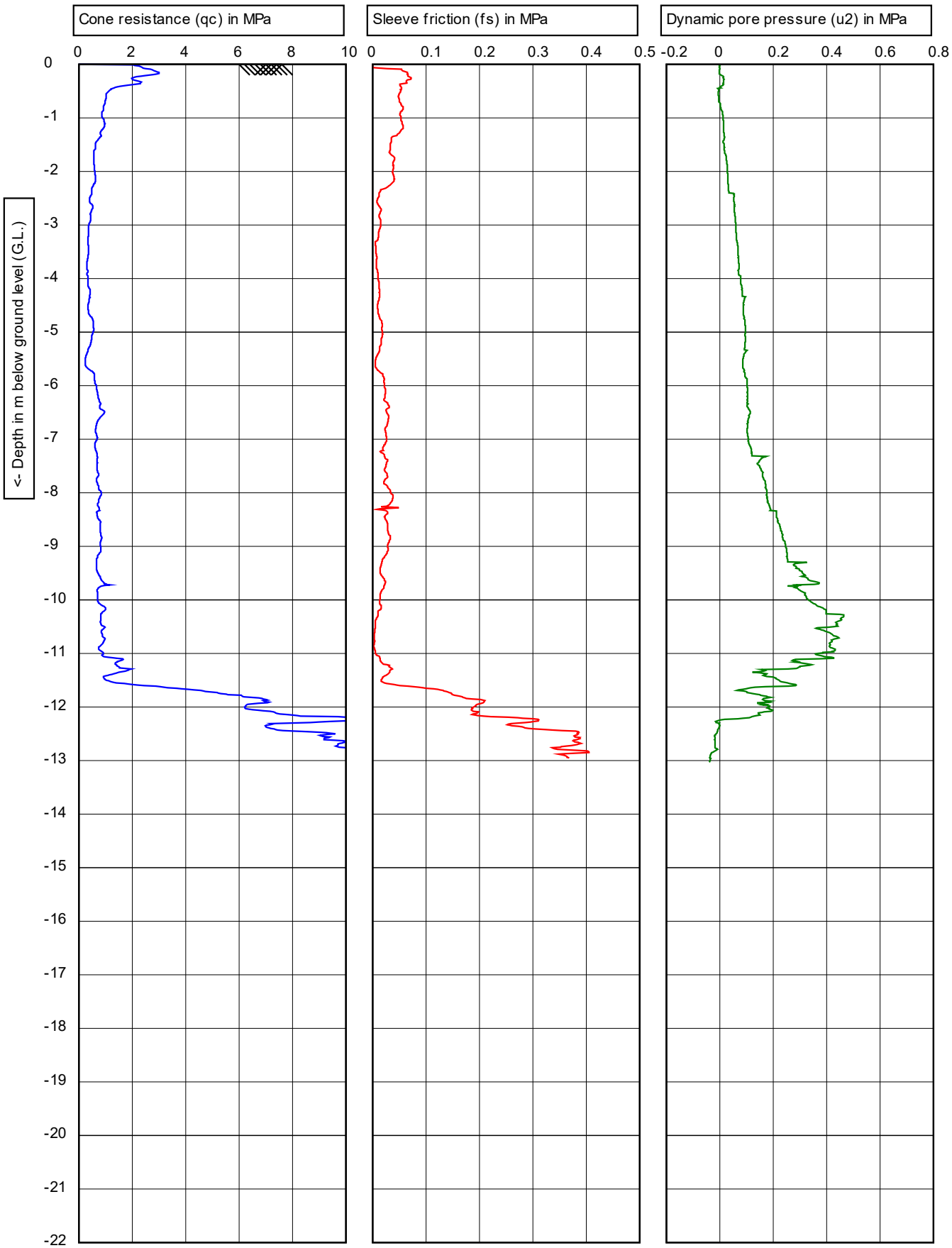


1.49




| | | | |
|---|---|---|---|
| WSP ACCREDITED IANZ TESTING LABORATORY. Test results indicated as not accredited are outside the scope of the laboratory's accreditation | r u2 L 150 cm² 10 cm² | Test according ASTM D5778:12 & ISO 22476-1:2012 | Predrill: **0.00 m Predrilled** |
| | | G.L.: **0.00 m MSL** | Date: **5/04/2023** |
| | Project: **1350 Dairy Flat Highway** | | Cone no.: **C10CFIIP.C13236** |
| | Location: **Auckland (P-001539)** | | Project no.: **2-68207.00_HA10639** |
| | Position: **1746940, 5942116 NZTM** | | CPT no.: **06** **1/6** |

1.49




Refusal 10t.

EOH - Dipped - Collapsed Dry @ 1.1m

WSP

ACCREDITED IANZ TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL**

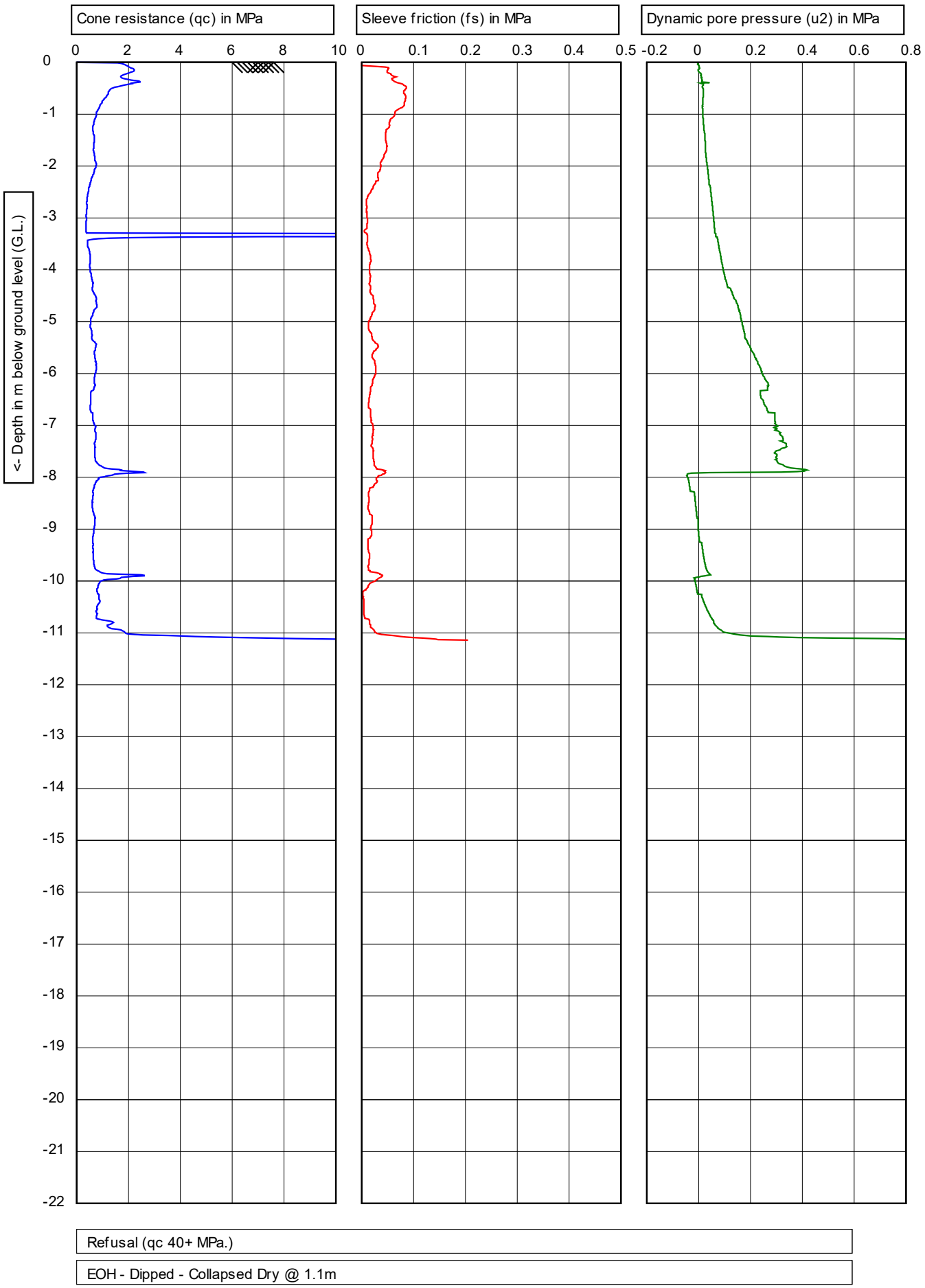
Project: **1350 Dairy Flat Highway**

Location: **Auckland (P-001539)**

Position: **1746961, 5942089 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **4/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **07** **1/6** |

1.49




Refusal (qc 40+ MPa.)

EOH - Dipped - Collapsed Dry @ 1.1m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
L 150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

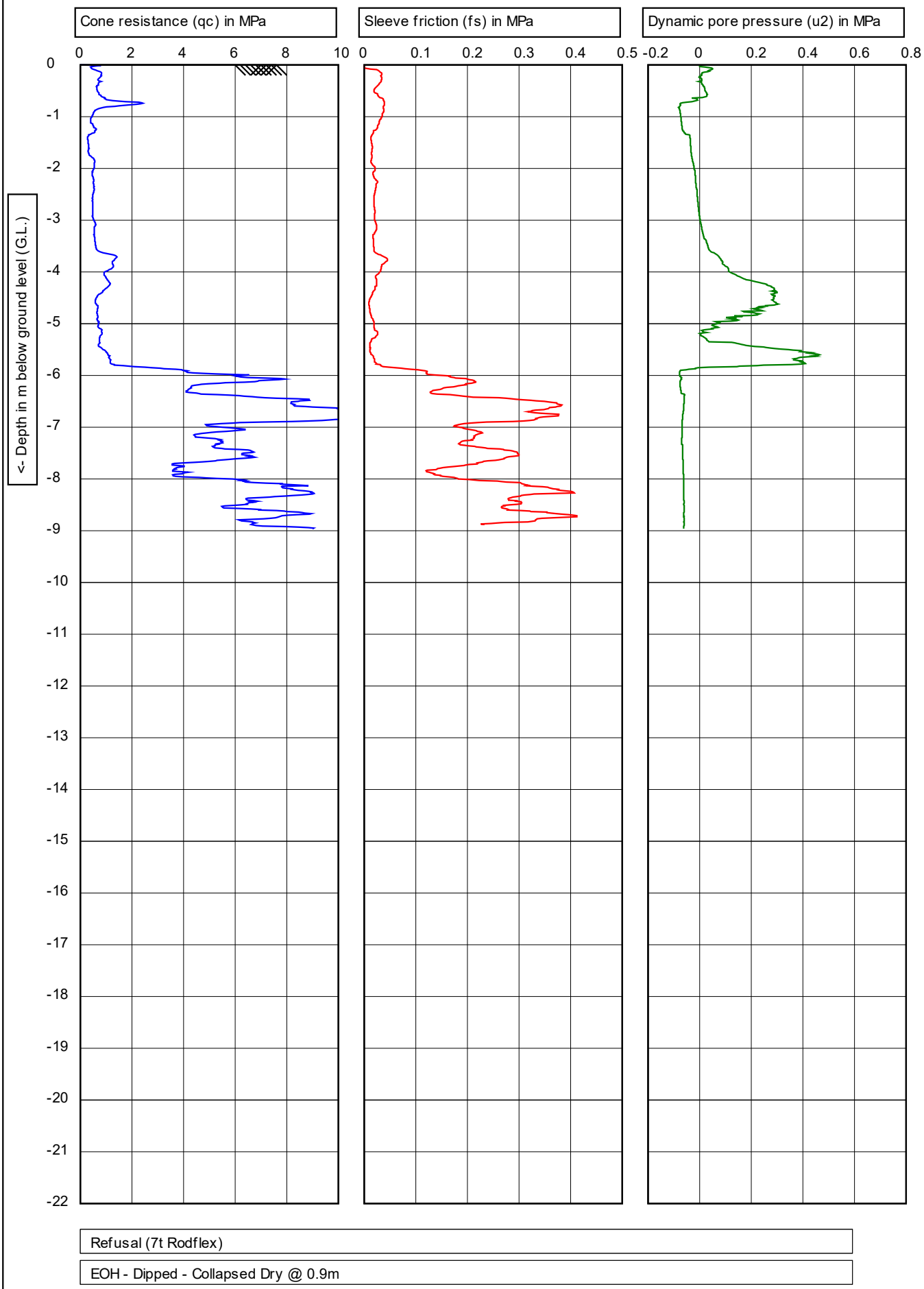
G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1747048, 5942106 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **5/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **08** |



1.49




Refusal (7t Rodflex)

EOH - Dipped - Collapsed Dry @ 0.9m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
150 cm²
10 cm²

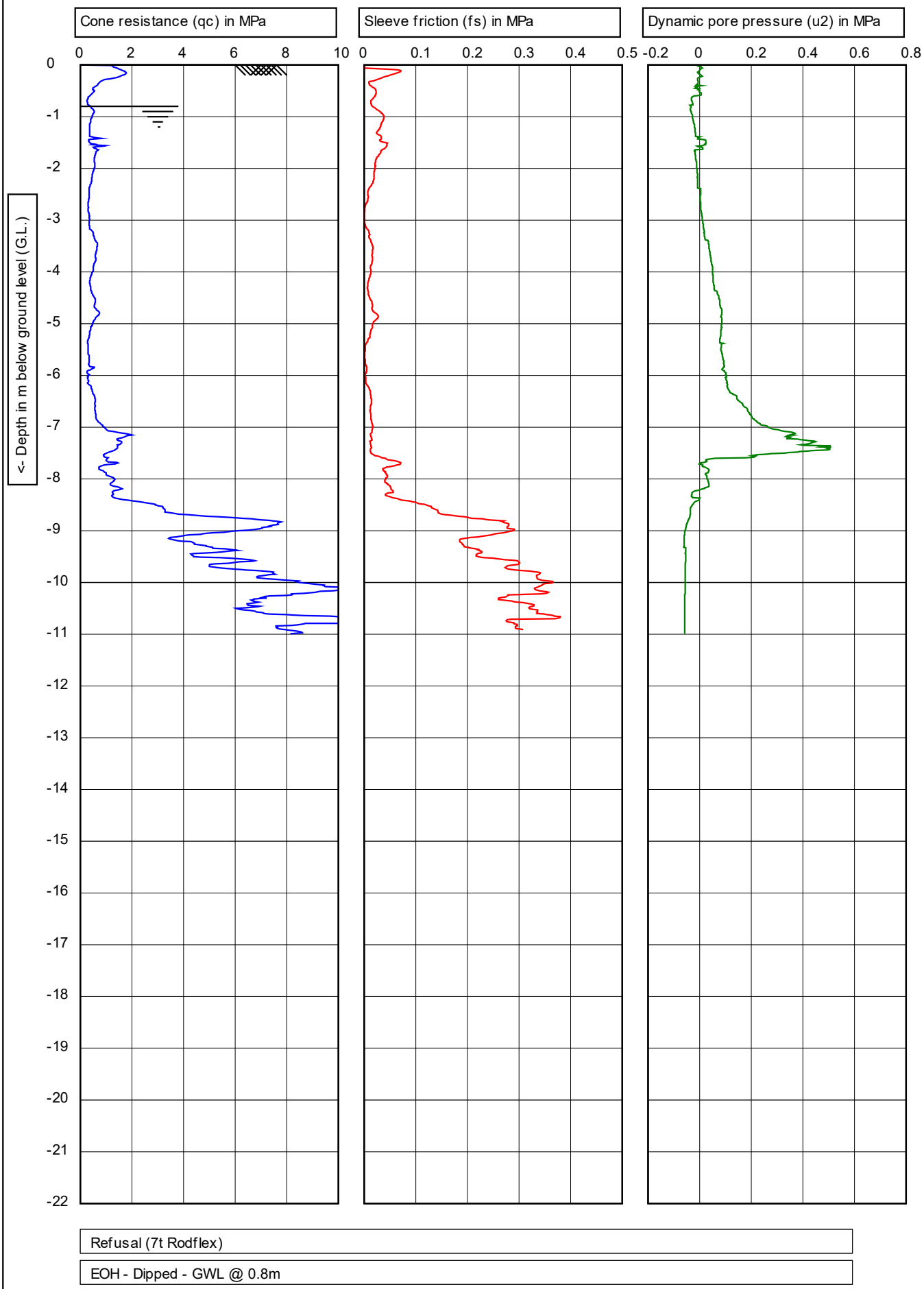
Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746755, 5942094 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **3/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **09** **1/6** |

1.49




Refusal (7t Rodflex)

EOH - Dipped - GWL @ 0.8m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

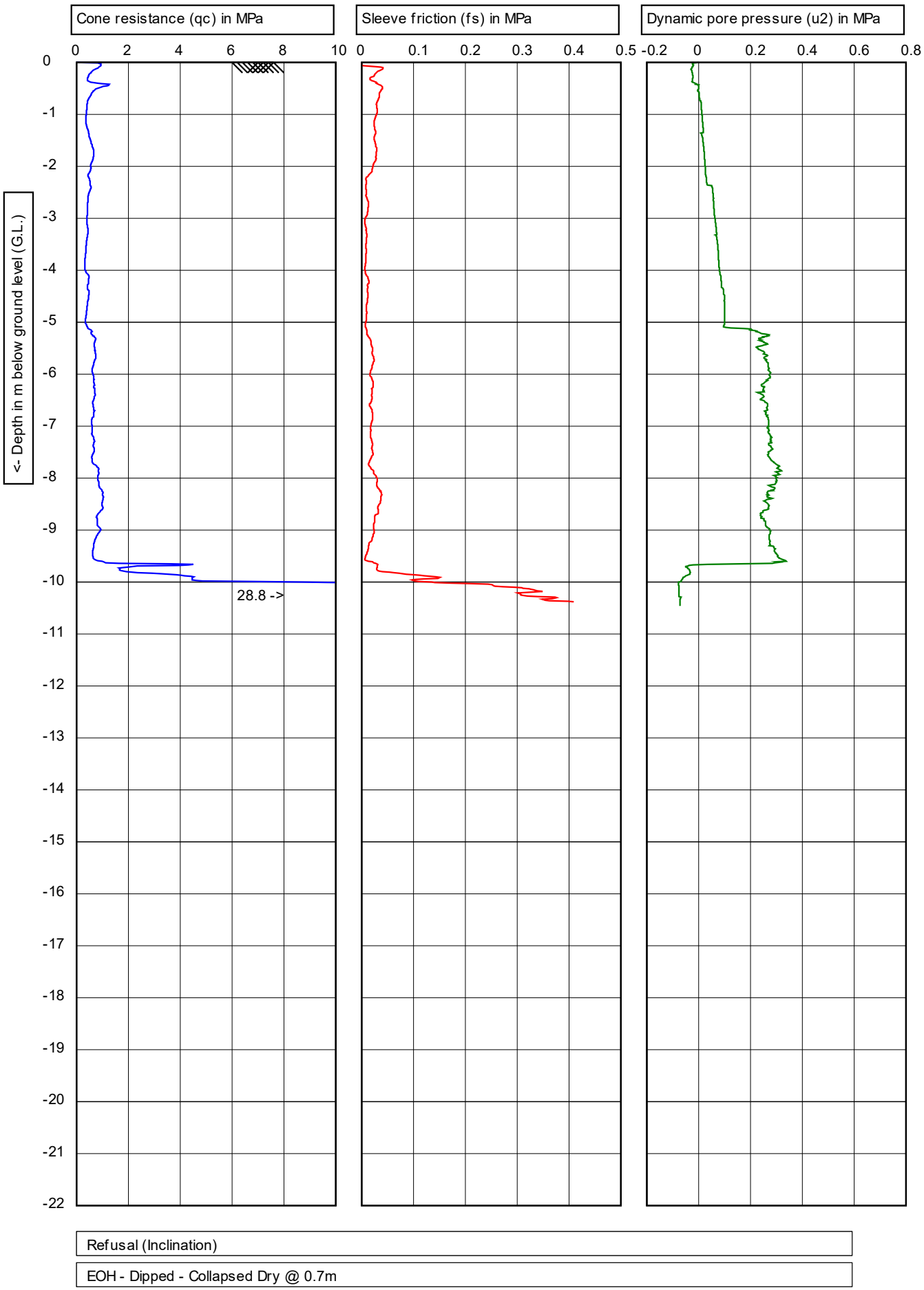
G.L.: **0.00 m MSL** | W.L.: **-0.80 m**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746836, 5942078 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **3/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **10** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
150 cm²
10 cm²

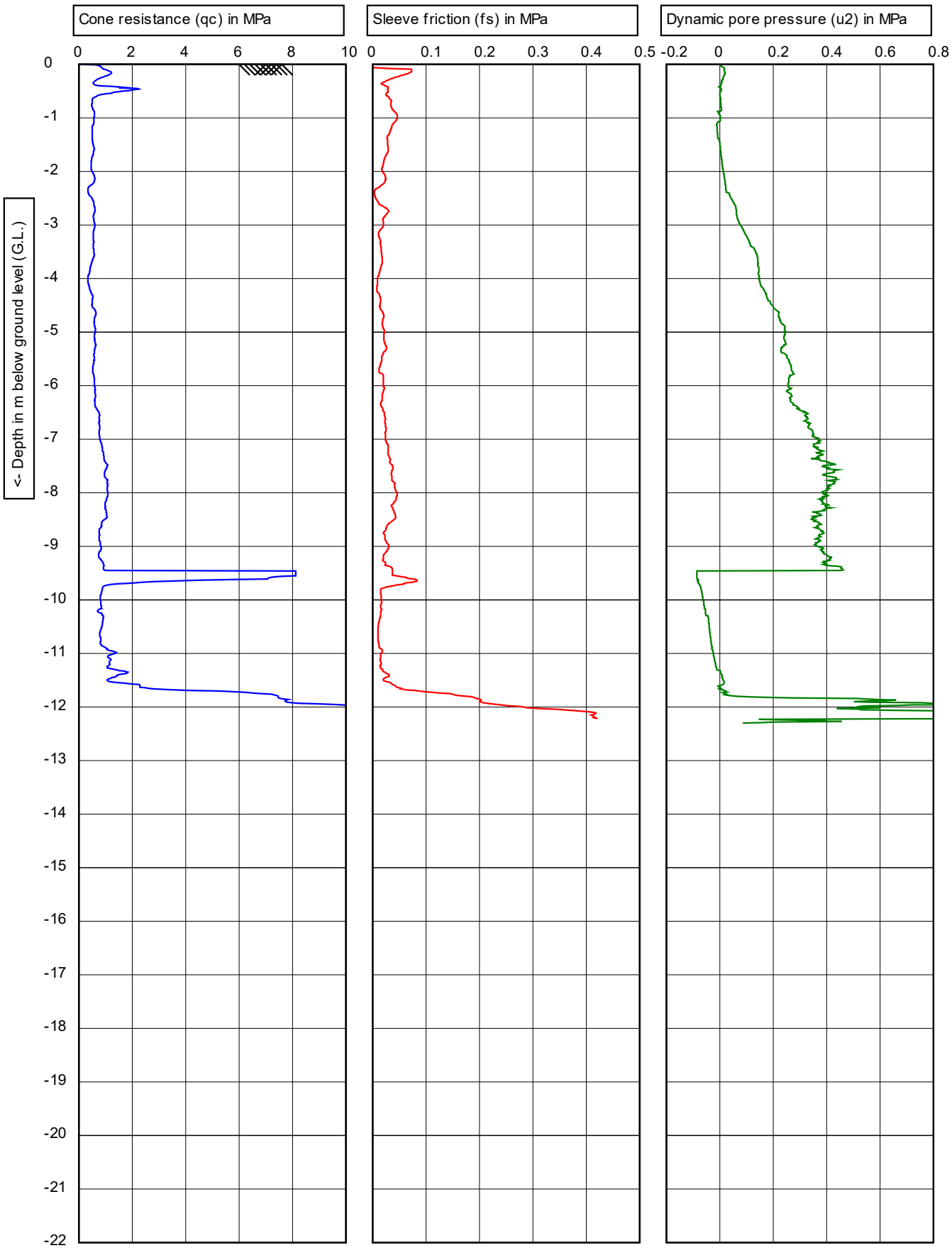
Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746896, 5942067 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **4/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **11** **1/6** |

1.49




Refusal (8t Rodflex)

EOH - Dipped - Collapsed Dry @ 0.4m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

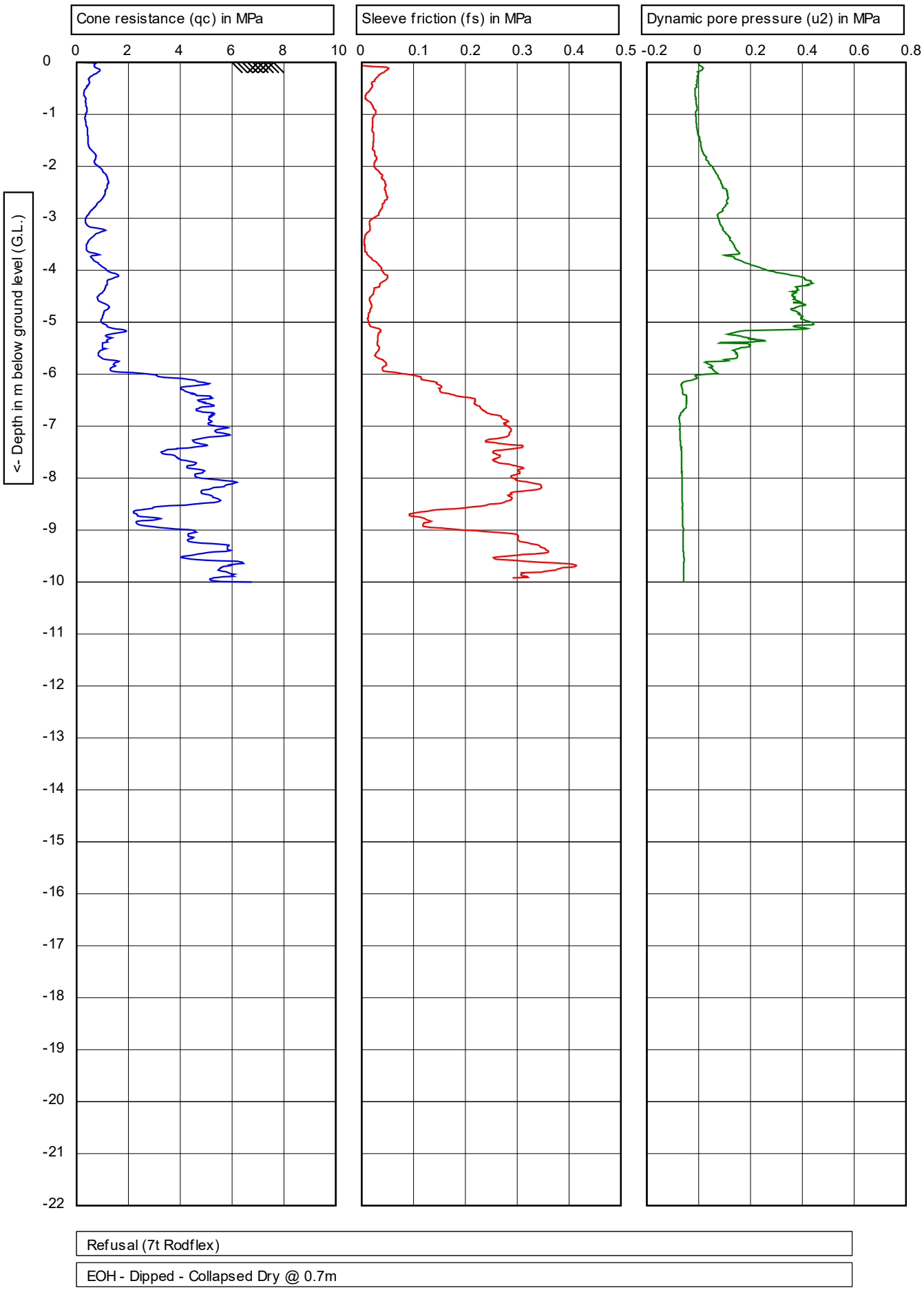
G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746951, 5942058 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **4/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **12** |



1.49




Refusal (7t Rodflex)

EOH - Dipped - Collapsed Dry @ 0.7m

WSP

ACCREDITED IANZ TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL**

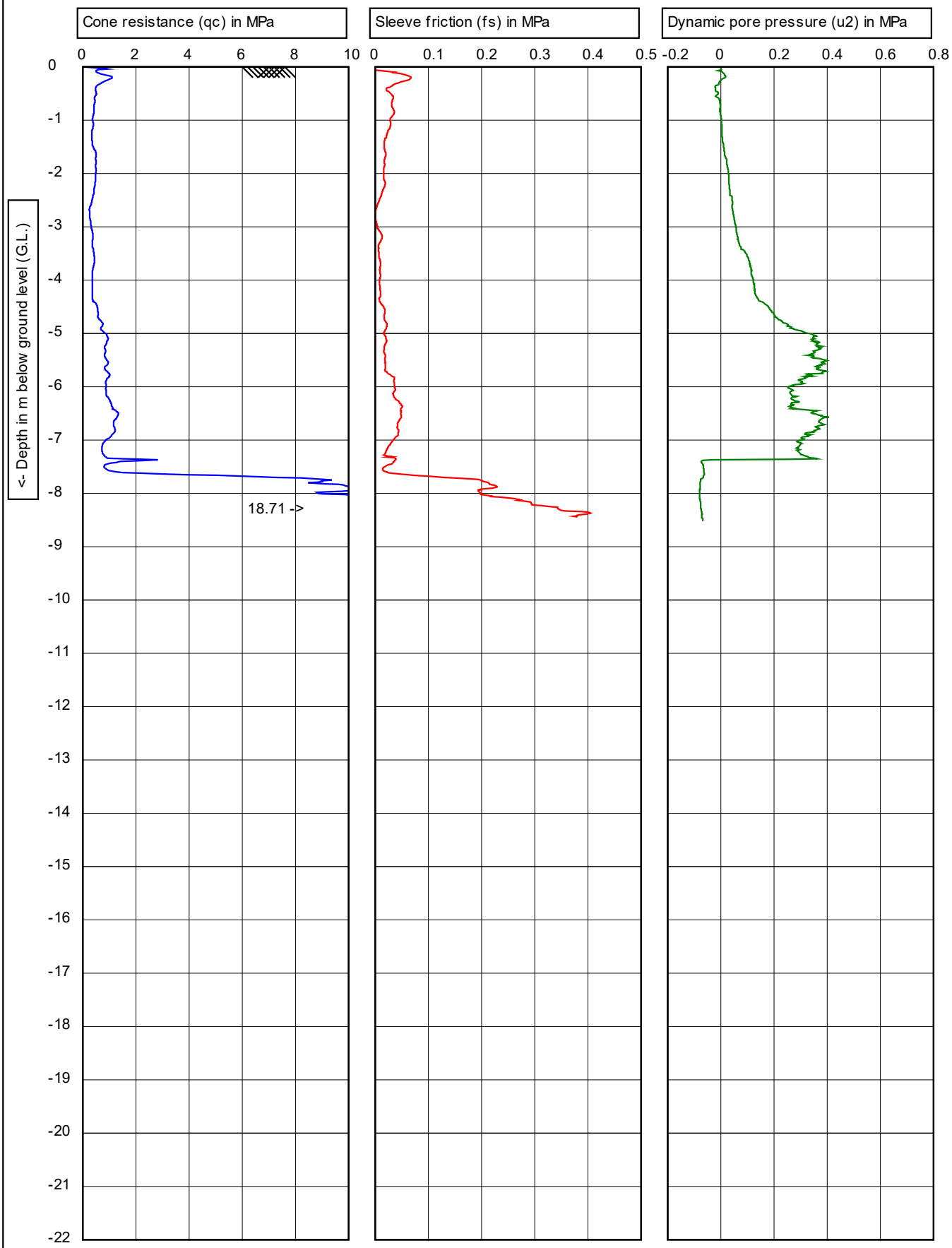
Project: **1350 Dairy Flat Highway**

Location: **Auckland (P-001539)**

Position: **1746769, 5942040 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **3/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **13** **1/6** |

1.49




WSP

ACCREDITED IANZ TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**

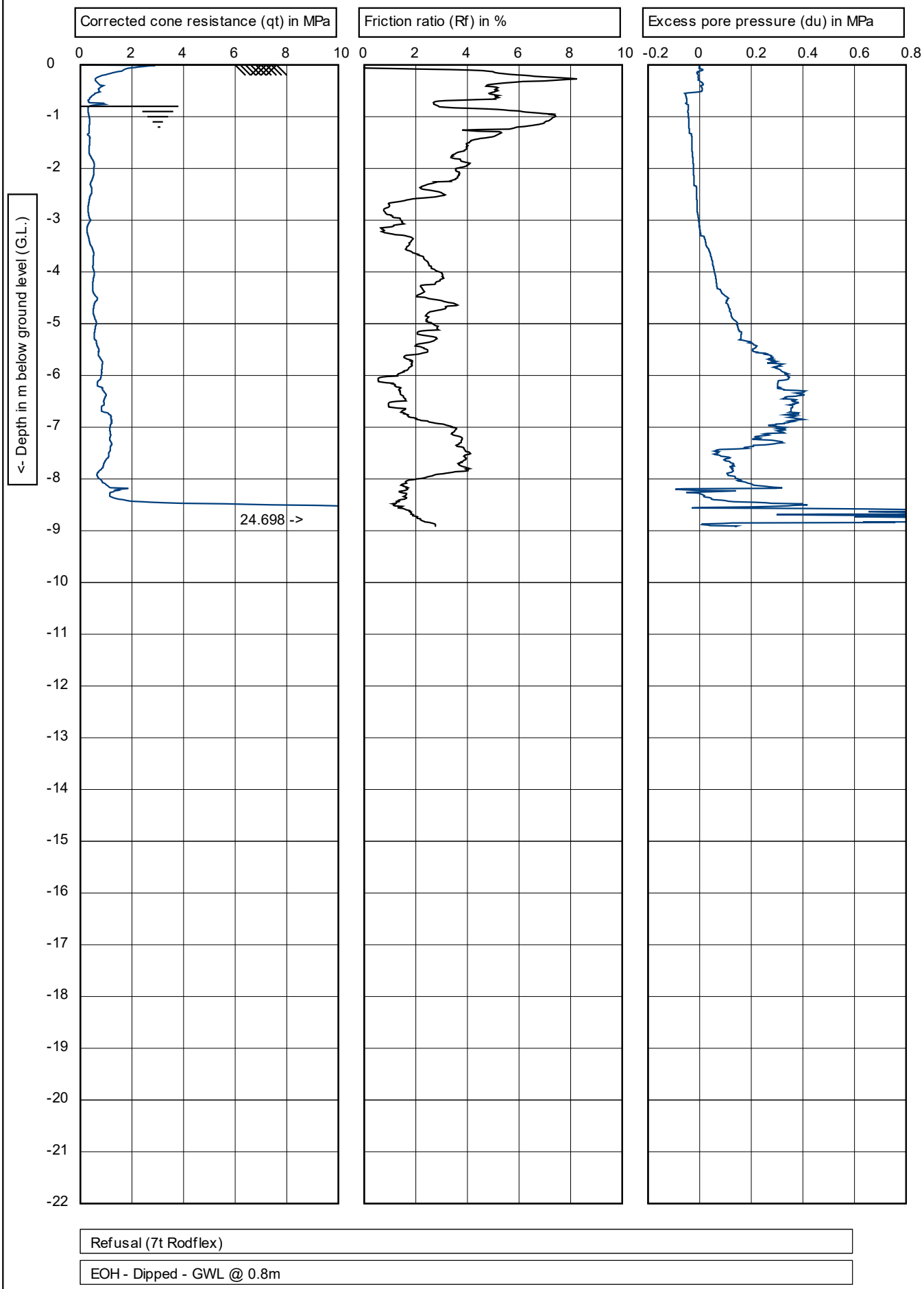
Location: **Auckland (P-001539)**

Position: **1746871, 5942044 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **4/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **14** |



1.49




Refusal (7t Rodflex)

EOH - Dipped - GWL @ 0.8m

Graphs on this page are not IANZ accredited

u2
150 cm²
10 cm²

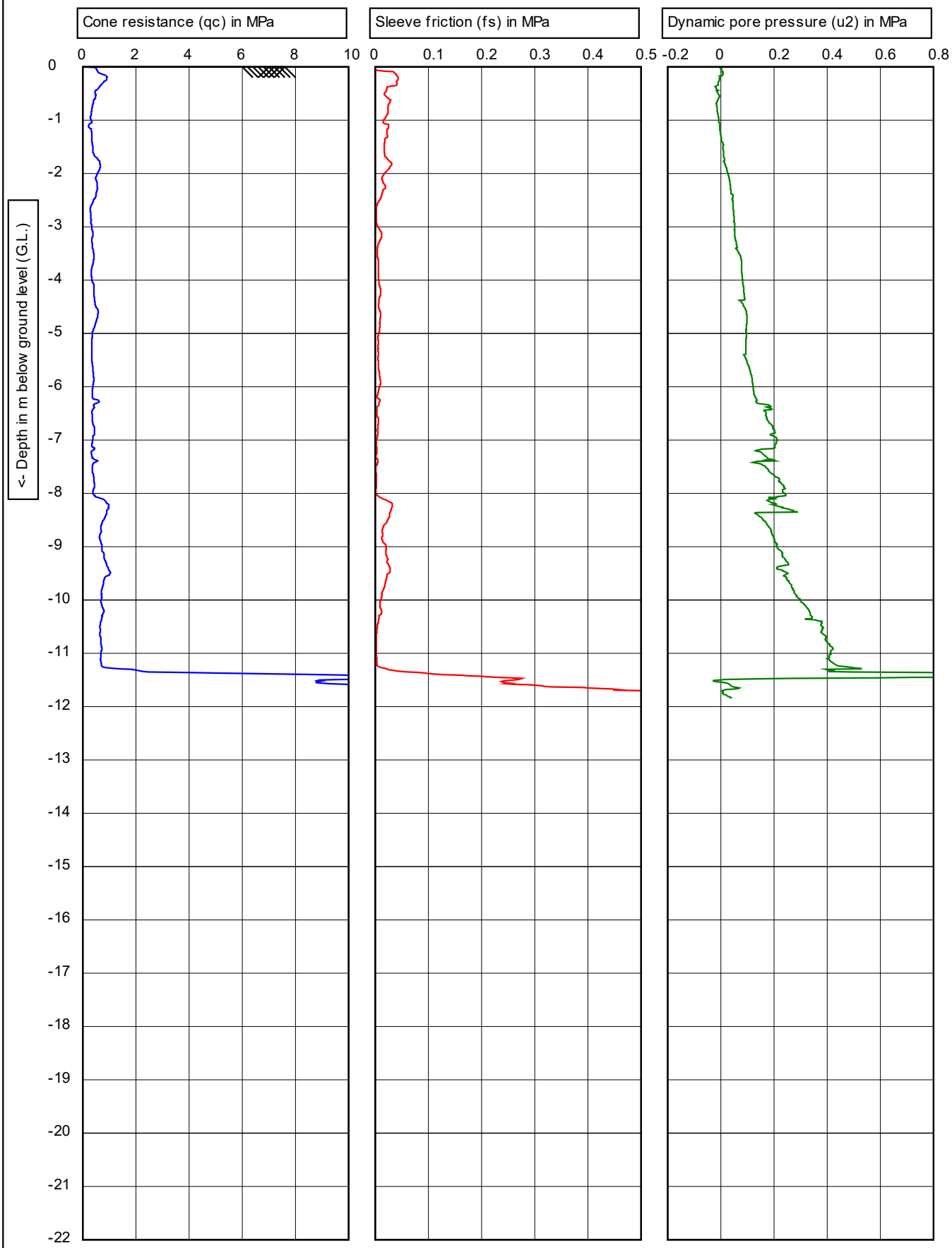
Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL** W.L.: **-0.80 m**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746887, 5942009 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **4/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **15** **2/6** |

1.49




Refusal (6t Rodflex)

EOH - Dipped - Collapsed Dry @ 0.6m

WSP

ACCREDITED IANZ TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**

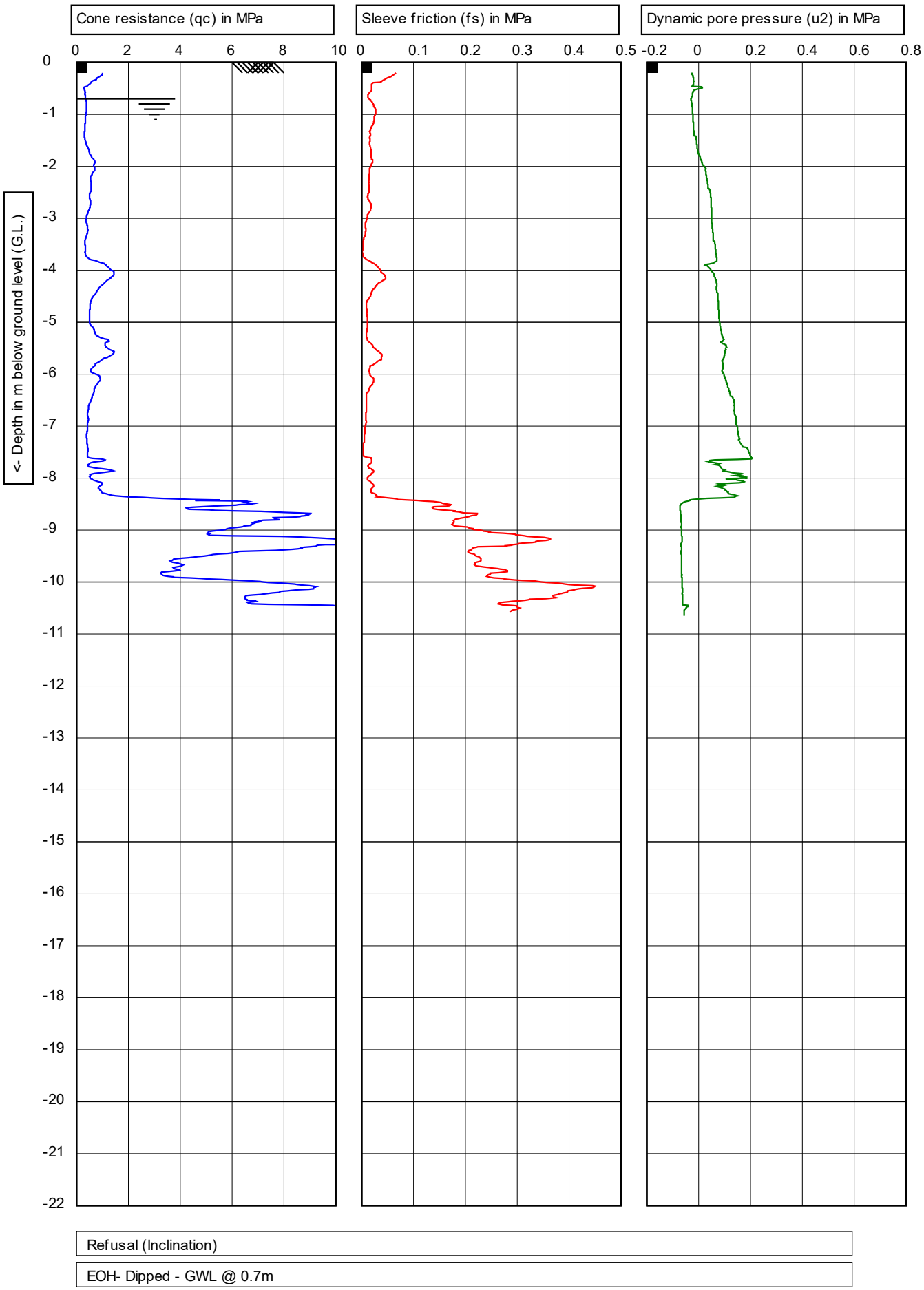
Location: **Auckland (P-001539)**

Position: **1746947, 5942022 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **4/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **16** |



1.49




Refusal (Inclination)

EOH- Dipped - GWL @ 0.7m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

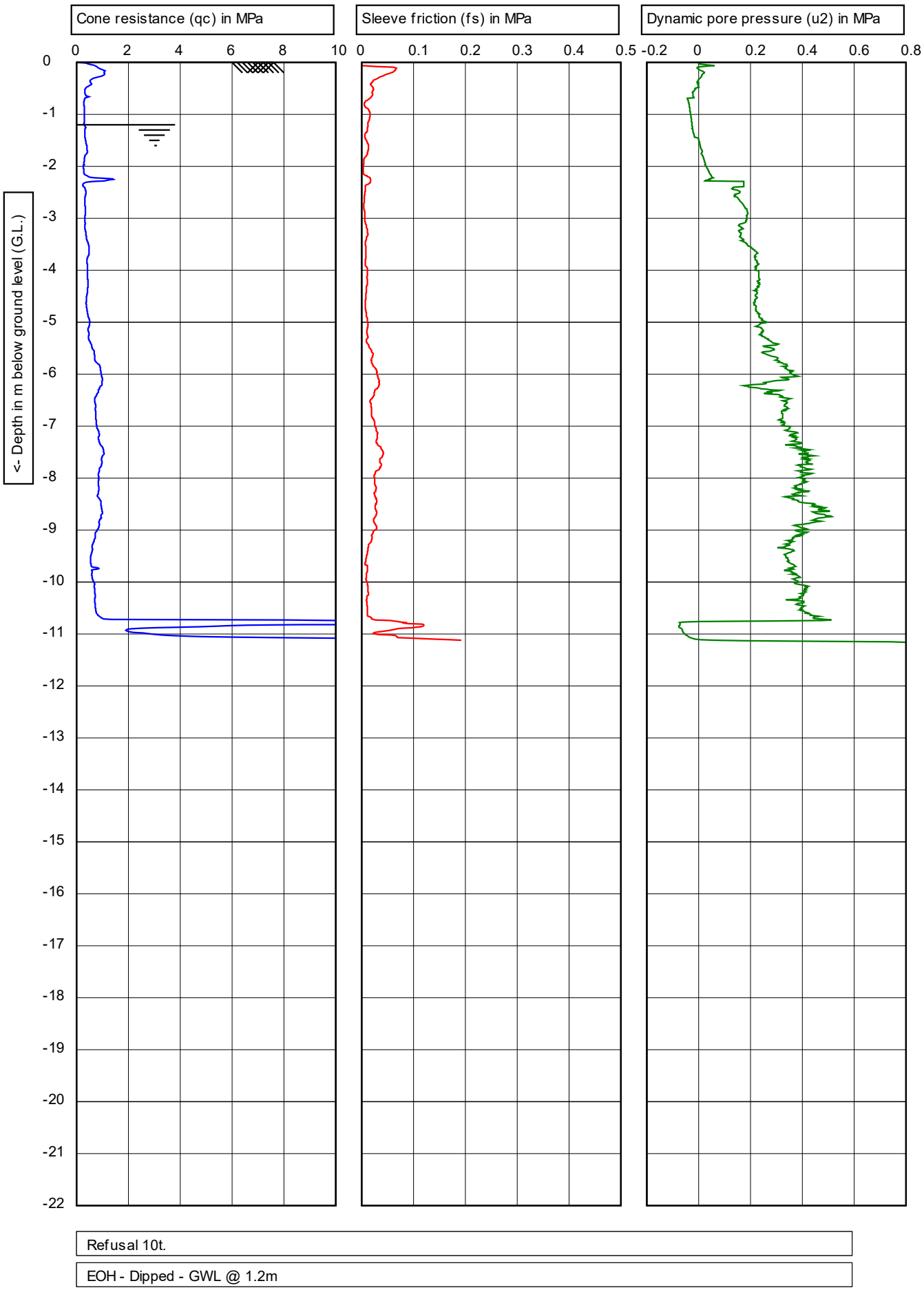
Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL** W.L.: **-0.70 m**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746797, 5941996 NZTM**

| | |
|---|---|
| Predrill: | **0.20 m Predrilled** |
| Date: | **3/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **17** **1/6** |

1.49




Refusal 10t.

EOH - Dipped - GWL @ 1.2m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

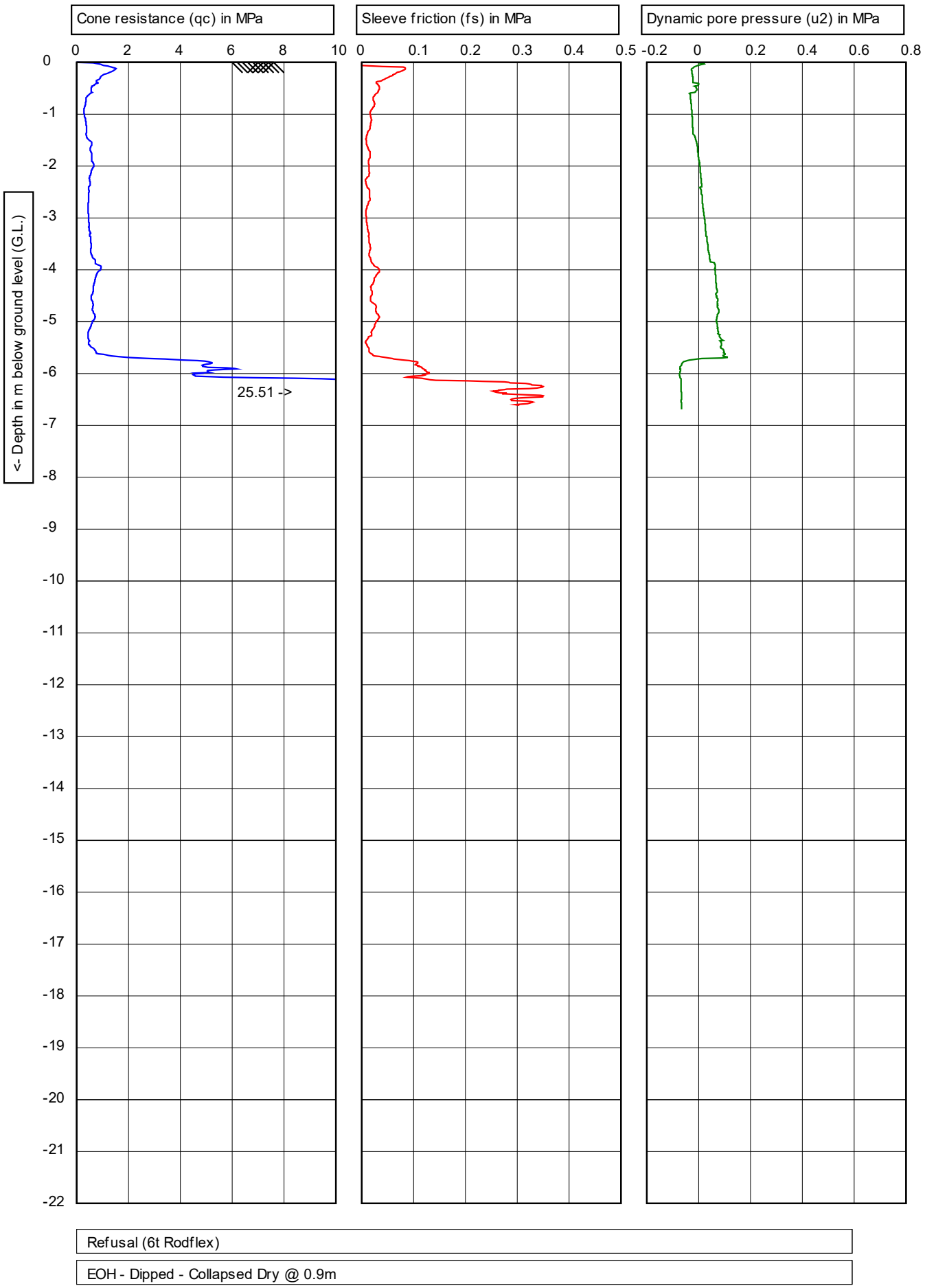
Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL** W.L.: **-1.20 m**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746920, 5941968 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **4/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **18** **1/6** |

1.49




Refusal (6t Rodflex)

EOH - Dipped - Collapsed Dry @ 0.9m

WSP

ACCREDITED TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
L 150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**

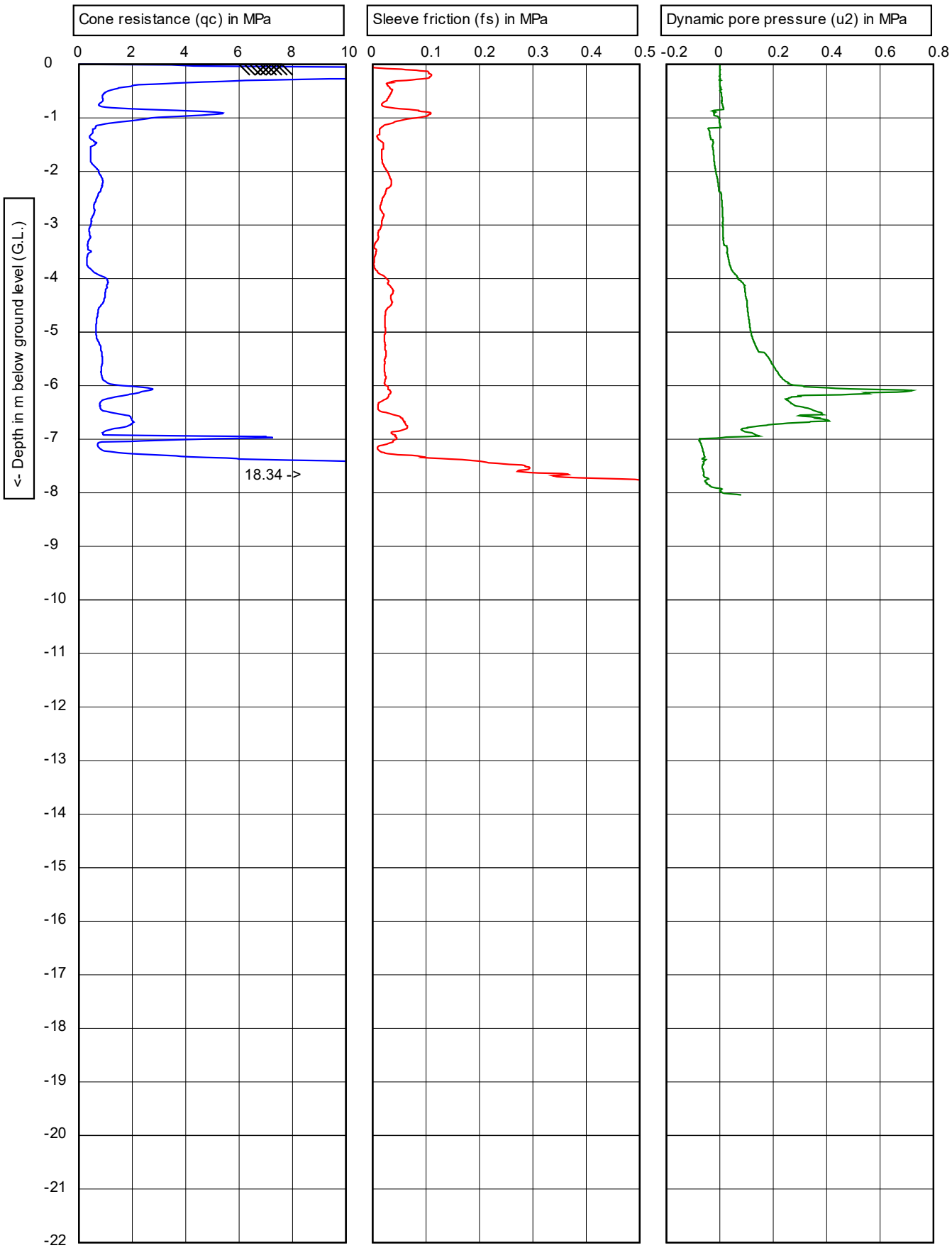
Location: **Auckland (P-001539)**

Position: **1747042, 5941973 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **5/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **19** |

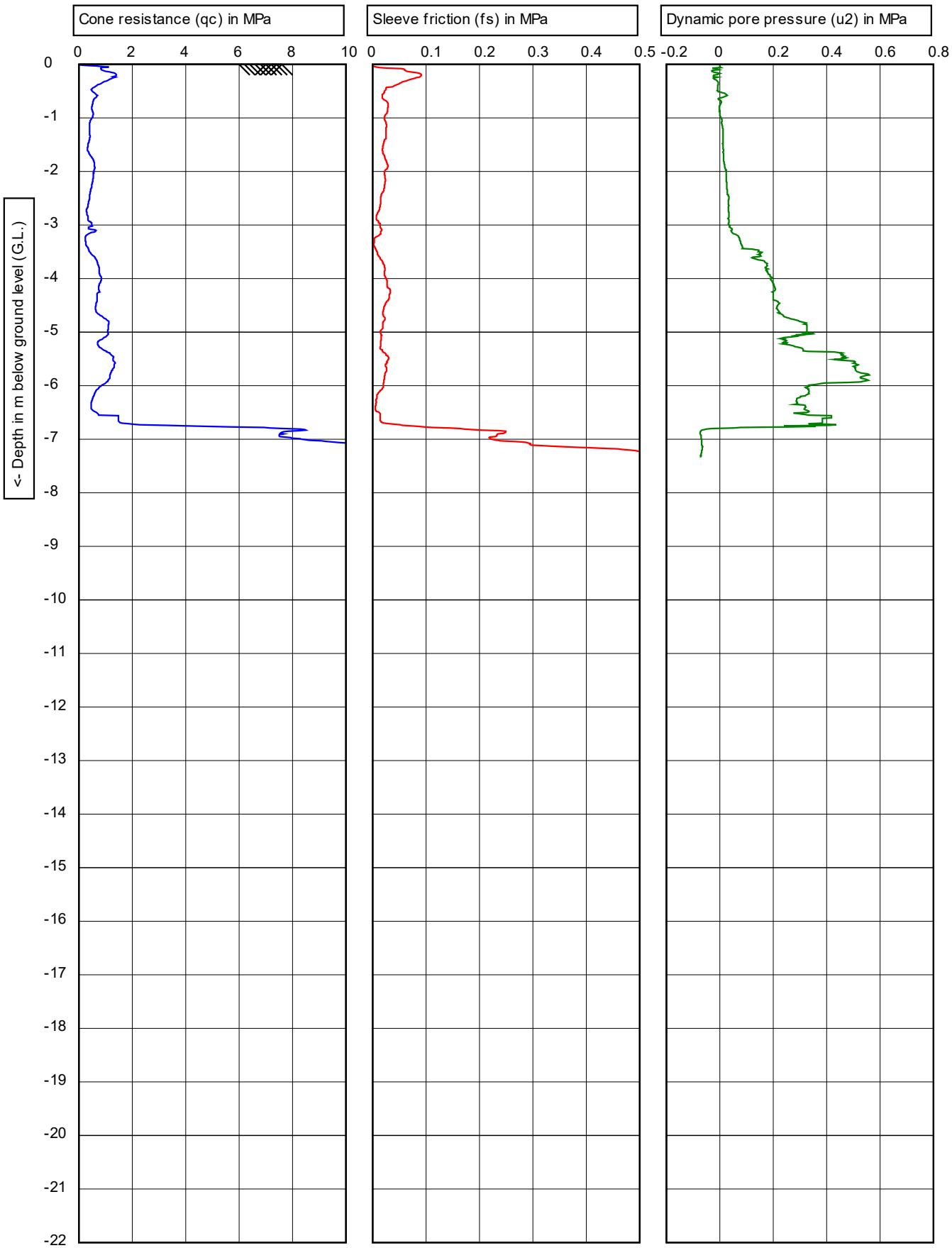


1.49




| | | | |
|---|---|---|---|
| WSP ACCREDITED IANZ TESTING LABORATORY. Test results indicated as not accredited are outside the scope of the laboratory's accreditation | r u2 / L 150 cm² / 10 cm² | Test according ASTM D5778:12 & ISO 22476-1:2012 | Predrill: **0.00 m Predrilled** |
| | | G.L.: **0.00 m MSL** | Date: **3/04/2023** |
| | | Project: **1350 Dairy Flat Highway** | Cone no.: **C10CFIIP.C21109** |
| | | Location: **Auckland (P-001539)** | Project no.: **2-68207.00_HA10639** |
| | | Position: **1746823, 5941967 NZTM** | CPT no.: **20** **1/6** |

1.49




Refusal 10t.

EOH - Dipped - Collapsed Dry @ 1.7m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

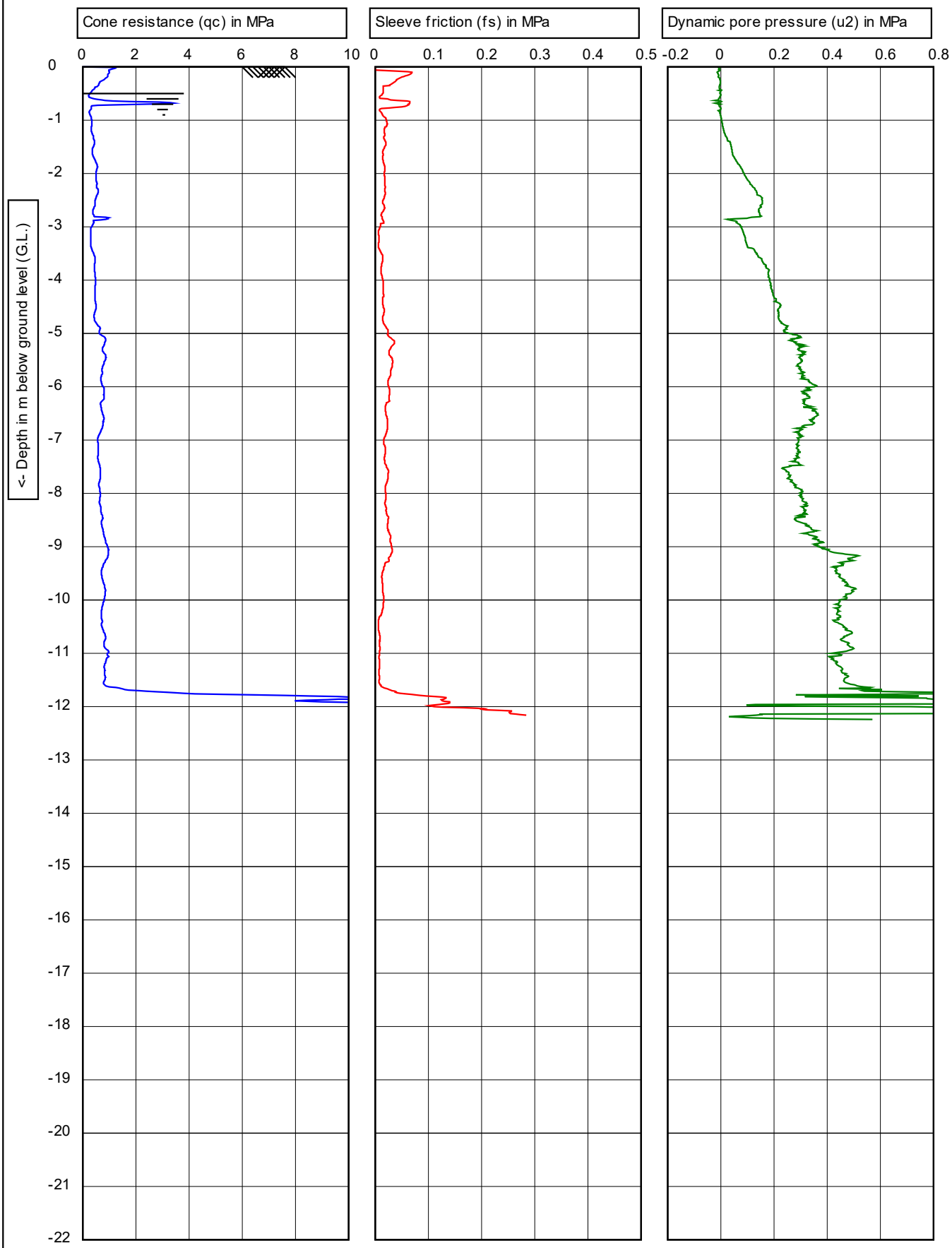
Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001537)**
Position: **1746845, 5942022**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **3/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **21** **1/6** |

1.49




Refusal 10t.

EOH - Dipped - GWL @ 0.5m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

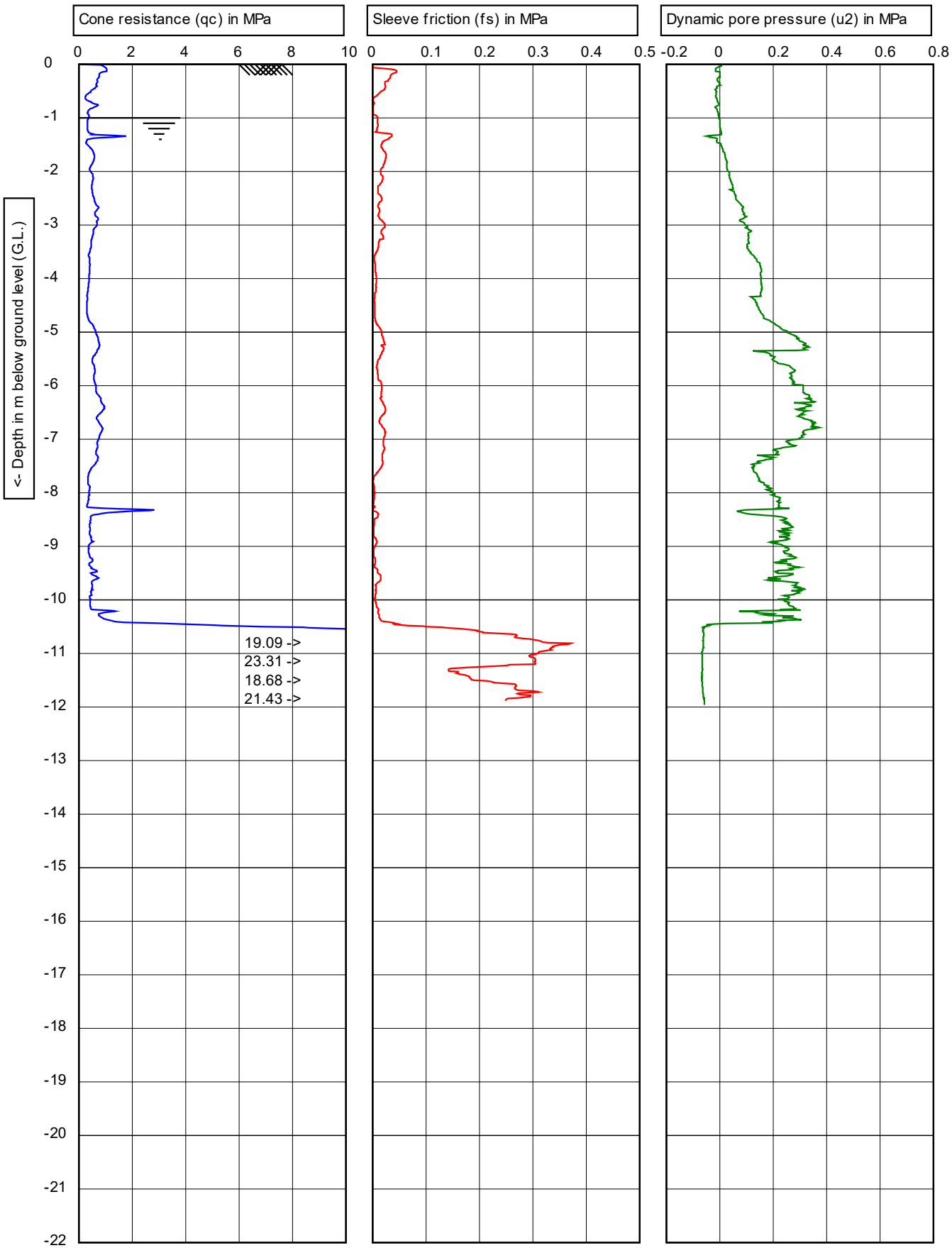
Test according ASTM D5778:12 & ISO 22476-1:2012

G.L.: **0.00 m MSL** W.L.: **-0.50 m**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746904, 5941940 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **4/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **22** **1/6** |

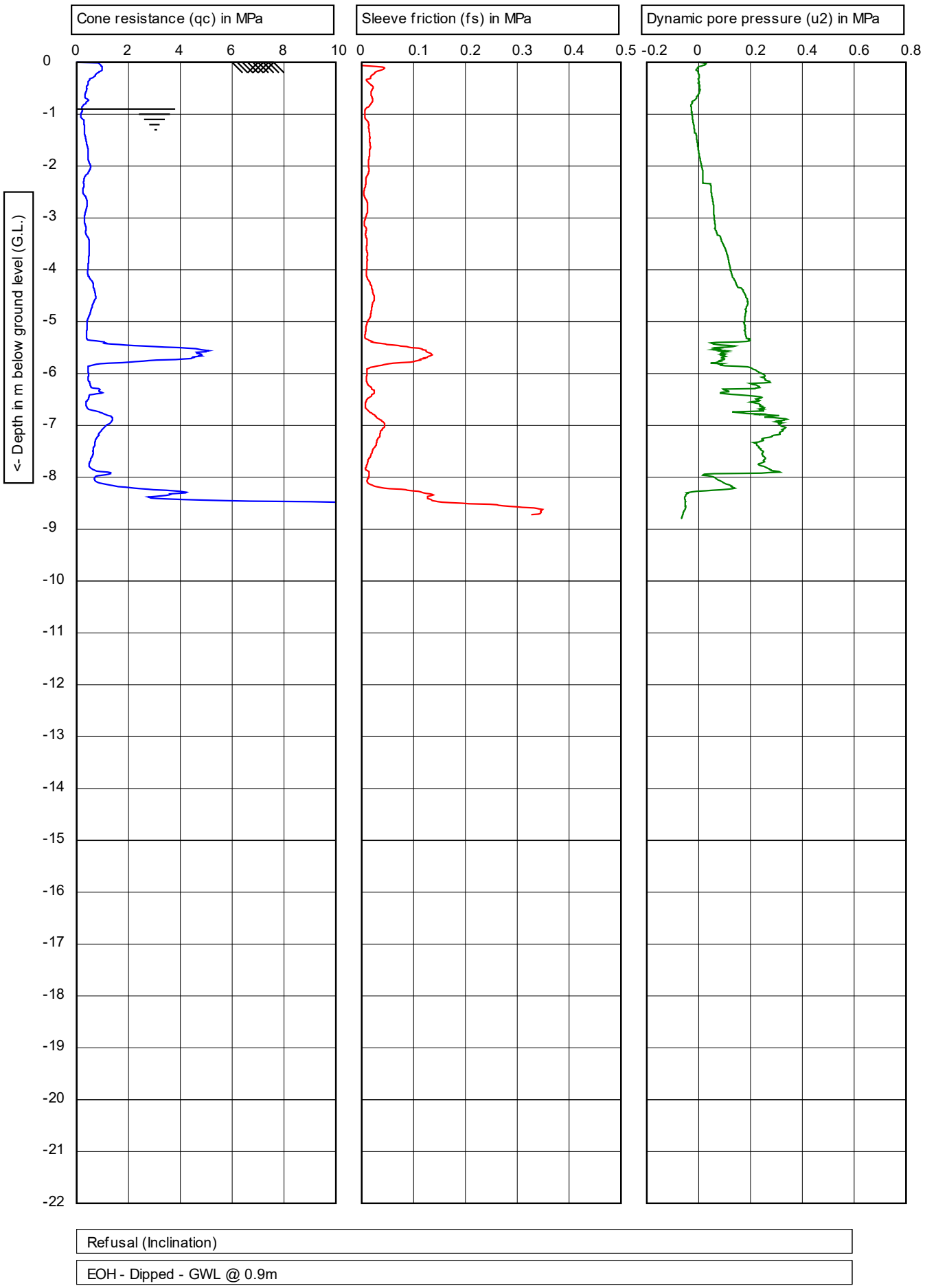
1.49




| | | | |
|---|---|---|---|
| Test according ASTM D5778:12 & ISO 22476-1:2012 | | Predrill: | 0.00 m Predrilled |
| G.L.: 0.00 m MSL | W.L.: -1.00 m | Date: | 4/04/2023 |
| Project: 1350 Dairy Flat Highway | | Cone no.: | C10CFIIP.C13236 |
| Location: Auckland (P-001539) | | Project no.: | 2-68207.00_HA10639 |
| Position: 1749654, 5941925 NZTM | | CPT no.: | 23 1/6 |

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

1.49




Refusal (Inclination)

EOH - Dipped - GWL @ 0.9m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
L 150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

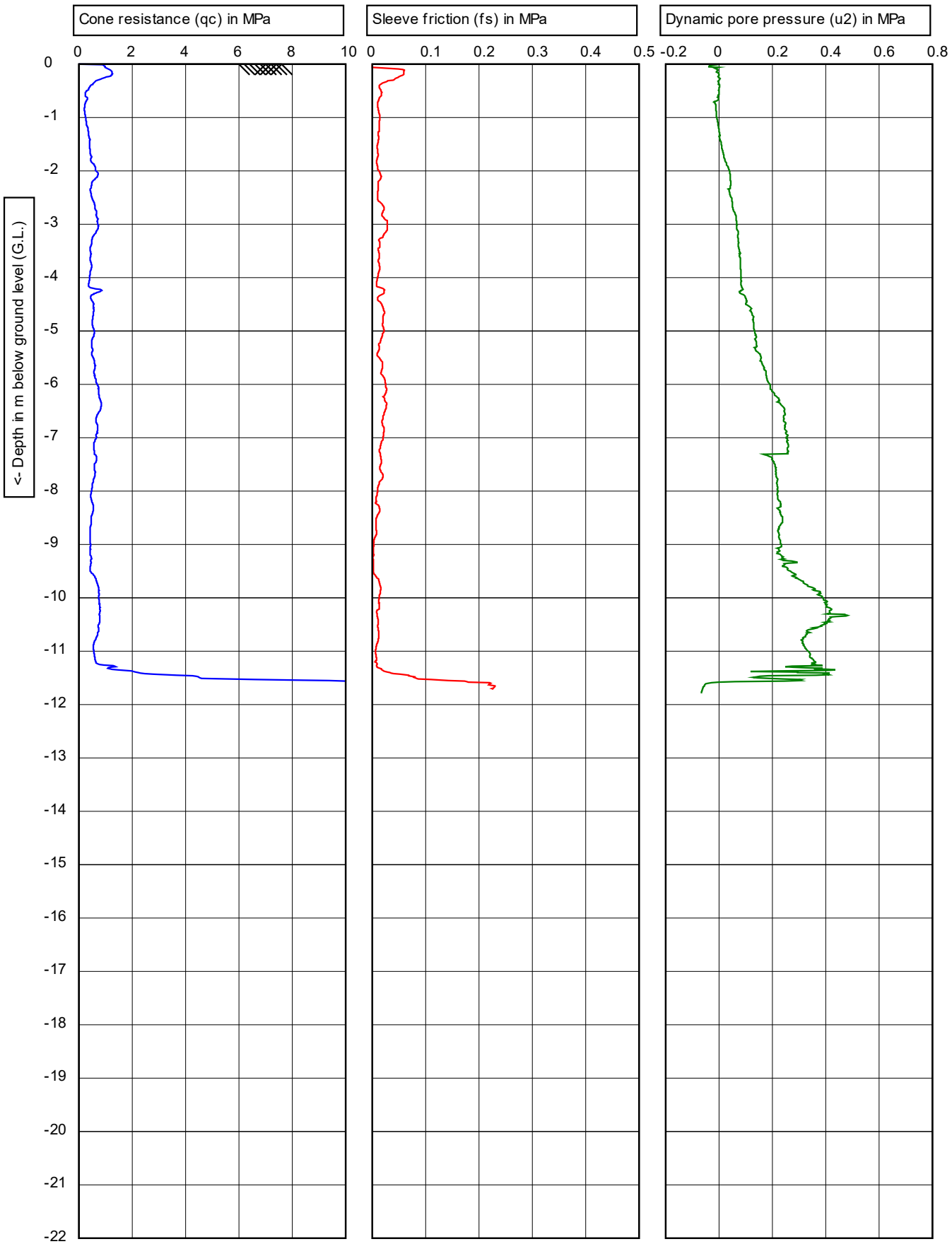
G.L.: **0.00 m MSL** | W.L.: **-0.90 m**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1747007, 5941890 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **5/04/2023** |
| Cone no.: | **C10CFIIP.C21109** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **24** |



1.49




Refusal (7t Rodflex)

EOH - Dipped - Collapsed Dry @ 0.9m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

r u2
L 150 cm²
10 cm²

Test according ASTM D5778:12 & ISO 22476-1:2012

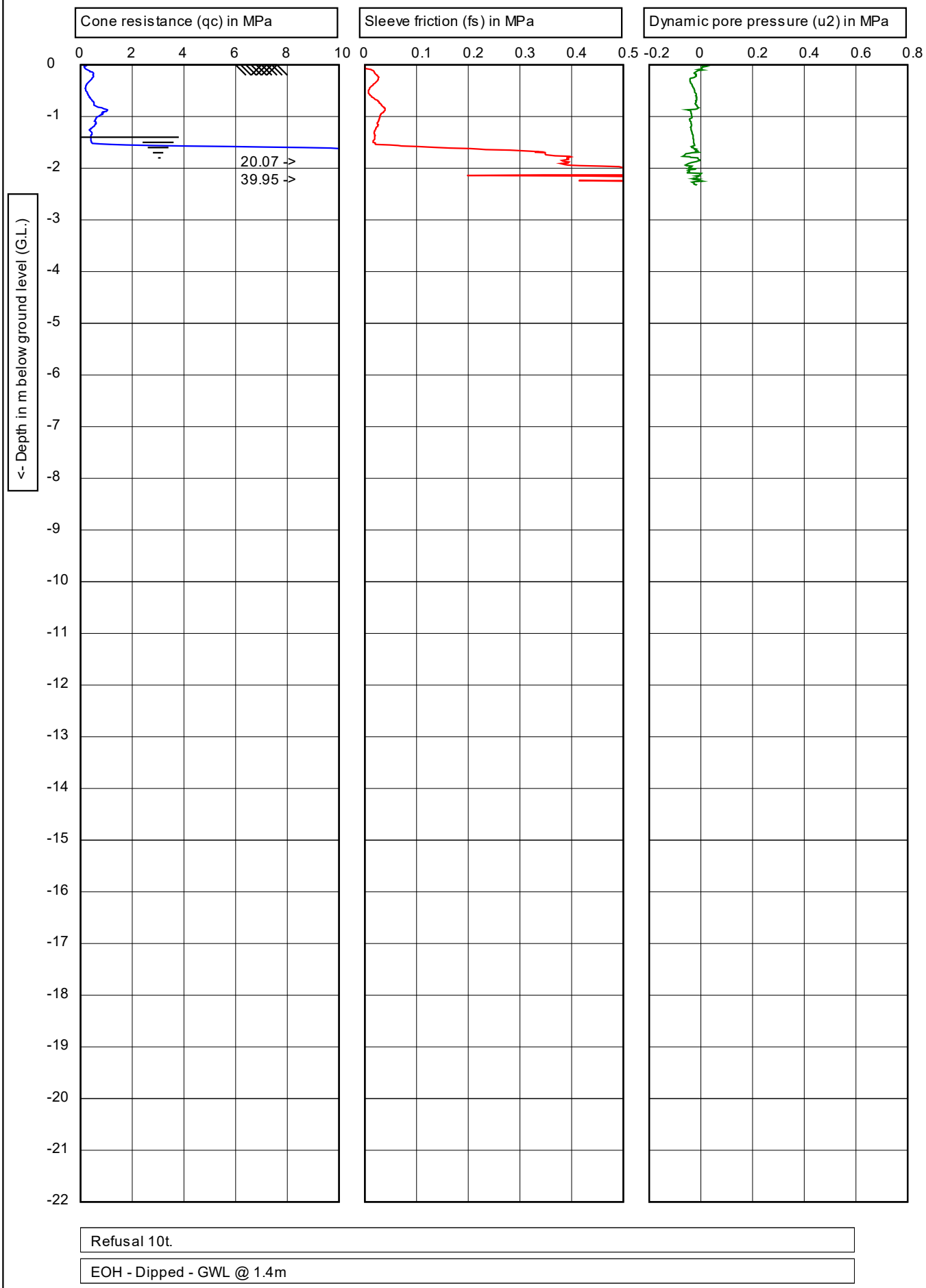
G.L.: **0.00 m MSL**

Project: **1350 Dairy Flat Highway**
Location: **Auckland (P-001539)**
Position: **1746976, 5941801 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **5/04/2023** |
| Cone no.: | **C10CFIIP.C13236** |
| Project no.: | **2-68207.00_HA10639** |
| CPT no.: | **25** |



1.49




Refusal 10t.

EOH - Dipped - GWL @ 1.4m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-1.40 m**

Project: **Surf Park Site (P-002405)**

Location: **Dairy Flat - Auckland**

Position: **1747028, 5942339 NZTM**

Predrill: **0.00 m Predrilled**

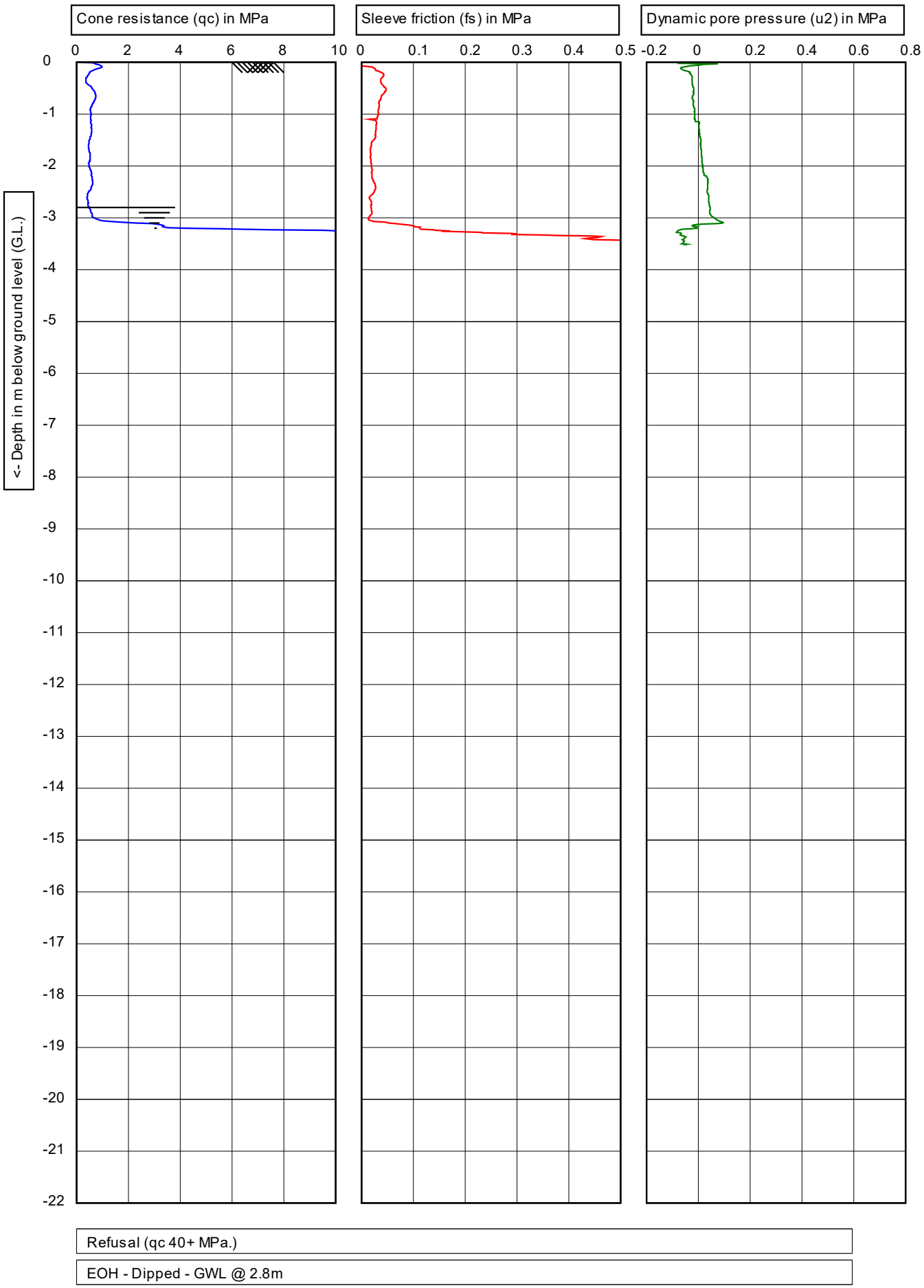
Date: **18/08/2025**

Cone no.: **C10CFIIP.C241654**

Project no.: **2-68207.00_HA15435**

CPT no.: **101** **1/6**

1.49




Refusal (qc 40+ MPa.)

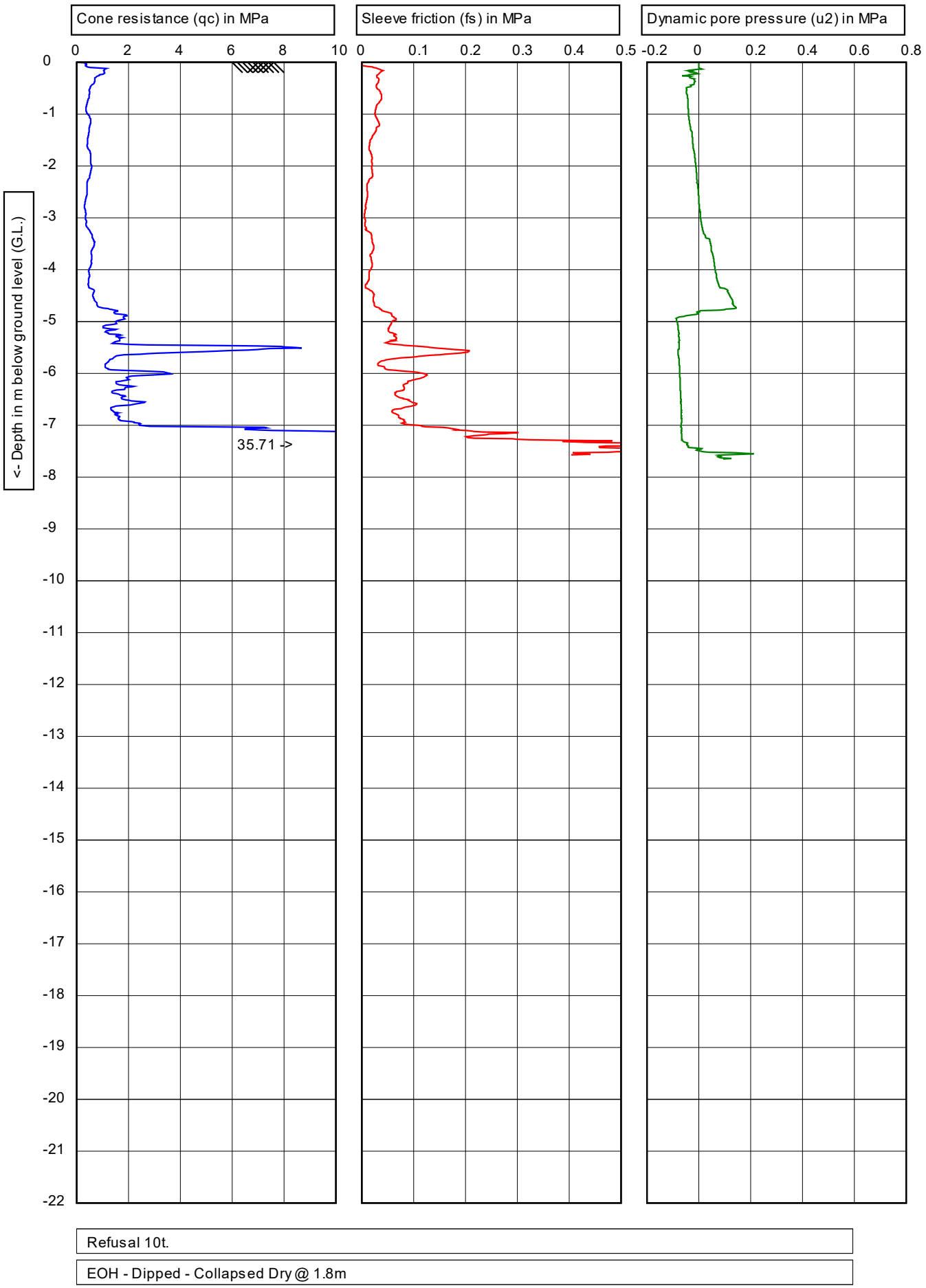
EOH - Dipped - GWL @ 2.8m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

| | | | |
|---|---|---|---|
| Method:ASTM D5778-20&ISO 22476:1:2012cor.2013 | | Predrill: | **0.00 m Predrilled** |
| G.L.: **0.00 m MSL** | W.L.: **-2.80 m** | Date: | **18/08/2025** |
| Project: **Surf Park Site (P-002405)** | | Cone no.: | **C10CFIIP.C21094** |
| Location: **Dairy Flat - Auckland** | | Project no.: | **2-68207.00_HA15435** |
| Position: **1747031, 5942293 NZTM** | | CPT no.: | **102** 1/6 |

1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

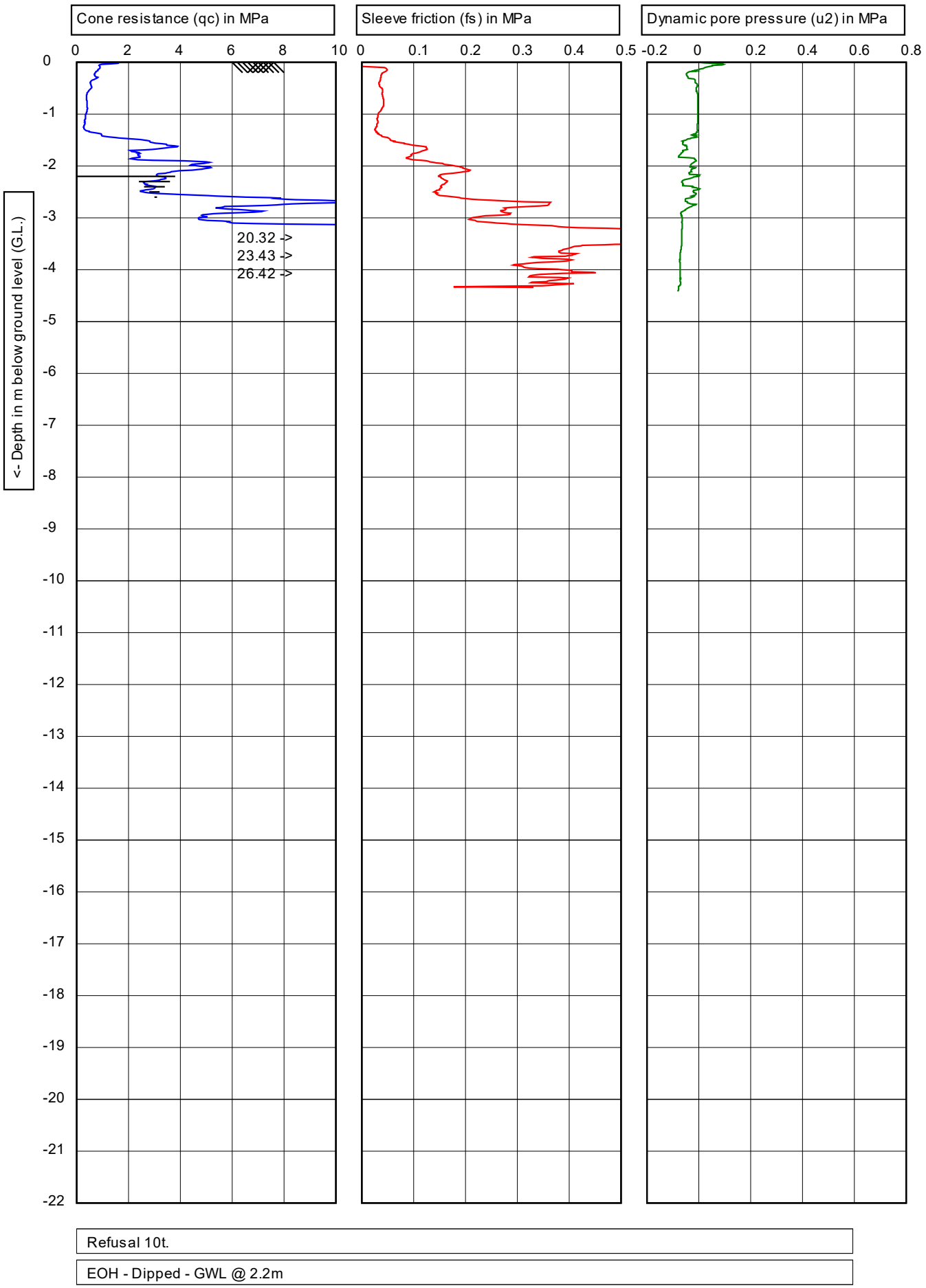
Location: **Dairy Flat - Auckland**

Position: **1747039, 5942254 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **18/08/2025** |
| Cone no.: | **C10CFIIP.C241654** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **103** |



1.49




Refusal 10t.

EOH - Dipped - GWL @ 2.2m

WSP — ACCREDITED IANZ TESTING LABORATORY. Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-2.20 m**

Project: **Surf Park Site (P-002405)**

Location: **Dairy Flat - Auckland**

Position: **1747062, 5942208 NZTM**

Predrill: **0.00 m Predrilled**

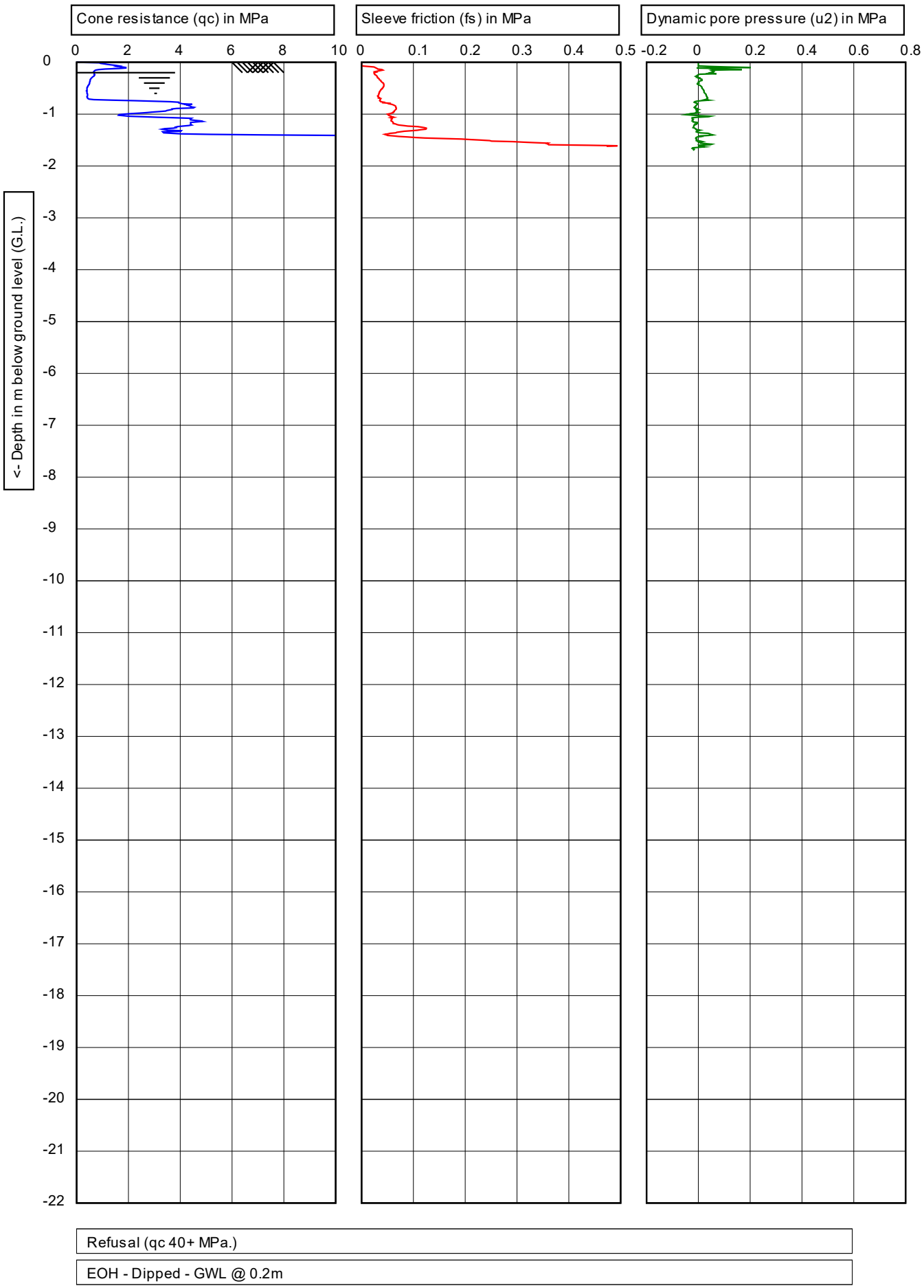
Date: **18/08/2025**

Cone no.: **C10CFIIP.C21094**

Project no.: **2-68207.00_HA15435**

CPT no.: **104** **1/6**

1.49




Refusal (qc 40+ MPa.)

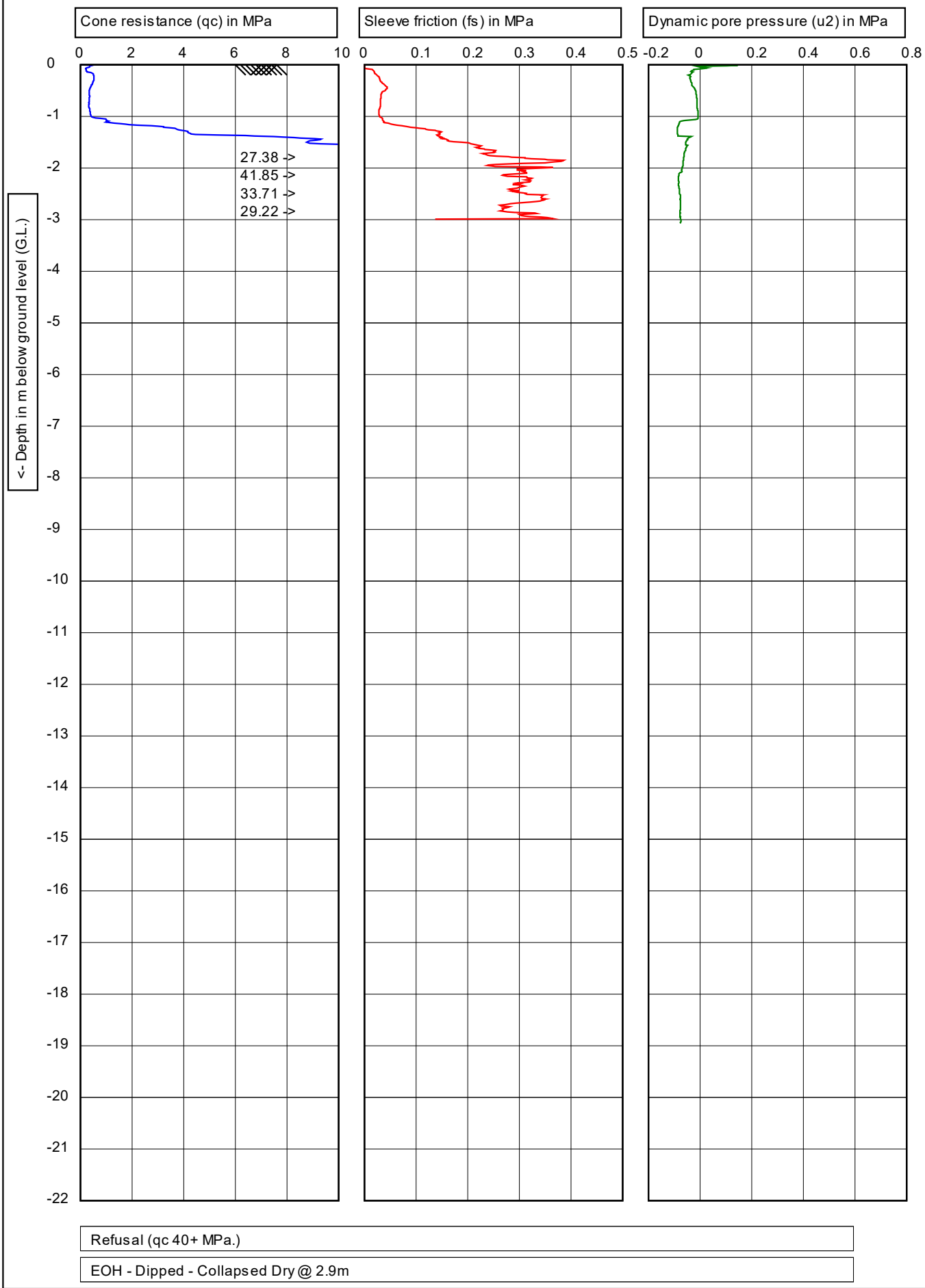
EOH - Dipped - GWL @ 0.2m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

| | | | |
|---|---|---|---|
| Method:ASTM D5778-20&ISO 22476:1:2012cor.2013 | | Predrill: | **0.00 m Predrilled** |
| G.L.: **0.00 m MSL** | W.L.: **-0.20 m** | Date: | **18/08/2025** |
| Project: **Surf Park Site (P-002405)** | | Cone no.: | **C10CFIIP.C241654** |
| Location: **Dairy Flat - Auckland** | | Project no.: | **2-68207.00_HA15435** |
| Position: **1747115, 5942170 NZTM** | | CPT no.: | **105** **1/6** |

1.49




Refusal (qc 40+ MPa.)

EOH - Dipped - Collapsed Dry @ 2.9m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

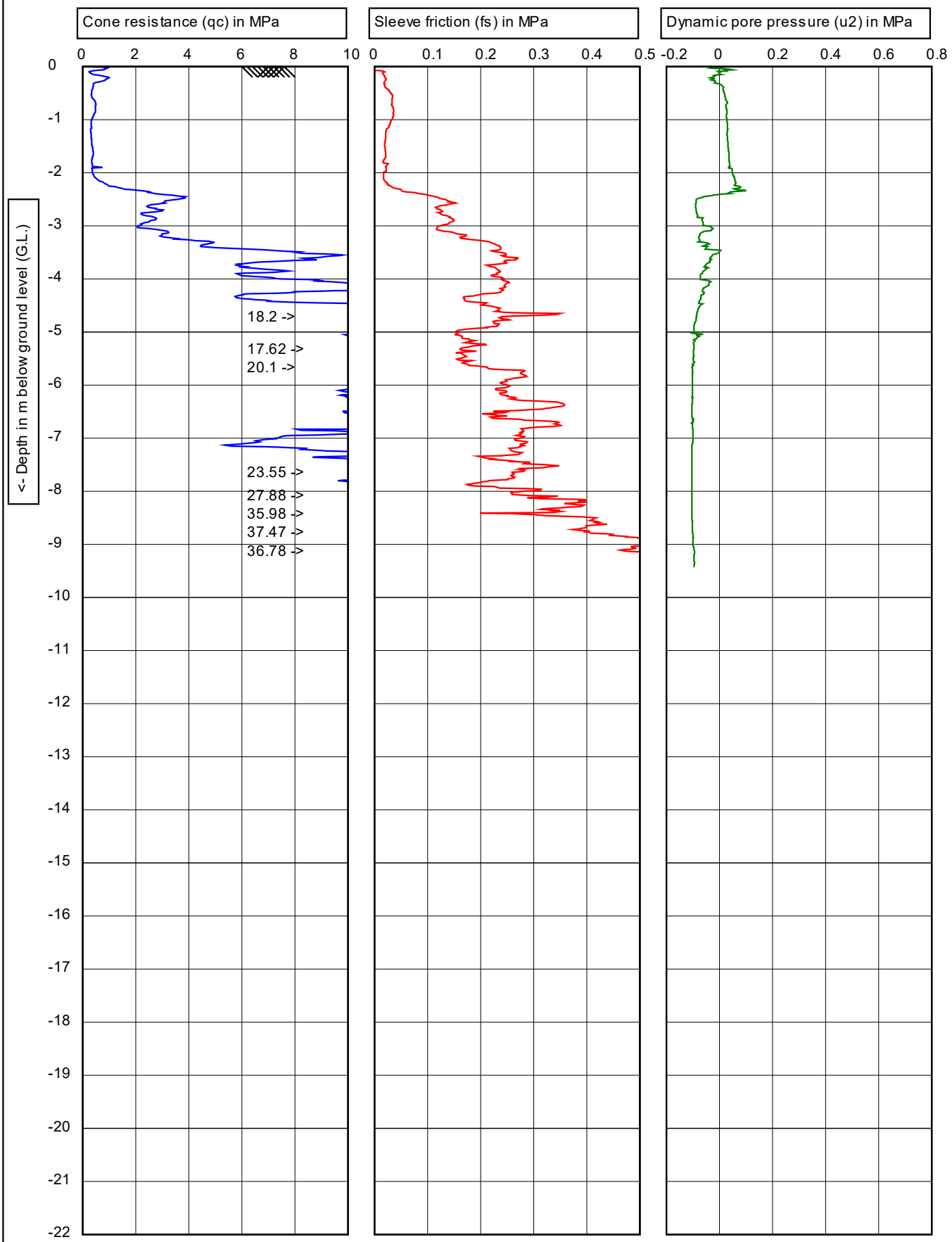
Location: **Dairy Flat - Auckland**

Position: **1747022, 5941566 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **21/08/2025** |
| Cone no.: | **C10CFIIP.C21094** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **106** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

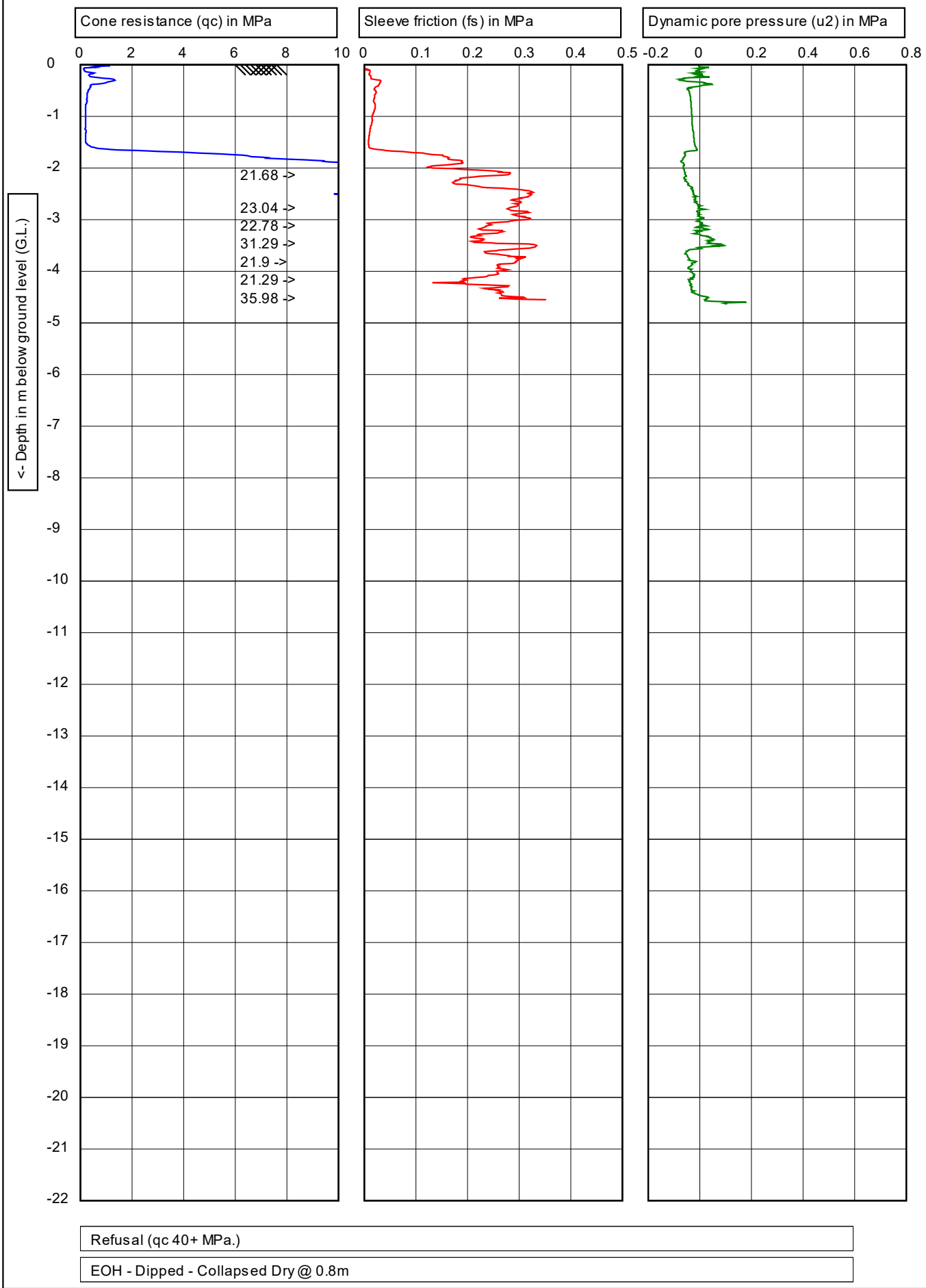
Location: **Dairy Flat - Auckland**

Position: **1746968, 5941567 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **22/08/2025** |
| Cone no.: | **C10CFIIP.C21094** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **107** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

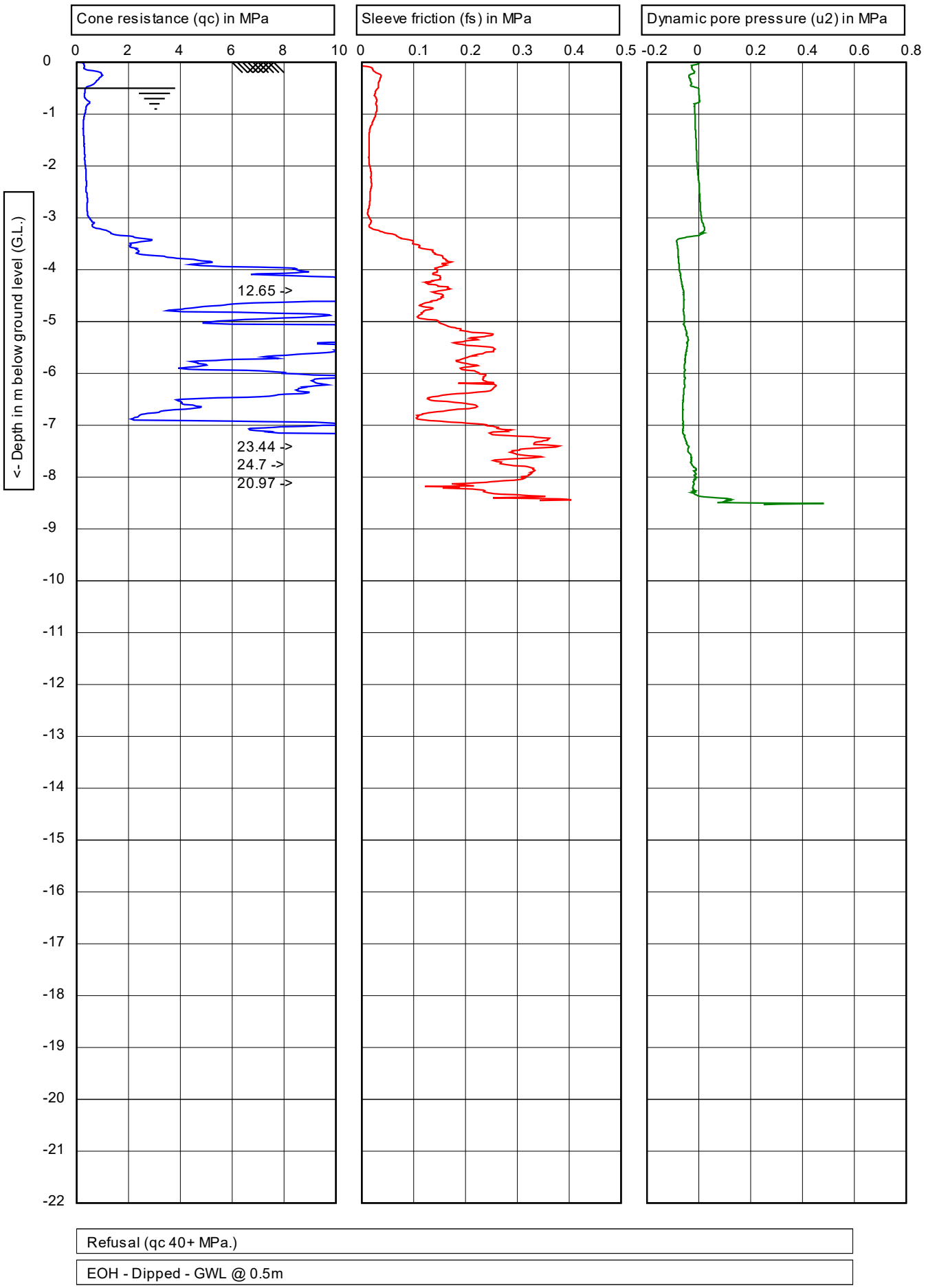
Location: **Dairy Flat - Auckland**

Position: **1746984, 5941615 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **21/08/2025** |
| Cone no.: | **C10CFIIP.C241654** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **108** |



1.49




WSP

ACCREDITED IANZ TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-0.50 m**

Project: **Surf Park Site (P-002405)**

Location: **Dairy Flat - Auckland**

Position: **1747031, 5941693 NZTM**

Predrill: **0.00 m Predrilled**

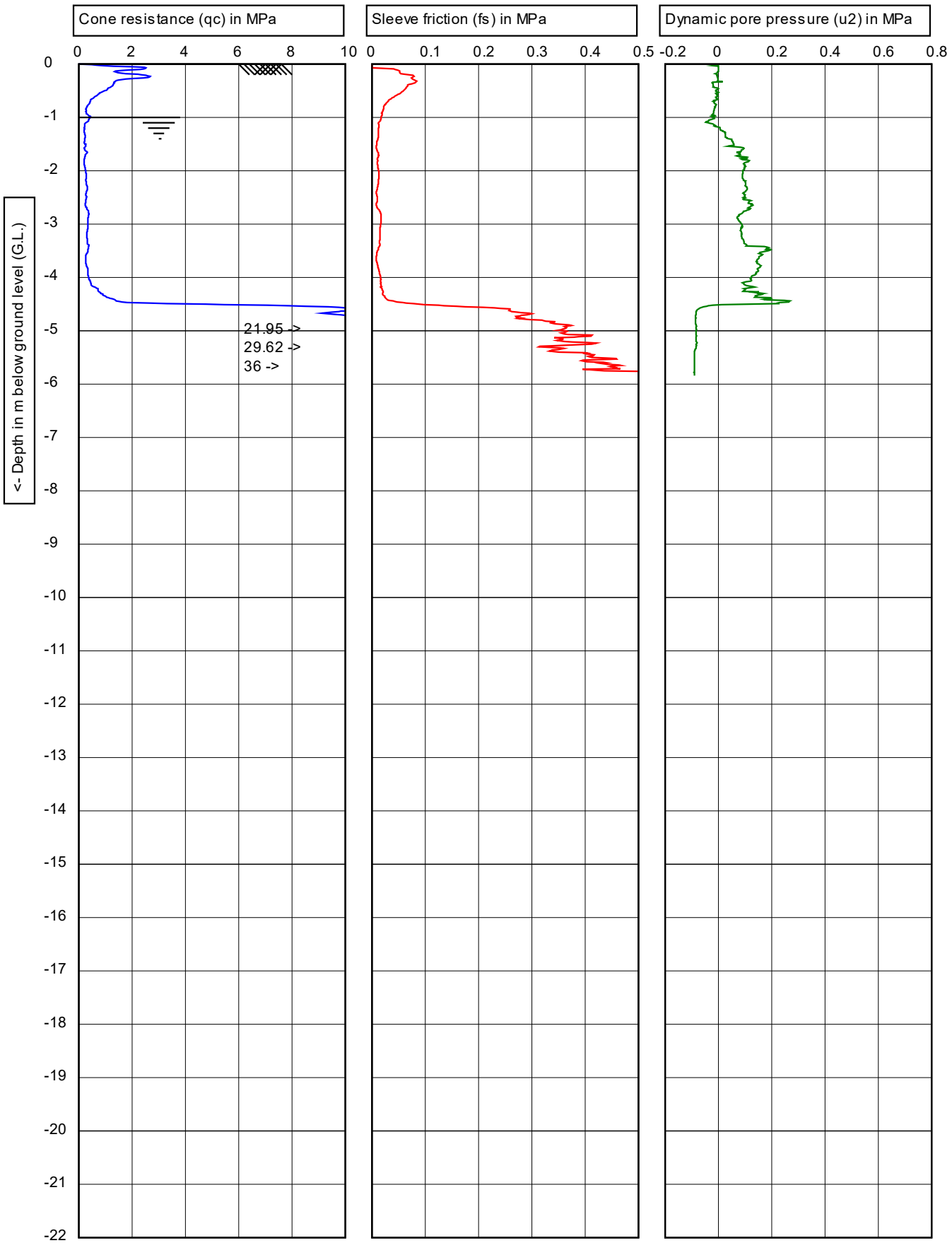
Date: **22/08/2025**

Cone no.: **C10CFIIP.C241654**

Project no.: **2-68207.00_HA15435**

CPT no.: **109** **1/6**

1.49




Refusal 10t.

EOH - Dipped - GWL @ 1.0m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-1.00 m**

Project: **Surf Park Site (P-002405)**

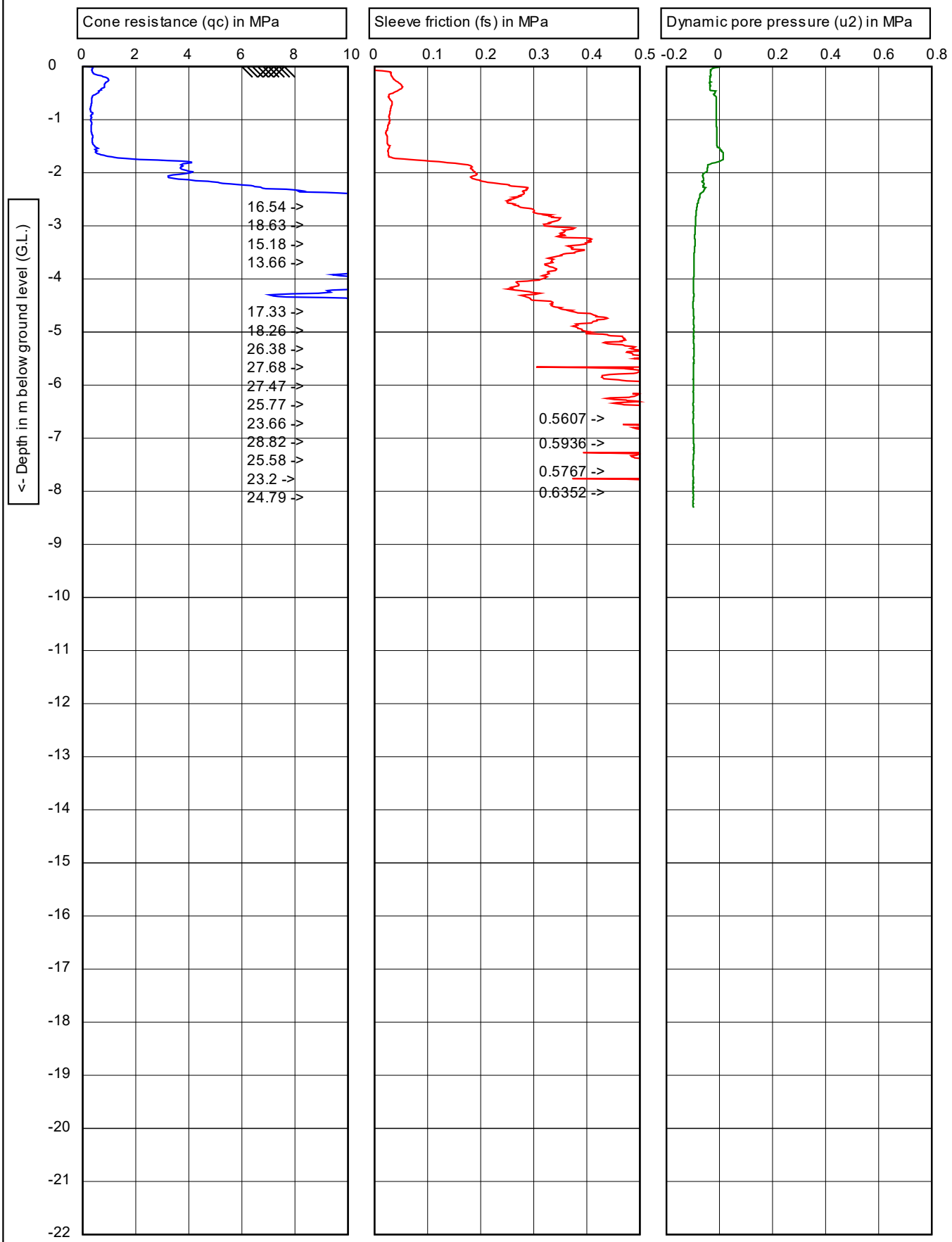
Location: **Dairy Flat - Auckland**

Position: **1747025, 5941732 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **22/08/2025** |
| Cone no.: | **C10CFIIP.C21094** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **110** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

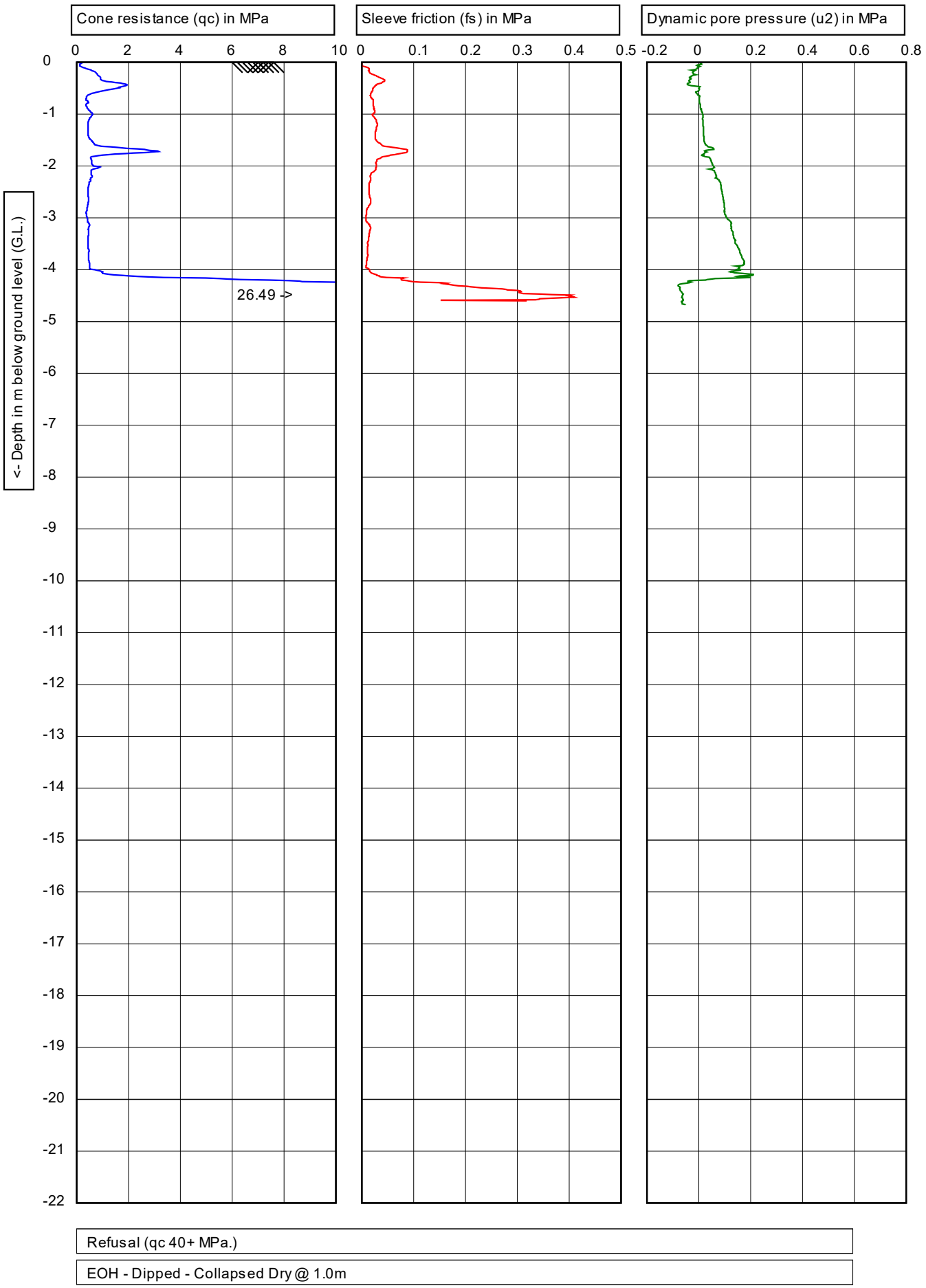
Location: **Dairy Flat - Auckland**

Position: **1747069, 5941736 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **22/08/2025** |
| Cone no.: | **C10CFIIP.C21094** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **111** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

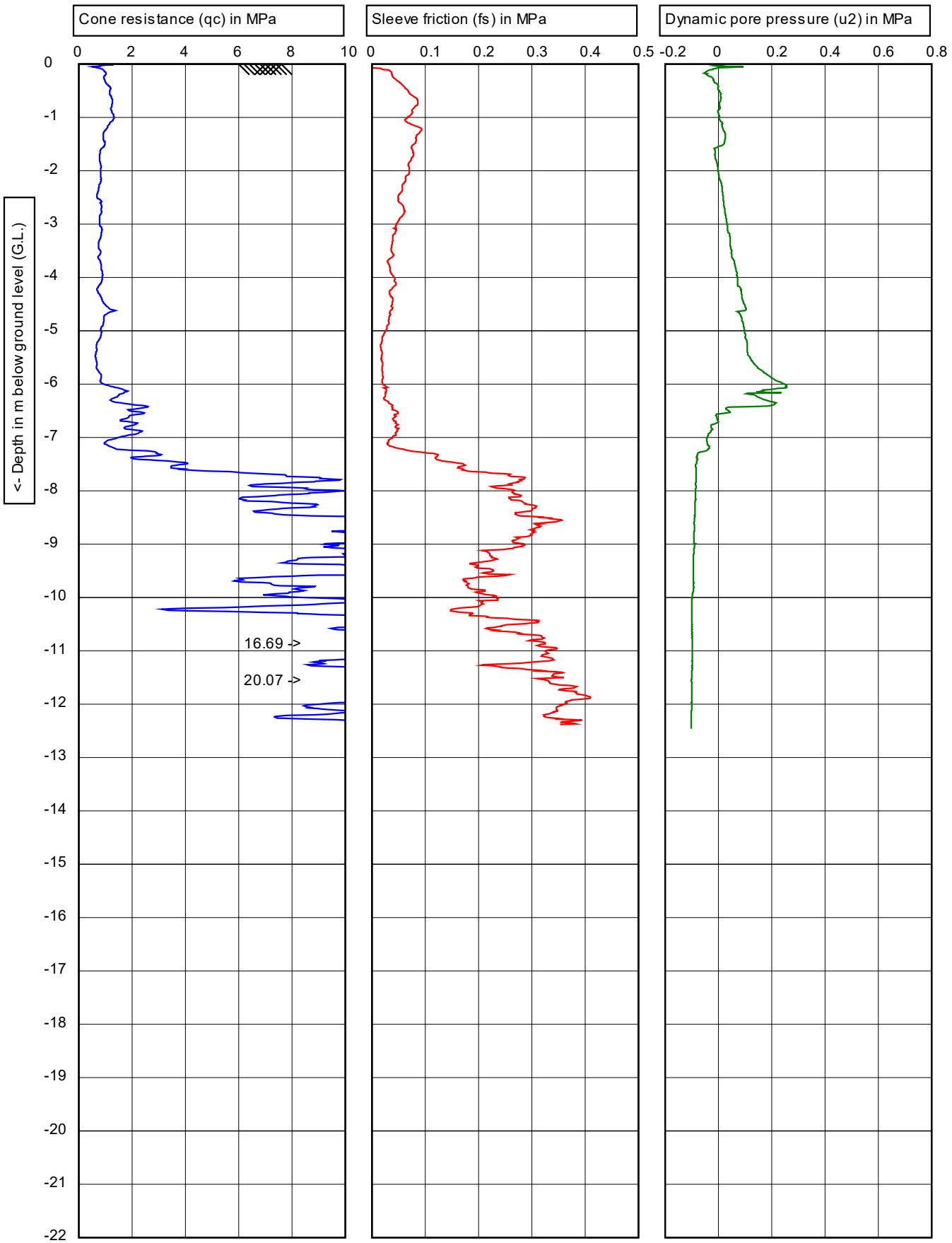
Location: **Dairy Flat - Auckland**

Position: **1747198, 5941748 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **22/08/2025** |
| Cone no.: | **C10CFIIP.C241654** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **112** |



1.49

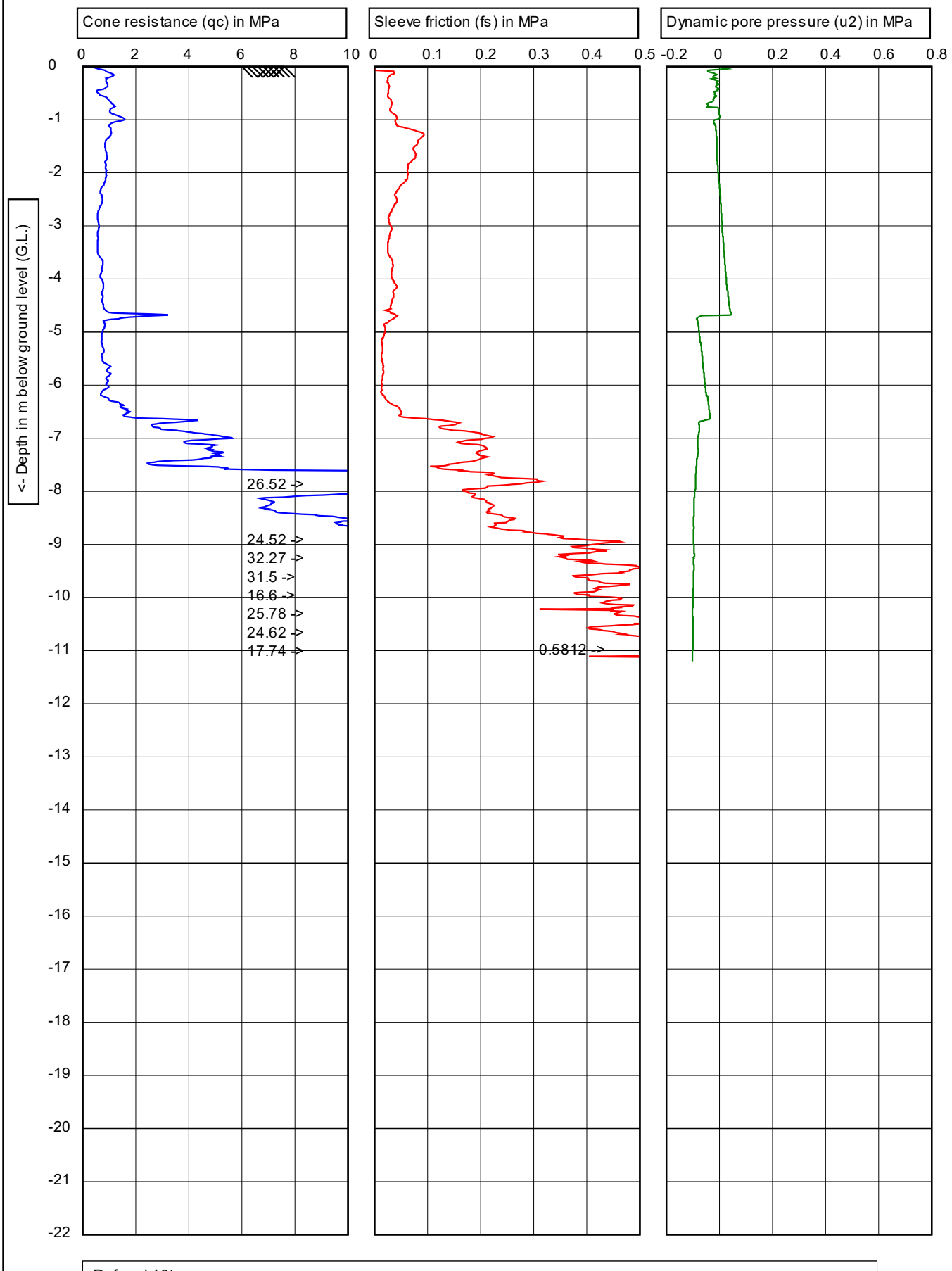



| | | | |
|---|---|---|---|
| Method:ASTM D5778-20&ISO 22476:1:2012cor.2013 | | Predrill: | **0.00 m Predrilled** |
| G.L.: **0.00 m MSL** | | Date: | **20/08/2025** |
| Project: | **Surf Park Site (P-002405)** | Cone no.: | **C10CFIIP.C21094** |
| Location: | **Dairy Flat - Auckland** | Project no.: | **2-68207.00_HA15435** |
| Position: | **1746809, 5942298 NZTM** | CPT no.: | **113** 1/6 |

u2 150 cm² 10 cm²

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

1.49




Refusal 10t.

EOH - Dipped - Collapsed Dry @ 0.8m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

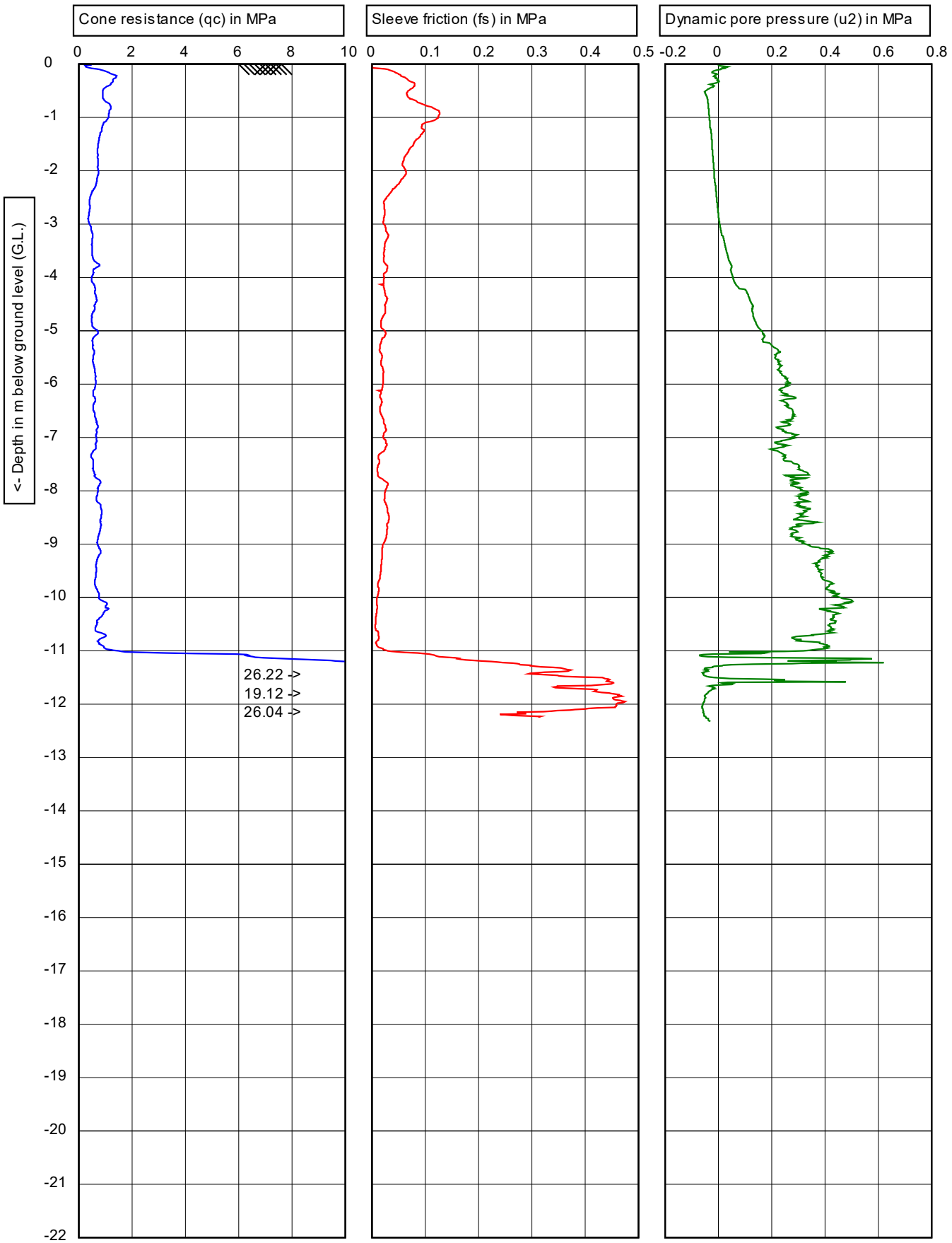
Location: **Dairy Flat - Auckland**

Position: **1746877, 5942290 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **20/08/2025** |
| Cone no.: | **C10CFIIP.C21094** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **114** |



1.49




Refusal 10t.

EOH - Dipped - Collapsed Dry @ 1.4m

WSP

ACCREDITED IANZ TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

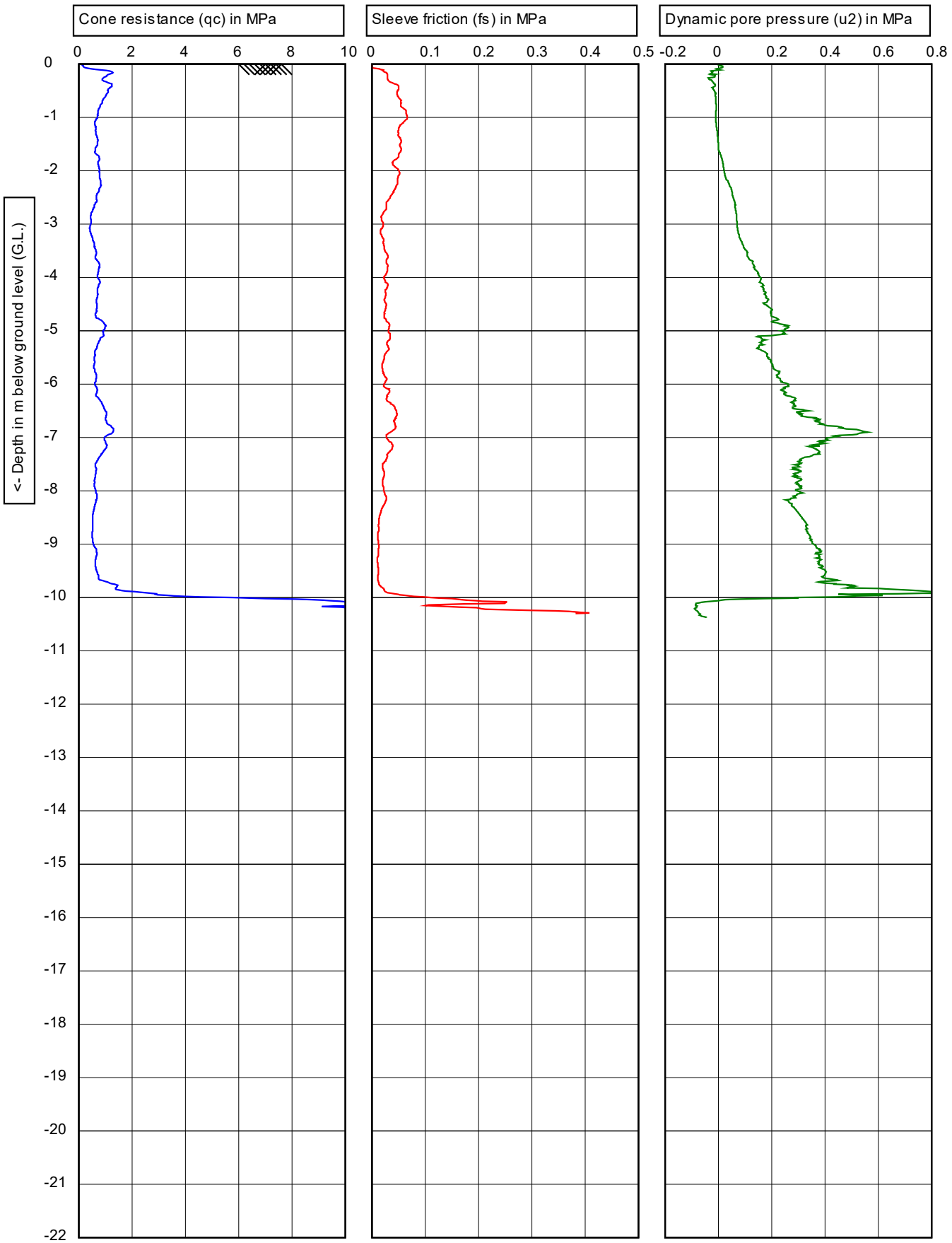
Location: **Dairy Flat - Auckland**

Position: **1746862, 5942239 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **20/08/2025** |
| Cone no.: | **C10CFIIP.C241654** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **115** |



1.49




Refusal (qc 40+ MPa.)

EOH - Dipped - Collapsed Dry @ 0.8m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

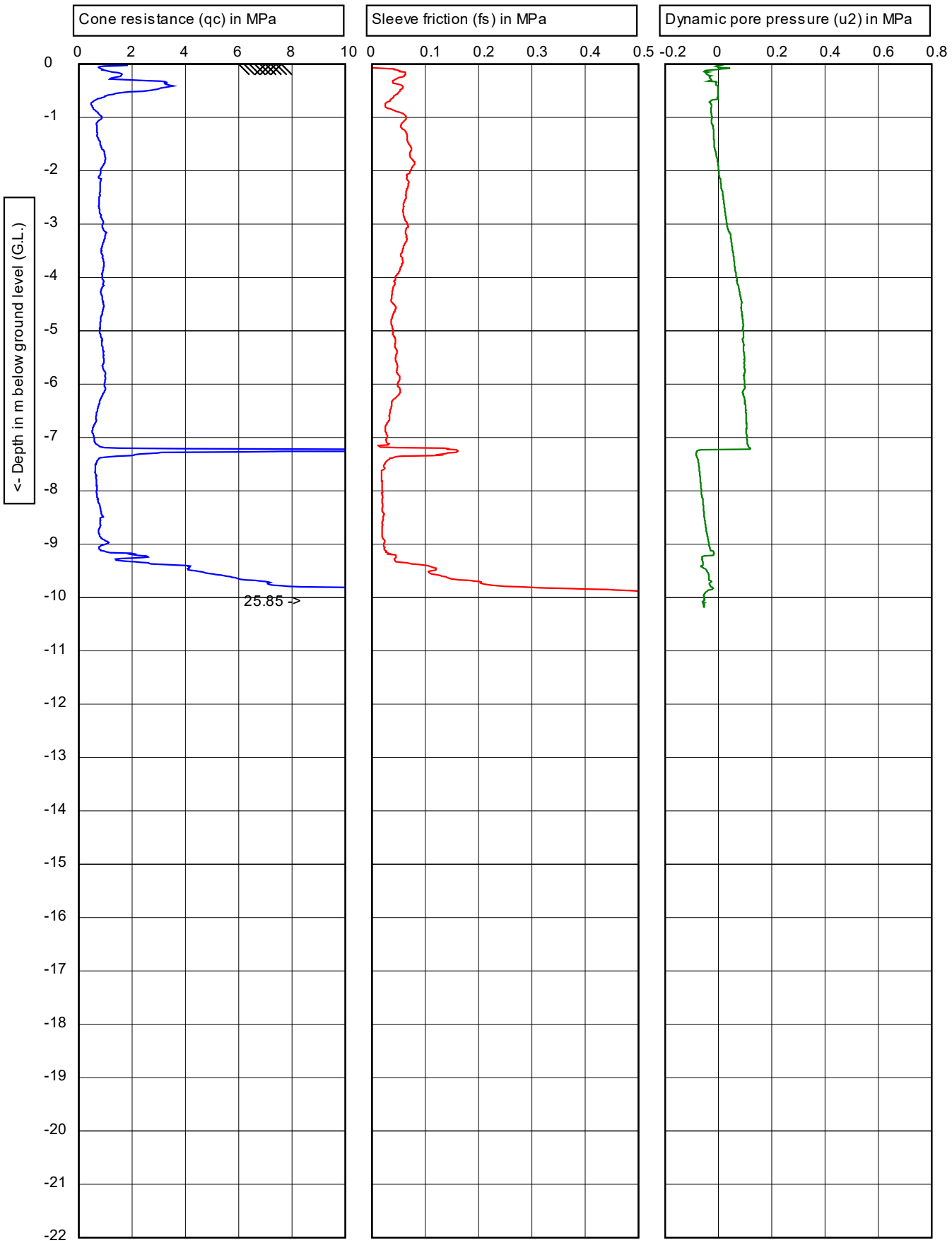
Location: **Dairy Flat - Auckland**

Position: **1746814, 5942198 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **20/08/2025** |
| Cone no.: | **C10CFIIP.C241654** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **116** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

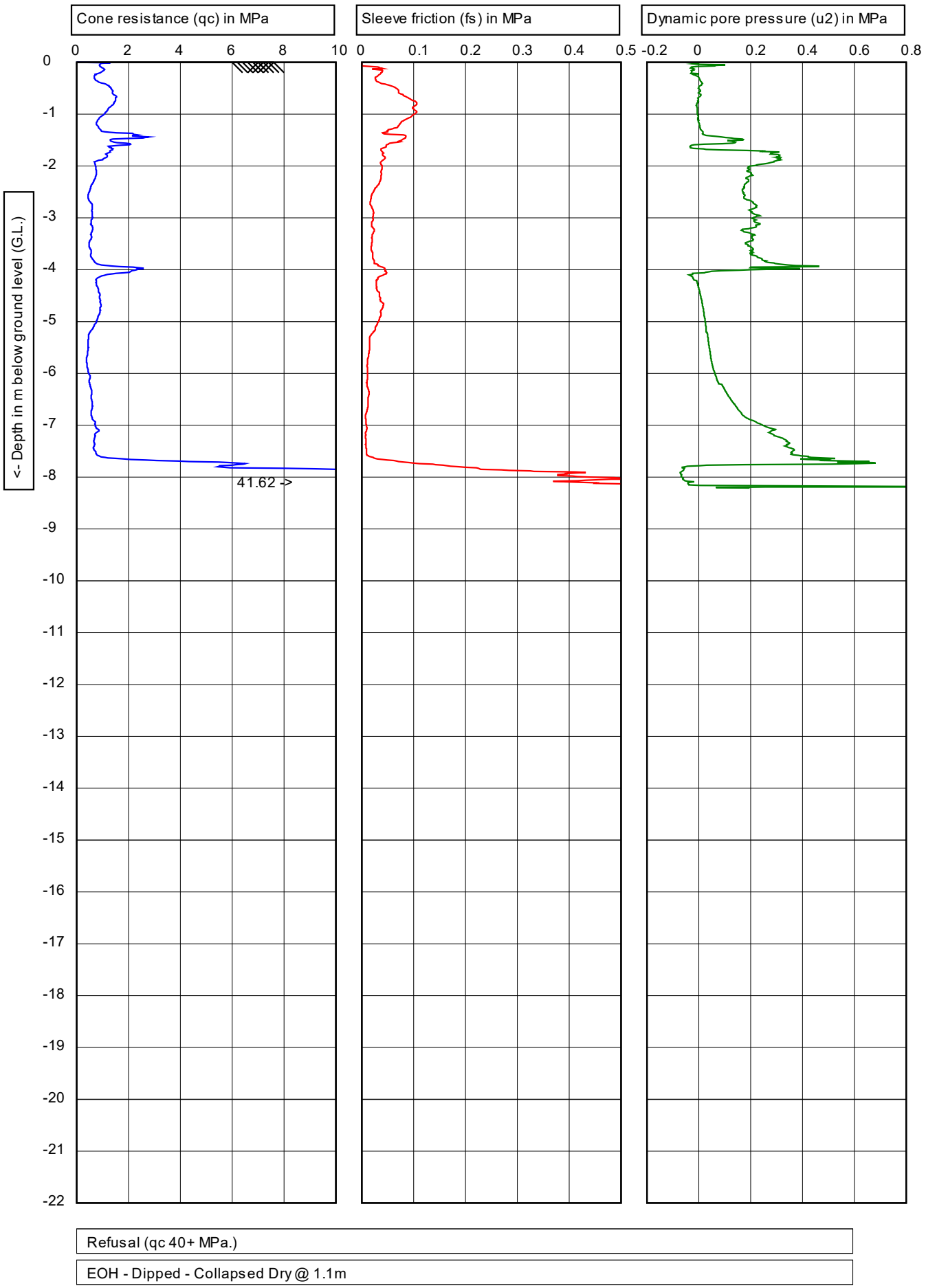
Method:ASTM D5778-20&ISO 22476:1:2012cor.2013
G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**
Location: **Dairy Flat - Auckland**
Position: **1746934, 5942221 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **20/08/2025** |
| Cone no.: | **C10CFIIP.C21094** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **117** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

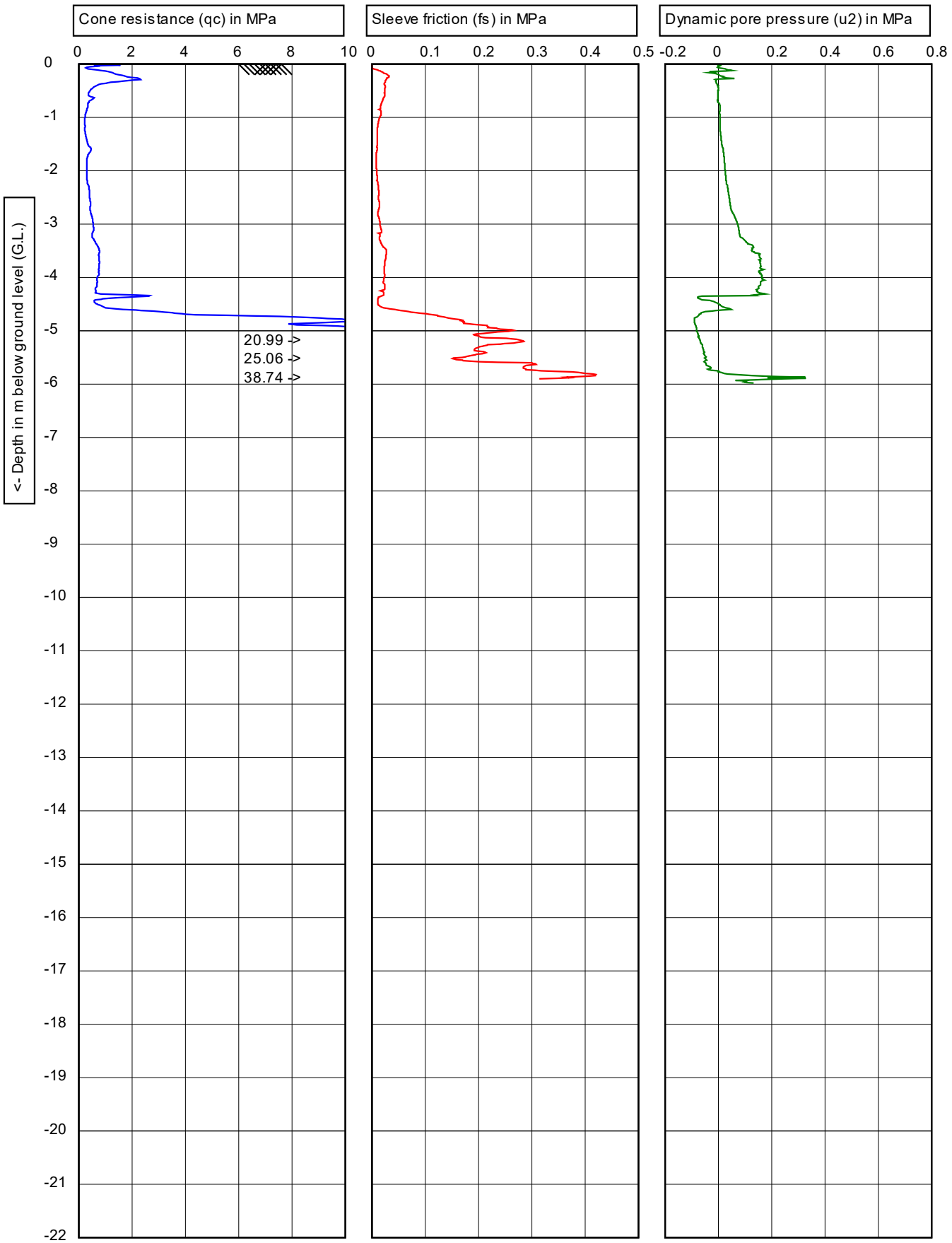
Location: **Dairy Flat - Auckland**

Position: **1746983, 5942230 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **20/08/2025** |
| Cone no.: | **C10CFIIP.C241654** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **118** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

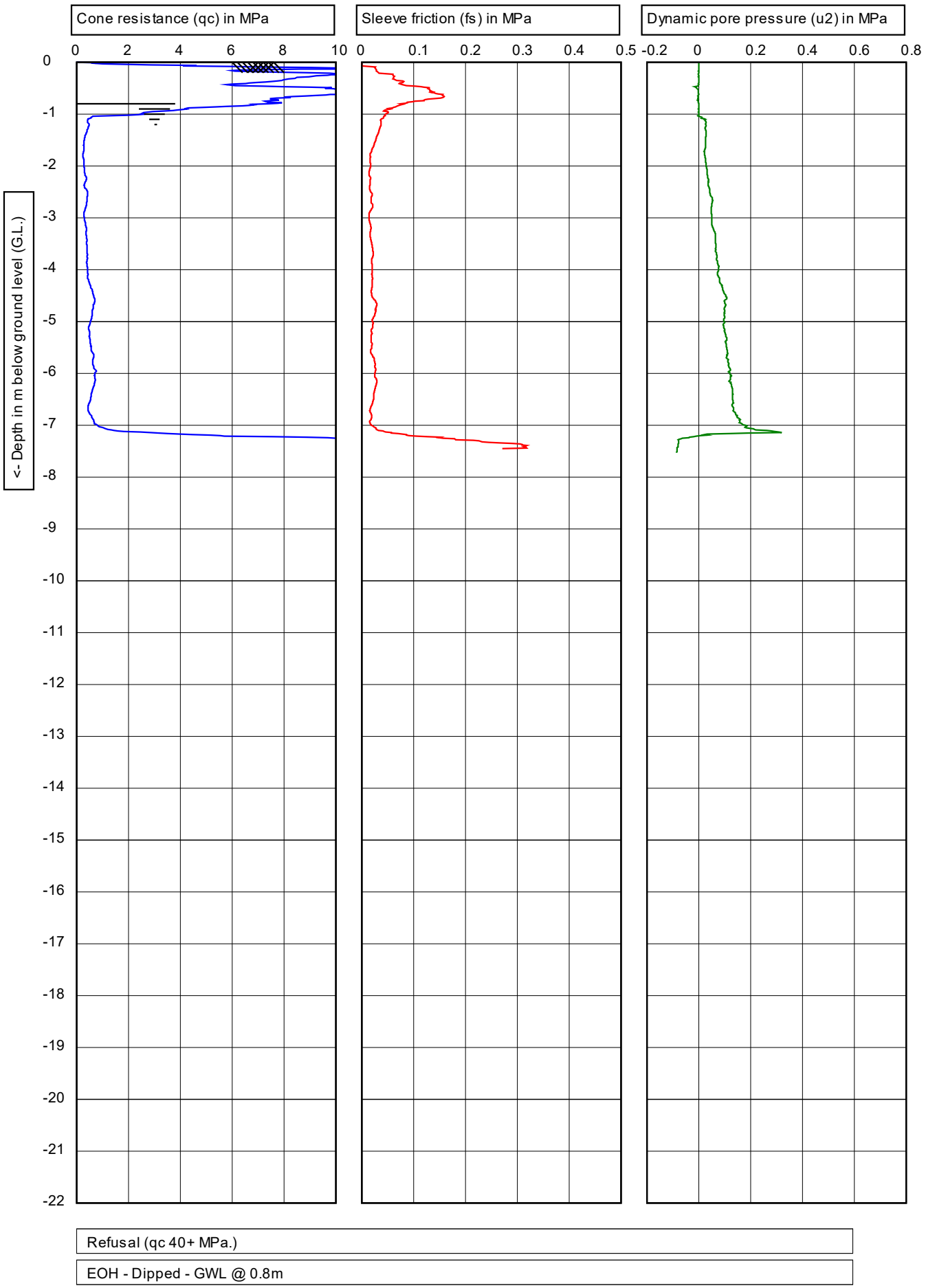
Location: **Dairy Flat - Auckland**

Position: **1747217, 5942145 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **21/08/2025** |
| Cone no.: | **C10CFIIP.C241654** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **119** |



1.49




Refusal (qc 40+ MPa.)

EOH - Dipped - GWL @ 0.8m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-0.80 m**

Project: **Surf Park Site (P-002405)**

Location: **Dairy Flat - Auckland**

Position: **1747223, 5942097 NZTM**

Predrill: **0.00 m Predrilled**

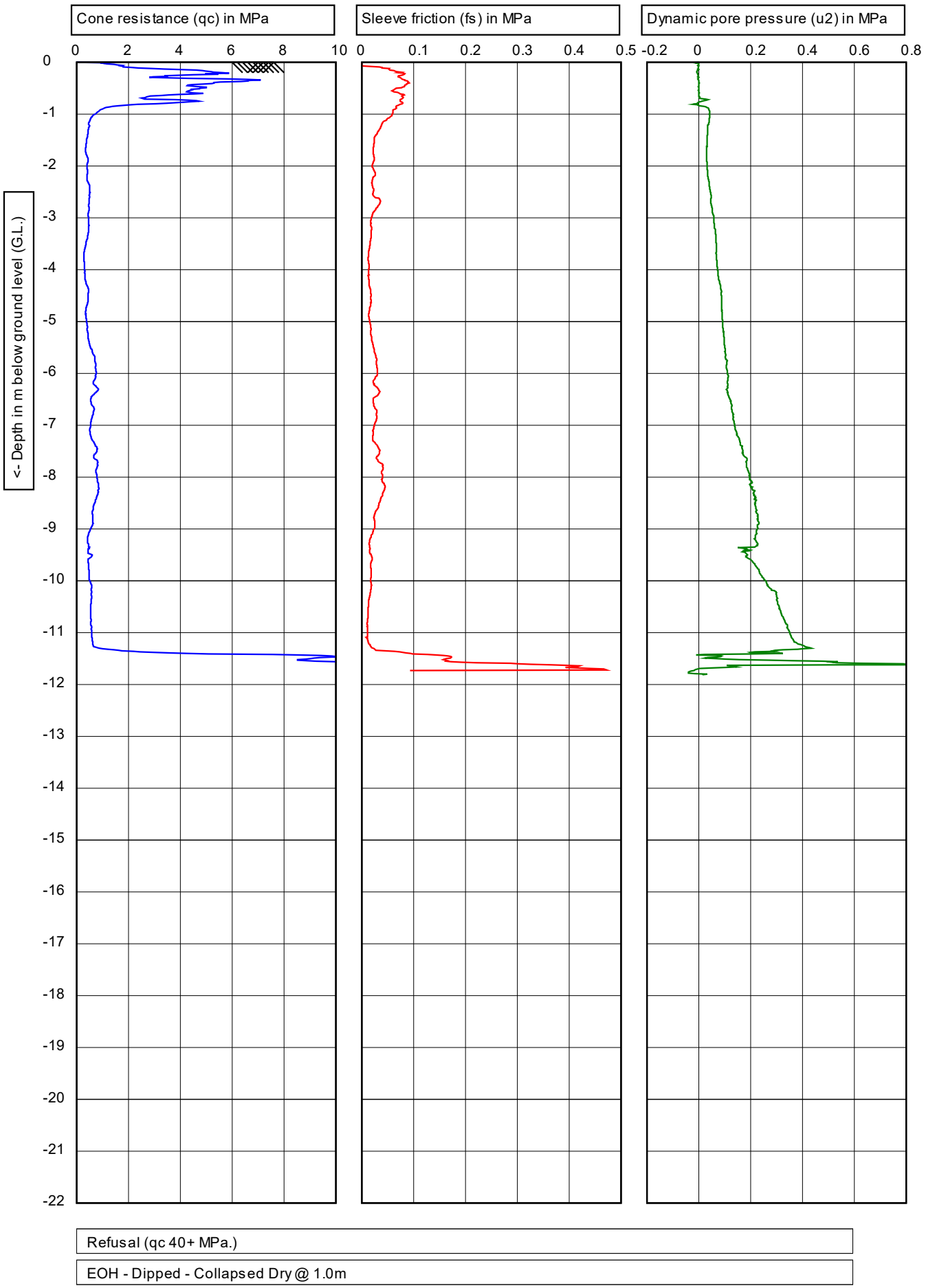
Date: **19/08/2025**

Cone no.: **C10CFIIP.C21094**

Project no.: **2-68207.00_HA15435**

CPT no.: **120** **1/6**

1.49




Refusal (qc 40+ MPa.)

EOH - Dipped - Collapsed Dry @ 1.0m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

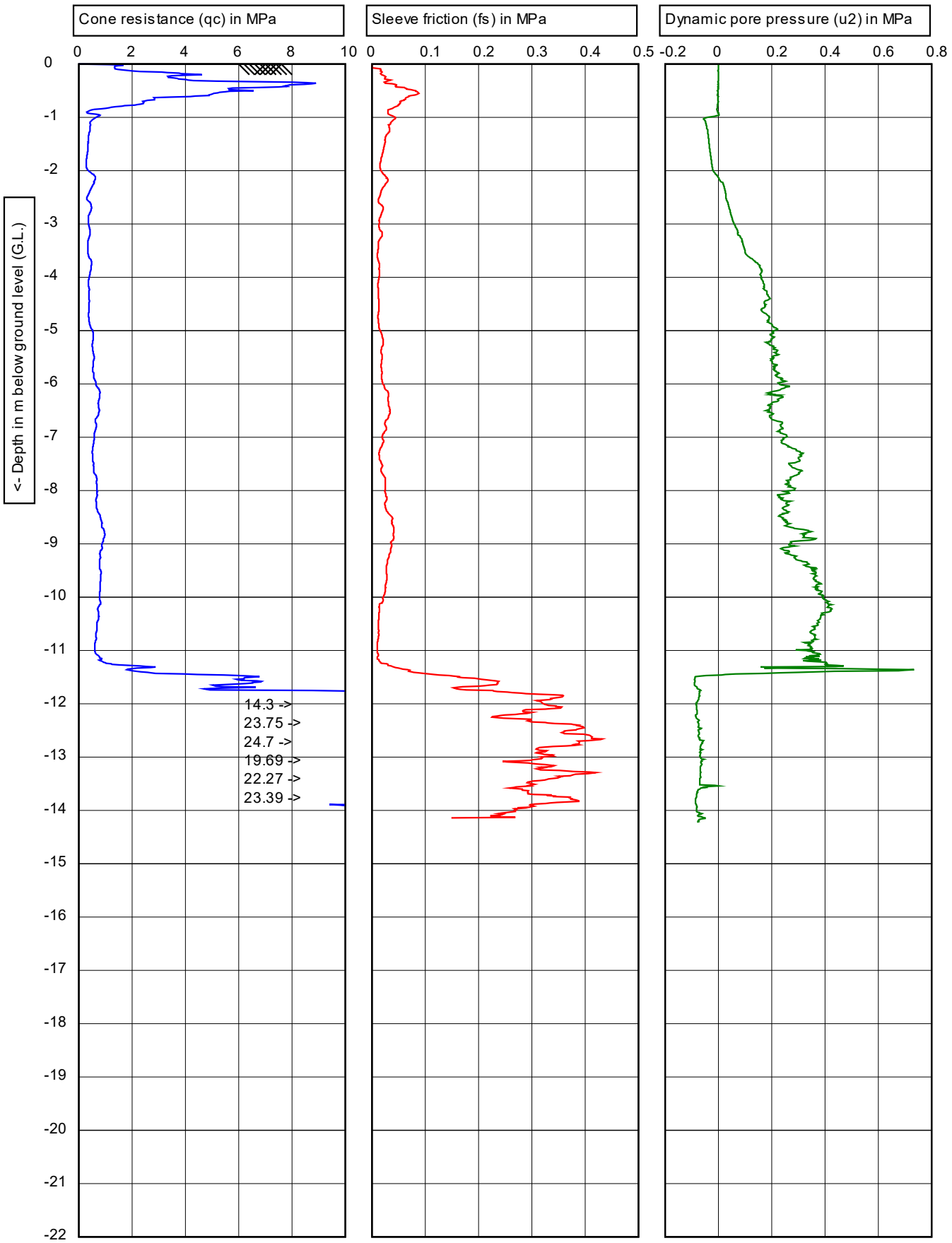
Location: **Dairy Flat - Auckland**

Position: **1746997, 5942010 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **21/08/2025** |
| Cone no.: | **C10CFIIP.C21094** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **121** |



1.49

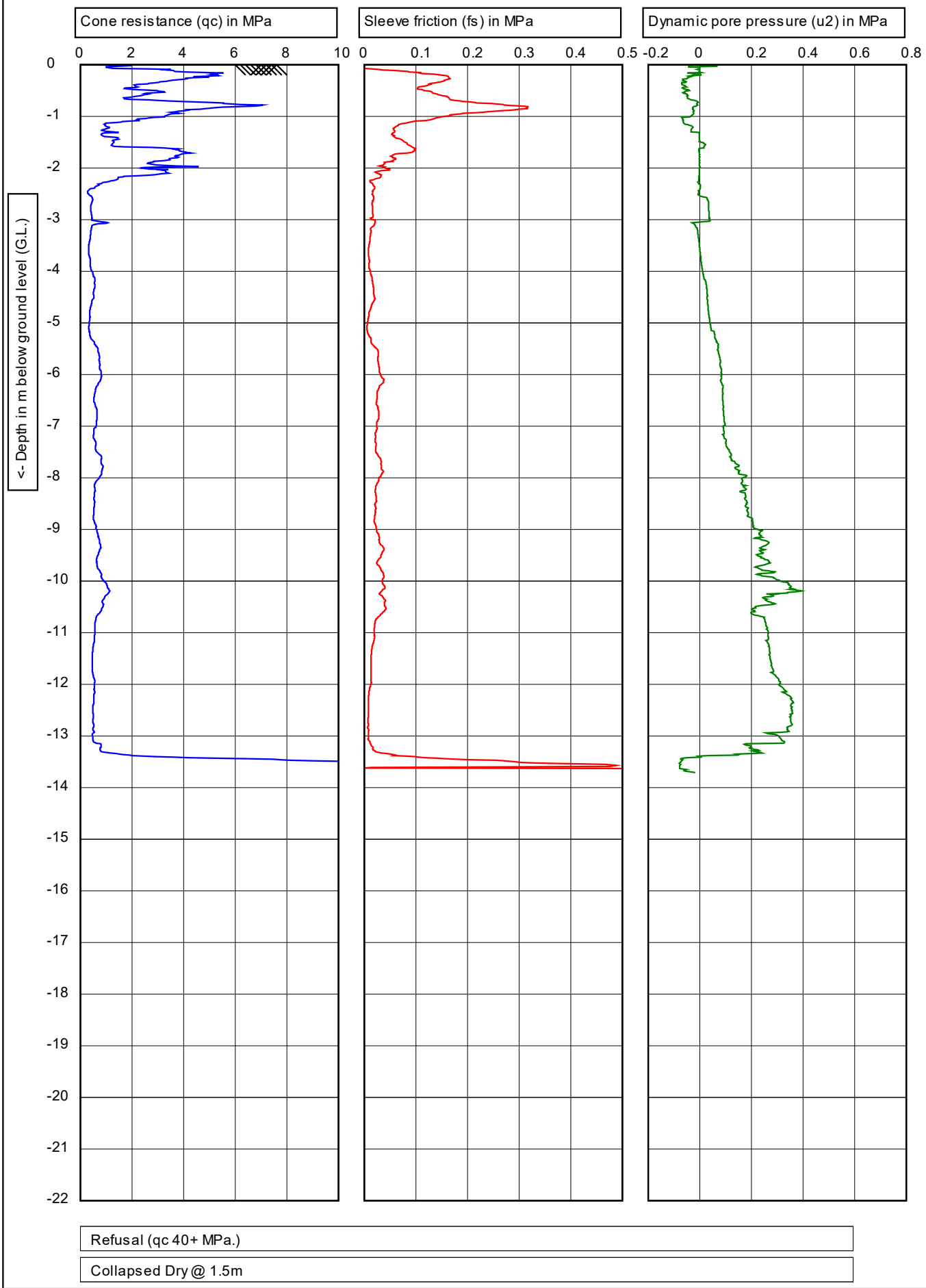



| | | | |
|---|---|---|---|
| Method:ASTM D5778-20&ISO 22476:1:2012cor.2013 | | Predrill: | **0.00 m Predrilled** |
| G.L.: **0.00 m MSL** | | Date: | **21/08/2025** |
| Project: | **Surf Park Site (P-002405)** | Cone no.: | **C10CFIIP.C21094** |
| Location: | **Dairy Flat - Auckland** | Project no.: | **2-68207.00_HA15435** |
| Position: | **1746957, 5941975 NZTM** | CPT no.: | **122** 1/6 |

u2 150 cm² 10 cm²

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

1.49




Refusal (qc 40+ MPa.)

Collapsed Dry @ 1.5m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

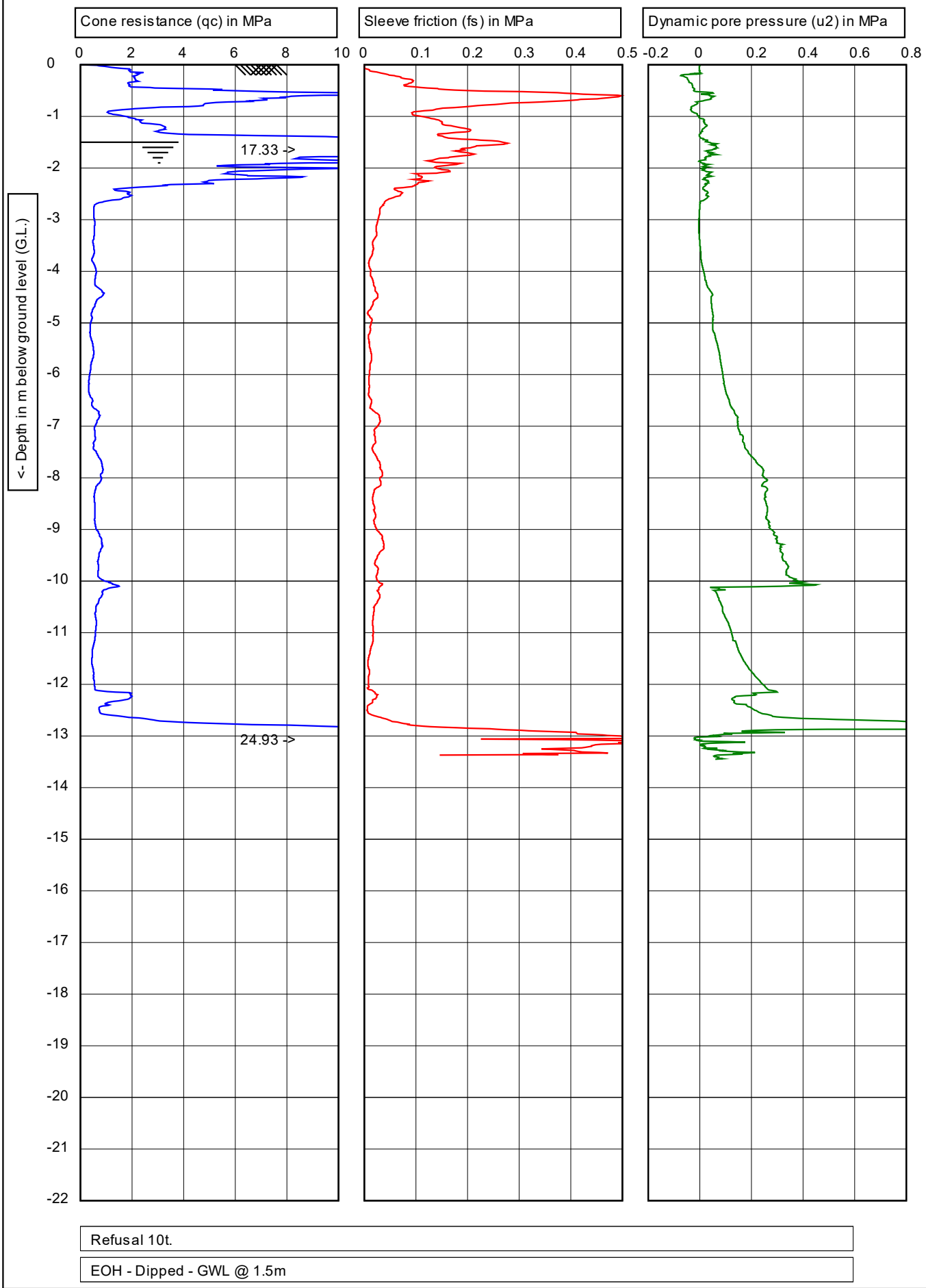
Location: **Dairy Flat - Auckland**

Position: **1746889, 5941855 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **20/08/2025** |
| Cone no.: | **C10CFIIP.C21094** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **123** |



1.49




Refusal 10t.

EOH - Dipped - GWL @ 1.5m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

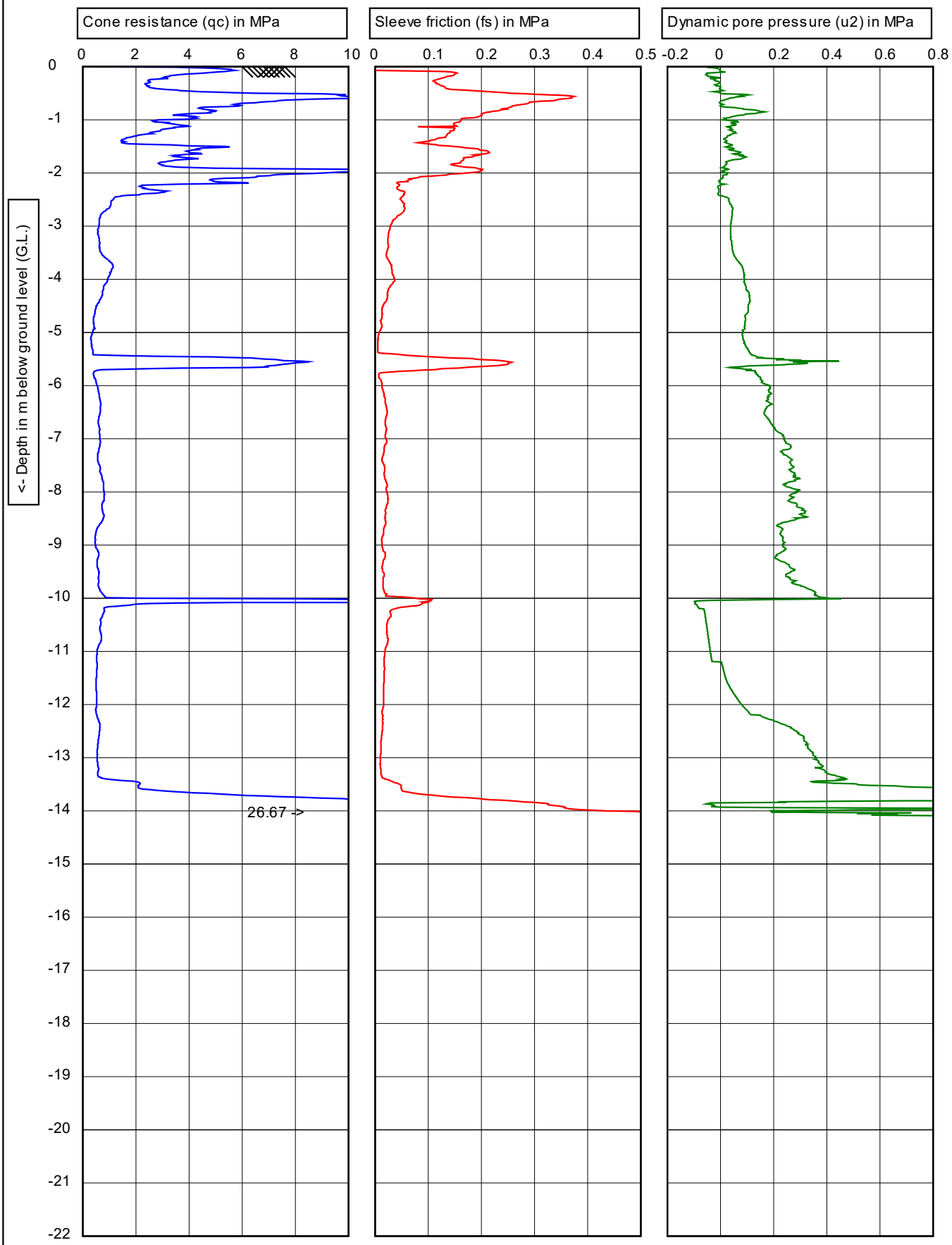
Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-1.50 m**

Project: **Surf Park Site (P-002405)**
Location: **Dairy Flat - Auckland**
Position: **1746952, 5941878 NZTM**

Predrill: **0.00 m Predrilled**
Date: **19/08/2025**
Cone no.: **C10CFIIP.C241654**
Project no.: **2-68207.00_HA15435**
CPT no.: **124** **1/6**

1.49




Refusal 10t.

EOH - Dipped - Collapsed Dry @ 0.8m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

Location: **Dairy Flat - Auckland**

Position: **1746076, 5941909 NZTM**

Predrill: **0.00 m Predrilled**

Date: **20/08/2025**

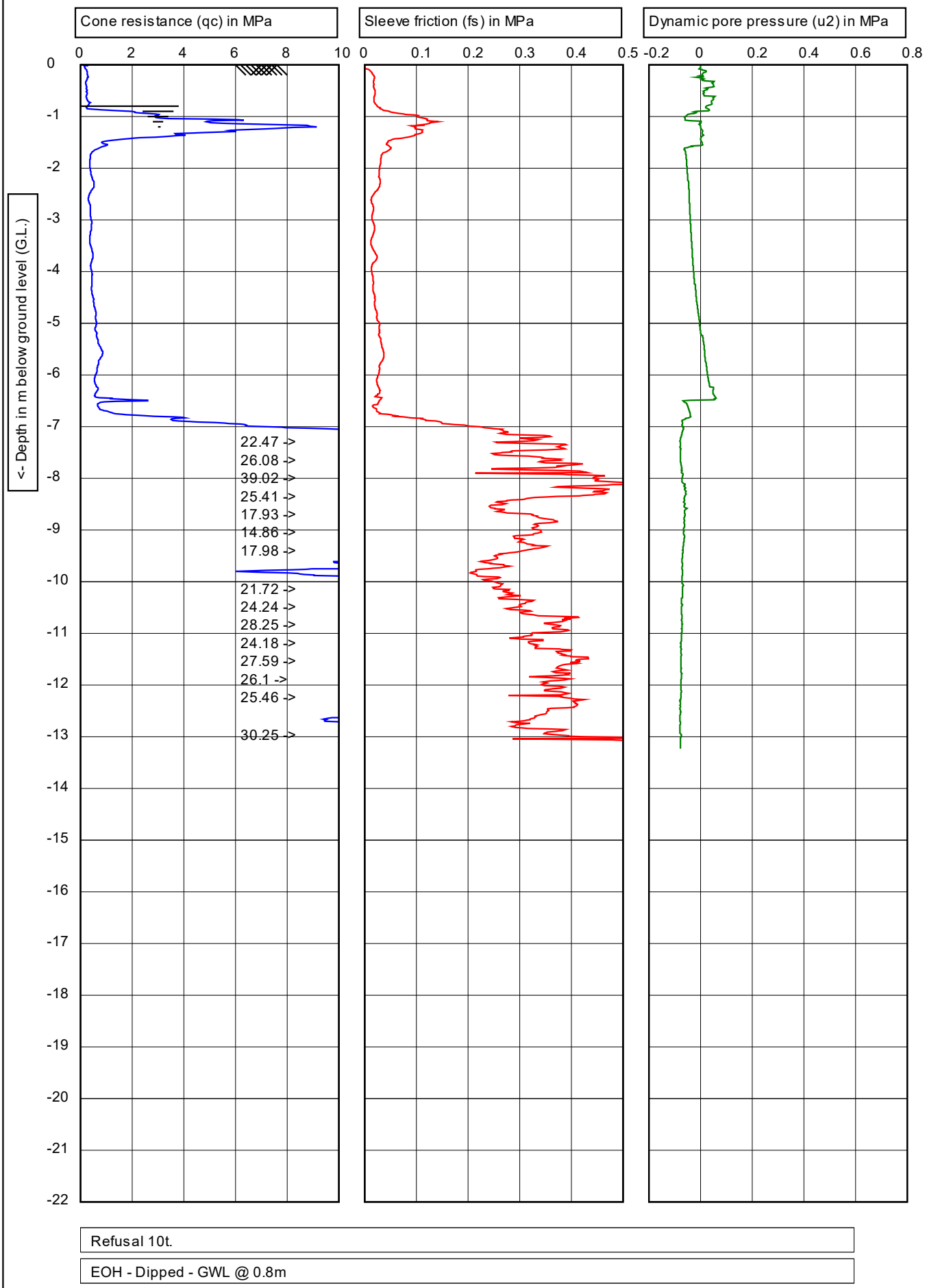
Cone no.: **C10CFIIP.C241654**

Project no.: **2-68207.00_HA15435**

CPT no.: **125**



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-0.80 m**

Project: **Surf Park Site (P-002405)**

Location: **Dairy Flat - Auckland**

Position: **1746999, 5941932 NZTM**

Predrill: **0.00 m Predrilled**

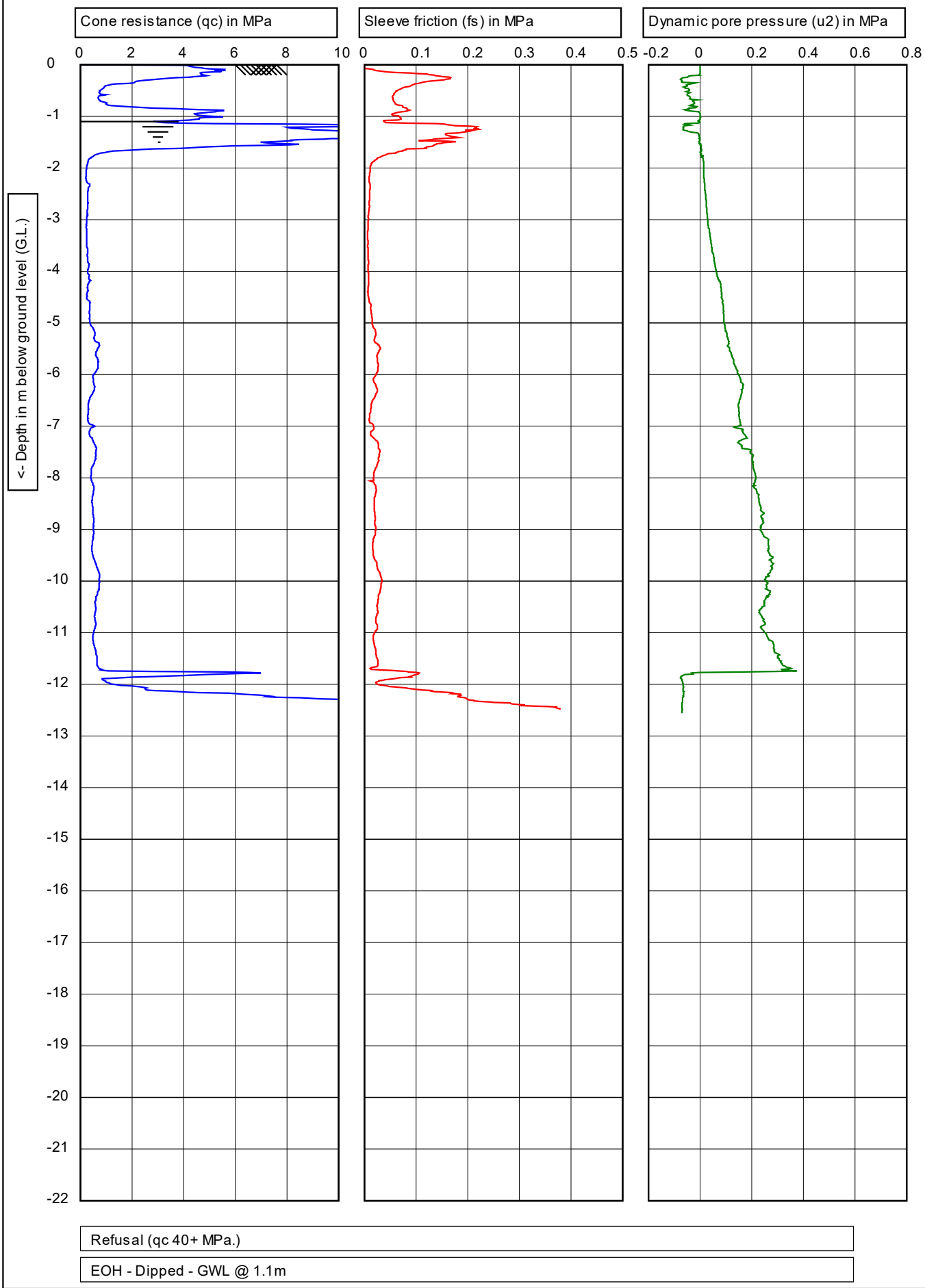
Date: **21/08/2025**

Cone no.: **C10CFIIP.C21094**

Project no.: **2-68207.00_HA15435**

CPT no.: **126** **1/6**

1.49




Refusal (qc 40+ MPa.)

EOH - Dipped - GWL @ 1.1m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-1.10 m**

Project: **Surf Park Site (P-002405)**

Location: **Dairy Flat - Auckland**

Position: **1747040, 5941846 NZTM**

Predrill: **0.00 m Predrilled**

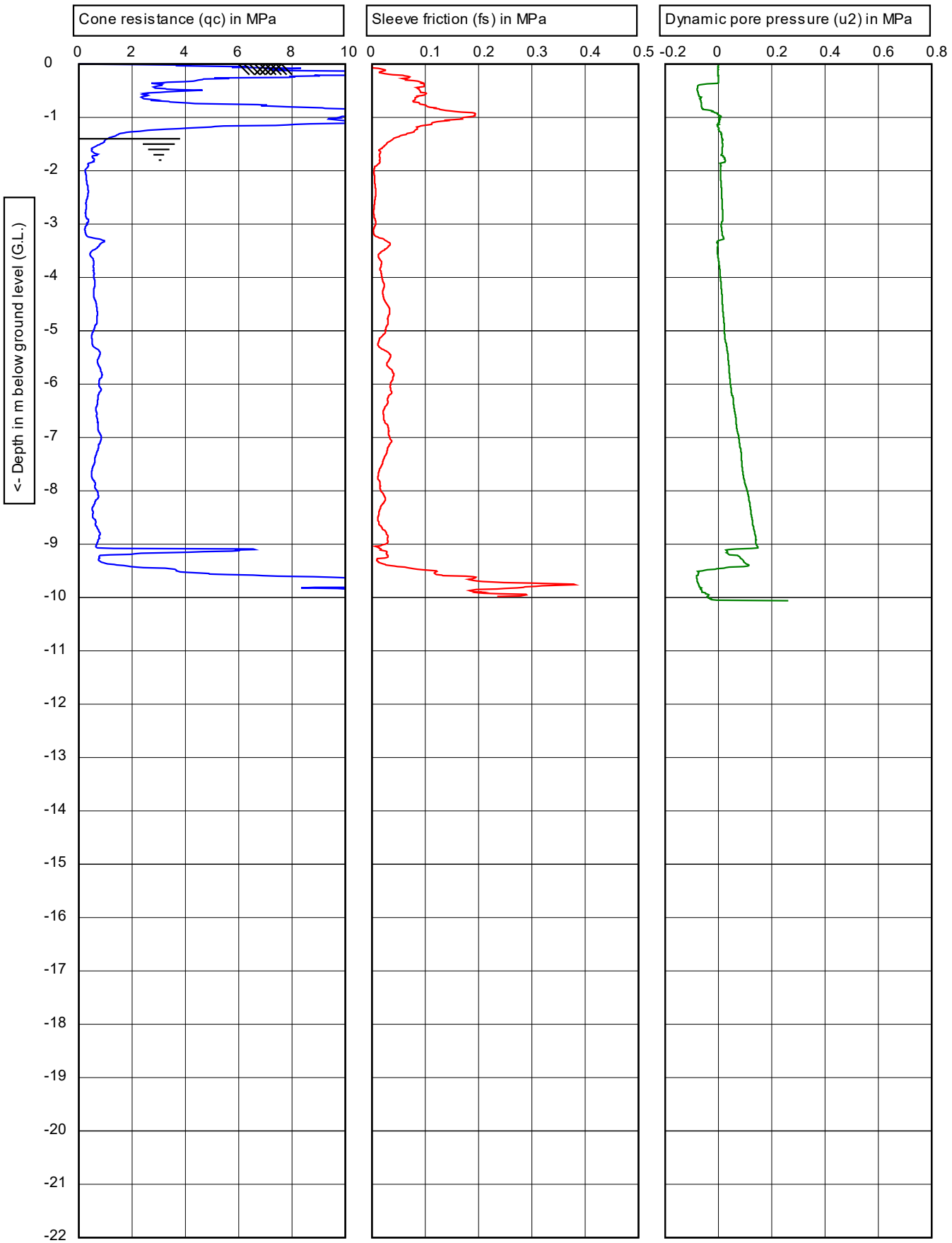
Date: **19/08/2025**

Cone no.: **C10CFIIP.C21094**

Project no.: **2-68207.00_HA15435**

CPT no.: **127** **1/6**

1.49




Refusal (qc/inclination)

EOH - Dipped - GWL @ 1.4m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-1.40 m**

Project: **Surf Park Site (P-002405)**

Location: **Dairy Flat - Auckland**

Position: **1747040, 5941799 NZTM**

Predrill: **0.00 m Predrilled**

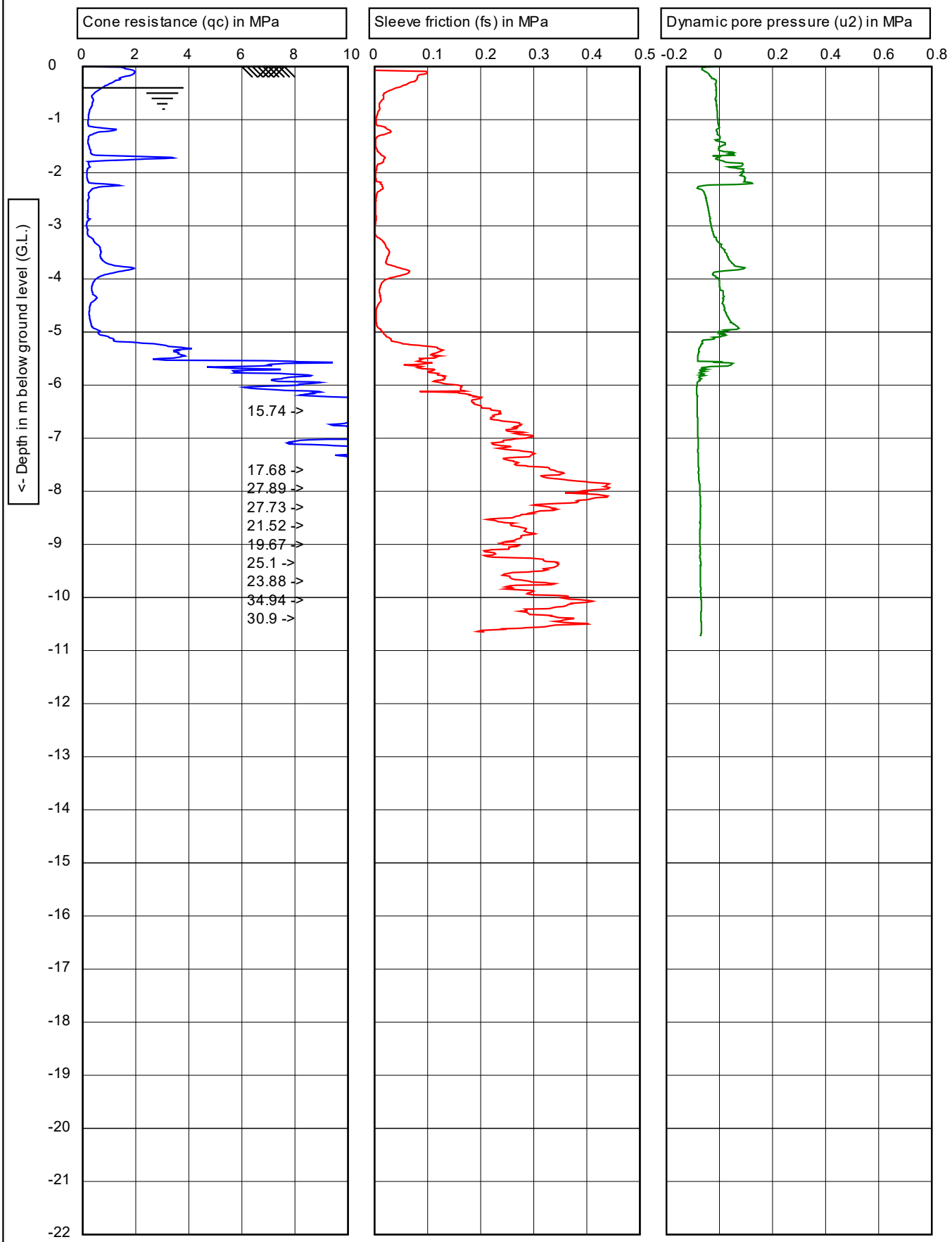
Date: **19/08/2025**

Cone no.: **C10CFIIP.C241654**

Project no.: **2-68207.00_HA15435**

CPT no.: **128** **1/6**

1.49




wsp

ACCREDITED IANZ TESTING LABORATORY

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-0.40 m**

Project: **Surf Park Site (P-002405)**

Location: **Dairy Flat - Auckland**

Position: **1747119, 5941965 NZTM**

Predrill: **0.00 m Predrilled**

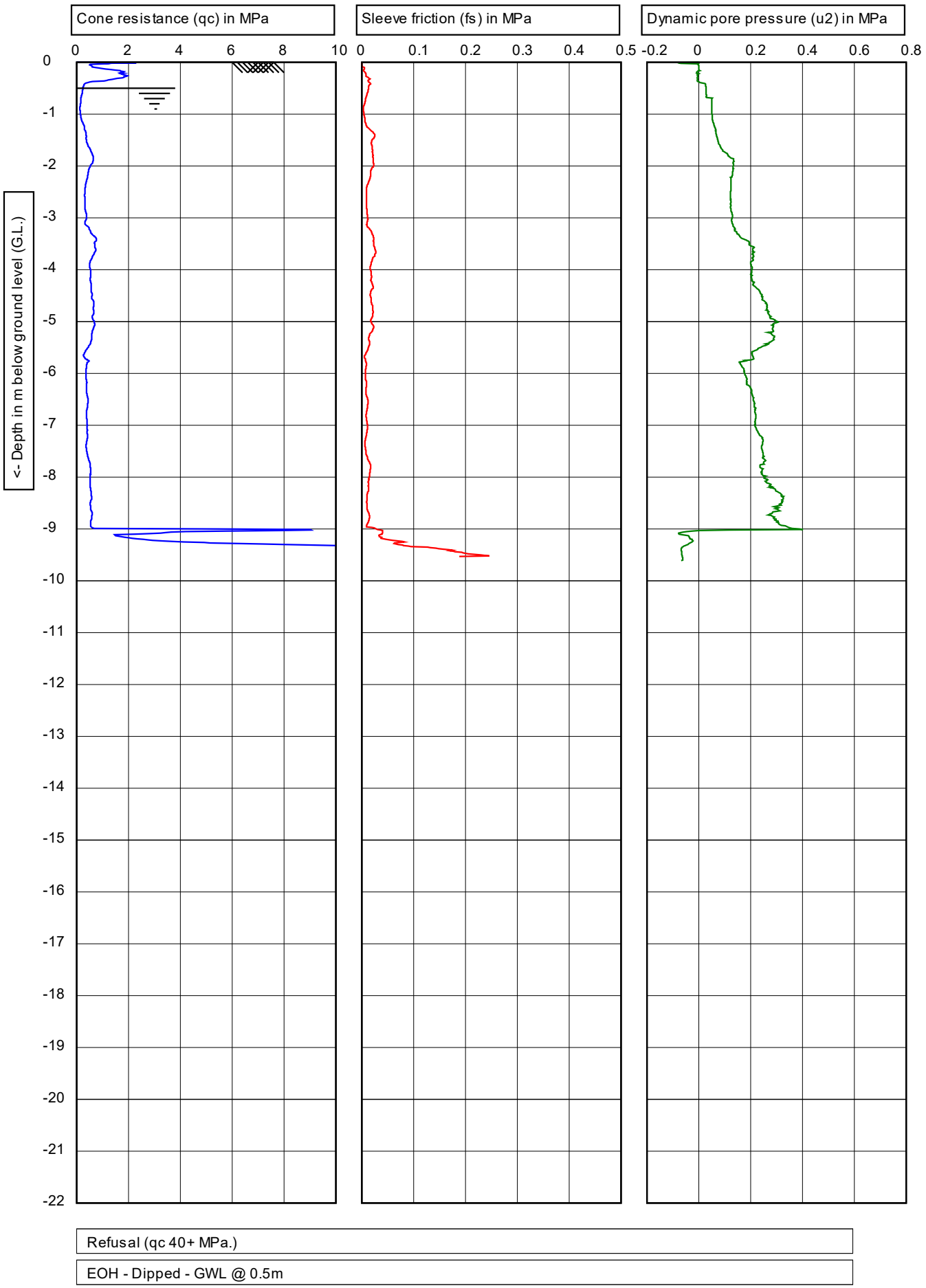
Date: **19/08/2025**

Cone no.: **C10CFIIP.C241654**

Project no.: **2-68207.00_HA15435**

CPT no.: **129** **1/6**

1.49




Refusal (qc 40+ MPa.)

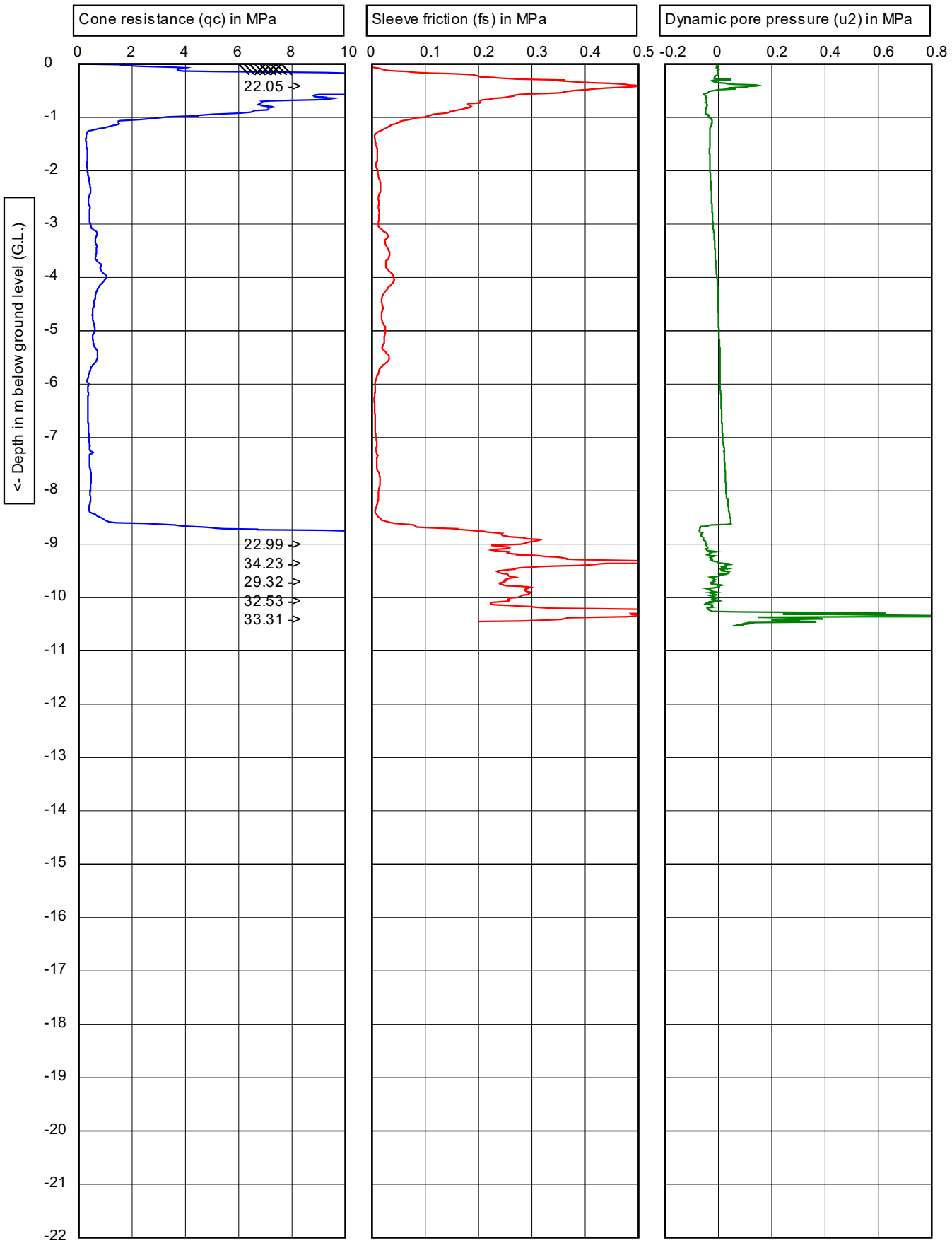
EOH - Dipped - GWL @ 0.5m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

| | | | |
|---|---|---|---|
| Method:ASTM D5778-20&ISO 22476:1:2012cor.2013 | | Predrill: | **0.00 m Predrilled** |
| G.L.: **0.00 m MSL** | W.L.: **-0.50 m** | Date: | **21/08/2025** |
| Project: **Surf Park Site (P-002405)** | | Cone no.: | **C10CFIIP.C241654** |
| Location: **Dairy Flat - Auckland** | | Project no.: | **2-68207.00_HA15435** |
| Position: **1747094, 5942013 NZTM** | | CPT no.: | **131** **1/6** |

1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

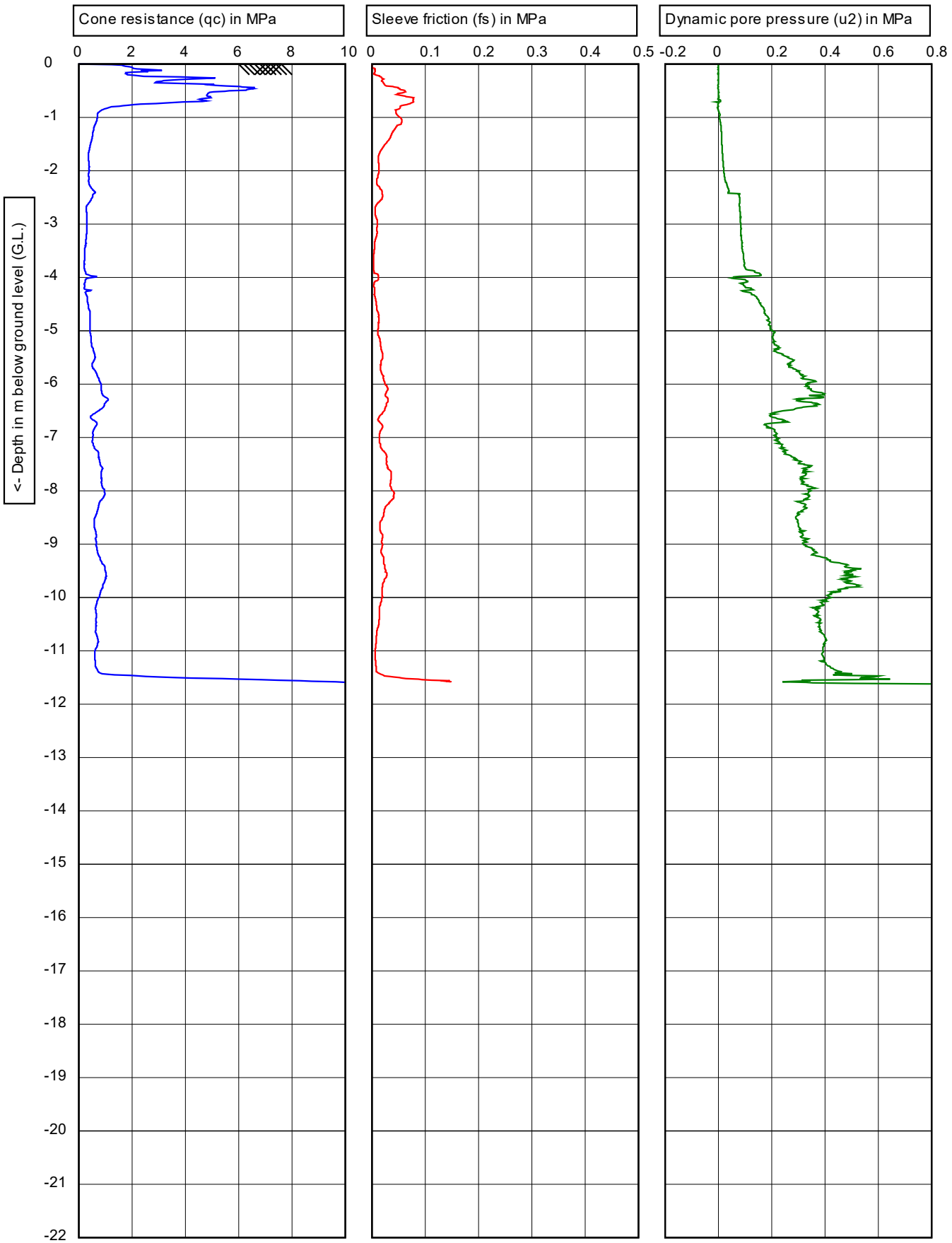
Location: **Dairy Flat - Auckland**

Position: **1747164, 5942022 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **19/08/2025** |
| Cone no.: | **C10CFIIP.C241654** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **132** |



1.49




Refusal (qc 40+ MPa.)

EOH - Dipped - Collapsed Dry @ 1.0m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

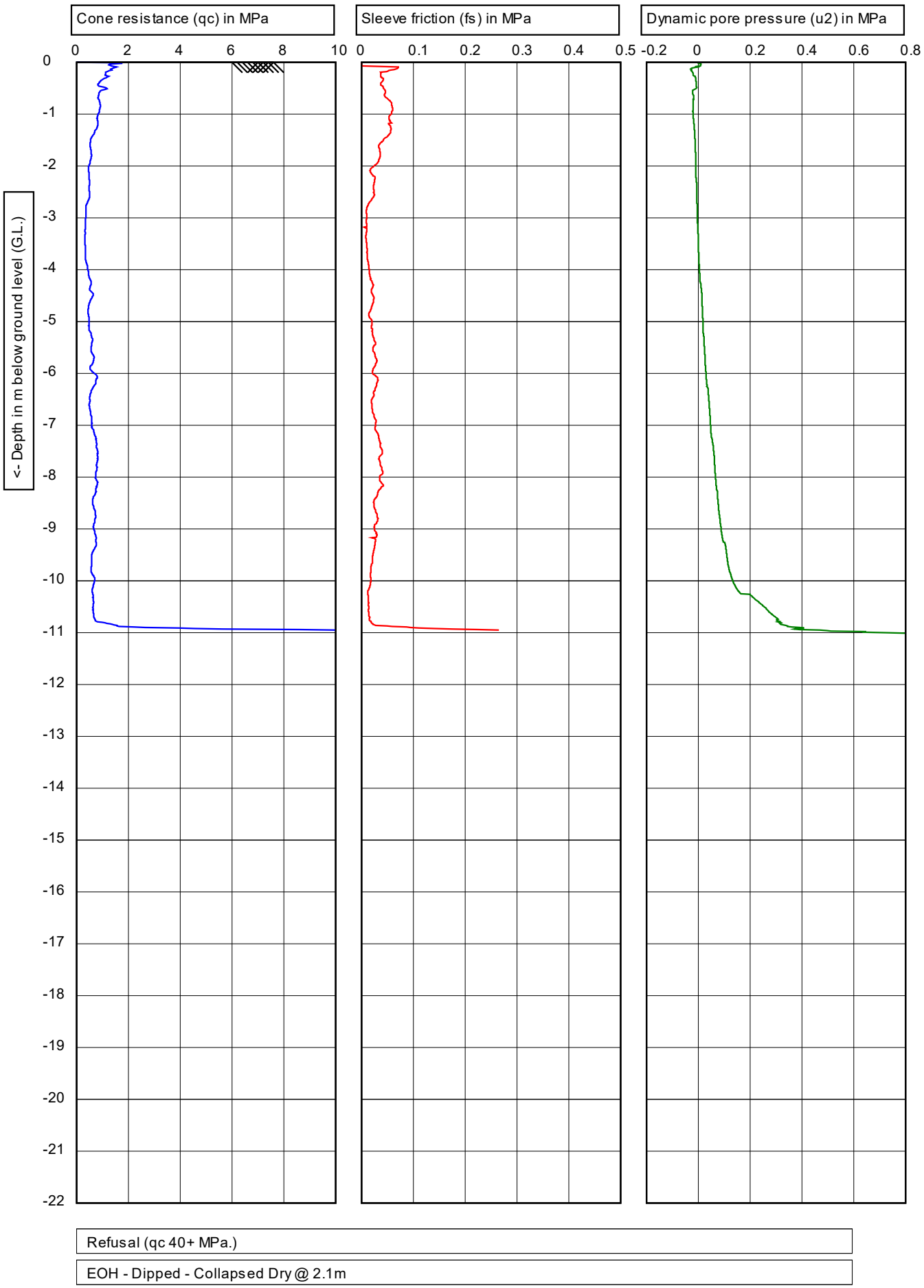
Location: **Dairy Flat - Auckland**

Position: **1747004, 5942046 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **21/08/2025** |
| Cone no.: | **C10CFIIP.C241654** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **133** |



1.49




Refusal (qc 40+ MPa.)

EOH - Dipped - Collapsed Dry @ 2.1m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

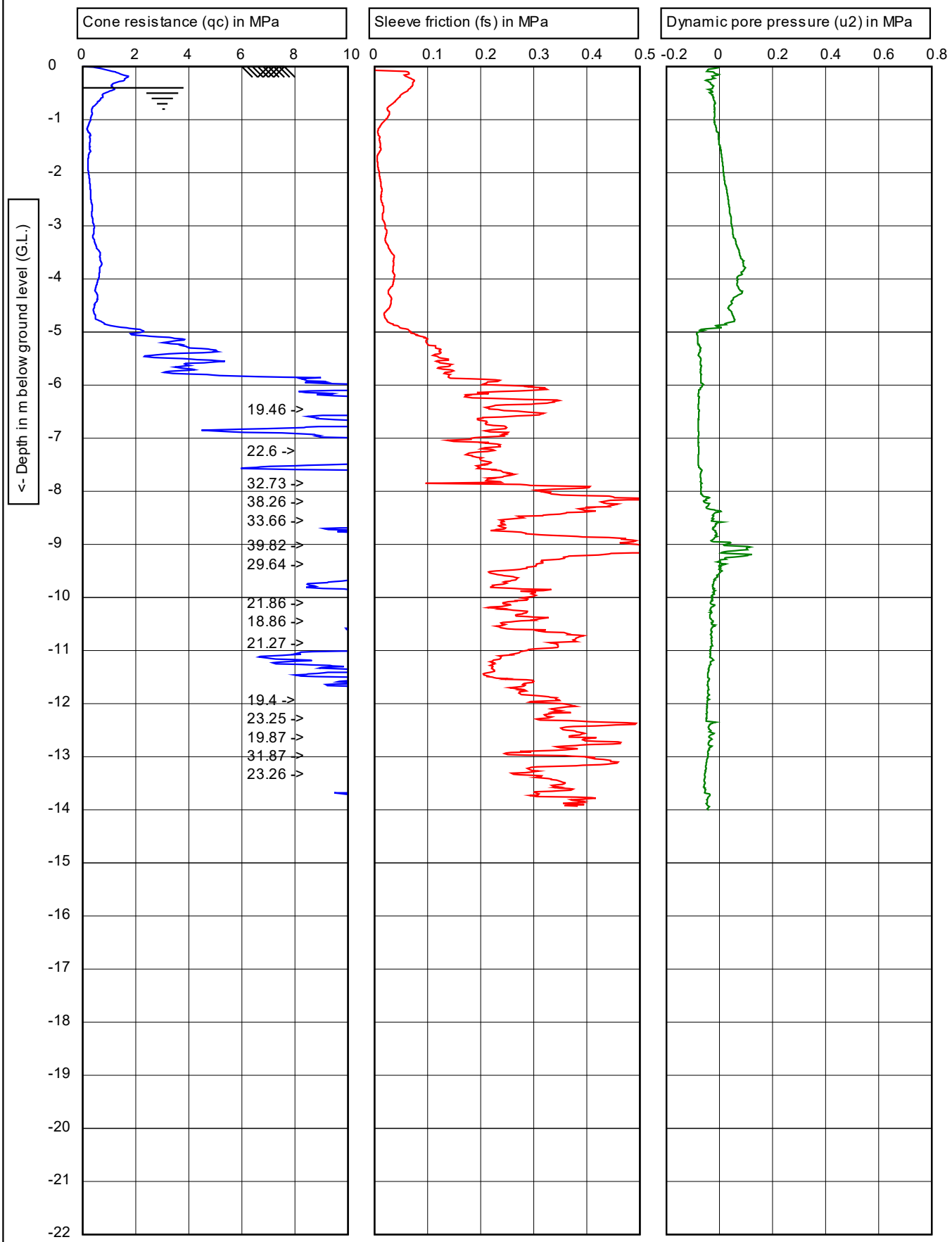
Location: **Dairy Flat - Auckland**

Position: **1746992, 5942135 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **21/08/2025** |
| Cone no.: | **C10CFIIP.C21094** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **134** |



1.49




Refusal 10t.

EOH - Dipped - GWL @ 0.4m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL** W.L.: **-0.40 m**

Project: **Surf Park Site (P-002405)**

Location: **Dairy Flat - Auckland**

Position: **1747167, 5941967 NZTM**

Predrill: **0.00 m Predrilled**

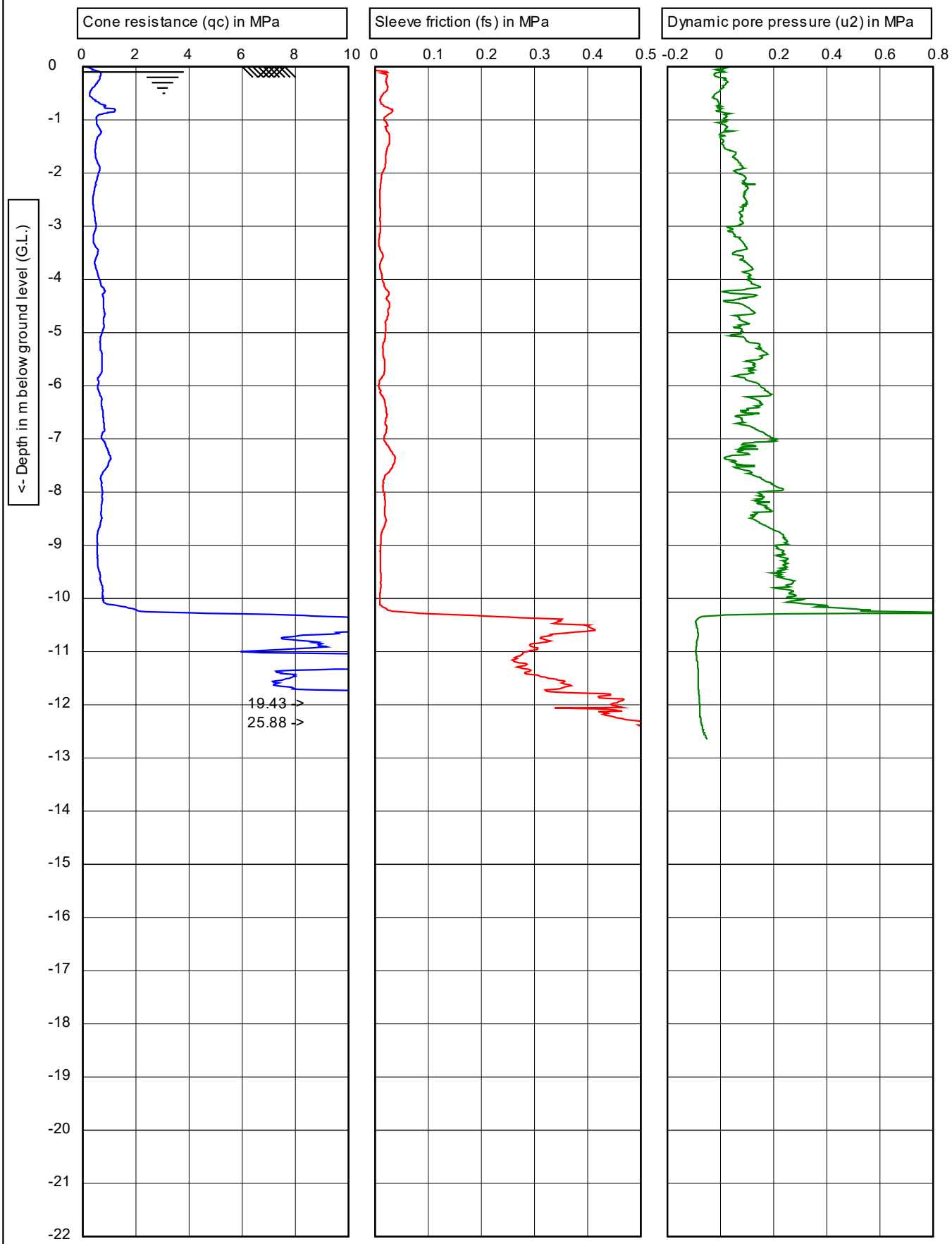
Date: **19/08/2025**

Cone no.: **C10CFIIP.C21094**

Project no.: **2-68207.00_HA15435**

CPT no.: **135** **1/6**

1.49

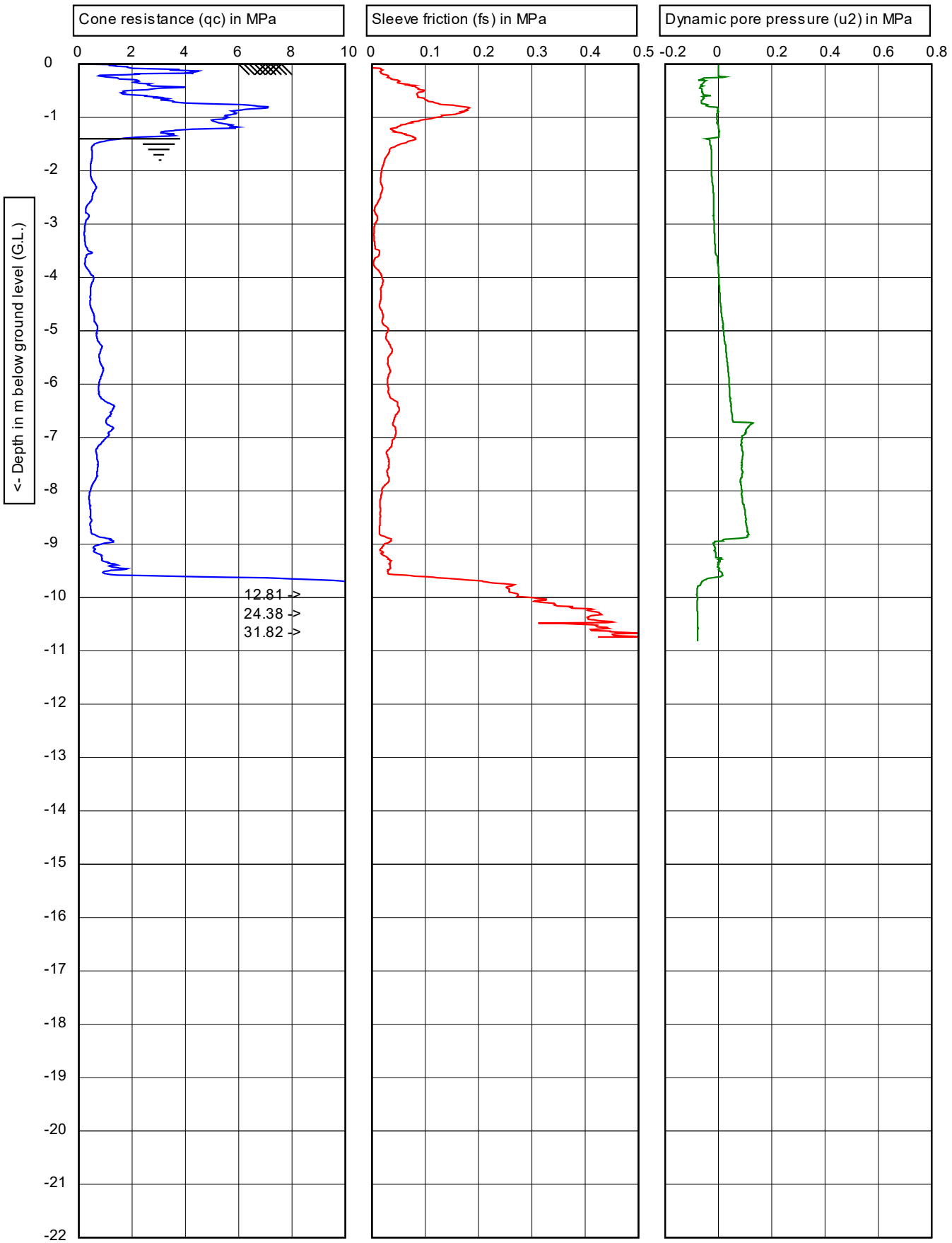



Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2
150 cm²
10 cm²

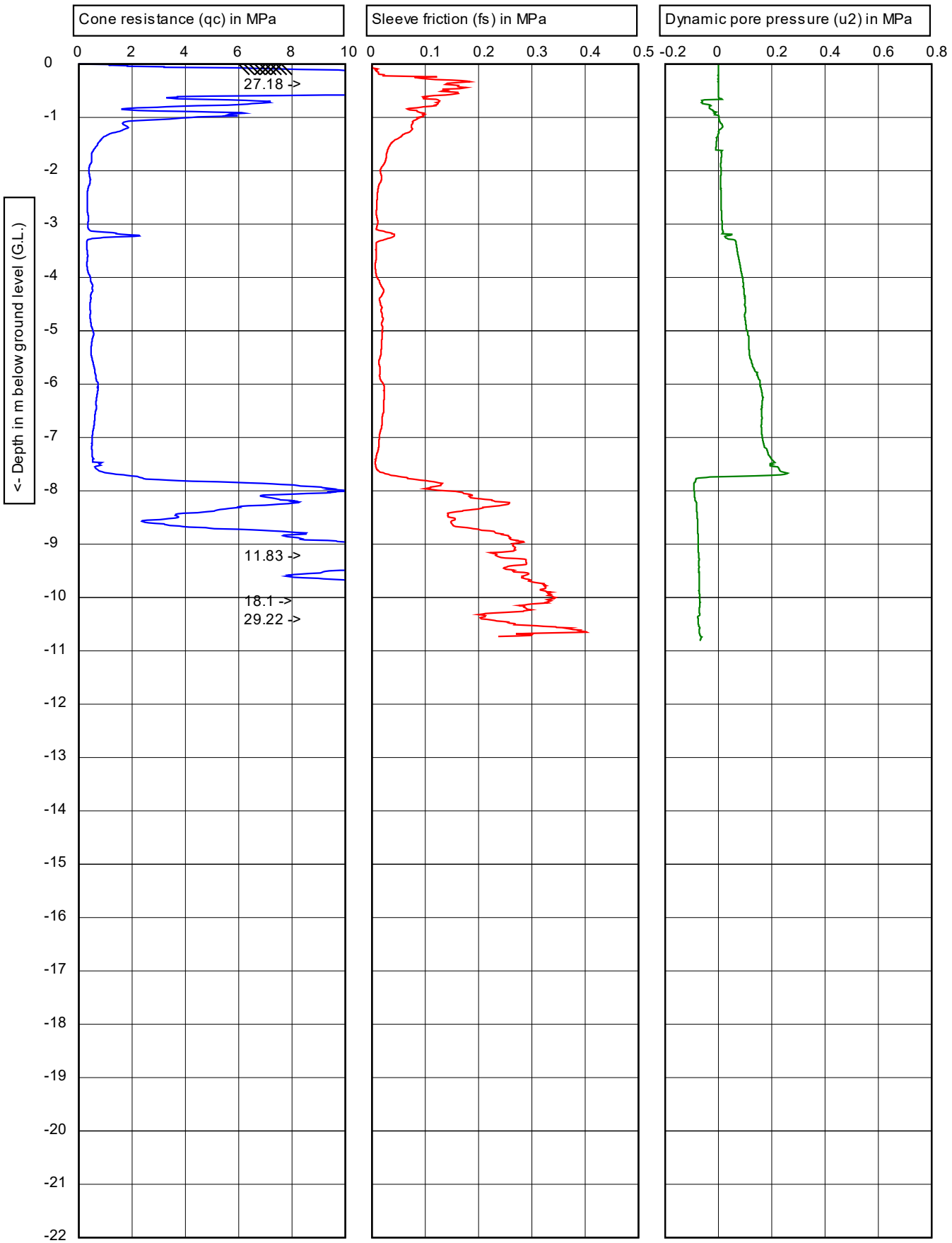
| | | | |
|---|---|---|---|
| Method:ASTM D5778-20&ISO 22476:1:2012cor.2013 | | Predrill: | **0.00 m Predrilled** |
| G.L.: **0.00 m MSL** | W.L.: **-0.10 m** | Date: | **21/08/2025** |
| Project: **Surf Park Site (P-002405)** | | Cone no.: | **C10CFIIP.C241654** |
| Location: **Dairy Flat - Auckland** | | Project no.: | **2-68207.00_HA15435** |
| Position: **1746874, 5942176 NZTM** | | CPT no.: | **136** 1/6 |

1.49




| | | | |
|---|---|---|---|
| wsp ACCREDITED IANZ TESTING LABORATORY. Test results indicated as not accredited are outside the scope of the laboratory's accreditation | u2 150 cm² 10 cm² | Method:ASTM D5778-20&ISO 22476:1:2012cor.2013 | Predrill: **0.00 m Predrilled** |
| | | G.L.: **0.00 m MSL** W.L.: **-1.40 m** | Date: **19/08/2025** |
| | Project: **Surf Park Site (P-002405)** | | Cone no.: **C10CFIIP.C21094** |
| | Location: **Dairy Flat - Auckland** | | Project no.: **2-68207.00_HA15435** |
| | Position: **1747077, 5941906 NZTM** | | CPT no.: **137** **1/6** |

1.49




Refusal 10t.

EOH - Dipped - Collapsed Dry @ 0.5m

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

u2 150 cm² 10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013

G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**

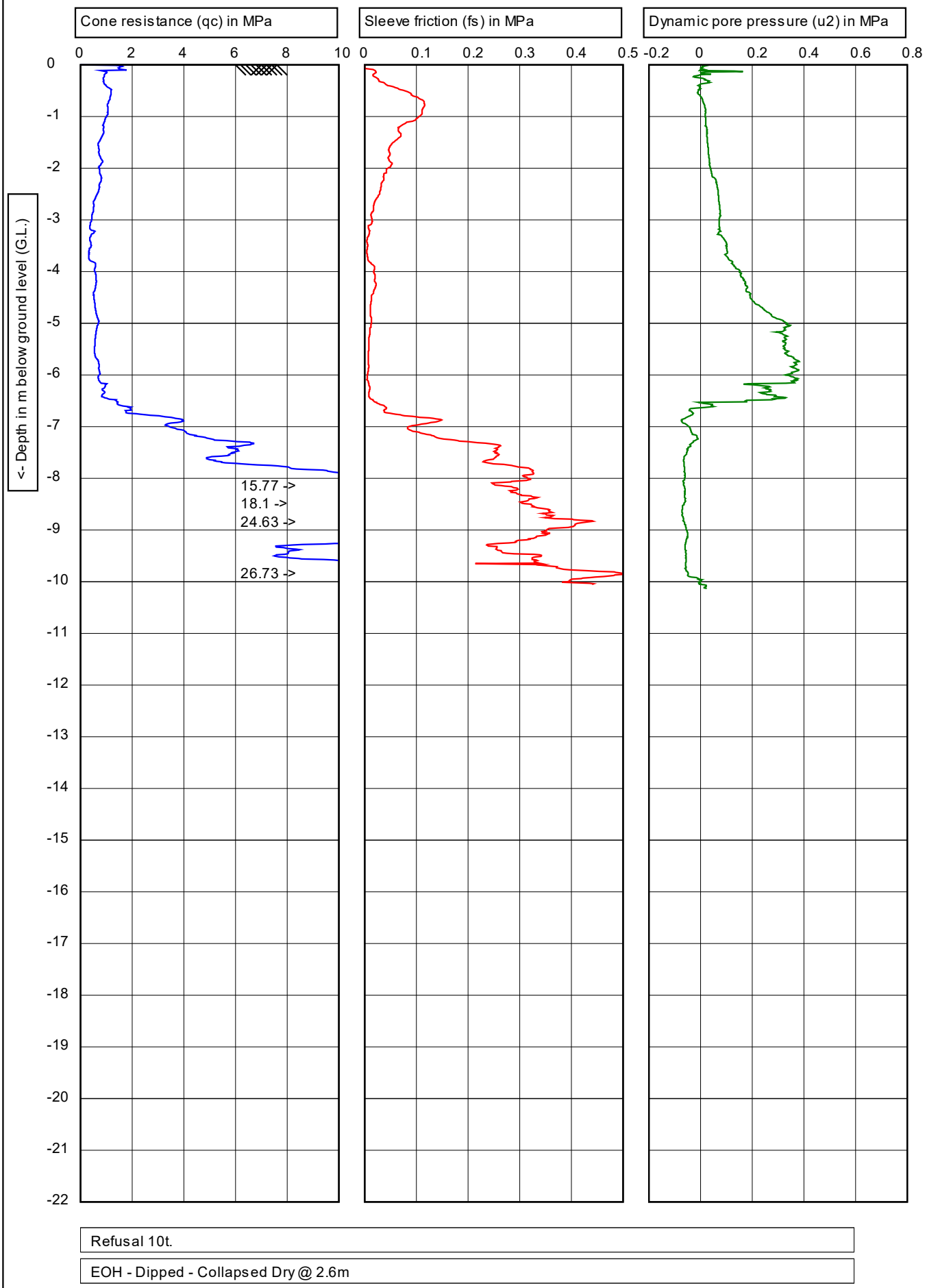
Location: **Dairy Flat - Auckland**

Position: **1747302, 5942127 NZTM**

| | |
|---|---|
| Predrill: | **0.00 m Predrilled** |
| Date: | **19/08/2025** |
| Cone no.: | **C10CFIIP.C241654** |
| Project no.: | **2-68207.00_HA15435** |
| CPT no.: | **138** |



1.49




Test results indicated as not accredited are outside the scope of the laboratory's accreditation

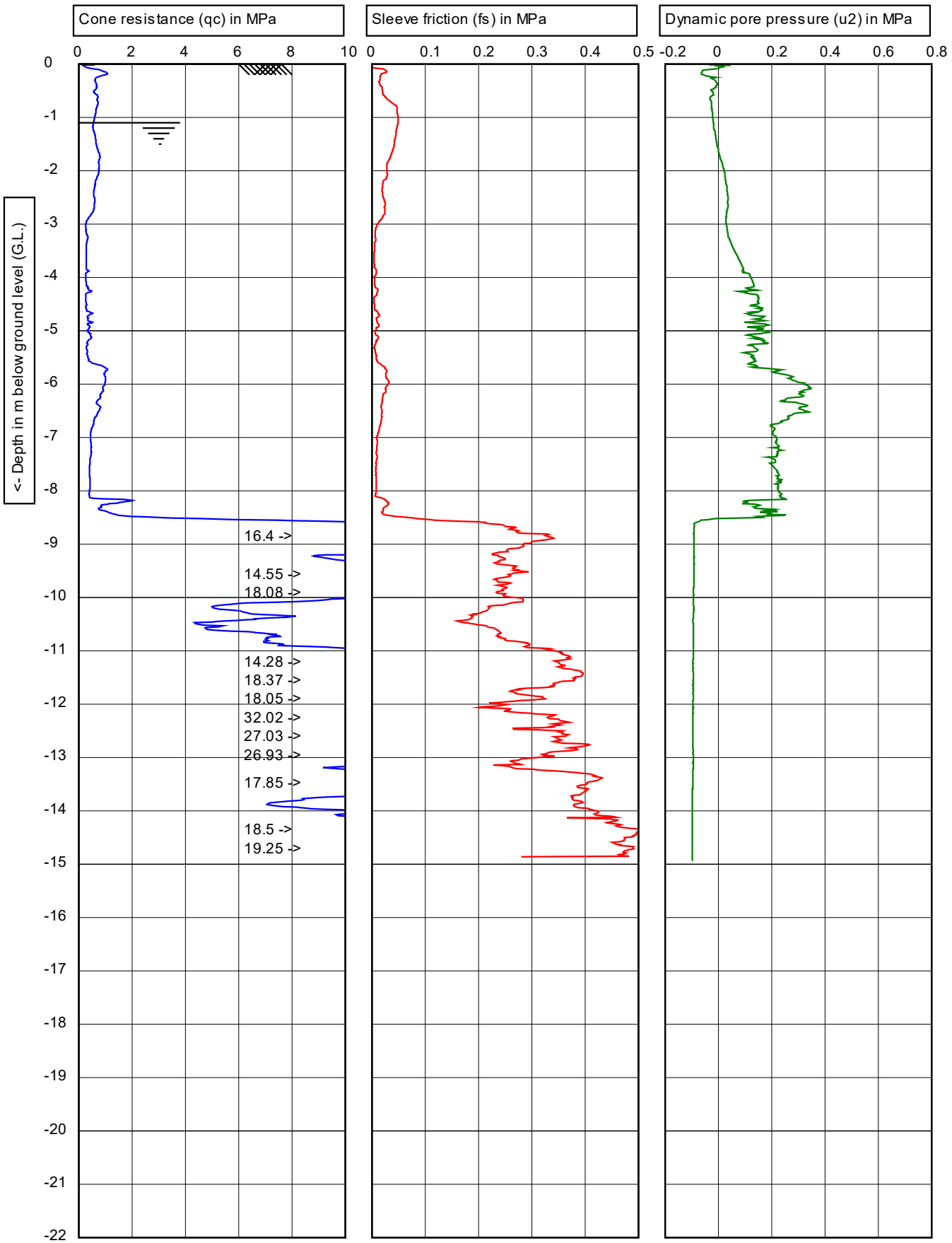
u2
150 cm²
10 cm²

Method:ASTM D5778-20&ISO 22476:1:2012cor.2013
G.L.: **0.00 m MSL**

Project: **Surf Park Site (P-002405)**
Location: **Dairy Flat - Auckland**
Position: **1746912, 5942275 NZTM**

Predrill: **0.00 m Predrilled**
Date: **20/08/2025**
Cone no.: **C10CFIIP.C241654**
Project no.: **2-68207.00_HA15435**
CPT no.: **139** **1/6**

1.49




| | | | |
|---|---|---|---|
| Method:ASTM D5778-20&ISO 22476:1:2012cor.2013 | | Predrill: | **0.00 m Predrilled** |
| G.L.: **0.00 m MSL** | W.L.: **-1.10 m** | Date: | **20/08/2025** |
| Project: | **Surf Park Site (P-002405)** | Cone no.: | **C10CFIIP.C21094** |
| Location: | **Dairy Flat - Auckland** | Project no.: | **2-68207.00_HA15435** |
| Position: | **1746773, 5942138 NZTM** | CPT no.: | **140** 1/6 |

Test results indicated as not accredited are outside the scope of the laboratory's accreditation

1.49

# Appendix C Historic Investigation Logs

# HAND AUGER LOG

HOLE Id: **HA01P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942131 mN (NZTM2000) 1746998 mE | DRILL TYPE: 75mm Auger | HOLE STARTED: 03/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 03/05/2022 |
| R.L.: 55m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: SCZH CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VSt H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | D | VSt | | *0.00m:* Clayey SILT; brown. Very stiff, dry, low plasticity. Trace of rootlets[Topsoil] |
| Tauranga Group | DRY 03/05/2022 | 100 | HA | | 140/36 kPa Insitu<br>176/63 kPa Insitu<br>170/45 kPa Insitu<br>123/45 kPa Insitu<br>120/69 kPa Insitu<br>78/36 kPa Insitu<br>78/51 kPa Insitu<br>63/36 kPa Insitu<br>36/27 kPa Insitu<br>27/9 kPa Insitu<br>66/24 kPa Insitu<br>21/12 kPa Insitu | | 54 53 52 51 50 49 | 1 2 3 4 5 6 | | | M | | | *0.30m:* Clayey SILT; light grey motted orange. Very stiff, moist, medium plasticity. |
| | | | | | | | | | | | | St | | *1.50m:* Silty CLAY; grey. Stiff, moist, high plasticity. Trace of organics and rootlets. |
| | | | | | | | | | | | W | F | | *2.90m:* Organic CLAY, some silt; black motted grey. Firm, wet, high plasticity. Organic, decomposed. |
| | | | | | | | | | | | M | F-St | | *3.10m:* Silty CLAY; dark grey. Firm to stiff, moist, high plasticity.<br>*3.60m:* Light grey |
| | | 0 | DCP | | | | | | | | | | | *4.00m:* Scala penetrometer testing |
| | | | | | | | 8 | | | | | | | 6m: Target depth |

0.0-4.0m

COMMENTS: Piezo installed between 0.2 - 3.5 m bgl; sand 0.2 - 4.0 m bgl; bentonite 0 - 0.2 m bgl; flush toby box

**Hole Depth** 6m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:15 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA01P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|
| CO-ORDINATES: 5942131 mN (NZTM2000) 1746998 mE<br>R.L.: 55m<br>DATUM: AUCKHT1946 | DRILL TYPE: 75mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 03/05/2022<br>HOLE FINISHED: 03/05/2022<br>DRILLED BY: T+T<br>LOGGED BY: SCZH CHECKED: ROM |



0.00-4.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:15 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA02**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942106 mN (NZTM2000) 1746956 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 02/05/2022 |
| R.L.: 55m | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 03/05/2022 |
| DATUM: AUCKHT1946 | | DRILLED BY: T+T |
| | | LOGGED BY: SCZH CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | ENGINEERING DESCRIPTION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VSt H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | VSt | | *0.00m:* Clayey SILT; light brown. Very stiff, moist, medium plasticity. |
| | | | | | | | | | | | | | | *0.20m:* Silty CLAY; light brown. Very stiff, moist, high plasticity. |
| | | | | | 185/54 kPa Insitu | | 54 | 1 | | | | | | |
| | | | | | 146/51 kPa Insitu | | | | | | | | | |
| | | | | | 146/39 kPa Insitu | | | | | | | | | |
| | | | | | 137/69 kPa Insitu | | | | | | | | | *1.20 - 1.60m:* Streaked orange |
| | | | | | 146/72 kPa Insitu | | | | | | | | | |
| | | | | | 123/60 kPa Insitu | | 53 | 2 | | | | | | |
| Tauranga Group | | 100 | HA | | 179/66 kPa Insitu | | | | | | | | | |
| | | | | | 164/75 kPa Insitu | | | | | | | | | |
| | | | | | 111/48 kPa Insitu | | | | | | | | | *2.60m:* Colour change to greyish brown |
| | | | | | 137/57 kPa Insitu | | 52 | 3 | | | | St | | *3.00m:* Silty CLAY, minor organics; brown. Stiff, moist, medium plasticity. Organics, decomposed. |
| | | | | | 72/45 kPa Insitu | | | | | | | | | |
| | | | | | 72/36 kPa Insitu | | | | | | | | | *3.50m:* Silty CLAY; light grey. Stiff, moist, high plasticity. |
| | DRY 02/05/2022 | | | | 81/33 kPa Insitu | | 51 | 4 | | | | | | |
| | | 0 | DCP | | | | | | | | | | | *4.00m:* Scala penetrometer testing. |
| | | | | | | | 50 | 5 | | | | | | |
| | | | | | | | | | | | | | | 6m: Target depth |
| | | | | | | | 49 | 6 | | | | | | |
| | | | | | | | 48 | | | | | | | |

0.0-4.0m

COMMENTS:

**Hole Depth** 6m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:22 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA02**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|
| CO-ORDINATES: 5942106 mN (NZTM2000) 1746956 mE<br>R.L.: 55m<br>DATUM: AUCKHT1946 | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 02/05/2022<br>HOLE FINISHED: 03/05/2022<br>DRILLED BY: T+T<br>LOGGED BY: SCZH CHECKED: ROM |



0.00-4.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:22 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA03P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942063 mN (NZTM2000) 1746900 mE | DRILL TYPE: 75mm Auger | HOLE STARTED: 04/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 04/05/2022 |
| R.L.: 55m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: SCZH CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) / DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Topsoil | | | | | | | | TS | | M | St | | *0.00m:* Clayey SILT, trace rootlets; dark brown. Stiff, moist, low to medium plasticity. |
| | | | | | | | | | | | | | *0.20m:* SILT, minor clay; dark brown. Stiff, moist, medium plasticity. |
| | | | | | | | | | | | | | *0.50m:* Silty CLAY; light grey motted yellow. Stiff, moist, high plasticity. Trace of organics. |
| Tauranga Group | DRY 04/05/2022 | 100 | HA | | 93/21 kPa Insitu<br>81/39 kPa Insitu<br>66/33 kPa Insitu<br>63/30 kPa Insitu<br>60/33 kPa Insitu<br>66/24 kPa Insitu<br>66/21 kPa Insitu<br>60/18 kPa Insitu<br>51/30 kPa Insitu<br>78/48 kPa Insitu<br>51/30 kPa Insitu<br>48/21 kPa Insitu<br>63/33 kPa Insitu | | 54 1 53 2 52 3 51 4 50 5 49 6 48 | | | | | | *2.10m:* Grades dark grey |
| | | | | | | | | | | W | | | *3.00m:* Organics silty CLAY; brown. Stiff, wet, high plasticity. Organics, wood fragments (decomposed). |
| | | | | | | | | | | M | F-St | | *3.20m:* Silty CLAY; dark grey. Firm to stiff, moist, high plasticity. |
| | | | | | | | | | | | | | *3.80m:* Grades light grey |
| | | 300 | DCP | | | | | | | | | | *4.00m:* Scala penetrometer testing. |
| | | | | | | | | | | | | | 6m: Target depth |

0.0-4.0m

COMMENTS: Piezo installed between 0.2 - 4.0 m bgl; sand 0.2 - 4.0 m bgl; bentonite 0 - 0.2 m bgl; flush toby box

**Hole Depth** 6m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:29 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA03P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|
| CO-ORDINATES: 5942063 mN (NZTM2000) 1746900 mE<br>R.L.: 55m<br>DATUM: AUCKHT1946 | DRILL TYPE: 75mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 04/05/2022<br>HOLE FINISHED: 04/05/2022<br>DRILLED BY: T+T<br>LOGGED BY: SCZH CHECKED: ROM |



0.00-4.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:29 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA04P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000

CO-ORDINATES: (NZTM2000) 5942039 mN, 1746836 mE

R.L.: 55m

DATUM: AUCKHT1946

DRILL TYPE: 50mm Auger

METHOD: Hand auger with dynamic cone

HOLE STARTED: 03/05/2022

HOLE FINISHED: 03/05/2022

DRILLED BY: T+T

LOGGED BY: CATA CHECKED: ROM

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VSt H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | St | | *0.00m:* SILT, minor clay; dark brown. Stiff, moist. (TOPSOIL). |
| | | | | | | | | | | | | | | *0.20m:* SILT, some clay; brown. Stiff, moist, low to medium plasticity. |
| | | | | | 90/35 kPa Insitu | | 55 | 1 | | | | | | *0.60m:* Silty CLAY; yellowish grey brown. Stiff, moist, high plasticity. |
| | | | | | 57/36 kPa Insitu | | | | | | | | | |
| | | | | | 102/39 kPa Insitu | | 54 | 2 | | | M-W | | | *1.40m:* Clayey SILT, minor organics; dark grey. Stiff, moist to wet, medium to high plasticity. Organics, decomposed . |
| Tauranga Group | | 100 | HA | | 60/24 kPa Insitu | | 53 | 3 | | | | | | |
| | 03/05/2022 | | | | 81/33 kPa Insitu | | | | | | | | | |
| | | | | | 63/27 kPa Insitu | | 52 | 4 | | | | | | *4.00m:* Scala penetrometer testing. |
| | | | | | 93/63 kPa Insitu | | | | | | | | | |
| | | | | | 84/57 kPa Insitu | | 51 | 5 | | | | | | |
| | | 0 | DCP | | | | 50 | 6 | | | | | | 6m: END OF HANDAUGER. Target depth reached. |
| | | | | | | | 49 | | | | | | | |

0.0-4.0m

COMMENTS: Piezo installed between 0.2 - 3.5 m bgl; sand 0.2 - 4.0 m bgl; bentonite 0 - 0.2 m bgl; flush toby box

**Hole Depth** 6m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:36 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA04P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5942039 mN<br>1746836 mE | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 03/05/2022<br>HOLE FINISHED: 03/05/2022 |
| R.L.: | 55m | | DRILLED BY: T+T |
| DATUM: | AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |




0.00-4.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:36 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA05**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 2

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942122 mN (NZTM2000) 1746857 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 03/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 03/05/2022 |
| R.L.: 55m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | St | | *0.00m:* Clayey SILT; dark brown. Stiff, moist, medium plasticity. (TOPSOIL). |
| | | | | | | | | | | | | | | *0.20m:* Clayey SILT; dark brown. Stiff, moist, medium plasticity. |
| | | | | | 90/51 kPa Insitu | | | | | | | | | *0.40m:* Silty CLAY; light greyish brown. Stiff, moist, high plasticity. |
| | | | | | 78/45 kPa Insitu | | 54 | 1 | | | | | | |
| | | | | | | | | | | | | F-St | | *1.20m:* Clayey SILT; brownish grey. Firm to stiff, moist, high plasticity. |
| Tauranga Group | | 100 | HA | | 39/18 kPa Insitu | | | | | | | | | |
| | | | | | 45/18 kPa Insitu | | 53 | 2 | | | | | | |
| | | | | | 54/24 kPa Insitu | | | | | | | | | |
| | | | | | 114/48 kPa Insitu | | 52 | 3 | | | | | | *3.00m:* Stiff to very stiff |
| | | | | | 108/87 kPa Insitu | | | | | | | | | |
| | DRY 03/05/2022 | | | | 99/57 kPa Insitu | | 51 | 4 | | | | | | 0.0-4.0m |
| | | | | | | | | | | | | | | *4.00m:* Scala penetrometer testing. |
| | | | | | | | 50 | 5 | | | | | | |
| | | | | | | | 49 | 6 | | | | | | |
| | | | | | | | 48 | | | | | | | |

COMMENTS:

**Hole Depth** 8.25m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:43 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA05**

**Hole Location:** 1350 Dairy Flat Highway



| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942122 mN (NZTM2000) 1746857 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 03/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 03/05/2022 |
| R.L.: 55m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| | | 0 | DCP | | | | 47 | 8 | | | | | | [CONT] *4.00m:* Scala penetrometer testing. |
| | | | | | | | 46 | 9 | | | | | | 8.25m: Effective refusal |
| | | | | | | | 45 | 10 | | | | | | |
| | | | | | | | 44 | 11 | | | | | | |
| | | | | | | | 43 | 12 | | | | | | |
| | | | | | | | 42 | 13 | | | | | | |
| | | | | | | | 41 | | | | | | | |

COMMENTS:

**Hole Depth** 8.25m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:43 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA05**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|
| CO-ORDINATES: 5942122 mN (NZTM2000) 1746857 mE<br>R.L.: 55m<br>DATUM: AUCKHT1946 | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 03/05/2022<br>HOLE FINISHED: 03/05/2022<br>DRILLED BY: T+T<br>LOGGED BY: CATA CHECKED: ROM |




0.00-4.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:43 pm - Produced with Core-GS by GeRoc

Tonkin+Taylor

# HAND AUGER LOG

HOLE Id: **HA06**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000

CO-ORDINATES: 5941998 mN, 1746939 mE (NZTM2000)
R.L.: 55m
DATUM: AUCKHT1946

DRILL TYPE: HA 50 mm & DCP
METHOD: Hand auger with dynamic cone

HOLE STARTED: 02/05/2022
HOLE FINISHED: 02/05/2022
DRILLED BY: T+T
LOGGED BY: KENL CHECKED: ROM

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/100mm) 0 1 2 3 4 5 6 7 8 9 | TESTS | SAMPLES | RL (m) / DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Topsoil | | | | | | | | TS | | M | St | | *0.00m:* Clayey SILT, minor rootlets; dark brown. Stiff, moist, medium plasticity. |
| | 03/05/2022 | | | | 77/35 kPa | | 54 | | | | F-St | | *0.30m:* Silty CLAY; light greyish brown. Firm to stiff, moist, high plasticity. |
| | | | | | 64/35 kPa | | | | | | | | |
| | | | | | 32/16 kPa | | 1 | | | | | | *1.00m:* Silty CLAY; brown. Firm to stiff, moist, medium to high plasticity. |
| | | | | | 38/19 kPa | | 53 | | | | | | |
| | | | | | 80/32 kPa | | | | | | | | |
| | | | | | 32/16 kPa | | | | | | S-F | | *1.60m:* Clayey SILT; brown. Soft to firm, moist, medium to high plasticity. |
| Tauranga Group | | | | | 19/16 kPa | | 2 | | | | | | |
| | | 100 | HA50 | 2 2 | 24/24 kPa | | | | | | | | |
| | | | | 4 | | | 52 | | | | | | *2.40m:* Scala penetrometer testing. |
| | | | | 5 5 | | | | | | | | | |
| | | | | 7 | | | | | | | | | |
| | | | | 5 5 | | | 3 | | | | | | |
| | | 0 | DCP | 6 | | | | | | | | | |
| | | | | 9 9 9 | | | 51 | | | | | | |
| | | | | 8 9 | | | | | | | | | |
| | | | | | | | | | | | | | 3.7m: Effective refusal |
| | | | | | | | 4 | | | | | | |
| | | | | | | | 50 | | | | | | |
| | | | | | | | 5 | | | | | | |
| | | | | | | | 49 | | | | | | |
| | | | | | | | 6 | | | | | | |
| | | | | | | | 48 | | | | | | |

0.0-2.4m

COMMENTS: HA termination due to washout

**Hole Depth** 3.7m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:51 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA06**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5941998 mN<br>1746939 mE | DRILL TYPE: HA 50 mm & DCP<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 02/05/2022<br>HOLE FINISHED: 02/05/2022<br>DRILLED BY: T+T |
| R.L.: | 55m | | LOGGED BY: KENL CHECKED: ROM |
| DATUM: | AUCKHT1946 | | |




0.00-2.40m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:51 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA07**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942260 mN (NZTM2000) 1746807 mE | DRILL TYPE: HA 50 mm & DCP | HOLE STARTED: 03/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 03/05/2022 |
| R.L.: 52m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: KENL CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Tauranga Group | 03/05/2022 | 100 | HA50 | | 82/16 kPa<br>96/40 kPa<br>56/13 kPa<br>30/16 kPa<br>54/19 kPa<br>71/33 kPa | | 51<br>50 | 1<br>2 | | | M<br>W<br>S | F<br>St<br>F-St | | *0.00m:* SILT, minor sand; dark brown. Firm, moist, medium plasticity<br>*0.30m:* Silty CLAY, minor organic flecks; light brown. Stiff, moist, medium to high plasticity.<br>*0.70m:* Clayey SILT, trace sand; dark brown. Firm to stiff, moist, medium plasticity.<br>*0.90m:* Silty CLAY, some organic flecks; brown. Firm to stiff, wet, high plasticity. Organics, decomposed.<br>*1.50m:* Clayey SILT, some organic flecks; brown. Firm to stiff, saturated, medium to high plasticity. Organics, decomposed. 0.0-1.9m |
| | | 0 | DCP | | | | 49<br>48 | 3<br>4 | | | | | | *1.90m:* Scala penetrometer testing.<br>4m: END OF HANDAUGER. Target depth reached. |
| | | | | | | | 47<br>46<br>45 | 5<br>6 | | | | | | |

COMMENTS: HA termination due to washout

**Hole Depth** 4m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:58 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA07**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5942260 mN<br>1746807 mE | DRILL TYPE: HA 50 mm & DCP<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 03/05/2022<br>HOLE FINISHED: 03/05/2022<br>DRILLED BY: T+T |
| R.L.: | 52m | | |
| DATUM: | AUCKHT1946 | | LOGGED BY: KENL CHECKED: ROM |




0.00-1.90m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:13:58 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA08**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 2

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942005 mN (NZTM2000) 1746733 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 09/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 09/05/2022 |
| R.L.: 57m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: SCZH CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VSt H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | VSt | | *0.00m:* Clayey SILT; dark brown motted orange. Very stiff, moist, medium plasticity. Trace of rootlets. |
| | | | | | | | | | | | | | | *0.20m:* Silty CLAY; light grey motted orange. Very stiff, moist, high plasticity. Trace of rootlets. |
| | | | | | 203/64 kPa | | | | | | | | | |
| | | | | | 177/119 kPa | | | | | | | | | |
| | | | | | 196/80 kPa | | | | | | | | | |
| Tauranga Group | | 100 | HA | | 164/64 kPa | | | | | | | | | *1.80m:* Silty CLAY; grey. Very stiff, moist, high plasticity. |
| | | | | | 64/51 kPa | | | | | | | | | *2.00m:* Trace wood fragments |
| | | | | | 83/35 kPa | | | | | | | | | *2.30m:* Dark grey; trace rootlets |
| | | | | | 80/35 kPa | | | | | | | St | | *2.50m:* Stiff |
| | DRY 09/05/2022 | | | | 64/29 kPa | | | | | | | | | *3.50m:* Clayey SILT; light grey. Stiff, moist, medium plasticity. |
| | | 100 | DCP | | | | | | | | | | | *4.00m:* Scala penetrometer testing. |
| *6.0-8.0m:* Scala values not recorded - Testing from 8mbgl completed 10/05/2022 | | | | 0 | | | | | | | | | | |

0.0-4.0m

COMMENTS:

**Hole Depth** 8.75m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:14:05 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA08**

**Hole Location:** 1350 Dairy Flat Highway

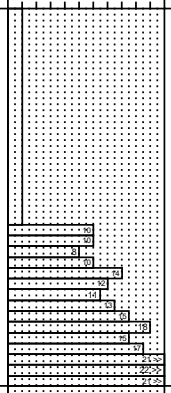


| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942005 mN (NZTM2000) 1746733 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 09/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 09/05/2022 |
| R.L.: 57m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: SCZH CHECKED: ROM |

GEOLOGICAL | METHOD OBSERVATIONS | ENGINEERING DESCRIPTION

STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS

WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION



[CONT] *4.00m:* Scala penetrometer testing.

8.75m: Effective refusal

COMMENTS:

**Hole Depth** 8.75m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:14:05 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA08**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5942005 mN<br>1746733 mE | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 09/05/2022<br>HOLE FINISHED: 09/05/2022<br>DRILLED BY: T+T |
| R.L.: | 57m | | |
| DATUM: | AUCKHT1946 | | LOGGED BY: SCZH CHECKED: ROM |



0.00-4.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:14:05 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA09**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | | |
|---|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: (NZTM2000) | 5941829 mN 1746981 mE | DRILL TYPE: HA 50 mm & DCP | HOLE STARTED: 03/05/2022 |
| | | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 03/05/2022 |
| R.L.: | 54m | | DRILLED BY: T+T |
| DATUM: | AUCKHT1946 | | LOGGED BY: KENL CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | D | S-F | | *0.00m:* SILT, minor rootlets, trace clay; brown brown. Soft to firm, dry, non-plastic to low plasticity. (TOPSOIL). |
| | | | | | 98/32 kPa | | 54 | | | | M | F | | *0.20m:* SILT, minor clay, trace sand; dark brown. Firm, moist, medium plasticity. |
| | | | | | 51/30 kPa | | | | | | | | | |
| | | | | | 30/16 kPa | | | 1 | | | | S | | *0.60m:* Clayey SILT, minor organic flecks; pinkish brown. Soft, moist, medium plasticity. |
| | | | | | 46/19 kPa | | 53 | | | | | | | |
| | | | | | 61/42 kPa | | | | | | | St-VSt | | *1.30m:* Silty CLAY; greyish brown. Stiff to very stiff, moist, high plasticity. |
| Tauranga Group | | 100 | HA50 | | 113/71 kPa | | | 2 | | | | | | |
| | | | | | 61/35 kPa | | 52 | | | | | | | |
| | | | | | 83/51 kPa | | | | | | | | | |
| | | | | | 40/40 kPa | | | | | | W | F-St | | *2.70m:* Clayey SILT, minor organic flecks; greyish brown. Firm to stiff, wet, medium to high plasticity. |
| | | | | | 98/56 kPa | | | 3 | | | | | | |
| | | | | | 83/45 kPa | | 51 | | | | | | | |
| | | | | | 63/63 kPa | | | | | | | | | |
| | DRY 03/05/2022 | | | | 129/109 kPa | | | 4 | | | | | | 0.0-4.0m |
| | | 0 | DCP | | | | 50 | | | | | | | *4.00m:* Scala penetrometer testing. |
| | | | | | | | | 5 | | | | | | |
| | | | | | | | 49 | | | | | | | |
| | | | | | | | | 6 | | | | | | 5.9m: END OF HANDAUGER. Target depth reached. |
| | | | | | | | 48 | | | | | | | |

COMMENTS: Termination at target depth.

**Hole Depth** 5.9m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:14:13 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA09**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5941829 mN<br>1746981 mE | DRILL TYPE: HA 50 mm & DCP<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 03/05/2022<br>HOLE FINISHED: 03/05/2022<br>DRILLED BY: T+T |
| R.L.: | 54m | | LOGGED BY: KENL CHECKED: ROM |
| DATUM: | AUCKHT1946 | | |




0.00-4.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:14:13 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA10**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000

CO-ORDINATES: (NZTM2000) 5942113 mN 1747128 mE

R.L.: 53m

DATUM: AUCKHT1946

DRILL TYPE: 50mm Auger

METHOD: Hand auger with dynamic cone

HOLE STARTED: 06/05/2022

HOLE FINISHED: 06/05/2022

DRILLED BY: T+T

LOGGED BY: CATA CHECKED: ROM

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VSt H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | VSt | | *0.00m:* SILT; greyish brown. Very stiff, moist, medium plasticity. (TOPSOIL). |
| | | | | | | | | | | | | | | *0.20m:* SILT; greyish brown. Very stiff, moist, medium plasticity. |
| | | | | | | | | | | | | | | *0.40m:* Silty CLAY; brown. Very stiff, moist, medium to high plasticity. |
| | 06/05/2022 | | | | 150/24 kPa | | | | | | | | | |
| | | | | | 122/15 kPa | | 53 | 1 | | | | | | |
| | | | | | 64/28 kPa | | | | | | | St | | *1.20m:* Clayey SILT; yellowish brown. Stiff, moist, medium to high plasticity. |
| Tauranga Group | | 100 | HA | | 73/37 kPa | | 52 | 2 | | CW | | | | *2.00m:* Clayey SILT; dark grey. Stiff, moist, medium to high plasticity. |
| | | | | | 82/43 kPa | | 51 | | | | | | | |
| | | | | | 134/67 kPa | | | 3 | | | | | | *3.00m:* Very stiff |
| | | | | | 171/110 kPa | | 50 | | | | | VSt | | *3.20m:* Silty CLAY; grey. Very stiff, moist, high plasticity. |
| | | | | | 156/119 kPa | | | 4 | | | | | | 0.0-4.0m |
| | | 0 | DCP | | | | 49 | | | | | | | *4.00m:* Scala penetrometer testing |
| | | | | | | | 48 | 5 | | | | | | |
| | | | | | | | | 6 | | | | | | |
| | | | | | | | 47 | | | | | | | 6m: END OF HANDAUGER. Target depth reached. |

COMMENTS:

**Hole Depth** 6m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:14:20 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA10**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5942113 mN<br>1747128 mE | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 06/05/2022<br>HOLE FINISHED: 06/05/2022 |
| R.L.: | 53m | | DRILLED BY: T+T |
| DATUM: | AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |




0.00-4.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:14:20 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA11P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5941928 mN (NZTM2000) 1747132 mE | DRILL TYPE: 75mm Auger | HOLE STARTED: 04/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 04/05/2022 |
| R.L.: 54m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: SCZH CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VSt H | DESCRIPTION |
| Topsoil | | | | | | | 54 | | TS | | D | VSt | | *0.00m:* Clayey SILT; brown. Very stiff, dry, low plasticity |
| | | | | | 146/51 kPa Insitu | | | | | | S | F-St | | *0.30m:* Clayey SILT, some organics; dark brown. Firm to stiff, saturated, medium to high plasticity. Organics, decomposed. Plastic when dried back from NMC. |
| | | | | | 84/36 kPa Insitu | | | 1 | | | | | | |
| | | | | | 36/15 kPa Insitu | | 53 | | | | | | | |
| | | | | | 36/12 kPa Insitu | | | | | | | F | | *1.20m:* Organic clayey SILT; dark brown. Firm, saturated, medium to high plasticity. Trace rootlets and wood fragments. |
| | | | | | 33/12 kPa Insitu | | | | | | | | | |
| Tauranga Group | | 100 | HA | | 42/9 kPa Insitu | | | 2 | | | | | | |
| | | | | | 18/9 kPa Insitu | | 52 | | | | | | | |
| | | | | | >212 kPa Insitu | | | | | | | | | *2.40m:* ClayeyPEAT; black. Firm, saturated, high plasticity. Organics, timber fragments (partially decomposed). Non-plastic upon initial remoulding. Highly plastic when dried back from NMC. |
| | | | | | 78/36 kPa Insitu | | | 3 | | | | | | |
| | | | | | 66/30 kPa Insitu | | 51 | | | | M | | | *3.00m:* Silty CLAY; light grey. Firm, moist, high plasticity. |
| | 04/05/2022 | | | | 78/36 kPa Insitu | | | | | | | | | |
| | | | | | 48/21 kPa Insitu | | | 4 | | | | | | |
| | | | | | 63/36 kPa Insitu | | 50 | | | | | | | |
| | | 100 | DCP | | | | | 5 | | | | | | *4.00m:* Scala penetrometer testing. |
| | | | | | | | 49 | | | | | | | |
| | | | | | | | | 6 | | | | | | 6m: Target depth |
| | | | | | | | 48 | | | | | | | |

0.0-4.0m

COMMENTS: Piezo installed between 0.2 - 4.0 m bgl; sand 0.2 - 4.0 m bgl; bentonite 0 - 0.2 m bgl; flush toby box

**Hole Depth** 6m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:19:53 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA11P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5941928 mN<br>1747132 mE | DRILL TYPE: 75mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 04/05/2022<br>HOLE FINISHED: 04/05/2022<br>DRILLED BY: T+T |
| R.L.: | 54m | | |
| DATUM: | AUCKHT1946 | | LOGGED BY: SCZH CHECKED: ROM |



0.00-4.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:19:53 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA12**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5941925 mN (NZTM2000) 1747372 mE | DRILL TYPE: 50mm Hand Auger | HOLE STARTED: 02/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 02/05/2022 |
| R.L.: 54m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VSt H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | VSt | | *0.00m:* SILT; grey mottled brown. Very stiff, moist, non-plastic. (TOPSOIL). |
| | | | | | 174/28 kPa Insitu | | | | | | | | | *0.20m:* Clayey SILT; grey . Very stiff, moist, medium plasticity. |
| | 02/05/2022 | | | | >214 kPa Insitu | | | | | | | | | |
| | | | | | 199/31 kPa Insitu | | | | | | | St-VSt | | *0.80m:* Silty CLAY, some organics; dark brown. Stiff to very stiff, moist, medium to high plasticity. |
| *1.5-4.0m:* SATURATED SOIL, NO RECOVERY FROM AUGER - UNKNOWN DEPTH OF PEAT. AFTER WHICH SUSPECTED SILTY CLAY GREY HIGHLY PLASTIC | | | | | 70/24 kPa Insitu | | | | | | | | | |
| | | | | | 46/15 kPa Insitu | | | | | | | F-St | | *1.30m:* PEAT; reddish brown and speckled black. Firm to stiff, moist, non-plastic. Spongey ; organics, wood fragments (partially decomposed). |
| | | 38 | HA50 | | | | | | | | | | | *1.50m:* NO RECOVERY. SATURATED SOIL NEAR LIQUID LIMIT (?). UNKNOWN DEPTH OF PEAT. Suspected Silty CLAY; grey, Soft, saturated, Medium to High plasticity. |
| Tauranga Group | | | | | 40/12 kPa Insitu | | | | | | | | | |
| | | | | | 24/12 kPa Insitu | | | | | | | | | |
| | | | | | 38/15 kPa Insitu | | | | | | | | | |
| | | 0 | DCP | | | | | | | | | | | *4.00m:* Scala penetrometer testing. |
| | | | | | | | | | | | | | | 6m: END OF HANDAUGER. Target depth reached. |

0.0-1.5m

COMMENTS: No recovery from 1.5 mbgl due to washout.

**Hole Depth** 6m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:01 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA12**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5941925 mN<br>1747372 mE | DRILL TYPE: 50mm Hand Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 02/05/2022<br>HOLE FINISHED: 02/05/2022<br>DRILLED BY: T+T |
| R.L.: | 54m | | LOGGED BY: CATA CHECKED: ROM |
| DATUM: | AUCKHT1946 | | |




0.00-1.50m

# HAND AUGER LOG

HOLE Id: **HA13**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5941778 mN (NZTM2000) 1747290 mE | DRILL TYPE: HA 50 mm & DCP | HOLE STARTED: 02/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 03/05/2022 |
| R.L.: 54m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: KENL CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Topsoil | | | | | | | | | | | D | F-St | | *0.00m:* Clayey SILT, minor rootlets, trace sand; brown. Firm to stiff, dry, low plasticity. (TOPSOIL). |
| | | | | | 64/25 kPa | | 54 | | | | | | | *0.10m:* Clayey SILT, trace sand; brown banded grey. Firm to stiff, dry, medium to high plasticity. |
| | | | | | 196/38 kPa | | | | | | | | | *0.60m:* Sandy SILT, some clay; greyish brown mixed orange. Firm to stiff, dry, low plasticity. Sand, fine to medium, quartz. |
| | | | | | 45/29 kPa | | | 1 | | | M | | | *1.00m:* Clayey SILT; greyish brown. Firm to stiff, moist, medium to high plasticity. |
| | | | | | 32/24 kPa | | 53 | | | | | | | |
| | | | | | 64/32 kPa | | | | | | | | | |
| | | | | | 30/22 kPa | | | | | | W | S | | *1.70m:* SiltyPEAT (AMORPHOUS), minor clay; dark dark brown. Soft, wet, medium plasticity. |
| Tauranga Group | | 100 | HA50 | | 133/48 kPa | | | 2 | | | | St | | *2.10m:* Peaty CLAY; greyish brown. Stiff, wet, medium to high plasticity, quick. Organics, rootlets (decomposed) and timber fragments (decomposed). |
| | | | | | 53/35 kPa | | 52 | | | | S | S-F | | *2.30m:* SiltyPEAT (AMORPHOUS); dark brown. Soft to firm, saturated, non-plastic. Organics, wood fragments (decomposed). |
| | | | | | 64/38 kPa | | | | | | | | | |
| | 02/05/2022 | | | | 48/35 kPa | | | 3 | | | | | | |
| | | | | | 96/80 kPa | | 51 | | | | W | St-VSt | | *3.10m:* Clayey SILT; greenish grey. Stiff to very stiff, wet, high plasticity. |
| | | | | | 109/93 kPa | | | | | | | | | |
| | | | | | 145/113 kPa | | | 4 | | | | | | 0.0-4.0m |
| | | 0 | DCP | | | | 50 | | | | | | | *4.00m:* Scala penetrometer testing. |
| | | | | | | | | 5 | | | | | | |
| | | | | | | | 49 | | | | | | | 5.05m: END OF HANDAUGER. Target depth reached |
| | | | | | | | | 6 | | | | | | |
| | | | | | | | 48 | | | | | | | |

COMMENTS: Termination at target depth.

**Hole Depth** 5.05m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:08 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA13**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|
| CO-ORDINATES: 5941778 mN (NZTM2000) 1747290 mE<br>R.L.: 54m<br>DATUM: AUCKHT1946 | DRILL TYPE: HA 50 mm & DCP<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 02/05/2022<br>HOLE FINISHED: 03/05/2022<br>DRILLED BY: T+T<br>LOGGED BY: KENL CHECKED: ROM |




0.00-4.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:08 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA14**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5941828 mN (NZTM2000) 1747521 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 09/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 09/05/2022 |
| R.L.: 59m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: SCZH CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Fill | 02/05/2022 | 100 | HA | | 137/30 kPa | | 59 | 0 | | | D | St-VSt | | *0.00m:* Fine to medium SAND, minor gravel; white motted brown, yellow and brown. Stiff to very stiff, dry. Gravel, fine to medium. Trace of rootlets. (FILL) |
| | | | | | 81/30 kPa | | | | | | | | | |
| | | | | | 114/45 kPa | | | | | | | | | |
| Tauranga Group | | | | | 114/21 kPa | | 58 | 1 | | | M | F-St | | *0.90m:* Clayey SILT, minor sand; brown motted yellow and white. Firm to stiff, moist, low plasticity. *1.10m:* dark brown |
| | | | | | 84/39 kPa | | | | | | | | | |
| | | | | | 81/15 kPa | | | | | | | | | |
| | | 100 | DCP | 10 14 23 57 69 | UTP | | 57 | 2 | | | | | | *2.10m:* Scala penetrometer testing. |
| | | | | | | | 56 | 3 | | | | | | 2.35m: Refusal |
| | | | | | | | 55 | 4 | | | | | | |
| | | | | | | | 54 | 5 | | | | | | |
| | | | | | | | 53 | 6 | | | | | | |

0.0-2.1m

COMMENTS: Refusal at 2.1m bgl(limestone)

**Hole Depth** 2.35m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:15 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA14**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|
| CO-ORDINATES: 5941828 mN (NZTM2000) 1747521 mE<br>R.L.: 59m<br>DATUM: AUCKHT1946 | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 09/05/2022<br>HOLE FINISHED: 09/05/2022<br>DRILLED BY: T+T<br>LOGGED BY: SCZH CHECKED: ROM |



0.00-2.10m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:15 pm - Produced with Core-GS by GeRoc

Tonkin+Taylor

# HAND AUGER LOG

HOLE Id: **HA15P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5941713 mN (NZTM2000) 1747566 mE | DRILL TYPE: HA 50 mm & DCP | HOLE STARTED: 03/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 03/05/2022 |
| R.L.: 63m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: KENL CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | ENGINEERING DESCRIPTION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Topsoil | DRY; 03/05/2022 | 100 | HA50 | | 209/38 kPa | | 62 | 1 | TS | | M | F-St | | *0.00m:* SILT, some clay, minor sand; brown. Firm to stiff, moist, low plasticity. |
| | | | | | | | | | | | | VSt | | *0.20m:* Silty CLAY, some sand; light brown mottled orange. Very stiff, moist, medium plasticity. |
| Tauranga Group | | | | | 83/48 kPa | | | | | | | St | | *0.35m:* Gravelly CLAY, some organic flecks; dark brown. Firm to stiff, moist, low to medium plasticity. Gravel, fine, black. |
| | | | | | >225 kPa | | | | | | | VSt | | *0.40m:* Silty CLAY, some organic flecks, minor sand; light brown streaked orange. Stiff, moist, high plasticity. |
| | | | | | UTP | | | | | | | | | *0.80m:* Clayey SILT, minor organic flecks; brownish white. Very stiff, moist, non-plastic to low plasticity. |
| | | 0 | DCP | | | | | | | | | | | *1.30m:* Scala penetrometer testing. |
| *1.75m:* DCP bouncing | | | | | | | 61 | 2 | | | | | | 1.75m: Scala bouncing |
| | | | | | | | 60 | 3 | | | | | | |
| | | | | | | | 59 | 4 | | | | | | |
| | | | | | | | 58 | 5 | | | | | | |
| | | | | | | | 57 | 6 | | | | | | |
| | | | | | | | 56 | | | | | | | |

0.0-1.3m

COMMENTS: HA termination due to washout;Piezo installed between 0.2 - 0.8 m bgl; sand 0.2 - 1.3 m bgl; bentonite 0 - 0.2 m bgl; flush toby box

**Hole Depth** 1.75m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:23 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA15P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5941713 mN<br>1747566 mE | DRILL TYPE: HA 50 mm & DCP<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 03/05/2022<br>HOLE FINISHED: 03/05/2022<br>DRILLED BY: T+T |
| R.L.: | 63m | | |
| DATUM: | AUCKHT1946 | | LOGGED BY: KENL CHECKED: ROM |




0.00-1.30m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:23 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA16**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942168 mN (NZTM2000) 1747325 mE | DRILL TYPE: 50mm auger | HOLE STARTED: 02/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 02/05/2022 |
| R.L.: 54m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Topsoil | | | | | | | | | | | M | St | | *0.00m:* Clayey SILT, minor sand; dark grey. Stiff, moist, medium plasticity. Sand, fine. (TOPSOIL). |
| | | | | | | | | | | | | | | *0.10m:* Clayey SILT, minor sand; dark grey. Stiff, moist, medium plasticity. Sand, fine. |
| | | | | | 92/43 kPa Insitu | | | | | | | | | *0.40m:* Silty CLAY; light grey. Stiff, moist, high plasticity. |
| | | | | | 98/49 kPa Insitu | | | 1 | | | | | | *1.10m:* Organic SILT; dark brown. Stiff, moist, medium to high plasticity. |
| | | | | | 89/43 kPa Insitu | | | | | | | | | *1.70m:* Organic silty CLAY; dark grey. Stiff, moist, high plasticity. |
| Tauranga Group | 02/05/2022 | 100 | HA | | 61/28 kPa Insitu | | | 2 | | | | | | |
| | | | | | 98/61 kPa Insitu | | | | | | M-W | St-VSt | | *2.30m:* Clayey SILT, some organics; dark grey. Stiff to very stiff, moist to wet, medium plasticity. |
| | | | | | 180/107 kPa Insitu | | | 3 | | | | | | |
| | | | | | 199/122 kPa Insitu | | | | | | | | | |
| | | | | | | | | 4 | | | | | | *4.00m:* Scala penetrometer testing. |
| | | 0 | DCP | | | | | 5 | | | | | | |
| | | | | | | | | 6 | | | | | | 6m: END OF HANDAUGER. Target depth reached. |

0.0-4.0m

COMMENTS:

**Hole Depth** 6m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:30 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA16**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|
| CO-ORDINATES: 5942168 mN (NZTM2000) 1747325 mE<br>R.L.: 54m<br>DATUM: AUCKHT1946 | DRILL TYPE: 50mm auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 02/05/2022<br>HOLE FINISHED: 02/05/2022<br>DRILLED BY: T+T<br>LOGGED BY: CATA CHECKED: ROM |




0.00-4.00m

# HAND AUGER LOG

HOLE Id: **HA17**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942250 mN (NZTM2000) 1747193 mE | DRILL TYPE: HA 50 mm & DCP | HOLE STARTED: 02/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 02/05/2022 |
| R.L.: 60m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: KENL CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | ENGINEERING DESCRIPTION | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Topsoil | | 100 | HA50 | | 161/38 kPa | | 59 | 1 | TS | | D-M | F | | *0.00m:* SILT, some rootlets, minor clay, trace sand; dark dark brown. Firm, dry to moist, low plasticity. (TOPSOIL). |
| Tauranga Group | | | | | 109/48 kPa | | | | | | | VSt | | *0.30m:* Silty CLAY, minor organic flecks; orange brown. Very stiff, dry to moist, medium plasticity. |
| | | | | | >225 kPa | | | | | | | | | *0.60m:* SILT, some clay, minor organic flecks; light greyish brown. Very stiff, dry to moist, medium plasticity. |
| Mahurangi Limestone | | | | | | | | | | | | H | | *1.00m:* Sandy SILT, trace clay; light greyish brown. Hard, dry to moist, non-plastic. [Residual soil, yellowish grey, LIMESTONE. Extremely weak].. |
| | DRY 02/05/2022 | 0 | DCP | 3 5 10 14 | UTP | | 58 | 2 | | | | | | *1.20m:* Scala penetrometer testing. |
| | | | | | | | 57 | 3 | | | | | | 1.55m: Effective refusal |
| | | | | | | | 56 | 4 | | | | | | |
| | | | | | | | 55 | 5 | | | | | | |
| | | | | | | | 54 | 6 | | | | | | |
| | | | | | | | 53 | | | | | | | |

0.0-1.2m

COMMENTS: HA termination due to washout

**Hole Depth** 1.55m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:38 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA17**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5942250 mN<br>1747193 mE | DRILL TYPE: HA 50 mm & DCP<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 02/05/2022<br>HOLE FINISHED: 02/05/2022<br>DRILLED BY: T+T |
| R.L.: | 60m | | LOGGED BY: KENL CHECKED: ROM |
| DATUM: | AUCKHT1946 | | |




0.00-1.20m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:38 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA18**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942356 mN (NZTM2000) 1747274 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 03/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 03/05/2022 |
| R.L.: 63m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 S 25 F 50 St 100 VSt 200 H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | VSt | | *0.00m:* Clayey SILT; greyish brown. Very stiff, moist, medium plasticity. (TOPSOIL). |
| Tauranga Group | | | | | 177/18 kPa Insitu | | 63 | | | | | | | *0.20m:* Peaty SILT; greyish black. Very stiff, moist, medium to high plasticity. Organics, organic flecks. |
| | | 100 | HA | | 102/24 kPa Insitu | | | | | | | St-VSt | | *0.50m:* Silty CLAY, trace organic flecks; brownish grey. Stiff to very stiff, moist, high plasticity. |
| Mahurangi Limestone | DRY 03/05/2022 | | | | >210 kPa Insitu | | 62 | 1 | | | | VSt-H | | *0.80m:* Sandy SILT; yellowish grey. Very stiff to hard, moist. [Residual soil, yellowish grey, LIMESTONE. Extremely weak]. |
| | | 0 | DCP | | UTP Insitu | | | 2 | | | | | | *1.40m:* Scala penetrometer testing |
| | | | | | | | 61 | 3 | | | | | | 2m: Effective refusal |
| | | | | | | | 60 | 4 | | | | | | |
| | | | | | | | 59 | 5 | | | | | | |
| | | | | | | | 58 | 6 | | | | | | |
| | | | | | | | 57 | | | | | | | |

0.0-1.4m

COMMENTS: Refusal at 1.4m (limestone)

**Hole Depth** 2m

Scale 1:35

Rev.: A

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# HAND AUGER PHOTOS

BOREHOLE No.: **HA18**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|
| CO-ORDINATES: 5942356 mN (NZTM2000) 1747274 mE<br>R.L.: 63m<br>DATUM: AUCKHT1946 | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 03/05/2022<br>HOLE FINISHED: 03/05/2022<br>DRILLED BY: T+T<br>LOGGED BY: CATA CHECKED: ROM |




0.00-1.40m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:46 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA19**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942451 mN (NZTM2000) 1747408 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 02/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 02/05/2022 |
| R.L.: 62m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: SCZH CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) / DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VH | DESCRIPTION |
| Topsoil | | 100 | HA | | 143/66 kPa | | 62 | TS | | M | VSt | | *0.00m:* Clayey SILT; dark brown. Very stiff, moist, low plasticity. Trace of rootlets. |
| Tauranga Group | | | | | 78/45 kPa | | | | | | St-VSt | | *0.30m:* Silty CLAY; light grey motted yellow. Stiff to very stiff, moist, high plasticity. |
| Mahurangi Limestone | | | | | 81/33 kPa | | 61 1 | | | | St | | *0.60m:* CLAY, minor silt; light grey. Stiff, moist, high plasticity. [Residual soil, yellowish grey, LIMESTONE. Extremely weak].. |
| | | 100 | DCP | | UTP | | | | | | | | *1.20m:* Scala penetrometer testing. |
| | | | | | | | 60 2 | | | | | | 1.5m: Effective refusal |
| | | | | | | | 59 3 | | | | | | |
| | | | | | | | 58 4 | | | | | | |
| | | | | | | | 57 5 | | | | | | |
| | | | | | | | 56 6 | | | | | | |

0.0-1.2m

COMMENTS: Refusal at 1.2m bgl(limestone)

**Hole Depth** 1.5m

Scale 1:35

Rev.: A

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:52 pm - Produced with Core-GS by GeRoc

# HAND AUGER PHOTOS

BOREHOLE No.: **HA19**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|
| CO-ORDINATES: 5942451 mN (NZTM2000) 1747408 mE<br>R.L.: 62m<br>DATUM: AUCKHT1946 | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 02/05/2022<br>HOLE FINISHED: 02/05/2022<br>DRILLED BY: T+T<br>LOGGED BY: SCZH CHECKED: ROM |




0.00-1.20m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:20:52 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA20P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942542 mN (NZTM2000) 1747320 mE | DRILL TYPE: HA 50 mm & DCP | HOLE STARTED: 03/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 03/05/2022 |
| R.L.: 67m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: KENL CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | DRY (03/05/2022) | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | S-F | | *0.00m:* Clayey SILT, minor rootlets; dark brown. Soft to firm, moist, low plasticity. |
| Tauranga Group | | 100 | HA50 | | 113/42 kPa | | 66 | | | | | VSt | | *0.20m:* Silty CLAY, minor organic flecks; greyish brown mottled orange. Very stiff, moist, high plasticity. |
| | | | | | 145/51 kPa | | | | | | | | | *0.40m:* Silty CLAY, minor organic flecks; greyish brown. Very stiff, moist, high plasticity. |
| Mahurangi Limestone | | | | | UTP | | | 1 | | | | H | | *0.80m:* SILT, minor sand, trace clay; white. Hard, moist, medium plasticity. (Residual Soil). |
| | | 0 | DCP | | UTP | | | | | | | | | *1.10m:* Scala penetrometer testing. |
| | | | | | | | 65 | 2 | | | | | | 1.45m: Effective refusal |
| | | | | | | | 64 | 3 | | | | | | |
| | | | | | | | 63 | 4 | | | | | | |
| | | | | | | | 62 | 5 | | | | | | |
| | | | | | | | 61 | 6 | | | | | | |
| | | | | | | | 60 | | | | | | | |

0.0-1.1m

COMMENTS: HA termination due to washout;Piezo installed between 0.2 - 0.7 m bgl; sand 0.2 - 1.2 m bgl; bentonite 0 - 0.2 m bgl; flush toby box

**Hole Depth** 1.45m

Scale 1:35

Rev.: A

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# HAND AUGER PHOTOS

BOREHOLE No.: **HA20P**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5942542 mN<br>1747320 mE | DRILL TYPE: HA 50 mm & DCP<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 03/05/2022<br>HOLE FINISHED: 03/05/2022<br>DRILLED BY: T+T |
| R.L.: | 67m | | |
| DATUM: | AUCKHT1946 | | LOGGED BY: KENL CHECKED: ROM |




0.00-1.10m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:21:00 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA21**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942147 mN (NZTM2000) 1746998 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 09/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 09/05/2022 |
| R.L.: 55m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: SCZH CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VSt H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | VSt | | *0.00m:* Clayey SILT; brown. Very stiff, moist, low plasticity. Trace of rootlets. |
| | | | | | | | | | | | | St-VSt | | *0.20m:* Clayey SILT, trace organics; light grey. Stiff to very stiff, moist, medium plasticity. Organics, rootlets. |
| | | | | | 148/48 kPa | | 54 | 1 | | | | | | *0.90m:* dark grey |
| | | | | | 100/29 kPa | | | | | | | | | |
| | | | | | 116/35 kPa | | | | | | | VSt | | *1.20m:* Silty CLAY; brownish grey. Very stiff, moist, high plasticity. |
| | | | | | 67/29 kPa | | 53 | 2 | | | W | St | | *1.80m:* Organic clayey SILT; black. Stiff, wet, high plasticity. Trace decomposed wood fragments. |
| | | | | | | | | | | | M | F-St | | *2.00m:* Silty CLAY; brownish grey. Firm to stiff, moist, high plasticity. |
| Tauranga Group | DRY 09/05/2022 | 100 | HA | | 67/35 kPa | | | | | | | | | *2.60m:* light grey |
| | | | | | 51/29 kPa | | 52 | 3 | | | | | | |
| | | | | | 51/32 kPa | | | | | | | | | |
| | | | | | 83/32 kPa | | 51 | 4 | | | | | | |
| | | | | | 80/48 kPa | | | | | | | | | |
| | | | | | 67/29 kPa | | 50 | 5 | | | | | | 0.0-5.0m |
| | | 100 | DCP | | | | 49 | 6 | | | | | | *5.00m:* Scala penetrometer testing. |
| | | | | | | | 48 | | | | | | | 7m: Effective refusal |

COMMENTS:

**Hole Depth** 7m

Scale 1:35

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# HAND AUGER PHOTOS

BOREHOLE No.: **HA21**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|
| CO-ORDINATES: 5942147 mN (NZTM2000) 1746998 mE<br>R.L.: 55m<br>DATUM: AUCKHT1946 | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 09/05/2022<br>HOLE FINISHED: 09/05/2022<br>DRILLED BY: T+T<br>LOGGED BY: SCZH CHECKED: ROM |



0.00-5.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:27:28 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA22**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 2

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942119 mN (NZTM2000) 1746943 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 09/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 09/05/2022 |
| R.L.: 55m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VSt H | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | VSt | | *0.00m:* SILT, some clay; brown. Very stiff, moist, medium plasticity. (TOPSOIL). |
| | | | | | 199/31 kPa Insitu | | | | | | | | | *0.30m:* Sandy SILT, minor clay; brownish grey. Very stiff, moist, low plasticity. Sand, fine. |
| | | | | | 195/55 kPa Insitu | | 55 | 1 | | | | | | *0.80m:* Silty CLAY; streaked orange and grey . Very stiff, moist, high plasticity. |
| | | | | | 168/79 kPa Insitu | | 54 | 2 | | | | | | |
| Tauranga Group | | 91 | HA | | 140/67 kPa Insitu | | 53 | | | | | St-VSt | | *2.20m:* Clayey SILT, trace organic; brownish grey. Stiff to very stiff, moist, medium plasticity. Organics, carbonaceous flecks. |
| | | | | | 95/46 kPa Insitu | | | | | | | St | | *2.60m:* Organic SILT, some clay; black. Stiff, moist, medium plasticity. Organics, decomposed. |
| | | | | | 89/49 kPa Insitu | | 52 | 3 | | | | | | *3.00m:* Silty CLAY; brownish grey. Stiff, moist, medium to high plasticity. |
| | | | | | 82/43 kPa Insitu | | | | | | | | | |
| | DRY 09/05/2022 | | | | 92/58 kPa Insitu | | 51 | 4 | | | | | | *4.00m:* Clayey SILT; light grey. Stiff, moist, medium to high plasticity. |
| | | | | | | | 50 | 5 | | | | | | *4.40m:* Scala penetrometer testing. |
| | | | | | | | 49 | 6 | | | | | | |

0.0-4.4m

COMMENTS:

**Hole Depth** 9.6m

Scale 1:35

Rev.: A

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# HAND AUGER LOG

HOLE Id: **HA22**

**Hole Location:** 1350 Dairy Flat Highway



| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942119 mN (NZTM2000) 1746943 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 09/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 09/05/2022 |
| R.L.: 55m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 H | DESCRIPTION |
| | | 0 | DCP | | | | 48 | 8 | | | | | | [CONT] *4.40m:* Scala penetrometer testing. |
| | | | | | | | 47 | 9 | | | | | | |
| | | | | | | | 46 | 10 | | | | | | 9.6m: Effective refusal |
| | | | | | | | 45 | 11 | | | | | | |
| | | | | | | | 44 | 12 | | | | | | |
| | | | | | | | 43 | 13 | | | | | | |
| | | | | | | | 42 | | | | | | | |

COMMENTS:

**Hole Depth** 9.6m

# HAND AUGER PHOTOS

BOREHOLE No.: **HA22**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5942119 mN<br>1746943 mE | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 09/05/2022<br>HOLE FINISHED: 09/05/2022 |
| R.L.: | 55m | | DRILLED BY: T+T |
| DATUM: | AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |




0.00-4.40m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:21:14 pm - Produced with Core-GS by GeRoc

# HAND AUGER LOG

HOLE Id: **HA23**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| | | |
|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942077 mN (NZTM2000) 1746903 mE | DRILL TYPE: 50mm Auger | HOLE STARTED: 09/05/2022 |
| | METHOD: Hand auger with dynamic cone | HOLE FINISHED: 09/05/2022 |
| R.L.: 55m | | DRILLED BY: T+T |
| DATUM: AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |

| GEOLOGICAL | METHOD OBSERVATIONS | | | | | | | | ENGINEERING DESCRIPTION | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| STRATIGRAPHY / ENG GEOLOGICAL UNIT / ADDITIONAL OBSERVATIONS | WATER | CORE RECOVERY (%) | METHOD | SCALA PENETROMETER (Blows/50mm) 0 2 4 6 8 10 12 14 16 18 | TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) VS 12 25 50 100 200 VH | DESCRIPTION |
| Topsoil | | | | | | | | | TS | | M | St | | *0.00m:* SILT, some clay; dark brown. Stiff, moist, low to medium plasticity. (TOPSOIL). |
| | | | | | | | | | | | | | | *0.20m:* SILT, some clay; dark brown mottled orange. Stiff, moist, low to medium plasticity. |
| | | | | | | | | | | | | F-St | | *0.40m:* Clayey SILT; brownish grey. Firm to stiff, moist, medium plasticity. |
| Tauranga Group | DRY 09/05/2022 | 80 | HA | | 67/31 kPa Insitu<br>49/28 kPa Insitu<br>82/49 kPa Insitu<br>58/31 kPa Insitu<br>43/12 kPa Insitu<br>86/46 kPa Insitu<br>79/46 kPa Insitu<br>92/52 kPa Insitu<br>>214 kPa Insitu<br>>214 kPa Insitu | | 54 53 52 51 50 49 | 1 2 3 4 5 6 | | | | St-VSt | | *1.80m:* Clayey SILT, minor organics; dark grey. Firm to stiff, moist, medium plasticity. Organics, carbonaceous material.<br>*3.00m:* Silty CLAY; grey. Stiff to very stiff, moist, high plasticity.<br>*4.50m:* Hard |
| | | 0 | DCP | | | | 8 | | | | | | | *5.00m:* Scala penetrometer testing.<br>7m: Effective refusal |

0.0-5.0m

COMMENTS:

**Hole Depth** 7m

Scale 1:35

Rev.: A

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# HAND AUGER PHOTOS

BOREHOLE No.: **HA23**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 1

| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
|---|---|---|---|
| CO-ORDINATES: (NZTM2000) | 5942077 mN<br>1746903 mE | DRILL TYPE: 50mm Auger<br>METHOD: Hand auger with dynamic cone | HOLE STARTED: 09/05/2022<br>HOLE FINISHED: 09/05/2022 |
| R.L.: | 55m | | DRILLED BY: T+T |
| DATUM: | AUCKHT1946 | | LOGGED BY: CATA CHECKED: ROM |




0.00-5.00m

TTNZ_20210729 - HandAugerLog - 30/05/2022 5:27:35 pm - Produced with Core-GS by GeRoc

# EXCAVATION LOG

Tonkin+Taylor

Excavation Id.: **TP01**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 2

| | | | |
|---|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5942115 mN (NZTM2000) 1746978 mE | METHOD: Trial pit/trench | EXCAV. STARTED: | 06/05/2022 |
| | EQUIPMENT: U55-4 5T Track mounted excavator | EXCAV. FINISHED: | 06/05/2022 |
| R.L.: 55m | OPERATOR: Active Contracting | LOGGED BY: | ROM |
| DATUM: AUCKHT1946 | DIMENSIONS: 3m by 0.4m | CHECKED BY: | RLXB |

EXCAVATION TESTS | ENGINEERING DESCRIPTION | GEOLOGICAL

| PENETRATION | SUPPORT | WATER | SAMPLES, TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) | DEFECTS, STRUCTURE, COMMENTS | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 2 3 | | | | | | | | | | | | VS 12 S 25 F 50 St 100 VSt 200 H | | |
| | | | ● 171/44 kPa Insitu | | 54 | 0.5 | TS | *0.00m:* Sandy SILT, trace rootlets; dark brown. Firm, moist, low plasticity. Sand, fine. | | M | F | | | Top |
| | | | | | | | | *0.15m:* Silty CLAY, trace rootlets; orange brown. Stiff to very stiff, moist, low to medium plasticity. | | | St-VSt | | | |
| | | | ● 95/30 kPa Insitu | | | 1.0 | | *0.45m:* Silty CLAY, trace rootlets; grey streaked black mottled orange. Stiff to very stiff, moist, high plasticity. , Occasional wood fragments, roots. | | | | | | |
| | | | 1.0 - 1.5 @ 1.00m | | | | | | | | | | | |
| | | | 1.5 - 2.0 @ 1.50m | | | 1.5 | | *1.50m:* Organic SILT, some clay; dark brown. Firm to stiff, moist to wet, high plasticity, moderately sensitive. , Occasional wood fragments, roots; organics, rootlets (decomposed). | | M-W | F-St | | | Tauranga Group |
| | | | ● 63/29 kPa Insitu | | 53 | | | | | | | | | |
| | | | ● 41/13 kPa Insitu | | | 2.0 | | | | | | | | |
| | | | ● 35/16 kPa Insitu | | | 2.5 | | *2.20m:* CLAY and SILT, minor organic flecks; grey streaked black. Firm, moist, high plasticity. , Occasional wood fragments, decomposed rootlets and wood fragments. Occasional lenses of Organic SILT, dark brown. Firm, moist, high plasticity, organics decomposed rootlets. | | M | F | | | |
| | | | ● 35/13 kPa Insitu | | 52 | 3.0 | | | | | | | | |
| | | | ● 33/16 kPa Insitu | | | 3.5 | | | | | | | | |
| | | 06/05/2022 | ● 35/19 kPa Insitu | | 51 | 4.0 | | | | | | | | |
| | | | | | | | | 4m: Machine limit | | | | | | |
| | | | | | 50 | 4.5 | | | | | | | | |

SKETCH / PHOTO:





0.0 - 1.5m:



1.5 - 4.0m:

COMMENTS: Target Depth Reached. Slight seepage at 3.9 m bgl. No observable water pooling.

**Hole Depth** 4m

Scale 1:42

Rev.: A

TTNZ_20210729 - Excavation - 25/05/2022 9:36:34 am - Produced with Core-GS by GeRoc

# EXCAVATION LOG

Excavation Id.: **TP02**

**Hole Location:** 1350 Dairy Flat Highway

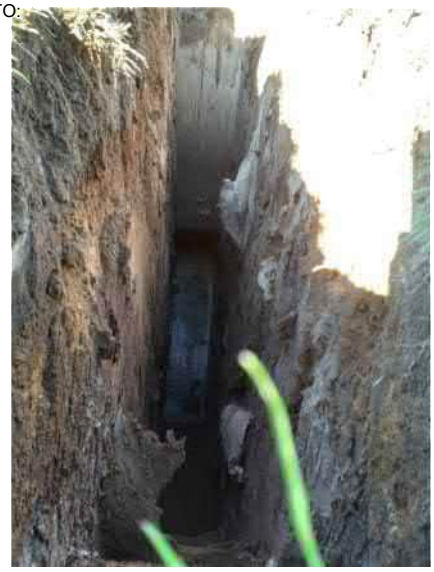
SHEET: 1 OF 2

| | | | |
|---|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: (NZTM2000) | 5942017 mN<br>1746846 mE | METHOD: Trial pit/trench | EXCAV. STARTED: 06/05/2022 |
| | | EQUIPMENT: U55-4 5T Track mounted excavator | EXCAV. FINISHED: 06/05/2022 |
| R.L.: | 55m | OPERATOR: Active Contracting | LOGGED BY: ROM |
| DATUM: | AUCKHT1946 | DIMENSIONS: 3m by 0.4m | CHECKED BY: RLXB |

EXCAVATION TESTS | ENGINEERING DESCRIPTION | GEOLOGICAL

| PENETRATION | SUPPORT | WATER | SAMPLES, TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) | DEFECTS, STRUCTURE, COMMENTS | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 2 3 | | | | | | | | | | | | VS 12 S 25 F 50 St 100 VSt 200 H | | |
| | | | ● 57/25 kPa Insitu | | 54 | 0.5<br>1.0 | TS | *0.00m:* Sandy SILT, minor rootlets; dark brown. Firm, moist, low plasticity. Sand, fine.<br>*0.15m:* Sandy SILT, minor rootlets; dark brown mottled brownish orange. Firm to stiff, moist, low plasticity. Sand, fine.<br>*0.40m:* Silty CLAY, trace organics; grey streaked black. Stiff, moist, high plasticity. Organics, rootlets (decomposed). | | M | F<br>F-St<br>St | | | Top |
| | | | ● 63/29 kPa Insitu | | | 1.5 | | | | | | | | |
| | | | ● 73/22 kPa Insitu | | 53 | 2.0 | | | | | | | | |
| | | 06/05/2022 | ● 60/16 kPa Insitu | | | 2.5 | | | | | | | | Tauranga Group |
| | | | ● 32/13 kPa Insitu | | 52 | 3.0 | | *2.90m:* CLAY and SILT, minor organics; grey streaked black. Firm to stiff, wet to saturated, high plasticity. , Organics, occasional partially decomposed wood fragments and rootlets. | | W-S | F-St | | | |
| | | | 3.5 - 4.0m @ 3.50m<br>● 70/35 kPa Insitu | | | 3.5 | | *3.00 - 4.00m:* Occasional lens of SILT Trace organics, brown streaked black. Firm, moist to wet, medium to high plasticity. Organic, partially decomposed rootless and wood fragments. | | | | | | |
| | | | ● 38/19 kPa Insitu | | 51 | 4.0<br>4.5 | | 4m: Machine limit | | | | | | |

SKETCH / PHOTO:





0.0 - 4.0m:

COMMENTS: Target Depth Reached. Slight seepage at 2.9 m bgl. No observable water pooling.

**Hole Depth** 4m

Scale 1:42

Rev.: A

TTNZ_20210729 - Excavation - 25/05/2022 9:36:51 am - Produced with Core-GS by GeRoc

# EXCAVATION LOG

Tonkin+Taylor

Excavation Id.: **TP03**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 2

| | | | |
|---|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | JOB No.: 1016502.1000 |
| CO-ORDINATES: (NZTM2000) | 5941893 mN<br>1747124 mE | METHOD: Trial pit/trench<br>EQUIPMENT: U55-4 5T Track mounted excavator | EXCAV. STARTED: 06/05/2022<br>EXCAV. FINISHED: 06/05/2022 |
| R.L.: | 54m | OPERATOR: Active Contracting | LOGGED BY: ROM |
| DATUM: | AUCKHT1946 | DIMENSIONS: 3m by 0.4m | CHECKED BY: RLXB |

EXCAVATION TESTS | ENGINEERING DESCRIPTION | GEOLOGICAL

| PENETRATION | SUPPORT | WATER | SAMPLES, TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) | DEFECTS, STRUCTURE, COMMENTS | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 2 3 | | | | | 54 | 0.0 | TS | *0.00m:* Sandy SILT, trace organics; brown. Firm, moist, low plasticity. | | M | F | | | Top |
| | | | ● 73/16 kPa Insitu | | | 0.5 | | *0.15m:* SILT, some sand, minor clay, trace organics; dark brown. Stiff, moist, low to medium plasticity. Sand, fine. | | | St | | | |
| | | | ● 25/3 kPa Insitu | | 53 | 1.0 | | *0.65m:* Clayey PEAT (FIBROUS AND AMORPHOUS), some silt; dark brown. Soft to firm, wet to saturated, high plasticity. Non-plastic upon initial remoulding. Highly plastic when dried back from NMC. | | W-S | S-F | | | |
| | | | ● 27/2 kPa Insitu | | | 1.5 | | | | | | | | |
| | | | ● 23/3 kPa Insitu | | 52 | 2.0 | | | | | | | | |
| | | | ● 20/5 kPa Insitu | | | 2.5 | | *2.30m:* Peaty CLAY, some silt; dark brown. Soft, moist, high plasticity. | | M | S | | | |
| | | | 2.7 @ 2.70m | | | | | | | | | | | |
| | | | ● 20/6 kPa Insitu | | 51 | 3.0 | | *2.80m:* Silty CLAY, trace organic flecks; grey streaked black. Soft to firm, moist to wet, high plasticity. | | M-W | S-F | | | Tauranga Group |
| | | 06/05/2022 | ● 23/6 kPa Insitu | | | 3.5 | | | | | | | | |
| | | | ● 35/17 kPa Insitu | | | | | *3.80m:* Firm. | | | | | | |
| | | | ● 37/15 kPa Insitu | | 50 | 4.0 | | 3.9m: Machine limit | | | | | | |
| | | | | | | 4.5 | | | | | | | | |

SKETCH / PHOTO:





2.0 - 4.0m:



0.0 - 2.0m:

COMMENTS: Target Depth Reached. Slight seepage at 3.8 m bgl. No observable water pooling.

**Hole Depth** 3.9m

Scale 1:42

Rev.: A

TTNZ_20210729 - Excavation - 25/05/2022 9:37:12 am - Produced with Core-GS by GeRoc

# EXCAVATION LOG

Tonkin+Taylor

Excavation Id.: **TP04**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 2

| | | | |
|---|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | | JOB No.: 1016502.1000 |
| CO-ORDINATES: 5941794 mN (NZTM2000) 1747486 mE | METHOD: Trial pit/trench | EXCAV. STARTED: | 06/05/2022 |
| | EQUIPMENT: U55-4 5T Track mounted excavator | EXCAV. FINISHED: | 06/05/2022 |
| R.L.: 59m | OPERATOR: Active Contracting | LOGGED BY: | ROM |
| DATUM: AUCKHT1946 | DIMENSIONS: 3m by 0.4m | CHECKED BY: | RLXB |

EXCAVATION TESTS | ENGINEERING DESCRIPTION | GEOLOGICAL

| PENETRATION | SUPPORT | WATER | SAMPLES, TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) | DEFECTS, STRUCTURE, COMMENTS | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 2 3 | | DRY 06/05/2022 | 0.1 - 0.5 @ 0.10m | | | 0.0 | | *0.00m:* SILT, some sand, trace organic flecks; brown. Firm, moist, low plasticity. Sand, fine. | | M | F | | | Top |
| | | | | | | | | *0.10m:* Sandy fine to coarse GRAVEL, some silt; light greenish grey. Tightly packed, dry to moist, well graded. Gravel, angular, highly weathered, very weak, limestone. (FILL). | | D-M | TP | | | Fill |
| | | | ● 100/32 kPa | | 58 | 0.5 | | | | | | | | |
| | | | ● 37/18 kPa | | | 1.0 | | *0.60m:* Silty CLAY, some sand, trace organic flecks; light brown mottled orange. Stiff, moist, high plasticity. Sand, fine. | | M | St | | | Tauranga Group |
| | | | ● 165/32 kPa | | | 1.5 | | *1.50m:* SILT, some clay, trace organic flecks; orange mottled light brown, blocky. Very stiff, moist, medium to high plasticity. Organics, carbonaceous flecks. (Residual Soil). | RS | | VSt | | | |
| | | | ● 171/25 kPa | | 57 | 2.0 | | *2.10m:* Completely weathered, light brownish grey, pervasively sheared, very closely spaced, broken LIMESTONE. Extremely weak, well cemented. Soil description: Clayey SILT. Very stiff to hard, moist, low plasticity. | CW | | EW | | | Mahurangi Limestone |
| | | | | | | 2.5 | | | HW | | VW | | | |
| | | | 2.8 @ 2.80m | | 56 | 3.0 | | *2.40m:* Highly weathered, light greenish grey, pervasively sheared, very closely spaced, broken LIMESTONE. Very weak, well cemented. | | | | | | |
| | | | | | | | | 3m: Refusal | | | | | *3.0m:* No groundwater encountered | |
| | | | | | 55 | 3.5 | | | | | | | | |
| | | | | | | 4.0 | | | | | | | | |
| | | | | | 54 | 4.5 | | | | | | | | |

SKETCH / PHOTO:





0.0 - 3.0m:

COMMENTS: Refusal on limestone at base of test pit. No groundwater encountered.

**Hole Depth** 3m

Scale 1:42

Rev.: A

TTNZ_20210729 - Excavation - 25/05/2022 9:37:27 am - Produced with Core-GS by GeRoc

# EXCAVATION LOG

Excavation Id.: **TP05**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 2

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | | LOCATION: Dairy Flat Highway | | JOB No.: 1016502.1000 | |
| CO-ORDINATES: (NZTM2000) | 5942097 mN<br>1747244 mE | METHOD: | Trial pit/trench | EXCAV. STARTED: | 06/05/2022 |
| | | EQUIPMENT: | U55-4 5T Track mounted excavator | EXCAV. FINISHED: | 06/05/2022 |
| R.L.: | 53m | OPERATOR: | Active Contracting | LOGGED BY: | ROM |
| DATUM: | AUCKHT1946 | DIMENSIONS: | 3m by 0.4m | CHECKED BY: | RLXB |

EXCAVATION TESTS | ENGINEERING DESCRIPTION | GEOLOGICAL

| PENETRATION | SUPPORT | WATER | SAMPLES, TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) | DEFECTS, STRUCTURE, COMMENTS | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 2 3 | | | | | | | | | | | | VS 12 S 25 F 50 St 100 VSt 200 H | | |
| | | | | | | 0 | | *0.00m:* Silty CLAY, some sand, trace rootlets; dark brown. Very stiff, dry to moist, high plasticity. Sand, fine; organics, carbonaceous material. | | D-M | VSt | | | Top |
| | | | 0.5 @ 0.50m<br>44/19 kPa | | | 0.5 | | *0.10m:* Silty CLAY, some sand, trace rootlets; dark brown. Very stiff, dry to moist, high plasticity. Sand, fine; organics, carbonaceous material. | | M | S-F | | | |
| | | | 24/13 kPa | | 52 | 1.0 | | *0.40m:* Organic CLAY, minor sand; dark brown. Soft to firm, moist, high plasticity. , Occasional partially decomposed roots, wood fragments and carbonaceous flecks. | | | | | | |
| | | 06/05/2022 | 31/7 kPa | | | 1.5 | | *1.50m:* Silty CLAY, minor rootlets; light greenish grey. Firm, moist to wet, high plasticity. , Decomposed rootlets, Occasional partially decomposed roots and wood fragments. | | M-W | F | | | |
| | | | 28/11 kPa | | 51 | 2.0 | | | | | | | | |
| | | | 27/9 kPa | | | 2.5 | | | | | | | | |
| | | | 27/9 kPa | | 50 | 3.0 | | | | | | | | |
| | | | 48/19 kPa | | | 3.5 | | | | | | | | |
| | | | 3.7 @ 3.70m<br>48/35 kPa | | 49 | 4.0 | | 3.8m: Machine limit | | | | | | Tauranga Group |
| | | | | | | 4.5 | | | | | | | | |
| | | | | | 48 | | | | | | | | | |

SKETCH / PHOTO:





0.0 - 1.5m:



1.5 - 3.8m:

COMMENTS: Target Depth Reached. Slight seepage at 1.6 m bgl. No observable water pooling.

**Hole Depth**
3.8m

Scale 1:42

Rev.: A

TTNZ_20210729 - Excavation - 25/05/2022 9:37:44 am - Produced with Core-GS by GeRoc

# EXCAVATION LOG

Tonkin+Taylor

Excavation Id.: **TP06**

**Hole Location:** 1350 Dairy Flat Highway

SHEET: 1 OF 2

| | | | |
|---|---|---|---|
| PROJECT: Dairy Flat Highway Geotech | LOCATION: Dairy Flat Highway | | JOB No.: 1016502.1000 |
| CO-ORDINATES: (NZTM2000) 5942423 mN 1747338 mE | METHOD: Trial pit/trench | EXCAV. STARTED: | 06/05/2022 |
| | EQUIPMENT: U55-4 5T Track mounted excavator | EXCAV. FINISHED: | 06/05/2022 |
| R.L.: 64m | OPERATOR: Active Contracting | LOGGED BY: | ROM |
| DATUM: AUCKHT1946 | DIMENSIONS: 3m by 0.4m | CHECKED BY: | RLXB |

EXCAVATION TESTS | ENGINEERING DESCRIPTION | GEOLOGICAL

| PENETRATION | SUPPORT | WATER | SAMPLES, TESTS | SAMPLES | RL (m) | DEPTH (m) | GRAPHIC LOG | SOIL NAME, PLASTICITY OR PARTICLE SIZE CHARACTERISTICS, COLOUR, SECONDARY AND MINOR COMPONENTS | WEATHERING CLASSIFICATION | MOISTURE CLASSIFICATION | CONSISTENCY / DENSITY CLASSIFICATION | ESTIMATED SOIL SHEAR STRENGTH (Su, kPa) | DEFECTS, STRUCTURE, COMMENTS | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 2 3 | | | 0.3 - 1.2 @ 0.30m<br>86/35 kPa Insitu<br>89/25 kPa Insitu<br>UTP Insitu | | 64<br>63<br>62<br>61<br>60 | 0.5<br>1.0<br>1.5<br>2.0<br>2.5<br>3.0<br>3.5<br>4.0<br>4.5 | | *0.00m:* SILT, some sand, trace rootlets; dark brown. Firm, moist, low plasticity. Organics, rootlets (fresh).<br>*0.10m:* Sandy SILT, trace rootlets; dark brown. Stiff, moist, low to medium plasticity. Organics, rootlets (fresh).<br>*0.30m:* Silty CLAY, trace organic flecks; light brown mottled orange brown speckled black. Stiff, moist, high plasticity. Organics, rootlets (fresh) and rootlets (partially decomposed).<br>*1.20m:* Silty CLAY; light brownish grey, blocky. Very stiff, moist, high plasticity. (Residual Soil).<br>*1.40m:* Completely weathered, light brownish grey , broken LIMESTONE. Extremely weak. Soil description: Clayey SILT; light brownish grey, blocky. Hard, moist, low plasticity.<br>*1.50m:* Highly weathered, light greenish grey, pervasively sheared, very closely spaced, broken LIMESTONE. Very weak.<br>2.4m: Refusal | CW<br>HW | M | F<br>St<br>VSt<br>EW<br>VW | VS 12 S 25 F 50 St 100 VSt 200 H | *2.4m:* No groundwater encountered | Top<br>Tauranga Group<br>Mahurangi Limestone |

SKETCH / PHOTO:





0.0 - 1.2m:



1.2 - 2.4m:

COMMENTS: Refusal on limestone at base of test pit. No groundwater encountered.

**Hole Depth** 2.4m

Scale 1:42

Rev.: A

TTNZ_20210729 - Excavation - 25/05/2022 9:38:08 am - Produced with Core-GS by GeRoc v3.0.0

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www.aurecongroup.com

Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH01



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389647.04m
Northing: 824739.64m
Reduced level: 53.31m (NZVD 2016)

Date started: 17/04/2023
Date completed: 17/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: DWB
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 53 | | | **0m:** Organic SILT, minor clay; brownish grey. Firm, moist, high plasticity. Organics; charcoal, rootlets. [TOPSOIL] | OL | | | | | | **0m: TOPSOIL** | |
| | | | | **0.3m:** Organic CLAY with trace silt; brownish grey with black streaks. Firm to stiff, wet, high plasticity. Organics; fibrous, decomposing wood and plant material. [TAURANGA GROUP] | OH | | | | | | **0.3m: TAURANGA GROUP** | |
| | | | | **0.5m:** CORE LOSS - No recovery due to washout. | | | 50 | | | | | |
| | | 1 | | | | | | | | | | |
| U54 | 52 | | | **1m:** PUSH TUBE SAMPLE - Fibrous PEAT; black. Saturated, non-plastic. [PEAT-H4] | PT | | 100 | | | | | |
| SPT | | | | **1.5m:** Organic CLAY with trace silt; brownish grey with black streaks. Firm, wet, high plasticity. Organics; fibrous, decomposing wood and plant material. | OH | 1.5m: SPT 0// 0,0,1,0 N = 1 | 100 | | | | | |
| | | | | **1.7m to 1.75m:**...Pumiceous fine SAND; light brown. Well packed, moist, low plasticity, uniformly graded. | SP | | | | | | | |
| | | 2 | | **1.9m:** Fibrous PEAT; black. Soft, saturated, low plasticity. Wood, rootlets. [PEAT-H5] | | | | | | | | |
| HQ3 | 51 | | | | | | 100 | | | | | |
| | | | | | PT | | | | | | | |
| U54 | | | | **2.5m to 3m:**...PUSH TUBE SAMPLE | | | 100 | | | | | |
| | | 3 | | | | | | | | | | |
| SPT | 50 | | | **3m:** CLAY with minor organics; light grey. Firm, saturated, high plasticity. Organics; decomposed wood and rootlets. | OH | 3m: SPT 0// 0,0,0,0 N = 0 | 100 | | | | | |
| | | | | **3.45m:** Organic CLAY; brown. Firm, saturated, high plasticity. Organics; wood, decomposed, amorphous, soft. | | | | | | | | |
| HQ3 | | 4 | | | | | 100 | | | | | |
| | 49 | | | | OH | | | | | | | |
| | | | | **4.4m:**...20mm fibrous decomposing wood. | | | | | | | | |
| SPT | | | | | | 4.5m: SPT 0// 0,0,0,0 N = 0 | 100 | | | | | |
| | | 5 | | | | | 100 | | | | | |

Box 1

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 18/04/23 07:00 | m | 0.1 m bgl
(2) 01/05/23 10:00 | m | 0.39 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH01



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389647.04m
Northing: 824739.64m
Reduced level: 53.31m (NZVD 2016)

Date started: 17/04/2023
Date completed: 17/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: DWB
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Box 1 HQ3 | 48 | 6 | | **3.45m:** Organic CLAY; brown. Firm, saturated, high plasticity. Organics; wood, decomposed, amorphous, soft. | OH | | 100 | | | | | |
| SPT | 47 | | | **6m:** CLAY with minor organics; light grey and black streaks. Firm, saturated, high plasticity. Organics, decomposing fibrous wood and rootlets. | CH | 6m: SPT 0// 0,0,1,0 N = 1 | 100 | | | | | |
| Box 2 HQ3 | 46 | 7 | | **6.5m:** Organic CLAY; dark brown. Soft, saturated, high plasticity, extra sensitive. Organics; fibrous wood and amorphous peat lenses. | OH | 7.5m: SPT 0// 0,0,0,0 N = 0 7.5m: IBHSV 17/2 kPa | 100 | | | | | |
| SPT | | 8 | | **7.85m:**...50mm decomposed wood. | | | 100 | | | | | |
| HQ3 | 45 | | | **8.5m to 8.63m:**...gradational colour change to light grey. | | | 100 | | | | | |
| SPT | 44 | 9 | | **8.65m:** CLAY with trace silt and organics; light grey. Soft, saturated, high plasticity, extra sensitive. Organics; decomposed fibrous plant material. | CH | 9m: SPT 0// 0,1,1,3 N = 5 9m: IBHSV 22/5 kPa | 100 | | | | | |
| Box 3 HQ3 | | 10 | | **9.3m:** Completely weathered, light grey, pervasively sheared, extremely closely spaced and broken LIMESTONE; extremely weak, recovered as a *SILT, minor clay; wet, low plasticity*. [MAHURANGI LIMESTONE] | CW | | | | | | **9.3m: NORTHLAND ALLOCHTHON - MAHURANGI LIMESTONE** | |
| | | | | **9.5m:** Moderately weathered, light grey, highly fractured, pervasively sheared LIMESTONE; very weak. Extremely closely spaced, breaks down to a *coarse GRAVEL, angular* when disturbed. | MW | | 71 | | 0 | 9.8m to 10.3m: CZ | |

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 18/04/23 07:00 | m | 0.1 m bgl
(2) 01/05/23 10:00 | m | 0.39 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH01



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389647.04m
Northing: 824739.64m
Reduced level: 53.31m (NZVD 2016)

Date started: 17/04/2023
Date completed: 17/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: DWB
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 43 | | | **9.5m:** Moderately weathered, light grey, highly fractured, pervasively sheared LIMESTONE; very weak. Extremely closely spaced, breaks down to a *coarse GRAVEL, angular* when disturbed. | MW | | 71 | | 0 | | | |
| SPT | | | | | | 10.5m: SPT 50 for 140mm// N = 50+ | 100 | | 0 | | | |
| HQ3 | | 11 | | **10.85m:** Slighly weathered, green grey, pervasively sheared, massive LIMESTONE; moderately strong; extremely closely spaced, brittle along shear planes. Breaks down into a *coarse GRAVEL* along shear planes, when disturbed. | | | 100 | | 0 | | 11m: JT 86° UnSm Cn Closed<br>11.07m: JT 5° PlSm Cn Subhorizontal | |
| | 42 | | | | SW | | | | | | 11.3m: JT 40° UnSm Cn Closed | |
| HQ3 | | 12 | | | | | 91 | | 0 | | | |
| SPT | | | | | | 12m: SPT 39// 23 for 45mm N = 50+ | 100 | | 0 | | | |

Box 3

End of borehole at 12.2m (Target depth reached)

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 18/04/23 07:00 | m | 0.1 m bgl
(2) 01/05/23 10:00 | m | 0.39 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH01** | Date Drilled: | **17/04/2023-17/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **17/04/2023-17/04/2023** |




**Box 1 - Depth: 0.00 m to 6.00 m.**




**Box 2 - Depth: 6.00 to 9.45m.**

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH01** | Date Drilled: | **17/04/2023-17/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **17/04/2023-17/04/2023** |




**Box 3 - Depth: 9.45 to 12.20m.**

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Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH02



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389780.02m
Northing: 824697.27m
Reduced level: 54.06m (NZVD 2016)

Date started: 20/04/2023
Date completed: 20/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 54 | 1 | | **0m:** Organic SILT, minor clay and organics; brown. Stiff, wet, high plasticity. Organics; rootlets. [TOPSOIL] | OL | | | | | | **0m: TOPSOIL** | |
| | | | | **0.3m:** CLAY, minor silt, trace organics; light brown. Hard, wet, high plasticity. Organics; trace black inclusions. [TAURANGA GROUP] | CH | 0.5m: IBHSV UTP | 100 | | | | **0.3m: TAURANGA GROUP** | |
| | | | | **0.5m:**...gradational colour change to a light grey. 50mm decomposing wood. | | | | | | | 0.5m: IBHSV Obscured due to wood. | |
| | 53 | | | **1m:** Organic CLAY with minor organics and trace silt; light brownish grey. Firm, wet, high plasticity, extra sensitive. Organics; fibrous, decomposing plant matter. | OH | | | | | | | |
| SPT | | 2 | | **1.3m:** Fibrous PEAT; black with brown mottling. Firm, saturated, high plasticity, sensitive to extra sensitive. Fibrous wood and rootlets, with plant material. [PEAT- H6] | PT | 1.5m: SPT 0// 1,0,0,0 N = 1<br>1.5m: IBHSV 35/4 kPa | 0 | | | | 1.5m: SPT dropped - washed out. | |
| HQ3 | 52 | 3 | | | | | 100 | | | | | |
| SPT | 51 | | | **3.1m:** Organic CLAY; light brown. Firm, saturated, high plasticity, sensitive. Organics; decomposing wood and rootlets. | | 3m: SPT 0// 0,0,0,0 N = 0<br>3m: IBHSV 35/5 kPa | 100 | | | | | |
| HQ3 | | 4 | | | | | 100 | | | | | |
| U54 | 50 | | | **3.9m to 4m:**...light brown. | OH | | | | | | | |
| | | | | **4.3m:**... 100mm piece of decomposing wood. | | | 100 | | | | | |
| SPT | | 5 | | **4.5m:**...soft | | 4.5m: SPT 0// 0,0,0,0 N = 0<br>4.5m: IBHSV 14/2 kPa | 100 | | | | | |
| | | | | | PT | | 100 | | | | | |

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 20/04/23 15:00 | m | 0.0 m bgl
(2) 01/05/23 10:10 | m | 0.55 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH02



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389780.02m
Northing: 824697.27m
Reduced level: 54.06m (NZVD 2016)

Date started: 20/04/2023
Date completed: 20/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Box 2 HQ3 | 49 | 6 | | **4.9m:** Amorphous PEAT with trace fibrous wood; black. Soft, saturated, highly plastic, sensitive. [PEAT- H7] | PT | | | | | | | |
| | | | | **5.1m:** Organic CLAY with minor wood fragments and rootlets; dark brown. Soft to firm, saturated, high plasticity, sensitive. | OH | | 100 | | | | | |
| SPT | 48 | 7 | | **6m:** Organic CLAY with minor organics; light grey. Soft to firm, saturated, high plasticity, extra sensitive. Organics; decomposing fibrous wood and rootlets. | | 6m: SPT 0// 0,0,0,0 N = 0<br>6m: IBHSV 26/2 kPa | 89 | | | | 6m to 6.2m: Core disturbed. | |
| HQ3 | | | | **6.6m to 6.8m:**...fibrous wood fragment, black. | OH | | 100 | | | | | |
| U54 | 47 | 8 | | **7m:** PUSH TUBE SAMPLE - Organic CLAY; brown. Soft, wet, high plasticity. Organics; decomposed fibrous plant lenses. | | 7m: IBHSV 17/2 kPa | 100 | | | | | |
| Box 3 SPT | | | | **7.5m:** Organic CLAY; light grey. Soft to firm, saturated, high plasticity, extra sensitive. Organics; decomposing fibrous wood and rootlets, brown staining. | OH | 7.5m: SPT 0// 0,0,0,0 N = 0 | 100 | | | | | |
| HQ3 | 46 | 9 | | **7.7m:** CLAY with trace organics; light grey. Soft, saturated, high plasticity, extra sensitive. Organics; rootlets. | CH | | 100 | | | | | |
| | | | | **8.65m:** Completely weathered, light grey, LIMESTONE; recovered as a *Silty CLAY, saturated, high plasticity.* [MAHURANGI LIMESTONE] | CW | | | | | | **8.65m: NORTHLAND ALLOCHTHON - MAHURANGI LIMESTONE** | |
| SPT | 45 | 10 | | **9m:** Moderately weathered, light grey, pervasively sheared LIMESTONE; very weak; extremely closely spaced, massive. Breaks down to a *Silty GRAVEL, fine to coarse, angular* when disturbed<br>**9.2m to 10.71m:**...recovered as *medium to coarse GRAVEL, angular, 10-30mm.*. | | 9m: SPT 7// 8,16,18,8 for 35mm N = 50+ | 100 | | 0 | | 9.1m to 10.1m: CZ | |
| HQ3 | | | | | MW | | 81 | | 0 | | | |

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 20/04/23 15:00 | m | 0.0 m bgl
(2) 01/05/23 10:10 | m | 0.55 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH02



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389780.02m
Northing: 824697.27m
Reduced level: 54.06m (NZVD 2016)

Date started: 20/04/2023
Date completed: 20/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 44 | | | **9m:** Moderately weathered, light grey, pervasively sheared LIMESTONE; very weak; extremely closely spaced, massive. Breaks down to a *Silty GRAVEL, fine to coarse, angular* when disturbed | MW | | 81 | | 0 | | | |
| SPT | | | | | | 10.5m: SPT 42// 25 for 60mm N = 50+ | 100 | | 0 | | 10.45m: JT 40° UnRo Cn | |

End of borehole at 10.71m (Target depth reached)

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 20/04/23 15:00 | m | 0.0 m bgl
(2) 01/05/23 10:10 | m | 0.55 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH02** | Date Drilled: | **20/04/2023-20/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **20/04/2023-20/04/2023** |




**Box 1. - Depth: 0.00 m to 3.00 m.**




**Box 2. - Depth: 3.00m to 6.00m.**

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH02** | Date Drilled: | **20/04/2023-20/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **20/04/2023-20/04/2023** |




**Box 3. - Depth: 6.00 m to 10.05 m.**




**Box 4. - Depth: 10.05 m to 10.71 m.**

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Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH03



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389698.01m
Northing: 824682.96m
Reduced level: 53.59m (NZVD 2016)

Date started: 18/04/2023
Date completed: 19/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 53 | 1 | | **0m:** Organic silty CLAY; brownish grey. Stiff, wet, high plasticity. Organics; fibrous wood. [TOPSOIL] | OL | | | | | | **0m: TOPSOIL** | |
| | | | | **0.2m:** CORE LOSS | | | 13 | | | | **0.2m: TAURANGA GROUP**<br>0.2m to 1.5m: Core drop out - not recovered, inferred core washout. | |
| SPT | 52 | 2 | | | | 1.5m: SPT<br>5//<br>1,1,1,1<br>N = 4 | 11 | | | | 1.5m to 1.95m: No recovery in SPT test. | |
| HQ3 | 51 | 3 | | **1.95m:** PEAT; black. Soft, saturated, high plasticity. Organics; fibrous wood, decomposing plant matter. [PEAT-H5] | PT | | 95 | | | | | |
| SPT | | | | | | 3m: SPT<br>0//<br>0,0,0,0<br>N = 0 | | | | | | |
| | | | | **3.2m:** CLAY with trace organics and sand; light grey. Soft, saturated, high plasticity. Organics; decomposing rootlets. Sand; fine. | CH | 3m: IBHSV 26/5 kPa | 100 | | | | | |
| HQ3 | 50 | 4 | | **3.75m:** Organic CLAY; dark brown. Soft, saturated, high plasticity. Organics; rootlets and moderately spaced, amorphous peat lenses. | | | 100 | | | | | |
| U54 | | | | **4m to 4.5m:**...PUSH TUBE SAMPLE | OH | 4m: IBHSV 17/5 kPa | 100 | | | | | |
| SPT | 49 | 5 | | **4.5m:** Organic CLAY; dark brown. Firm, saturated, high plasticity. Organics; decomposing rootlets and amorphous peat lens. | OH | 4.5m: SPT<br>0//<br>0,0,0,0<br>N = 0 | | | | | | |
| | | | | **4.65m:** CORE LOSS | | | 33 | | | | | |
| | | | | | OH | | 38 | | | | | |

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4938 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 19/04/23 10:00 | m | 0 m Bgl
(2) 01/05/23 10:30 | m | 0 m Bgl

Box 1
**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH03



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389698.01m
Northing: 824682.96m
Reduced level: 53.59m (NZVD 2016)

Date started: 18/04/2023
Date completed: 19/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Box 1 HQ3 | 48 | 6 | | **4.95m:** Organic CLAY; dark brown. Firm, saturated, high plasticity. Organics; decomposing rootlets and amorphous peat lenses. | OH | | | | | | | |
| | | | | **5.3m:** Fibrous PEAT; black. Soft, saturated, low plasticity. Organics; decomposed wood and rootlets. [PEAT-H5] | PT | | | | | | | |
| | | | | **5.4m:** CORE LOSS | | | 38 | | | | | |
| SPT | | | | **6m:** Fibrous PEAT; black. Soft, saturated, low plasticity. Organics; decomposed wood and rootlets. [PEAT-H5] | PT | 6m: SPT 0// 0,0,0,0 N = 0 6m: IBHSV 13/2 kPa | 100 | | | | | |
| HQ3 | 47 | 7 | | **6.3m:** Amorphous PEAT; black. Soft, saturated, low plasticity. [PEAT-H7] | PT | | | | | | | |
| | | | | **6.75m:** CORE LOSS | | | 29 | | | | 6.75m to 7.5m: No Recovery. | |
| SPT | 46 | 8 | | **7.5m:** Organic CLAY, trace silt; dark brown. Soft, saturated, high plasticity. Organics; black inclusions. | OH | 7.5m: SPT 0// 0,0,0,0 N = 0 | 100 | | | | | |
| Box 2 HQ3 | | | | **8.2m:** Fibrous PEAT; black. Soft, saturated, low plasticity. Organics; decomposing wood and plant material with some organics amorphous. [PEAT-H4] | PT | | 100 | | | | | |
| | 45 | 9 | | **8.5m:** CLAY with trace organics and sand; light grey. Firm, wet, high plasticity. Organics; rootlets, fibrous wood inclusions. Sand; fine. | | | | | | | | |
| SPT | | | | | CH | 9m: SPT 0// 0,0,0,1 N = 1 9m: IBHSV 29/5 kPa | 100 | | | | | |
| HQ3 | 44 | 10 | | | | | 86 | | | | | |

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4938 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 19/04/23 10:00 | m | 0 m Bgl
(2) 01/05/23 10:30 | m | 0 m Bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH03



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389698.01m
Northing: 824682.96m
Reduced level: 53.59m (NZVD 2016)

Date started: 18/04/2023
Date completed: 19/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | | | | **10m:** Completety weathered, light grey, LIMESTONE; extremely weak; Recovered as a *Silty CLAY, trace organics. Firm, saturated, high plasticity. Organics; fibrous, rootlets.* [MAHURANGI LIMESTONE] | CW | | | | | | **10m: NORTHLAND ALLOCHTHON - MAHURANGI LIMESTONE** | |
| SPT | 43 | 11 | | **10.2m:** Moderately to slightly weathered, light grey, pervasively sheared LIMESTONE. Very weak to weak, massive, extremely closely spaced. Breaks along shear planes into a *Fine to coarse GRAVEL; angular.* . | MW | 10.5m: SPT 15// 12,12,13,19 N = 56 | 86<br>67 | | 0 | | | |
| HQ3 | 42 | 12 | | **10.95m:** CORE LOSS<br>**11.5m:** Moderately to slightly weathered, light grey, pervasively sheared LIMESTONE. Very weak to weak, massive, extremely closely spaced. Breaks along shear planes into a *Fine to coarse GRAVEL; angular.* . | | | 48 | | 0 | | 10.95m to 11.5m: Core dropped, did not recover.<br>11.65m to 11.9m: CZ | |
| SPT | 41 | 13 | | **12.5m:**...black and purple staining on gravel faces. | MW | 12m: SPT 50 for 145mm// N = 50+<br>13.5m: SPT 50 for 90mm// N = 50+ | 56<br>100 | | 0<br>0 | | 12.7m: JT 45° UnSm Cn Closed<br>12.75m: JT 2° UnRo Cn Horizontal failure plane Closed<br>13.05m: JT 40° UnSm Cn Closed<br>13.1m: JT 60° UnRo Cn Closed<br>13.4m: JT 68° UnSm Cn Closed | |
| HQ3 | 40 | 14 | | | | | 67 | | 0 | | 13.95m: JT 41° UnRo Cn Closed<br>14m: JT 55° UnSm Cn Closed | |
| SPT | 39 | 15 | | | | | 95 | | 0 | | 14.5m: JT 60° UnRo Cn Closed | |

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4938 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 19/04/23 10:00 | m | 0 m Bgl
(2) 01/05/23 10:30 | m | 0 m Bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH03



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389698.01m
Northing: 824682.96m
Reduced level: 53.59m (NZVD 2016)

Date started: 18/04/2023
Date completed: 19/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPT | | | | | MW | 15m: SPT 40// 27 for 70mm N = 50+ | 49 | | 0 | | | |

Box 4

End of borehole at 15.22m (Target depth reached)

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4938 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 19/04/23 10:00 | m | 0 m Bgl
(2) 01/05/23 10:30 | m | 0 m Bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH03** | Date Drilled: | **18/04/2023-19/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **18/04/2023-19/04/2023** |




**Box 1. - Depth: 0.00 m to 6.00 m.**




**Box 2. - Depth: 6.00m to 10.50m.**

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH03** | Date Drilled: | **18/04/2023-19/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **18/04/2023-19/04/2023** |




**Box 3. - Depth: 10.50 m to 14.25 m.**




**Box 4. - Depth: 14.25 m to 15.22 m.**

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Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH04



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389621.98m
Northing: 824682.28m
Reduced level: 53.45m (NZVD 2016)

Date started: 19/04/2023
Date completed: 20/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 53 | | | **0m:** Organic SILT with trace clay; dark brown. Stiff, wet, high plasticity. [TOPSOIL] | OL | | | | | | **0m: TOPSOIL** | |
| HQ3 | | | | **0.4m:** Organic silty CLAY; dark brown. Firm, wet, high plasticity. Organics; decomposing fibrous wood and tree sap. [TAURANGA GROUP]<br>**0.6m to 0.7m:**...piece of tree sap. | OH | | 100 | | | | **0.4m: TAURANGA GROUP** | |
| HQ3 | | 1 | | **0.9m:** CLAY with minor silt and organics; light brown. Firm, wet, high plasticity. Organics; decomposing wood fragments. | CH | | | | | | | |
| SPT | 52 | | | **1.2m:** Organic CLAY; black. Soft to firm, saturated, high plasticity. Organics; fibrous wood, decomposing plant material. | OH | 1.5m: SPT 0// 0,0,0,0 N = 0 | 56 | | | | | |
| HQ3 | | 2 | | **1.8m:** Fibrous PEAT; black. Soft, saturated, moderate plasticity. [PEAT- H5] | PT | | 100 | | | | | |
| HQ3 | 51 | 3 | | | | 3m: SPT 0// 0,0,0,0 N = 0<br>3m: IBHSV 29/4 kPa | | | | | | |
| SPT | | | | **3.1m:** CLAY with minor organics and trace silt. Soft, saturated, high plasticity, sensitive. Organics; decomposing plant matter, small black inclusions. | CH | | 100 | | | | | |
| HQ3 | 50 | 4 | | **3.9m:** Organic CLAY; brownish grey. Soft, wet, high plasticity. Organics; decomposing fibrous plant material and amorphous peat lenses. | OH | | 100 | | | | | |
| SPT | 49 | | | | | 4.5m: SPT 0// 0,0,0,0 N = 0<br>4.5m: IBHSV 23/5 kPa | 78 | | | | | |
| | | 5 | | **4.9m:**...gradational colour change to dark brown, fibrous wood | | | 100 | | | | | |

Box 1
Box 2

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Additional peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 20/04/23 14:00 | m | 0 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Project Reference: **523578**

# AU23-BH04



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389621.98m
Northing: 824682.28m
Reduced level: 53.45m (NZVD 2016)

Date started: 19/04/2023
Date completed: 20/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 48 | | | inclusions.<br>**3.9m:** Organic CLAY; brownish grey. Soft, wet, high plasticity. Organics; decomposing fibrous plant material and amorphous peat lenses. | OH | | 100 | | | | | |
| SPT | | 6 | | **5.7m:** Organic CLAY; light grey to dark brown. Firm, saturated, high plasticity, sensitive to extra sensitive. Organics; fibrous wood, decomposing plant material. | | 6m: SPT 0// 0,0,0,0 N = 0<br>6m: IBHSV 29/5 kPa | 78 | | | | | |
| HQ3 | 47 | 7 | | **6.4m:**...gradational colour change to dark brown. | OH | | 100 | | | | | |
| SPT | 46 | 8 | | **7.35m:** Amorphous PEAT; black. Soft, saturated, low plasticity. [PEAT-H6] | PT | 7.5m: SPT 0// 0,0,0,0 N = 0<br>7.5m: IBHSV 17/2 kPa | 100 | | | | | |
| HQ3 | 45 | 9 | | **8.1m:** CLAY with minor organics; light grey. Soft to firm, saturated, high plasticity, sensitive to extra sensitive. Organics; decomposing plant material. | CH | 9m: SPT 0// 0,0,0,0 N = 0<br>9m: IBHSV 26/5 kPa | 100 | | | | | |
| SPT | 44 | | | | | | 100 | | | | | |
| HQ3 | | | | **9.5m:** Completely weathered, light grey, indistinctly bedded LIMESTONE; extremely weak; Recovered as a *Clayey SILT, light grey. Firm, wet, low plasticity.* [MAHURANGI LIMESTONE] | CW | | | | | | **9.5m: NORTHLAND ALLOCHTHON - MAHURANGI LIMESTONE** | |
| | | 10 | | **9.7m:** Moderately weathered, pervasively sheared LIMESTONE; Very weak, massive, extremely closely spaced. Breaks along shear planes, recovered as a *Medium to coarse GRAVEL; angular, 10-60mm.* | MW | | 100 | | 0 | | | |

Box 2 | Box 3 | Box 4

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Additional peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 20/04/23 14:00 | m | 0 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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# AU23-BH04



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389621.98m
Northing: 824682.28m
Reduced level: 53.45m (NZVD 2016)

Date started: 19/04/2023
Date completed: 20/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 43 | | | **9.7m:** Moderately weathered, pervasively sheared LIMESTONE; Very weak, massive, extremely closely spaced. Breaks along shear planes, recovered as a *Medium to coarse GRAVEL; angular, 10-60mm.* | MW | | 100 | | 0 | | 10m: JT 39° UnSm Cn Closed | |
| SPT | | | | **10.5m:** Slightly weathered, greenish grey, pervasively sheared, LIMESTONE; Weak to moderately strong, extremely closely spaced, massive. Breaks along shear planes, to a *fine to coarse GRAVEL; angular, 10-60mm,* when disturbed. | | 10.5m: SPT 36// 25 for 60mm N = 50+ | 100 | | 0 | | | |
| HQ3 | | 11 | | | | | 94 | | 0 | | 10.95m: JT 86° UnSm Cn Closed | |
| HQ3 | 42 | | | **11.25m to 11.6m:**...Core washout, recovered as smooth gravels. | SW | | 53 | | 0 | | 11.8m to 12m: CZ | |
| SPT | | 12 | | | | 12m: SPT 34// 20,25,5 for 10mm N = 50+ | 100 | | 0 | | | |
| | | | | End of borehole at 12.31m (Target depth reached) | | | | | | | | |

Box 4

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Additional peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 20/04/23 14:00 | m | 0 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH04** | Date Drilled: | **19/04/2023-19/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **19/04/2023-19/04/2023** |




**Box 1. - Depth: 0.00 m to 3.00 m.**




**Box 2. - Depth: 3.00m to 6.60m.**

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH04** | Date Drilled: | **19/04/2023-19/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **19/04/2023-19/04/2023** |




**Box 3. - Depth: 6.60 m to 9.85 m.**




**Box 4. - Depth: 9.85 m to 12.31m.**

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Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH05



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389679.95m
Northing: 824635.09m
Reduced level: 53.58m (NZVD 2016)

Date started: 27/04/2023
Date completed: 28/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | | | | **0m:** Silty CLAY with some fine gravel and trace rootlets; light brown, mottled black. Stiff, moist, high plasticity. Gravel; fine, angular. [TOPSOIL] | CL-ML | | | | | | **0m: TOPSOIL** | |
| | | | | **0.2m:**...Piece of Tree sap, 10mm. | | | 100 | | | | | |
| | | | | **0.25m:** Organic silty CLAY with minor fibrous wood and rootlets; light brown, mottled black. Hard, wet, high plasticity. Organics; fibrous wood inclusions, rootlets. [TAURANGA GROUP] | OH | | | | | | **0.25m: TAURANGA GROUP** | |
| | 53 | | | | | 0.5m: IBHSV UTP | | | | | | |
| HQ3 | | 1 | | **0.6m:** Organic CLAY; dark brown mottled black. Firm to hard, wet, high plasticity, moderately sensitive. Organics; decomposing wood fragments, rootlets and bark. | OH | | 100 | | | | | |
| | 52 | | | **1.45m:** Fibrous PEAT; black. Soft to firm, saturated, high plasticity, moderately sensitive to quick. Organics; moderately decomposed, black fibrous wood material and rootlets. [PEAT-H5] | PT | 1.5m: SPT 0// 0,0,0,0 N = 0 | 0 | | | | | |
| SPT | | | | | | 1.5m: IBHSV 26/7 kPa | | | | | | |
| | | 2 | | | | | | | | | | |
| HQ3 | 51 | | | | | | 100 | | | | | |
| | | 3 | | | | 3m: SPT 0// 0,0,0,0 N = 0 | | | | | | |
| SPT | | | | **3.15m:** Organic CLAY; dark brown. Soft, saturated, high plasticity, quick. Organics; wood inclusions, rootlets. | OH | 3m: IBHSV 17/0 kPa | 100 | | | | | |
| | | | | **3.4m:**...Wood lens, 10mm. | | | | | | | | |
| | 50 | | | **3.5m:** CLAY with minor organics; light grey. Soft, saturated, high plasticity, quick. Organics; fibrous inclusions, wood and rootlets. | CH | | | | | | | |
| | | 4 | | **3.95m:** Organic CLAY; light brown and light grey. Soft, saturated, high plasticity, quick. Organics; fibrous wood inclusions, rootlets. | OH | | | | | | | |
| HQ3 | | | | **4.1m:** Organic CLAY; dark brown, mottled black. Soft, saturated, high plasticity, sensitive to quick. Organics; rootlets and fibrous wood fragments. | | | 100 | | | | | |
| | | | | **4.35m:**...Wood, 15mm. | | | | | | | | |
| | 49 | | | | OH | 4.5m: IBHSV 14/0 kPa | | | | | | |
| | | 5 | | | | | | | | | | |

Box 1
Box 2

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
No water level recorded

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH05



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389679.95m
Northing: 824635.09m
Reduced level: 53.58m (NZVD 2016)

Date started: 27/04/2023
Date completed: 28/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPT | | | | **4.1m:** Organic CLAY; dark brown, mottled black. Soft, saturated, high plasticity, sensitive to quick. Organics; rootlets and fibrous wood fragments. | OH | 5m: SPT 3// 0,1,0,1 N = 2 | 100 | | | | | |
| HQ3 | 48 | | | | | | 76 | | | | | |
| | | 6 | | **5.9m:** CLAY with trace organics; light brown to light grey. Soft, saturated, high plasticity, sensitive. Organics; rootlets. | CH | | | | | | | |
| SPT | | | | **6m:** Organic CLAY; light grey. Soft, saturated, high plasticity, sensitive. Organics; rootlets and fibrous material. | OH | 6m: SPT 0// 0,0,0,0 N = 0 6m: IBHSV 17/4 kPa | 100 | | | | | |
| HQ3 | 47 | | | **6.5m:** Amorphous PEAT; black. Soft, saturated, high plasticity. [PEAT-H8] | PT | | | | | | | |
| | | 7 | | | | | 100 | | | | | |
| | | | | **7.1m:** Organic CLAY; brown and light brown. Soft, saturated, high plasticity, sensitive to extra sensitive. Fibrous organics; rootlets. | | | | | | | | |
| SPT | 46 | | | **7.7m:**...fibrous wood. | OH | 7.5m: SPT 0// 0,0,0,0 N = 0 7.5m: IBHSV 17/2 kPa | 100 | | | | | |
| | | 8 | | | | | | | | | | |
| HQ3 | | | | **8.1m:** CLAY with trace organics; light grey. Soft to firm, saturated, high plasticity, sensitive to extra sensitive. Organics; fibrous decomposing rootlets. | CH | | 100 | | | | | |
| | 45 | | | | | | | | | | | |
| | | 9 | | | | 9m: SPT 0// 0,1,1,3 N = 5 9m: IBHSV 29/7 kPa | | | | | | |
| SPT | | | | **9.1m:** Completely weathered, light grey, LIMESTONE; extremely weak; Recovered as a *silty CLAY; firm, saturated, high plasticity.* | CW | | 100 | | 0 | | **9.1m: NORTHLAND ALLOCHTHON - MAHURANGI LIMESTONE** | |
| HQ3 | 44 | | | **9.4m:** Highly weathered, light grey, pervasively sheared LIMESTONE; very weak, extremely closely spaced. Recovered as *silty GRAVEL; angular.* due to pervasive shearing. [MAHURANGI LIMESTONE] | CW | | 82 | | 0 | | 9.4m: Drillers mud added to improve recovery. | |
| | | 10 | | | MW | | | | | | | |

Box 2
Box 3

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
No water level recorded

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH05



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389679.95m
Northing: 824635.09m
Reduced level: 53.58m (NZVD 2016)

Date started: 27/04/2023
Date completed: 28/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | | | | **9.85m:** Moderately weathered, greenish grey, pervasively sheared LIMESTONE; very weak, extremely closely spaced, massive. Breaks down to a *coarse GRAVEL; angular 20mm-60mm* , when disturbed. | | | 82 | | 0 | | 10.3m to 10.5m: Core Loss. | |
| SPT | 43 | | | | | 10.5m: SPT 31// 29 N = 50+ | 100 | | 0 | | | |
| HQ3 | | | | | | | 100 | | 0 | | | |
| HQ3 | | 11 | | | MW | | 100 | | 0 | | 11.1m: JT 68° UnSm Cn Closed | |
| HQ3 | 42 | | | | | | | | | | 11.65m: JT 35° UnSm Cn Closed | |
| SPT | | 12 | | | | 12m: SPT 50 for 145mm// N = 50+ | 100 | | 0 | | | |

End of borehole at 12.15m (Target depth reached)

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
No water level recorded

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH05** | Date Drilled: | **27/04/2023-28/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **27/04/2023-28/04/2023** |




**Box 1 - Depth: 0.00 m to 3.60 m.**




**Box 2 - Depth: 3.60m to 7.20m.**

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH05** | Date Drilled: | **27/04/2023-28/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **27/04/2023-28/04/2023** |




**Box 3 - Depth: 7.20 m to 10.80 m.**




**Box 4 - Depth: 10.80 m to 12.145m.**

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Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH06



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389759.72m
Northing: 824635.26m
Reduced level: 54.16m (NZVD 2016)

Date started: 21/04/2023
Date completed: 21/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 54 | | | **0m:** Organic SILT with minor clay. Firm, wet, low plasticity. Organics; trace rootlets. [TOPSOIL] | OL | | 100 | | | | **0m: TOPSOIL** | |
| U54 | | 1 | | **0.4m:** Organic CLAY with trace silt; light brown. Firm, wet, high plasticity. Organics; trace black organic inclusions, rootlets. [TAURANGA GROUP]<br>**0.5m to 1m:**...PUSH TUBE SAMPLE | OH | | 100 | | | | **0.4m: TAURANGA GROUP** | |
| HQ3 | 53 | | | **1m:** CLAY with trace silt and organics; light brown. Firm, wet, high plasticity. Organics; trace amorphous inclusions and rootlets. | CH | | 100 | | | | | |
| SPT | | 2 | | **1.7m:** Organic CLAY; dark brown and black. Firm, saturated, high plasticity. Organics; fibrous wood, rootlets, decomposing fibrous plant material. | OH | 1.5m: SPT<br>0//<br>0,0,0,0<br>N = 0 | 100 | | | | | |
| HQ3 | 52 | 3 | | **2m:** Fibrous PEAT; black. Soft, saturated, high plasticity. Organics; moderately decomposed wood and rootlets. [PEAT-H5]. | PT | | 100 | | | | | |
| SPT | 51 | | | **3m:** Organic CLAY; light brown. Stiff, saturated, high plasticity, sensitive. Organics; black fibrous organic inclusions. | OH | 3m: SPT<br>0//<br>0,0,0,0<br>N = 0 | 100 | | | | | |
| HQ3 | | 4 | | **3.15m:** CLAY with trace organics; light grey. Stiff, saturated, high plasticity, sensitive. Organics; decomposing indistinct fibrous organics. | CH | 3m: IBHSV 59/11 kPa | | | | | | |
| SPT | 50 | 5 | | **4.05m:** Organic CLAY with minor peat lenses; brown and dark brown. Soft, saturated, highly plastic, sensitive. Organics; decomposed fibrous wood and amorphous peat. | OH | 4.5m: SPT<br>0//<br>0,0,0,0<br>N = 0<br>4.5m: IBHSV 23/5 kPa | 100 | | | | | |

Box 1
Box 2

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 01/05/23 12:00 | m | 0.37 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH06



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389759.72m
Northing: 824635.26m
Reduced level: 54.16m (NZVD 2016)

Date started: 21/04/2023
Date completed: 21/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 49 | | | **4.05m:** Organic CLAY with minor peat lenses; brown and dark brown. Soft, saturated, highly plastic, sensitive. Organics; decomposed fibrous wood and amorphous peat. | OH | | | | | | | |
| HQ3 | | | | **5.4m:** Organic CLAY; light brown. Soft, saturated, highly plastic, sensitive. Organics; black organic inclusions, rootlets.<br>**5.5m to 5.6m:**...Peat lense [PEAT-H4] | OH<br>OH | | 100 | | | | | |
| SPT | 48 | 6 | | **5.9m:** CLAY with minor organics; light grey and light brownish grey. Soft, saturated, high plasticity, sensitive. Organics; decomposing fibrous plant material and wood. | CH | 6m: SPT<br>0//<br>0,0,0,0<br>N = 0<br>6m: IBHSV 20/5 kPa | 100 | | | | | |
| HQ3 | 47 | 7 | | **6.55m to 6.75m:**...gradational colour change to light grey.<br>**6.75m:** CLAY with trace organics; light grey. Soft to stiff, saturated, highly plastic, moderately sensitive. Organics; fibrous inclusions and rootlets. | CH | | 100 | | | | | |
| SPT | | | | | | 7.5m: SPT<br>0//<br>0,0,1,0<br>N = 1<br>7.5m: IBHSV 59/16 kPa | 100 | | | | | |
| HQ3 | 46 | 8 | | **7.75m:** Completely weathered, light grey, LIMESTONE; extremely weak; Recovered as a *silty CLAY; stiff, wet, high plasticity.* [MAHURANGI LIMESTONE] | CW | | | | | | **7.75m: NORTHLAND ALLOCHTHON - MAHURANGI LIMESTONE** | |
| | | | | **8.15m:** Highly weathered, light grey, pervasively sheared LIMESTONE; very weak, extremely closely spaced. Breaks down to a *GRAVEL; angular, 10-30mm*, on shear planes.<br>**8.2m:**...purple and green staining on fracture faces. | CW | | | | | | | |
| | | | | **8.5m:** Slightly weathered, light grey, pervasively sheared LIMESTONE; weak, extremely closely spaced, massive. Breaks down to *GRAVEL; angular, 10-80mm*, when disturbed. | | | 100 | | 0 | | 8.75m: JT 20° UnSm Cn Closed<br>8.8m: JT 40° UnSm Cn Closed | |
| SPT | 45 | 9 | | | MW | 9m: SPT<br>50//<br>N = 50+ | 100 | | 0 | | 9.1m to 9.6m: SZ | |
| HQ3 | | | | | | | 100 | | 0 | | 9.4m: JT 40° UnSm Cn Closed<br>9.5m: JT 45° UnSm Cn Closed<br>9.6m to 9.8m: CZ | |
| HQ3 | | 10 | | | | | 71 | | 0 | | | |

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 01/05/23 12:00 | m | 0.37 m bgl

Database File: SPARK DC_523578__GINTMASTER.GPJ Library file: AURECON_AKL_20220728.GLB Template: AURECON_AKL_20170201.GDT Report File: AURECON DH LOG V3.9 0DP Date Generated: 1/06/2023

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Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH06



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389759.72m
Northing: 824635.26m
Reduced level: 54.16m (NZVD 2016)

Date started: 21/04/2023
Date completed: 21/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | 44 | | | **8.5m:** Slightly weathered, light grey, pervasively sheared LIMESTONE; weak, extremely closely spaced, massive. Breaks down to *GRAVEL; angular, 10-80mm*, when disturbed. | MW | | 71 | | 0 | | 9.99m to 10.5m: SZ<br>10m: JT 45° UnSlk Cn Closed<br>10.1m: JT 50° UnSm Cn Closed<br>10.3m: JT 30° UnSm Cn Closed | |
| SPT | | | | | | 10.5m: SPT 50 for 135mm// N = 50+ | 100 | | 0 | | | |
| | | | | End of borehole at 10.64m (Target depth reached) | | | | | | | | |

Box 4

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 01/05/23 12:00 | m | 0.37 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH06** | Date Drilled: | **21/04/2023-21/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **21/04/2023-21/04/2023** |




**Box 1. - Depth: 0.00 m to 4.00 m.**




**Box 2. - Depth: 4.00 to 7.40m.**

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH06** | Date Drilled: | **21/04/2023-21/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **21/04/2023-21/04/2023** |




**Box 3. - Depth: 7.40 m to 10.00 m.**




**Box 4. - Depth: 10.00 m to 10.64m**

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Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH07



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389599.26m
Northing: 824594.63m
Reduced level: 53.66m (NZVD 2016)

Date started: 27/04/2023
Date completed: 27/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| HQ3 | | | | **0m:** Organic SILT; light brown. Hard, moist, low plasticity. Organics; some rootlets, black organic inclusions. [TOPSOIL] | OL | | | | | | **0m: TOPSOIL** | |
| HQ3 | | | | **0.15m:** Organic CLAY with trace silt; light brown. Stiff, wet, high plasticity. Organics, fibrous organic inclusions, rootlets and tree sap. [TAURANGA GROUP] | | | 100 | | | | **0.15m: TAURANGA GROUP** | |
| HQ3 | 53 | 1 | | **0.5m to 0.6m:**...100mm wood lens. | OH | | 100 | | | | | |
| | | | | **1.2m:** Organic CLAY; black. Firm, saturated, high plasticity, quick. Organics; fibrous material, rootlets. | OH | 1.5m: SPT 0// 0,0,0,0 N = 0 1.5m: IBHSV 29/1 kPa | | | | | | |
| SPT | 52 | | | | | | 100 | | | | | |
| Box 1 HQ3 | | 2 | | **1.8m:** PEAT; black. Soft to firm, saturated, high plasticity, extra sensitive to quick. Organics; fibrous wood inclusions, rootlets. Highly decomposed, indistinct plant structure [H4-H5]. | PT | | 100 | | | | | | |
| | 51 | 3 | | | | 3m: SPT 0// 0,0,0,0 N = 0 3m: IBHSV 20/2 kPa | | | | | | |
| SPT | | | | **3.1m:** Organic CLAY; light brown and light grey. Soft, saturated, high plasticity, extra sensitive. Organics; trace organic fibres, rootlets, fibrous wood inclusions. | | | 100 | | | | | |
| HQ3 | 50 | 4 | | | OH | | 100 | | | | | |
| Box 2 | | | | **4m:** CLAY; light grey. Stiff, saturated, high plasticity, moderately sensitive. | CH | | | | | | | |
| HQ3 | 49 | 5 | | **4.5m:** PUSH TUBE SAMPLE - CLAY with trace organics; light brownish grey. Stiff, saturated, high plasticity, moderately sensitive. Organics; fibrous plant material. | CH | 4.5m: IBHSV 56/20 kPa | 100 | | | | | |

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 01/05/23 12:30 | m | 0.2 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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www.aurecongroup.com

Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH07



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Tractor Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389599.26m
Northing: 824594.63m
Reduced level: 53.66m (NZVD 2016)

Date started: 27/04/2023
Date completed: 27/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: BC
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SPT | | | | **5m:** CLAY with trace organics; light grey with black streaks. Stiff, saturated, high plasticity, moderately sensitive. Organics; amorphous material. | CH | 5m: SPT 0// 1,0,1,1 N = 3 | 100 | | | | | |
| HQ3 | 48 | | | **5.4m:** Completely weathered, light grey, LIMESTONE; extremely weak; Recovered as a *silty CLAY with minor gravel. Firm, saturated, high plasticity. Gravel; fine, angular.* [MAHURANGI LIMESTONE] | CW | | 100 | | 0 | | **5.4m: NORTHLAND ALLOCHTHON - MAHURANGI LIMESTONE** | |
| SPT | | 6 | | **5.8m:** Moderately weathered, light grey, pervasively sheared, LIMESTONE; very weak, extremely closely spaced. Recovered as *silty GRAVEL; angular* | MW | 6m: SPT 10// 10,13,17,10 for 40mm N = 50+ | 100 | | 0 | | | |
| HQ3 | 47 | 7 | | **6.1m:**...Recovered as medium to coarse GRAVEL; angular, 10-40mm. | | | 100 | | 0 | | 7.1m to 7.3m: CZ<br>7.4m: JT 0-5° UnSm Cn | |
| SPT | | | | | | 7.5m: SPT 50 for 130mm// N = 50+ | 100 | | 0 | | | |

Box 2
Box 3

End of borehole at 7.63m (Target depth reached)

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 01/05/23 12:30 | m | 0.2 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH07** | Date Drilled: | **27/04/2023-27/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **27/04/2023-27/04/2023** |




**Box 1. - Depth: 0.00 m to 3.60 m.**




**Box 2. - Depth: 3.60m to 7.25m.**

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH07** | Date Drilled: | **27/04/2023-27/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **27/04/2023-27/04/2023** |




**Box 3. - Depth: 7.25 m to 7.63 m.**

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Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH08



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Trailer Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389719.96m
Northing: 824551.06m
Reduced level: 54.60m (NZVD 2016)

Date started: 28/04/2023
Date completed: 28/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: SN
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OB HQ | 54 | 1 | | **0m:** Sandy SILT with minor clay, trace gravel and organics; brown. Stiff, moist, high plasticity. Sand; fine to coarse. Gravel; fine, angular. Organics; rootlets. [TOPSOIL] | OL | | | | | | **0m: TOPSOIL** | |
| | | | | **0.2m:** SILT with some clay, trace sand and organics; light grey. Stiff, moist, high plasticity. Sand; fine. Organics; rootlets. [TAURANGA GROUP] | MH | | 100 | | | | **0.2m: TAURANGA GROUP** | |
| SPT | 53 | 2 | | **1.3m:** Silty CLAY with trace sand and organics; light grey with orange and black mottling. Stiff, moist, high plasticity, insensitive. Sand; fine. Organics; amorphous, highly decomposed wood fragments. | CH | 1.5m: SPT 0// 0,1,1,1 N = 3<br>1.5m: IBHSV 62/32 kPa | 100 | | | | | |
| OB HQ | 52 | 3 | | **2.2m:** Organic CLAY with minor silt and trace sand; black mottled brown. Stiff, moist, high plasticity, insensitive. Organics; spongy fibrous wood. Sand; fine. | OH | | | | | | | |
| | | | | **2.3m:** Fibrous PEAT; black. Firm, wet, non-plastic. [PEAT-H4] | PT | | 100 | | | | | |
| U54 | | | | **3m to 3.5m:**...PUSH TUBE | | 3m: IBHSV 29/5 kPa | 100 | | | | | |
| OB HQ | 51 | 4 | | **3.5m:** CLAY with trace sand and organics; grey wth black streaks. Firm to stiff, moist, high plasticity, moderately sensitive to sensitive. Sand; fine. Organics; moderately decomposed to slightly decomposed wood fragments. | CH | | 100 | | | | | |
| SPT | 50 | 5 | | **4.5m:** Organic CLAY; dark brown. Firm, wet, high plasticity. Organics; amorphous plant material. | CH | 4.5m: SPT 1// 0,0,0,0 N = 0<br>4.5m: IBHSV 26/8 kPa | 100 | | | | | |
| | | | | | | | 100 | | | | | |

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 01/05/23 11:45 | m | 0.33 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH08



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Trailer Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389719.96m
Northing: 824551.06m
Reduced level: 54.60m (NZVD 2016)

Date started: 28/04/2023
Date completed: 28/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: SN
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OB HQ | 49 | 6 | | **4.5m:** Organic CLAY; dark brown. Firm, wet, high plasticity. Organics; amorphous plant material. | CH | | 100 | | | | | |
| SPT | | | | **5.7m:** CLAY with trace sand and organics; grey with black mottling. Firm to stiff, moist, high plasticity, moderately sensitive to sensitive. Sand; fine. Organics; moderately decomposed to slightly decomposed wood fragments. | | 6m: SPT 0// 0,0,1,1 N = 2<br>6m: IBHSV 56/8 kPa | 100 | | | | | |
| OB HQ | 48 | 7 | | | CH | | 100 | | | | | |
| SPT | 47 | 8 | | | | 7.5m: SPT 0// 0,0,1,1 N = 2<br>7.5m: IBHSV 77/23 kPa | 100 | | | | | |
| OB HQ | 46 | 9 | | **8.5m:** Completely weathered, light greenish grey, LIMESTONE; extremely weak; Recovered as a *Silty CLAY with trace sand; grey. Stiff, moist, high plasticity. Sand, fine* [MAHURANGI LIMESTONE] | CW | | 100 | | | | **8.5m: NORTHLAND ALLOCHTHON - MAHURANGI LIMESTONE** | |
| SPT | | | | **9m:** Highly weathered, light green grey, pervasively sheared LIMESTONE; Weak, extremely closely spaced, massive, recovered as a *GRAVEL; angular, 10mm-40mm.* | HW | 9m: SPT 17// 18,26,6 for 10mm N = 50+ | 69 | | 0 | | | |
| OB HQ | 45 | 10 | | **9.35m:** Moderately to slightly weathered, light green grey, pervasively sheared LIMESTONE; Weak, extremely closely spaced, massive, recovered as a *GRAVEL; angular, 10mm-40mm.*<br>**9.5m:** CORE LOSS | MW | | 26 | | 0 | | 9.5m to 10.2m: Core loss. | |

REMARKS:
1. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
2. Standpipe piezometer and galvanised upstand installed upon completion of drilling.
3. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]
4. Pushtube samples logged from extruded sample photo.

Hand Shear Vane Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 01/05/23 11:45 | m | 0.33 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20170201.GDT **Report File:** AURECON DH LOG V3.9 0DP **Date Generated:** 1/06/2023

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Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-BH08



**BOREHOLE INFORMATION**
Method: Rotary Core Wireline
Equipment: Morooka Trailer Rig
Contractor: DCN Drilling Ltd

**CO-ORDINATES: Mt Eden Circuit 2000**
Easting: 389719.96m
Northing: 824551.06m
Reduced level: 54.60m (NZVD 2016)

Date started: 28/04/2023
Date completed: 28/04/2023
Inclination: -90°
Azimuth: -090°

Logged by: SN
Input by: BC
Reviewed by: AM
Verified by: RG

| Method | R.L. (m) | Length (m) | Graphic Log | Material Description | Weathering/USC | Testing | TCR (%) | SCR (%) | RQD (%) | Fracture Log (VWS WS MWS CS VCS ECS) | Stratigraphy Defect Description Additional Notes | Installation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OB HQ | | | | **9.5m:** CORE LOSS | | | | | | | | |
| OB HQ | | | × × ×

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH08** | Date Drilled: | **28/04/2023-28/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **28/04/2023-28/04/2023** |




**Box 1. - Depth: 0.00 m to 4.0 m.**




**Box 2. - Depth: 4.0m to 7.0m.**

**SPARK-DC**

| | | | |
|---|---|---|---|
| Borehole Reference: | **AU23-BH08** | Date Drilled: | **28/04/2023-28/04/2023** |
| Photographed By: | **BC** | Date Photographed: | **28/04/2023-28/04/2023** |




**Box 3. - Depth: 7.0 m to 10.5 m.**

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Project Reference: **523578**

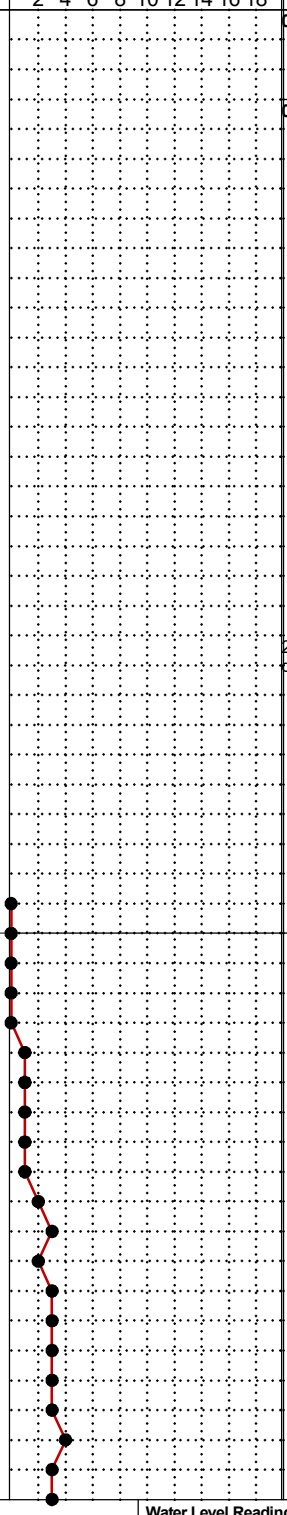
# AU23-HA01



| **DRILLING INFORMATION** | **CO-ORDINATES:** **Mt Eden Circuit 2000** | | |
|---|---|---|---|
| Method: Hand Auger | Easting: 389614.92m | Date started: 11/04/2023 | Logged by: BC |
| Equipment: 50 mm hand auger | Northing: 824726.31m | Date completed: 11/04/2023 | Input by: BC |
| Contractor: Aurecon | Ground Level: 53.12m (NZVD 2016) | Inclination: -90° | Reviewed by: AM |
| | | Orientation: N/A | Verified by: RG |

| Depth (m) | Graphic Log | Soil Description | Testing | Additional Observations | R.L. (m) |
|---|---|---|---|---|---|
| | | **0m:** Organic SILT; dark brown. Moist, low plasticity. [TOPSOIL] | | **0m: TOPSOIL** | 53 |
| | | **0.3m:** Organic CLAY with minor silt; dark brown. Stiff, wet, high plasticity, moderately sensitive to extra sensitive. Organics, odourous, disseminated. [TAURANGA GROUP] | 0.3m: IBHSV 80/25 kPa | **0.3m: TAURANGA GROUP** | |
| | | **0.6m:**...traces of tree sap, saturated. | 0.6m: IBHSV 70/10 kPa | | |
| | | **0.8m:**...light brown, groundwater seepage encountered. | 0.9m: IBHSV 50/5 kPa | | |
| 1 | | **1m:** Organic silty CLAY with trace sand; dark brown to black. Stiff, saturated, high plasticity, sensitive. Organics; amorphous, fibrous wood, tree sap inclusions. Sand, fine. | 1.2m: IBHSV 70/10 kPa | | 52 |
| | | **1.3m:** Organic SILT, trace clay and sand; dark brown. Stiff, saturated, low plasticity, moderately sensitive. Organics; amorphous, wood fragments. Sand, fine. | 1.5m: IBHSV 65/15 kPa | | |
| | | | 1.8m: IBHSV 80/15 kPa | | |
| 2 | | **1.9m:**...fibrous wood fragments. | | | |
| | | **2.1m:** Fibrous PEAT; black. Soft to firm, saturated, high plasticity, insensitive to moderately sensitive. [PEAT - H6] | 2.1m: ISFHSV 30/10 kPa | 2.1m to 2.7m: Shear vane dropping under own weight. | 51 |
| | | **2.2m:** No recovery. | | | |
| | | | 2.7m: ISFHSV 20/10 kPa | | |
| 3 | | **3m:** CLAY, minor organics, trace silt and trace sand; greyish black. Firm, saturated, high plasticity, insensitive. Sand, fine. Organics; rootlets. | 3m: ISFHSV 25/15 kPa | | 50 |
| | | Hand Auger terminated at 3.1m (Hole collapse) | | | |
| 4 | | | | | 49 |

Scala Penetrometer Test (Blows/100mm)




REMARKS:
1. This hand auger has been logged in accordance with NZGS Guidelines for the Field Classification of Soil and Rock for Engineering Purposes, 2005.
2. Vane shear strengths are corrected values.
3. UTP = Unable to Penetrate.
4. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
5. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

HSV Serial No: DR4938 Correction Factor: 1.568

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 11/04/23 10:00 | 3.10m | 0.5 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH SCALA 1.0 **Date Generated:** 1/06/2023

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Project Reference: **523578**

# AU23-HA02



| **DRILLING INFORMATION** | **CO-ORDINATES:** **Mt Eden Circuit 2000** | | |
|---|---|---|---|
| Method: Hand Auger | Easting: 389706.59m | Date started: 11/04/2023 | Logged by: DWB |
| Equipment: 50 mm hand auger | Northing: 824721.68m | Date completed: 11/04/2023 | Input by: DWB |
| Contractor: Aurecon | Ground Level: 53.48m (NZVD 2016) | Inclination: -90° | Reviewed by: AM |
| | | Orientation: N/A | Verified by: RG |

| Depth (m) | Graphic Log | Soil Description | Testing | Scala Penetrometer Test (Blows/100mm) | Additional Observations | R.L. (m) |
|---|---|---|---|---|---|---|
| | | **0m:** Organic SILT; light brown. Moist, low plasticity; organics, traces of tree sap. [TOPSOIL] | | | **0m: TOPSOIL** | |
| | | **0.3m:** Organic CLAY, minor silt; dark brown and grey. Stiff, moist, high plasticity, moderately sensitive; organics, decomposing wood and sap. | 0.3m: ISHSV 77/22 kPa | | **0.3m: TAURANGA GROUP** | 53 |
| | | **0.6m:**...brown, wet. | 0.6m: ISHSV 65/23 kPa | | | |
| 1 | | **0.9m:**...firm. | 0.9m: ISHSV 44/17 kPa | | | |
| | | **1m:**...saturated. | 1.2m: ISHSV 41/11 kPa | | | |
| | | **1.3m:**...Groundwater seepage encountered at 1.3m. | | | | |
| | | **1.4m:** Amorphous PEAT, with trace fibrous organics; black. Very soft to firm, saturated, high plasticity, highly sensitive. Organics, decomposing wood, amorphous. [PEAT-H5]. | 1.5m: ISHSV 44/7 kPa | | 1.4m to 3m: Poor sample recovery. | 52 |
| | | | 1.8m: ISHSV 47/11 kPa | | | |
| 2 | | **2m to 2.1m:**...fibrous wood, 10mm. | 2.1m: ISHSV 44/22 kPa | | | |
| | | | 2.4m: ISHSV 11/11 kPa | | | 51 |
| | | | 2.7m: ISHSV 22/11 kPa | | | |
| 3 | | **3m:** CLAY, some silt, trace sand and organics; blue grey. Stiff to very stiff, wet, high plasticity. Organics; rootlets , decomposed wood. | 3m: ISHSV 80/20 kPa | | | |
| | | | 3.3m: ISHSV 145/50 kPa | | | 50 |
| | | | 3.6m: ISHSV 65/20 kPa | | | |
| 4 | | Hand Auger terminated at 4m (Hole collapse) | | | | |
| | | | | | | 49 |
| 5 | | | | | | |
| | | | | | | 48 |

REMARKS:
1. This hand auger has been logged in accordance with NZGS Guidelines for the Field Classification of Soil and Rock for Engineering Purposes, 2005.
2. Vane shear strengths are corrected values.
3. UTP = Unable to Penetrate.
4. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
5. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

HSV Serial No: DR4940 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 11/04/23 12:00 | 4.00m | 0.54 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH SCALA 1.0 **Date Generated:** 1/06/2023

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Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-HA03

Sheet **1** of **1**

| **DRILLING INFORMATION** | **CO-ORDINATES:** **Mt Eden Circuit 2000** | | |
|---|---|---|---|
| Method: Hand Auger | Easting: 389656.70m | Date started: 11/04/2023 | Logged by: BC |
| Equipment: 50 mm hand auger | Northing: 824680.53m | Date completed: 11/04/2023 | Input by: BC |
| Contractor: Aurecon | Ground Level: 53.56m (NZVD 2016) | Inclination: -90° | Reviewed by: AM |
| | | Orientation: N/A | Verified by: RG |

| Depth (m) | Graphic Log | Soil Description | Testing | Additional Observations | R.L. (m) |
|---|---|---|---|---|---|
| | | **0m:** Organic SILT, trace clay; light brown. Very stiff, moist, low plasticity, sensitive. [TOPSOIL] | 0.3m: 105/25 kPa | **0m: TOPSOIL** | |
| | | **0.4m:** Organic CLAY, trace silt; dark brown. Stiff to hard, moist, high plasticity, sensitive. [TAURANGA GROUP] | 0.6m: 75/10 kPa | **0.4m: TAURANGA GROUP** | 53 |
| 1 | | **0.8m:**...black, saturated. | 0.9m: 60/10 kPa | | |
| | | | 1.2m: UTP | | |
| | | **1.4m:** PEAT; black. Soft to firm, saturated, low plasticity, insensitive to moderately sensitive. Odourous, fibrous organics, decomposed wood. [PEAT-H5]. | | 1.5m to 1.8m: Shear vane sinks under it's own weight | 52 |
| | | | 1.8m: 20/10 kPa | | |
| 2 | | | | | |
| | | | 2.4m: 30/20 kPa | | 51 |
| | | **2.6m:**...red fibrous wood fragments. | | | |
| 3 | | | | 3m to 3.5m: Poor recovery; unable to undertake shear vane reading. | |
| | | **3.5m:** CLAY, trace silt; light grey. Very stiff, moist, high plasticity, insensitive to sensitive. | 3.5m: 155/40 kPa<br>3.6m: 185/45 kPa | | 50 |
| | | **3.7m:** Silty CLAY; light grey. Stiff, moist, high plasticity, insensitive. | | | |
| | | **3.8m:** CLAY, minor sand; dark grey mottled brown. Stiff, saturated, medium plasticity, insensitive. Sand is fine to medium. Organics present. | 3.8m: 60/45 kPa | | |
| 4 | | | | | |
| | | **4.2m:** CLAY, trace sand; dark brown mottled black. Firm, saturated, low plasticity, insensitive. Sand is fine to medium. Odourous. | 4.2m: 30/15 kPa | | |
| | | Hand Auger terminated at 4.5m (Poor recovery) | 4.5m: 30/25 kPa | | 49 |

Scala Penetrometer Test (Blows/100mm)
2 4 6 8 10 12 14 16 18

REMARKS:
1. This hand auger has been logged in accordance with NZGS Guidelines for the Field Classification of Soil and Rock for Engineering Purposes, 2005.
2. Vane shear strengths are corrected values.
3. UTP = Unable to Penetrate.
4. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
5. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

HSV Serial No: DR4938 Correction Factor: 1.568

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 11/04/23 11:30 | 4.50m | 0.5 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH SCALA 1.0 **Date Generated:** 1/06/2023

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Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-HA04



| **DRILLING INFORMATION** | **CO-ORDINATES: Mt Eden Circuit 2000** | | |
|---|---|---|---|
| Method: Hand Auger | Easting: 389734.15m | Date started: 12/04/2023 | Logged by: DWB |
| Equipment: 50 mm hand auger | Northing: 824649.40m | Date completed: 12/04/2023 | Input by: DWB |
| Contractor: Aurecon | Ground Level: 53.77m (NZVD 2016) | Inclination: -90° | Reviewed by: AM |
| | | Orientation: N/A | Verified by: RG |

| Depth (m) | Graphic Log | Soil Description | Testing | Scala Penetrometer Test (Blows/100mm) | Additional Observations | R.L. (m) |
|---|---|---|---|---|---|---|
| | | **0m:** Organic SILT; dark brown. Moist, low plasticity. [TOPSOIL] | | | **0m: TOPSOIL** | |
| | | **0.2m:** Organic silty CLAY; dark greyish brown. Stiff to very stiff, wet, high plasticity, moderately sensitive; organics, sap, decomposing fibrous wood. [TAURANGA GROUP] | 0.3m: ISHSV 137/29 kPa | | **0.2m: TAURANGA GROUP** | |
| | | **0.6m:** CLAY, trace silt and organics; light grey with dark brown streaks. Firm to stiff, wet, moderate plasticity, moderately sensitive; organics, decomposing wood and rootlets. | 0.6m: ISHSV 74/29 kPa | | | 53 |
| 1 | | **0.9m:** Fibrous organic CLAY; dark brown. dark brown and grey. Firm to stiff, wet, high plasticity, moderately sensitive. Organics, decomposing wood, rootlets. | 0.9m: ISFHSV 52/20 kPa | | | |
| | | | 1.2m: ISFHSV 29/8 kPa | | | |
| | | **1.35m to 1.37m:**...piece of decomposing wood. | | | 1.4m: Groundwater seepage encountered, saturated. | |
| | | **1.5m to 1.7m:**...black. | 1.5m: ISFHSV 47/11 kPa | | | |
| | | **1.7m:** Amorphous PEAT, with trace fibrous organics; black. Soft to firm, saturated, high plasticity, highly sensitive. Poor sample recovery. [PEAT - H7]. | 1.8m: ISFHSV 29/11 kPa | | 1.7m to 2.4m: Poor sample recovery. | 52 |
| 2 | | | 2.1m: ISFHSV 23/11 kPa | | | |
| | | Hand Auger terminated at 2.4m (Hole collapse) | 2.4m: ISFHSV 38/11 kPa | | | |
| 3 | | | | | | 51 |
| | | | | | | 50 |
| 4 | | | | | | |
| | | | | | | 49 |

Scala Penetrometer Test (Blows/100mm): 2 4 6 8 10 12 14 16 18

REMARKS:
1. This hand auger has been logged in accordance with NZGS Guidelines for the Field Classification of Soil and Rock for Engineering Purposes, 2005.
2. Vane shear strengths are corrected values.
3. UTP = Unable to Penetrate.
4. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
5. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

HSV Serial No: DR4390 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 12/04/23 14:00 | 2.40m | 0.7 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH SCALA 1.0 **Date Generated:** 1/06/2023

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Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-HA05



| **DRILLING INFORMATION** | **CO-ORDINATES: Mt Eden Circuit 2000** | | |
|---|---|---|---|
| Method: Hand Auger | Easting: 389734.61m | Date started: 12/04/2023 | Logged by: BC |
| Equipment: 50 mm hand auger | Northing: 824601.97m | Date completed: 12/04/2023 | Input by: BC |
| Contractor: Aurecon | Ground Level: 54.19m (NZVD 2016) | Inclination: -90° | Reviewed by: AM |
| | | Orientation: N/A | Verified by: RG |

| Depth (m) | Graphic Log | Soil Description | Testing | Additional Observations | R.L. (m) |
|---|---|---|---|---|---|
| | | **0m:** Organic SILT; dark brown. Moist, medium plasticity. [TOPSOIL] | | **0m: TOPSOIL** | |
| | | **0.15m:** CLAY; light brownish grey. Stiff, moist, high plasticity, insensitive. [TAURANGA GROUP] | 0.3m: ISHSV 50/30 kPa | **0.15m: TAURANGA GROUP** | 54 |
| | | **0.4m:** CLAY, trace silt and organics; dark grey mottled black. Firm to very stiff, moist, high plasticity, insensitive to sensitive. Organics present, fibrous wood fragments. | | | |
| | | **0.6m:**...tree sap inclusions. | 0.6m: ISHSV 115/30 kPa | | |
| 1 | | **0.9m:**...Groundwater seepage encountered at 0.9m, saturated. | 0.9m: ISHSV 145/25 kPa | | |
| | | **1.2m:**...firm. | 1.2m: ISHSV 45/15 kPa | | 53 |
| | | | 1.5m: ISHSV 50/15 kPa | | |
| | | | 1.8m: ISHSV 40/25 kPa | | |
| 2 | | **1.9m:** PEAT; black. Firm, saturated, high plasticity, moderately sensitive. Organics, decomposing wood, rootlets. [PEAT-H5]. | 2.1m: ISFHSV 35/15 kPa | | 52 |
| | | Hand Auger terminated at 2.4m (Poor recovery) | | | |
| 3 | | | | | 51 |
| 4 | | | | | 50 |

Scala Penetrometer Test (Blows/100mm)
2 4 6 8 10 12 14 16 18

REMARKS:
1. This hand auger has been logged in accordance with NZGS Guidelines for the Field Classification of Soil and Rock for Engineering Purposes, 2005.
2. Vane shear strengths are corrected values.
3. UTP = Unable to Penetrate.
4. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
5. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

HSV Serial No: DR4938 Correction Factor: 1.568

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 12/04/23 13:45 | 2.40m | 1.37 m bgl

**Database File:** SPARK DC_523578_GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH SCALA 1.0 **Date Generated:** 1/06/2023

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Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-HA06



| **DRILLING INFORMATION** | **CO-ORDINATES: Mt Eden Circuit 2000** | | |
|---|---|---|---|
| Method: Hand Auger | Easting: 389580.70m | Date started: 12/04/2023 | Logged by: DWB |
| Equipment: 50 mm hand auger | Northing: 824631.89m | Date completed: 12/04/2023 | Input by: DWB |
| Contractor: Aurecon | Ground Level: 53.41m (NZVD 2016) | Inclination: -90° | Reviewed by: AM |
| | | Orientation: N/A | Verified by: RG |

| Depth (m) | Graphic Log | Soil Description | Testing | Additional Observations | R.L. (m) |
|---|---|---|---|---|---|
| | | **0m:** Organic SILT; dark brown. Moist, low plasticity. [TOPSOIL] | | **0m: TOPSOIL** | |
| | | **0.2m:** Organic SILT, minor clay; dark brown and black. Stiff to very stiff, wet, moderate plasticity, insensitive; organics, decomposing rootlets, wood and trace charcoal. [TAURANGA GROUP] | 0.3m: ISHSV 104/29 kPa | **0.2m: TAURANGA GROUP** | |
| | | **0.4m:** Organic CLAY; dark brown. Stiff, saturated, high plasticity, moderately sensitive; organics, fibrous wood and peat lenses. | 0.6m: ISHSV 56/29 kPa | 0.5m: Ground water seepage encountered, saturated. | 53 |
| 1 | | **0.7m to 1m:**...300mm of decomposing fibrous wood; reddy brown. | | | |
| | | **1.2m:** Amorphous PEAT, with trace fibrous organics; black. Firm, saturated, high plasticity, moderately sensitive. Organics, highly decomposed wood. [PEAT-H7]. | 1.2m: ISHSV 26/11 kPa<br>1.5m: ISFHSV 29/11 kPa<br>1.8m: ISFHSV 47/26 kPa | 1.2m to 2.1m: Poor sample recovery. | 52 |
| 2 | | | | | |
| | | Hand Auger terminated at 2.1m (Hole collapse) | 2.1m: ISFHSV 23/5 kPa | | 51 |
| 3 | | | | | 50 |
| 4 | | | | | 49 |

● Scala Penetrometer Test (Blows/100mm)
2 4 6 8 10 12 14 16 18

REMARKS:
1. This hand auger has been logged in accordance with NZGS Guidelines for the Field Classification of Soil and Rock for Engineering Purposes, 2005.
2. Vane shear strengths are corrected values.
3. UTP = Unable to Penetrate.
4. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
5. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

HSV Serial No: DR4390 Correction Factor: 1.491

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 12/04/23 14:15 | 2.10m | 0.6 m bgl

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH SCALA 1.0 **Date Generated:** 1/06/2023

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Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-HA07



| **DRILLING INFORMATION** | **CO-ORDINATES: Mt Eden Circuit 2000** | | |
|---|---|---|---|
| Method: Hand Auger | Easting: 389666.14m | Date started: 12/04/2023 | Logged by: BC |
| Equipment: 50 mm hand auger | Northing: 824593.72m | Date completed: 12/04/2023 | Input by: BC |
| Contractor: Aurecon | Ground Level: 53.84m (NZVD 2016) | Inclination: -90° | Reviewed by: AM |
| | | Orientation: N/A | Verified by: RG |

| Depth (m) | Graphic Log | Soil Description | Testing | Additional Observations | R.L. (m) |
|---|---|---|---|---|---|
| | | **0m:** Organic clayey SILT; brown. Moist, medium plasticity. [TOPSOIL] | | **0m: TOPSOIL** | |
| | | **0.15m:** CLAY; light brownish grey. Stiff to very stiff, moist, high plasticity, insensitive to moderately sensitive. [TAURANGA GROUP] | | **0.15m: TAURANGA GROUP** | |
| | | **0.3m:** ...wet. | 0.3m: ISHSV 50/30 kPa | | |
| | | **0.5m:** ...brown. | | | |
| | | | 0.6m: ISHSV 100/45 kPa | | |
| | | **0.7m:** CLAY; dark brown mottled black. Hard, wet, high plasticity, sensitive. Organics; fibrous, wood fragments, odourous. | | | |
| 1 | | | 0.9m: ISHSV 215 kPa | | 53 |
| | | **1.2m:** Amorphous PEAT; black. Firm to stiff, saturated, low plasticity, moderately sensitive to sensitive. [PEAT - H7] | 1.2m: ISFHSV 55/10 kPa | | |
| | | | 1.5m: ISFHSV 55/10 kPa | | |
| | | | 1.8m: ISFHSV 35/10 kPa | | |
| 2 | | | | | 52 |
| | | Hand Auger terminated at 2.4m (Poor recovery) | | | |
| 3 | | | | | 51 |
| | | | | | 50 |
| 4 | | | | | |
| | | | | | 49 |

● Scala Penetrometer Test (Blows/100mm)
2 4 6 8 10 12 14 16 18

REMARKS:
1. This hand auger has been logged in accordance with NZGS Guidelines for the Field Classification of Soil and Rock for Engineering Purposes, 2005.
2. Vane shear strengths are corrected values.
3. UTP = Unable to Penetrate.
4. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
5. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

HSV Serial No: DR4938 Correction Factor: 1.568

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
(1) 12/04/23 14:15 | 2.40m | 0.78 m bgl

**Database File:** SPARK DC_523578_.GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH SCALA 1.0 **Date Generated:** 1/06/2023

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Client: **Spark New Zealand**
Project: **Spark Data Centres**
Location: **1350 Dairy Flat Highway, Dairy Flat, AUCKLAND**
Project Reference: **523578**

# AU23-HA08

Sheet **1** of **1**

| DRILLING INFORMATION | CO-ORDINATES: Mt Eden Circuit 2000 | | |
|---|---|---|---|
| Method: Hand Auger | Easting: 389928.27m | Date started: 11/04/2023 | Logged by: DWB |
| Equipment: 50 mm hand auger | Northing: 824620.85m | Date completed: 11/04/2023 | Input by: DWB |
| Contractor: Aurecon | Ground Level: 62.00m (NZVD 2016) | Inclination: -90° | Reviewed by: AM |
| | | Orientation: N/A | Verified by: RG |

| Depth (m) | Graphic Log | Soil Description | Testing | Scala Penetrometer Test (Blows/100mm) 2 4 6 8 10 12 14 16 18 | Additional Observations | R.L. (m) |
|---|---|---|---|---|---|---|
| | | **0m:** Organic SILT; dark brown. Moist, low plasticity. [TOPSOIL] | | | **0m: TOPSOIL** | |
| | | **0.2m:** Silty CLAY, trace sand; brownish grey and orange. Very stiff, moist to wet, high plasticity, moderately sensitive; sand, fine. [FILL] | 0.3m: ISHSV 106/35 kPa | | **0.2m: FILL** | |
| | | **0.4m:**...light grey and orange. | | | | |
| | | **0.5m:**...with minor siltstone gravels and trace sand; Gravels, fine to medium, angular, limonitic nodules; sand, fine. | 0.6m: ISHSV 74/32 kPa | | **0.6m: TAURANGA GROUP** | |
| | | **0.6m:** CLAY, minor silt; light grey with orange streaks. Stiff to very stiff, wet, high plasticity, moderately sensitive. [TAURANGA GROUP] | | | | |
| | | **0.8m:**...with minor silt and trace organics; light brownish orange; Organics, wood fibres. | 0.9m: ISHSV 157/47 kPa | | | |
| 1 | | | | | | 61 |
| | | **1.1m:** Completely weathered, light grey LIMESTONE; *Recovered as: Gravelly SILT, minor clay; light grey. Hard, dry, low plasticity, insensitive* [MAHURANGI LIMESTONE] | 1.2m: ISHSV UTP | | **1.1m: NORTHLAND ALLOCTHON - MAHURANGI LIMESTONE** | |
| | | Hand Auger terminated at 1.5m (Refusal) | 1.5m: ISHSV UTP | 27<br>24<br>26<br>30 | | |
| 2 | | | | | | 60 |
| 3 | | | | | | 59 |
| 4 | | | | | | 58 |

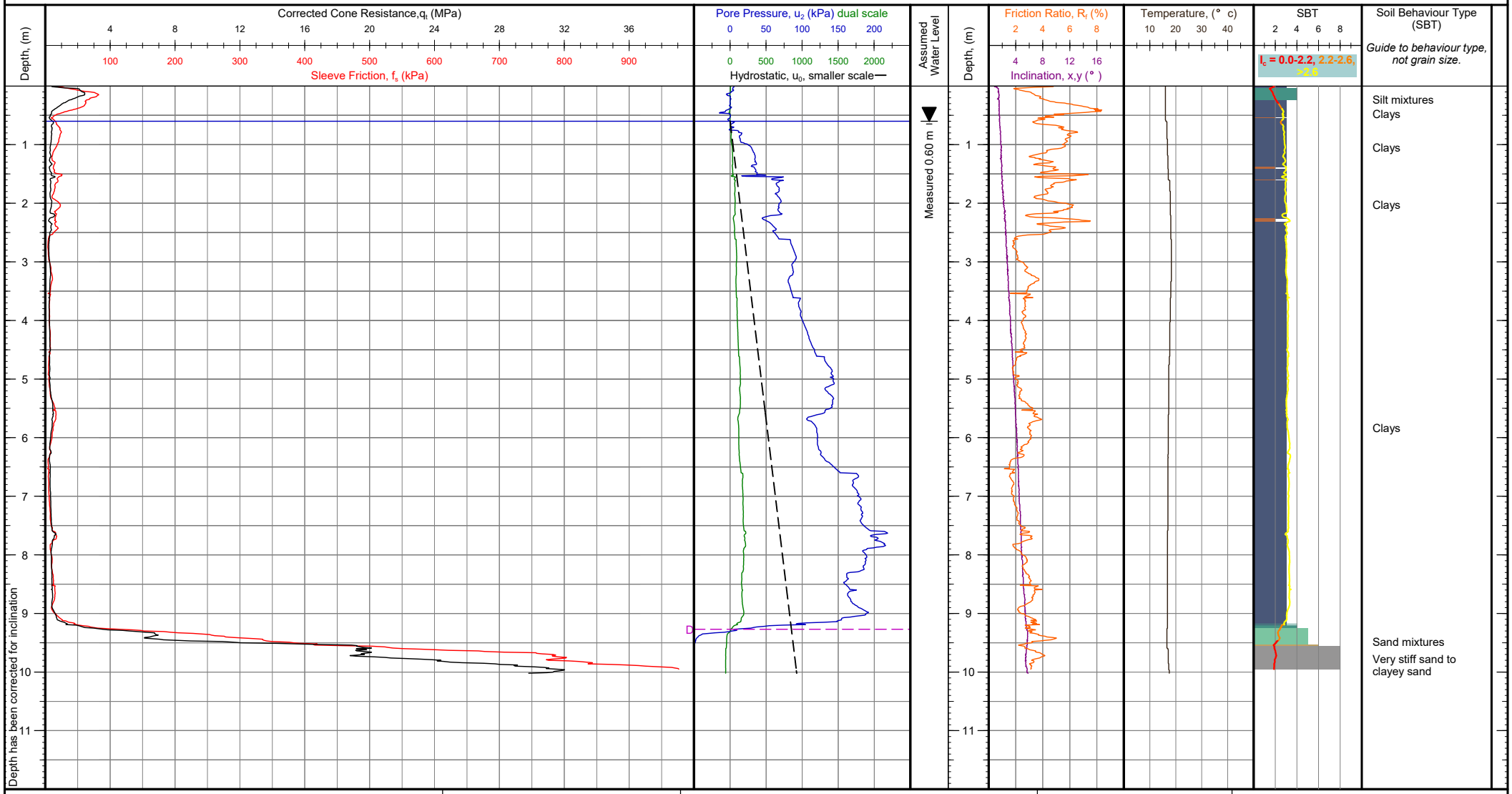
REMARKS:
1. This hand auger has been logged in accordance with NZGS Guidelines for the Field Classification of Soil and Rock for Engineering Purposes, 2005.
2. Vane shear strengths are corrected values.
3. UTP = Unable to Penetrate.
4. Investigation collar is recorded to an accuracy of ±8 mm horizontal and ±15mm vertical, using Leica GS16 GNSS RTK Rover and Leica CS20 Field Controller in single baseline RTK configuration.
5. Peat classification derived from Von-Post Humification Scale [Peat H1-H10]

HSV Serial No: DR4390 Correction Factor: 1.486

**Water Level Readings:**
**Date Time | Hole Depth | Water Level**
No water level recorded

**Database File:** SPARK DC_523578__GINTMASTER.GPJ **Library file:** AURECON_AKL_20220728.GLB **Template:** AURECON_AKL_20130722.GDT **Report File:** AURECON HA LOG WITH SCALA 1.0 **Date Generated:** 1/06/2023

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Alyssa Malamatenios | **NZTM 2000 N, E (m):** | 5941955.90, 1747321.41 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | MKJ167 | **WGS84 (deg):** | -36.656598,174.648293 | **Date of Test:** | 6/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 10cm$^2$ Compression | **Location Method:** | Handheld GPS | **Depth (m):** | 10.02 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.79 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Limit of reaction force | | |

**Client Reference:**

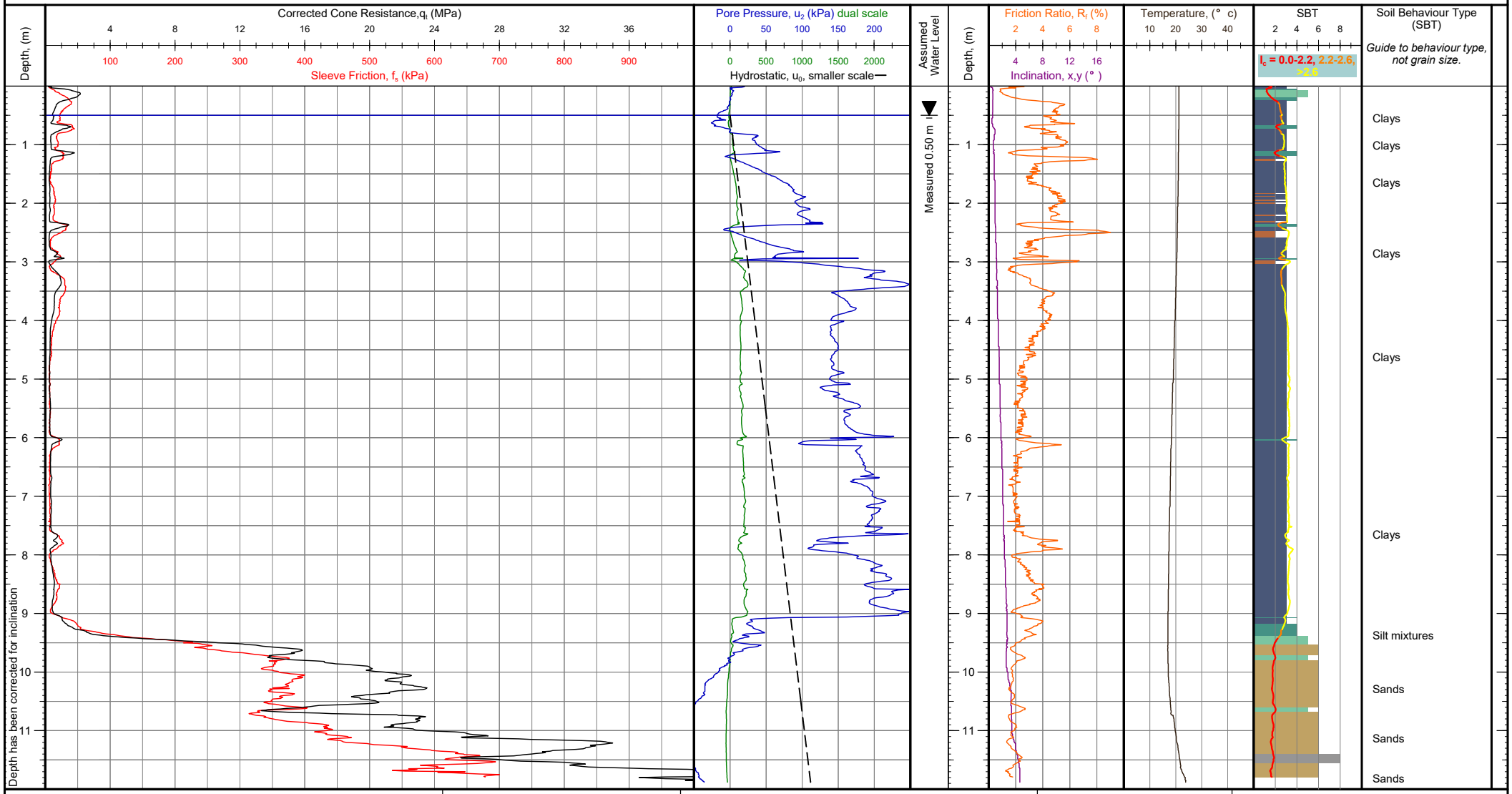
**Test Number:** **CPT-01**

**G.I. Job Ref:** 230270

**Comments:** Dissipation performed at 9.27m.

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Marcelo Martinez | **NZTM 2000 N, E (m):** | 5941913.11, 1747383.17 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | 71137 | **WGS84 (deg):** | -36.656974,174.648992 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 15cm$^2$ Subtraction | **Location Method:** | Handheld GPS | **Depth (m):** | 11.88 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.75 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Danger of buckling rods | **G.I. Job Ref:** | 230270 |

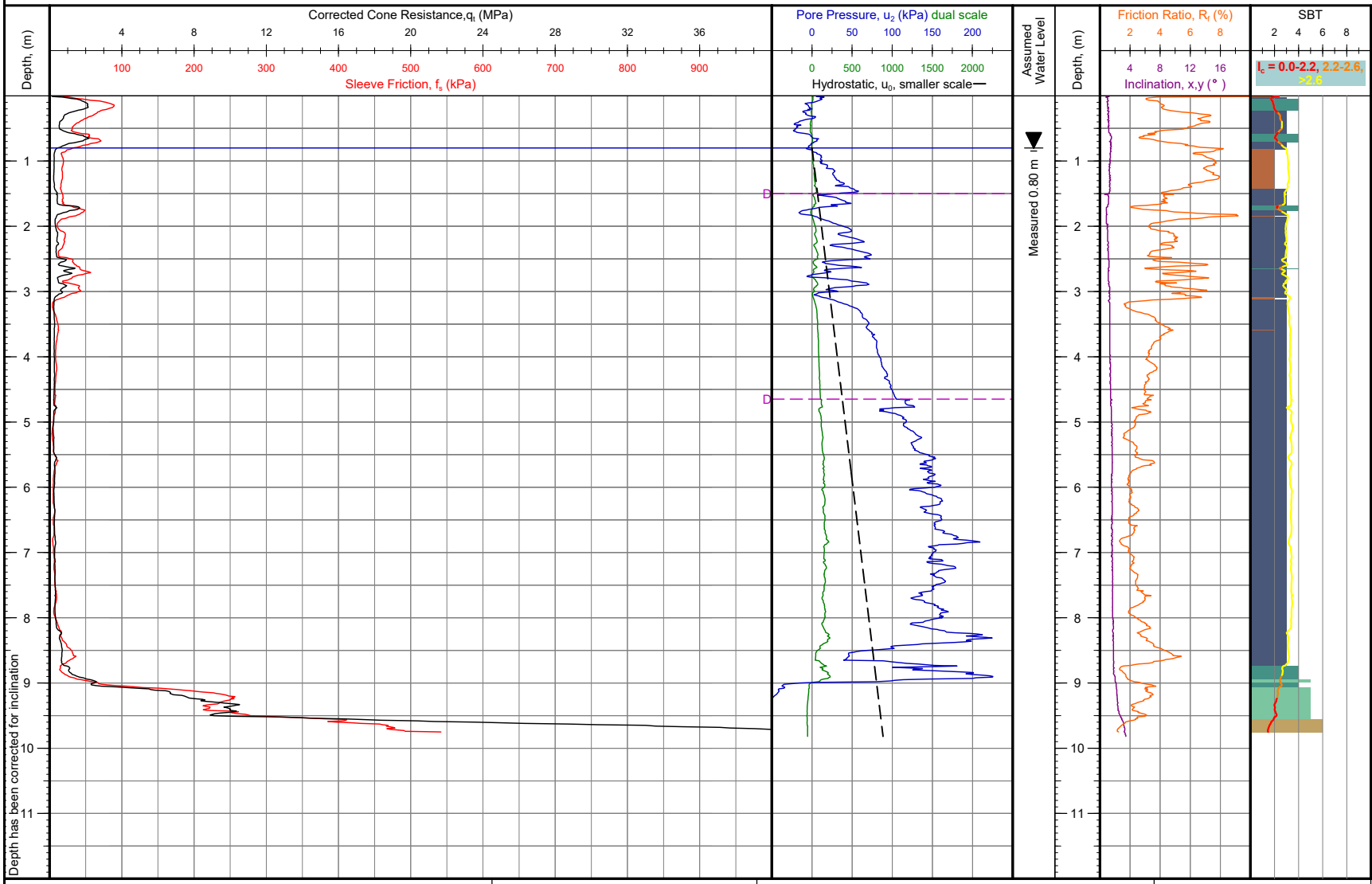
**Client Reference:**

**Test Number:** **CPT-02**

**Comments:**

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




## Soil Behaviour Type (SBT)

*CPT Classifications cannot be expected to provide accurate predictions of soil type based on grain size, but provide a guide to behaviour type.*

- Clays: clay to silty clay
- Organic soils - clays
- Clays: clay to silty clay
- Clays: clay to silty clay
- Clays: clay to silty clay
- Clays: clay to silty clay
- Clays: clay to silty clay
- Silt mixtures: clayey silt & silty clay
- Sand mixtures: silty sand to sandy silt
- Sands: clean sands to silty sands

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Alyssa Malamatenios | **NZTM 2000 N, E (m):** | 5941920.47, 1747458.41 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | MKJ333 | **WGS84 (deg):** | -36.656864,174.649839 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 10cm$^2$ Compression | **Location Method:** | Handheld GPS | **Depth (m):** | 9.82 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.80 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Limit of reaction force | | |

**Client Reference:**

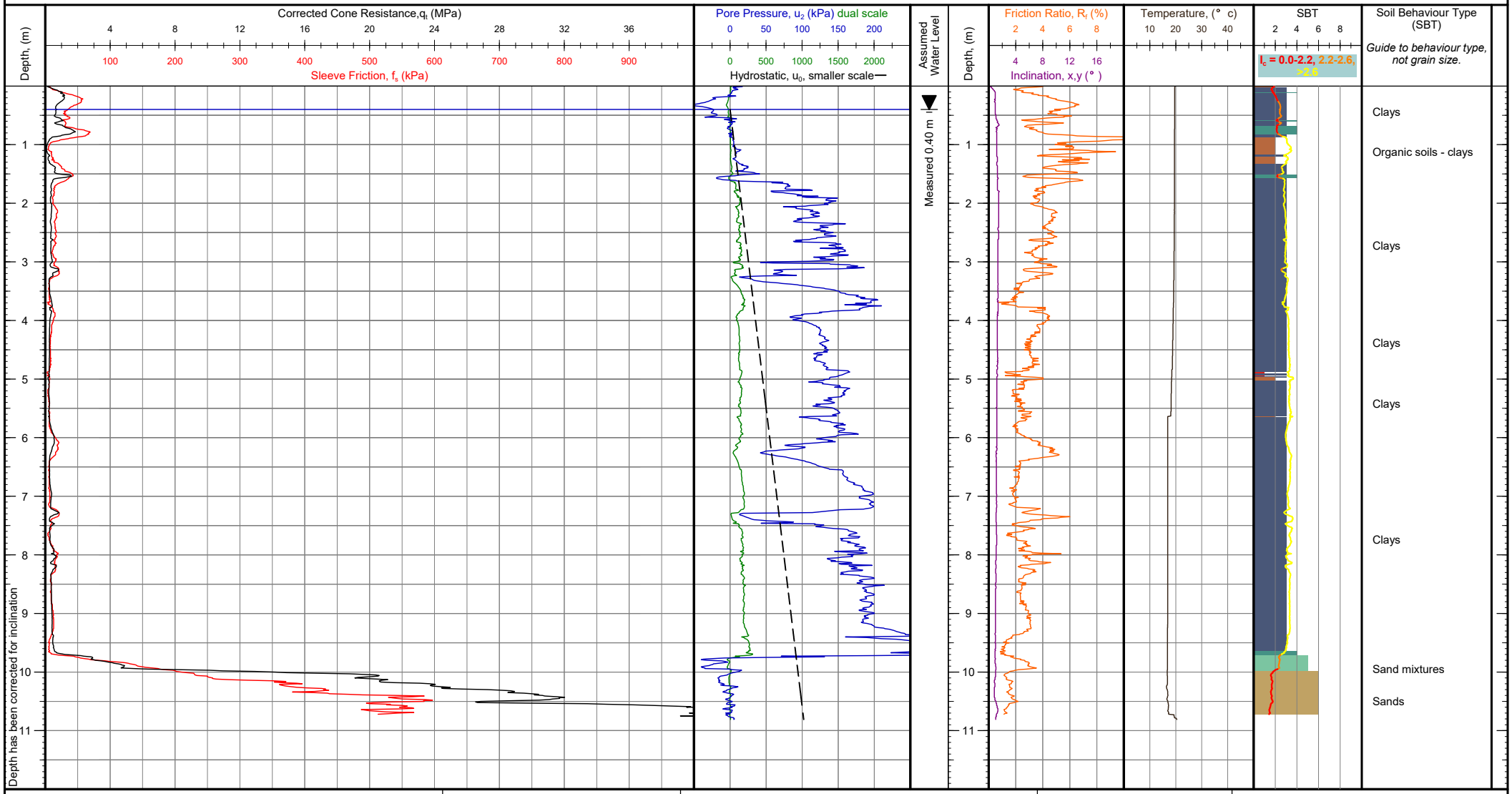
**Test Number:** **CPT-03**

**G.I. Job Ref:** 230270

**Comments:** Dissipation performed at 1.50m.

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Marcelo Martinez | **NZTM 2000 N, E (m):** | 5941917.61, 1747334.16 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | 71062 | **WGS84 (deg):** | -36.656941,174.648443 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 15cm$^2$ Subtraction | **Location Method:** | Handheld GPS | **Depth (m):** | 10.81 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.75 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Danger of buckling rods | | |

**Client Reference:**

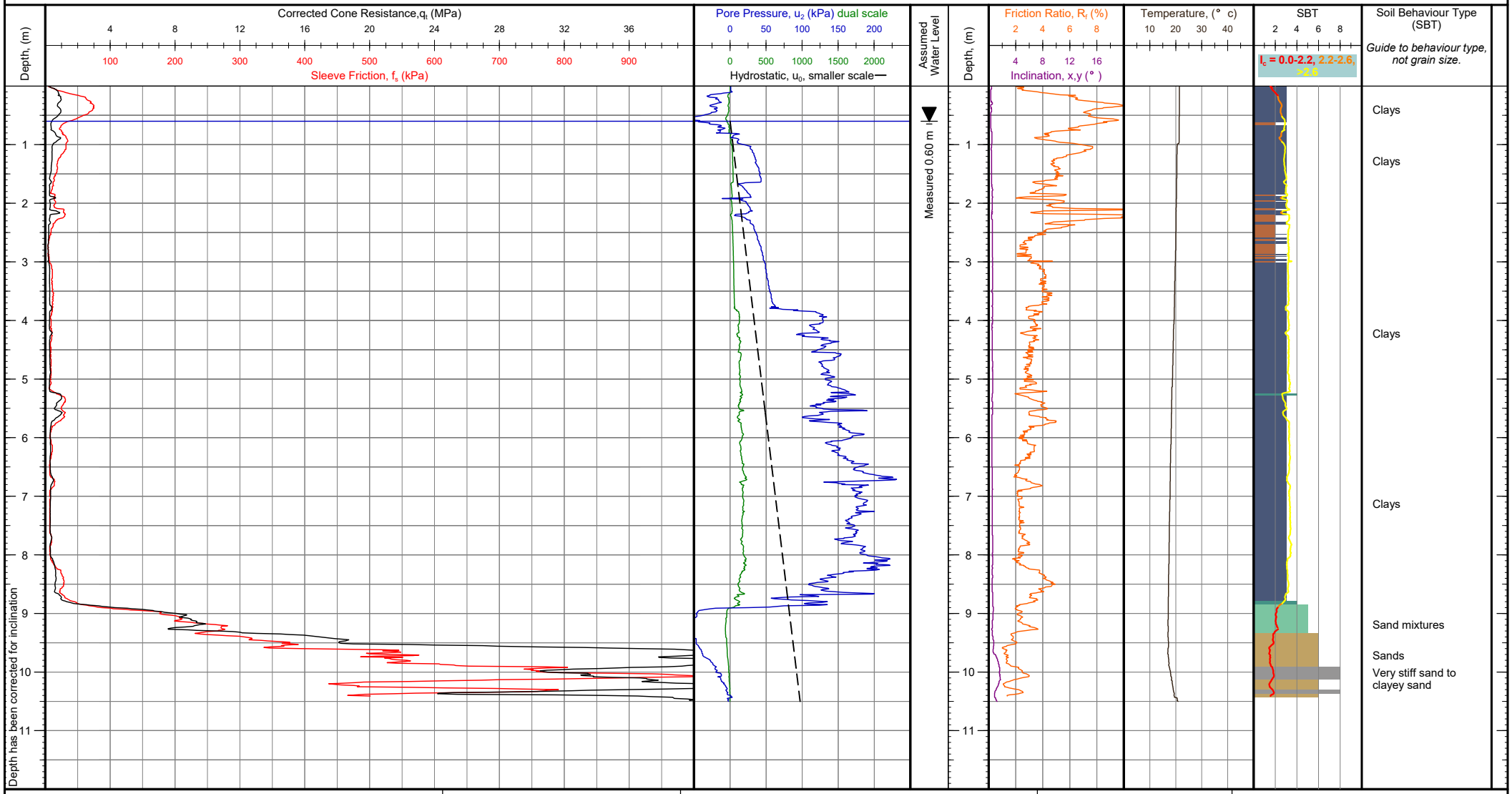
**Test Number:** **CPT-04**

**G.I. Job Ref:** 230270

**Comments:**

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Marcelo Martinez | **NZTM 2000 N, E (m):** | 5941876.09, 1747438.51 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | 70169 | **WGS84 (deg):** | -36.657299,174.649618 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 15cm$^2$ Subtraction | **Location Method:** | Handheld GPS | **Depth (m):** | 10.50 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.75 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Danger of buckling rods | | |

**Client Reference:**

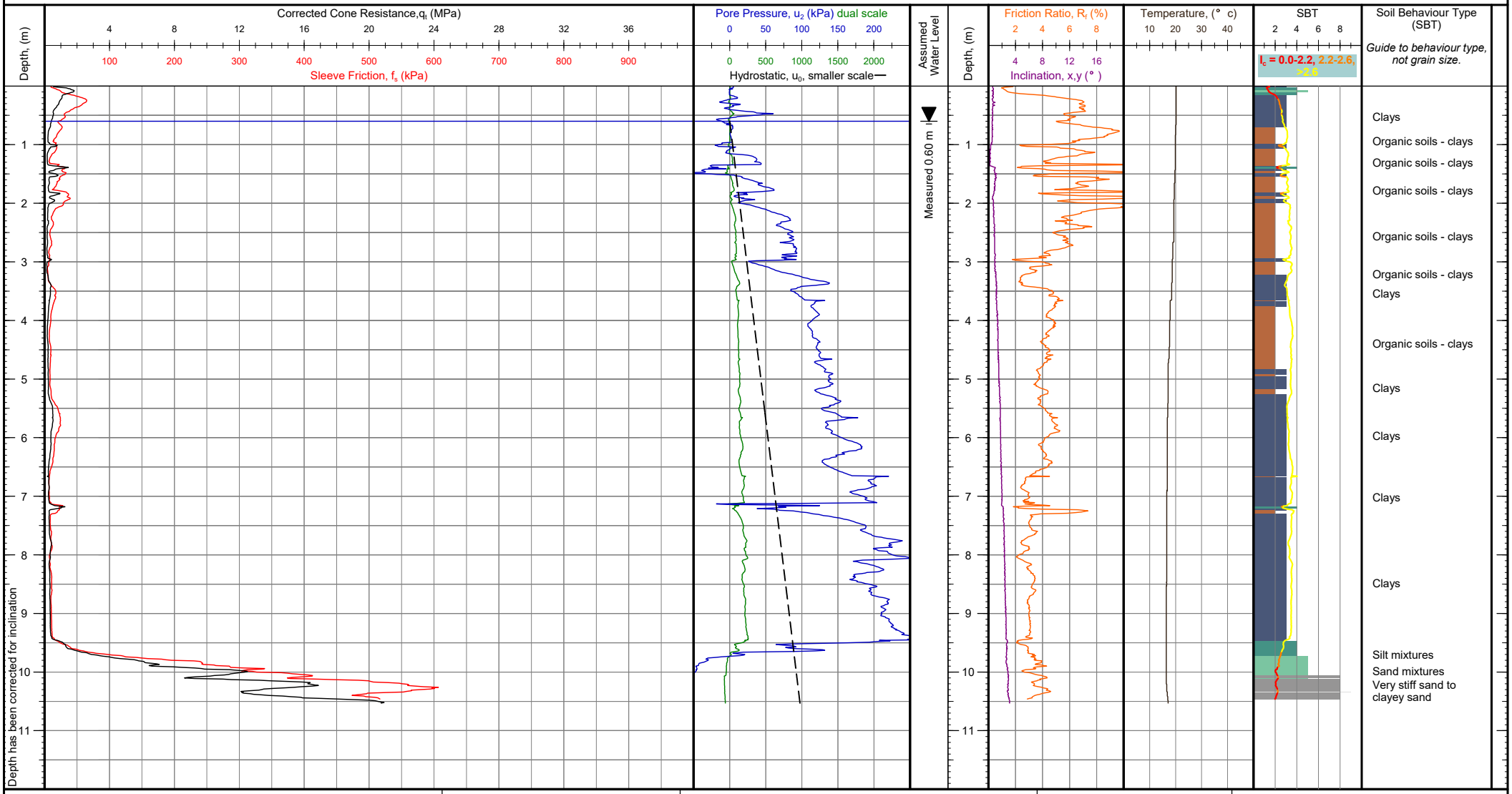
**Test Number:** **CPT-05**

**G.I. Job Ref:** 230270

**Comments:**

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Alyssa Malamatenios | **NZTM 2000 N, E (m):** | 5941895.98, 1747288.37 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | MKJ167 | **WGS84 (deg):** | -36.657143,174.647935 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 10cm$^2$ Compression | **Location Method:** | Handheld GPS | **Depth (m):** | 10.53 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.79 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Limit of reaction force | | |

**Client Reference:**

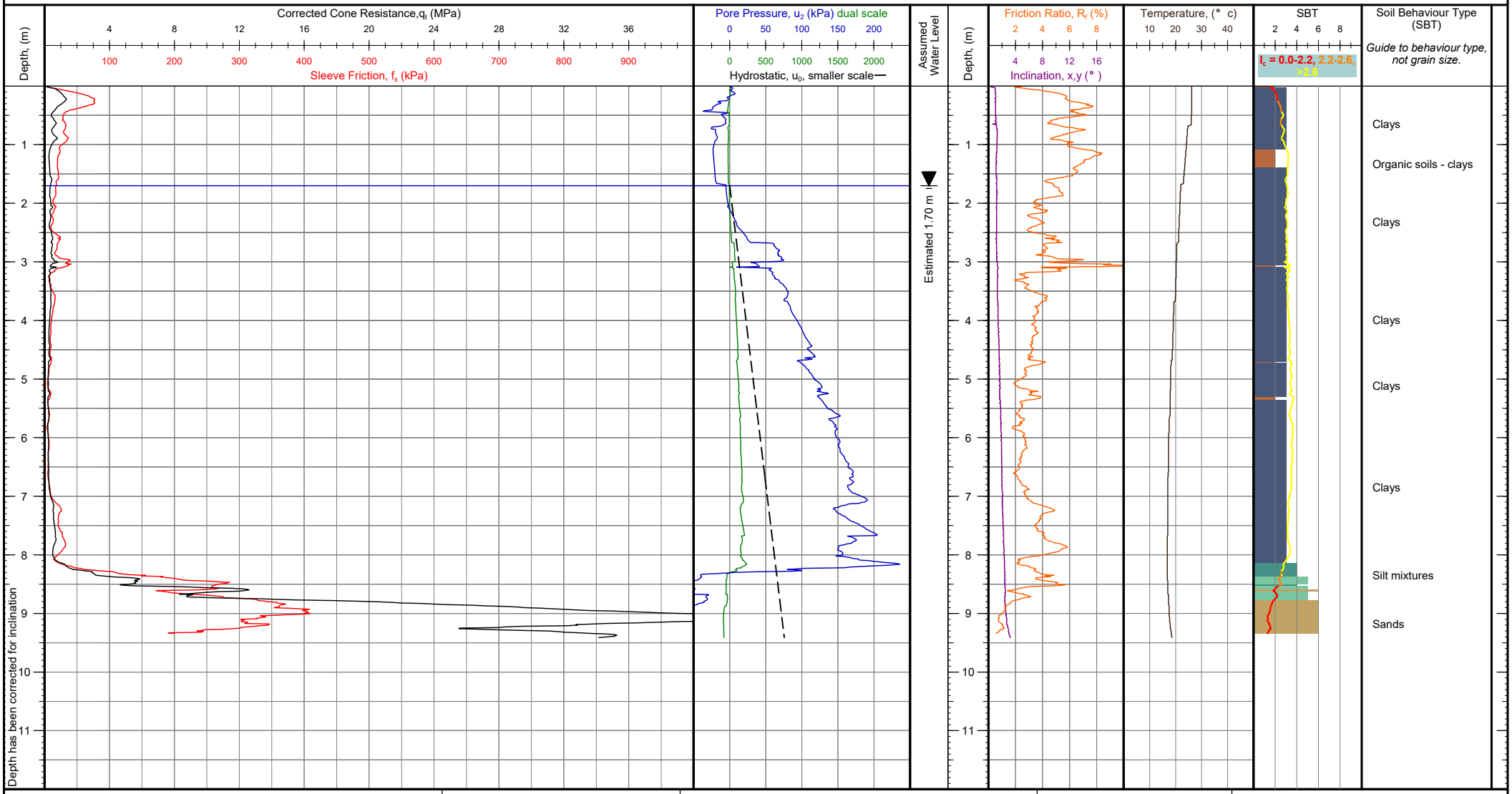
**Test Number:** **CPT-06**

**G.I. Job Ref:** 230270

**Comments:**

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Alyssa Malamatenios | **NZTM 2000 N, E (m):** | 5941838.20, 1747435.08 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | MKJ167 | **WGS84 (deg):** | -36.657639,174.649605 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 10cm$^2$ Compression | **Location Method:** | Handheld GPS | **Depth (m):** | 9.41 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.79 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Limit of reaction force | **G.I. Job Ref:** | 230270 |

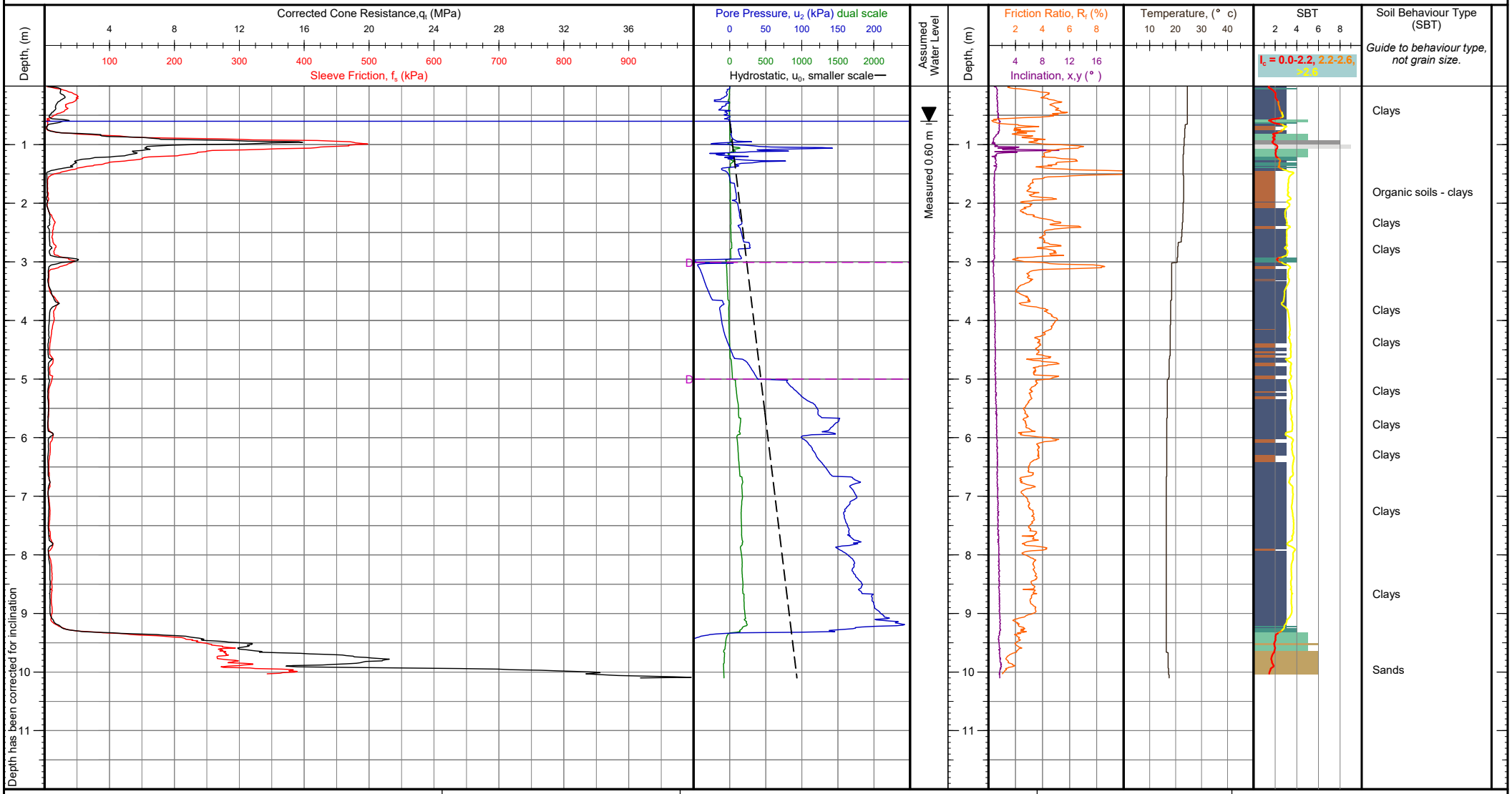
**Client Reference:**

**Test Number:** **CPT-07**

**Comments:** Hole collapsed at 1.00m and dipped dry.

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Alyssa Malamatenios | **NZTM 2000 N, E (m):** | 5941837.32, 1747363.54 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | MKJ167 | **WGS84 (deg):** | -36.657636,174.648776 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 10cm$^2$ Compression | **Location Method:** | Handheld GPS | **Depth (m):** | 10.10 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.79 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Limit of reaction force | | |

**Client Reference:**

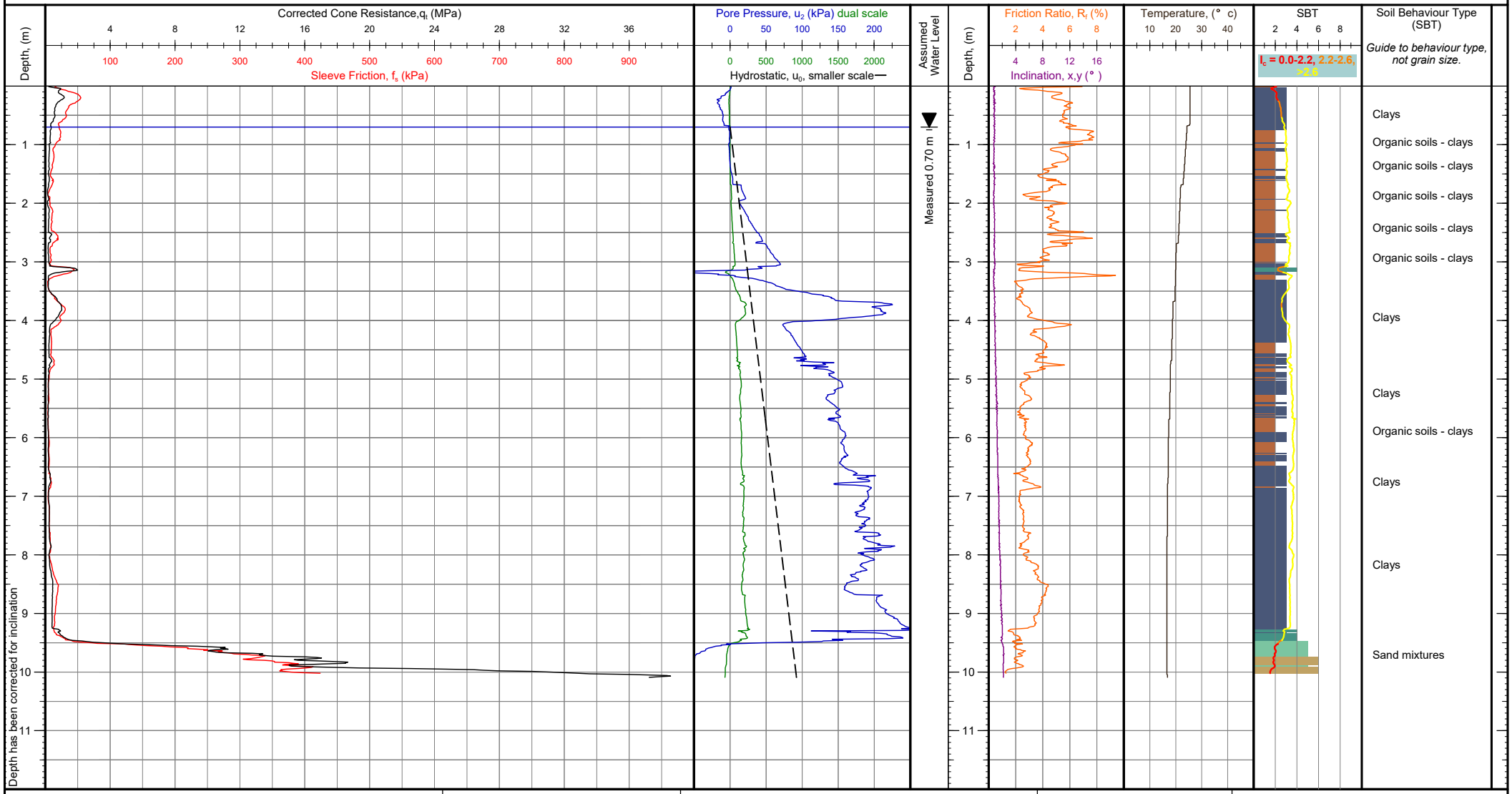
**Test Number:** **CPT-08**

**G.I. Job Ref:** 230270

**Comments:** Dissipations performed at 3.01m and 5.00m.

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Alyssa Malamatenios | **NZTM 2000 N, E (m):** | 5941839.70, 1747328.35 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | MKJ167 | **WGS84 (deg):** | -36.657545,174.648363 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 10cm$^2$ Compression | **Location Method:** | Handheld GPS | **Depth (m):** | 10.09 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.79 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Limit of reaction force | | |

**Client Reference:**

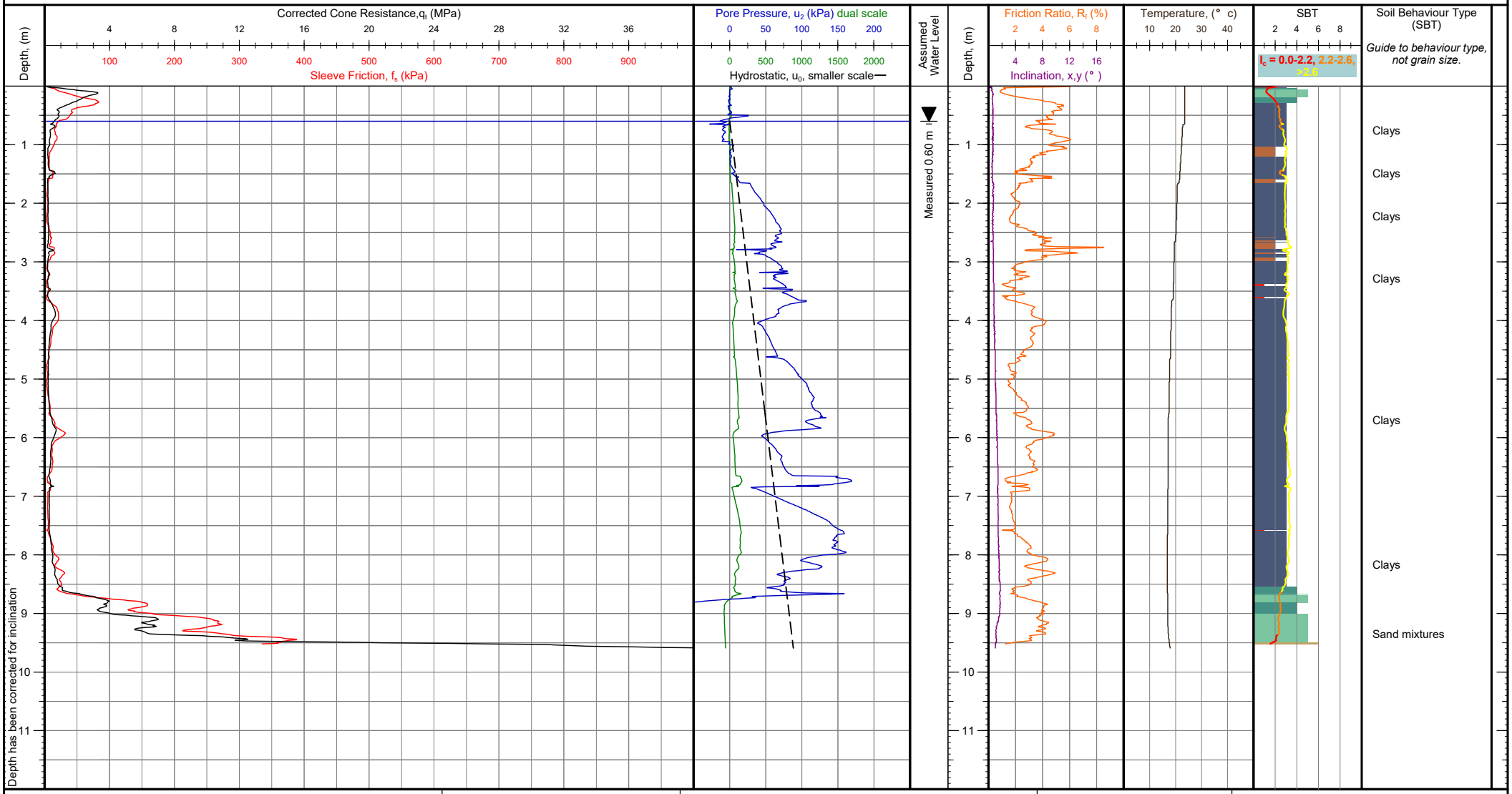
**Test Number:** **CPT-09**

**G.I. Job Ref:** 230270

**Comments:**

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Alyssa Malamatenios | **NZTM 2000 N, E (m):** | 5941840.86, 1747267.31 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | MKJ333 | **WGS84 (deg):** | -36.657643,174.647710 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 10cm$^2$ Compression | **Location Method:** | Handheld GPS | **Depth (m):** | 9.59 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.80 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Limit of reaction force | | |

**Client Reference:**

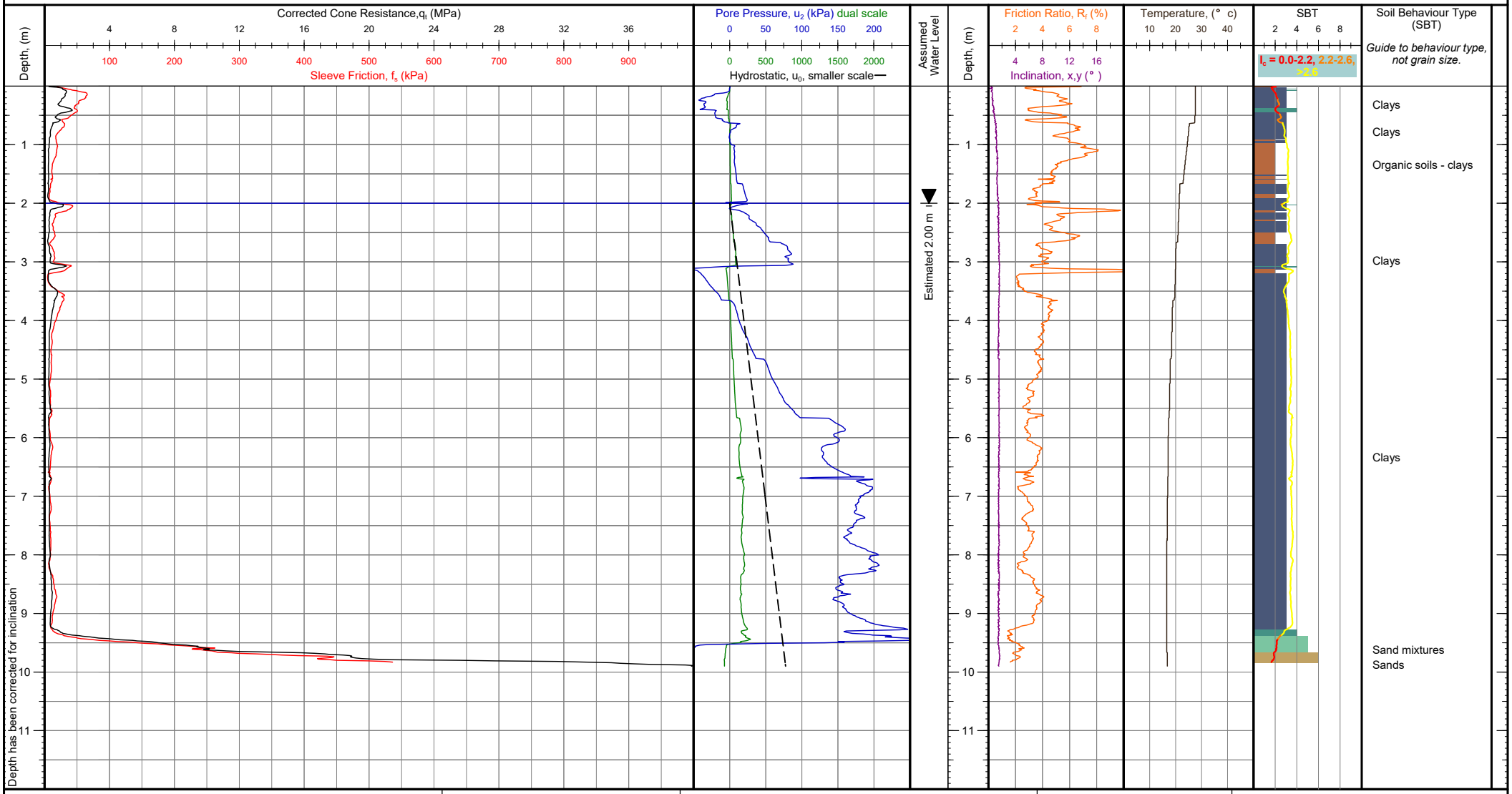
**Test Number:** **CPT-10**

**G.I. Job Ref:** 230270

**Comments:**

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Alyssa Malamatenios | **NZTM 2000 N, E (m):** | 5941796.08, 1747341.46 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | MKJ333 | **WGS84 (deg):** | -36.658035,174.648548 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 10cm$^2$ Compression | **Location Method:** | Handheld GPS | **Depth (m):** | 9.90 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.80 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Limit of reaction force | | |

**Client Reference:**

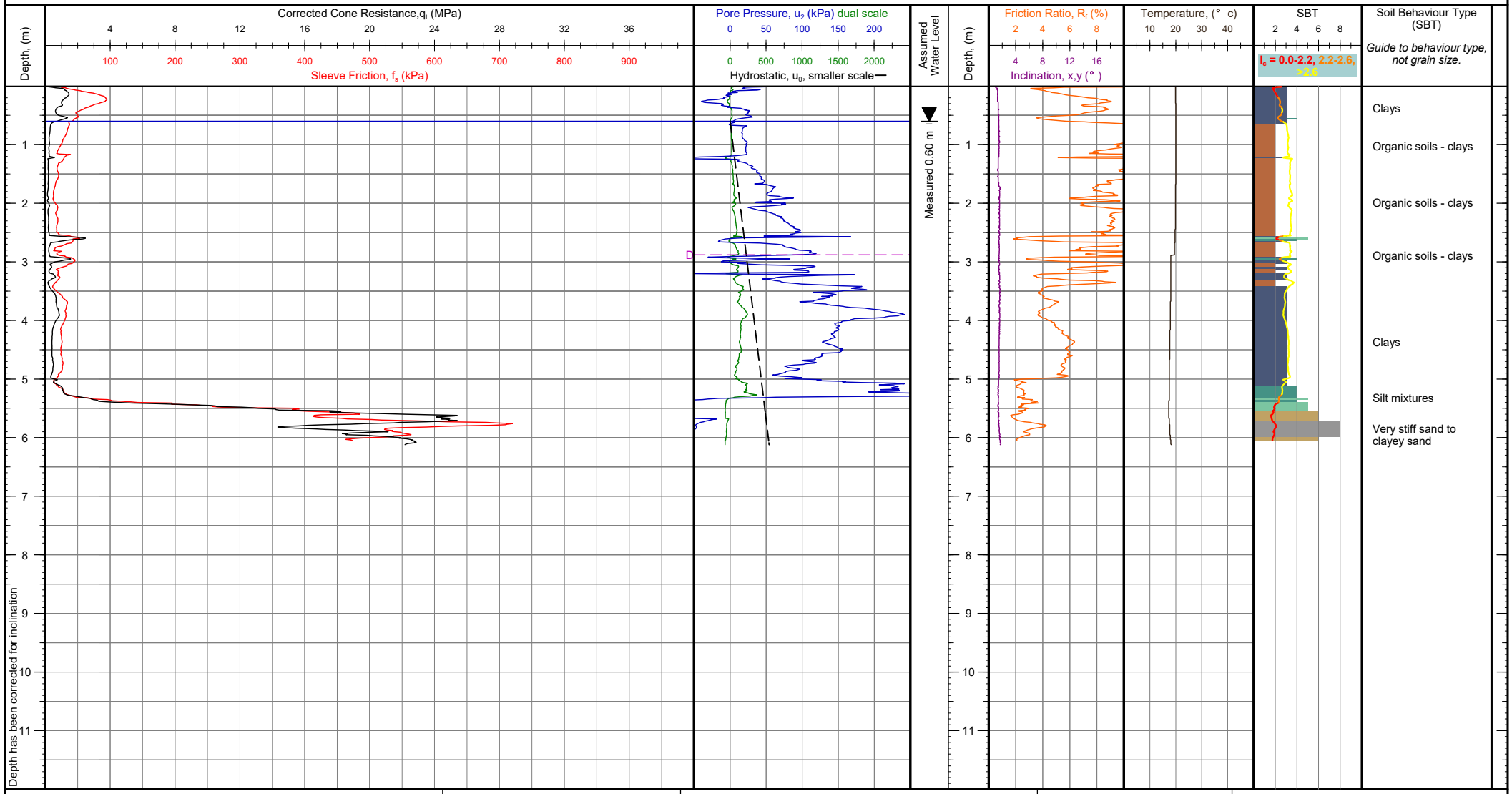
**Test Number:** **CPT-11**

**G.I. Job Ref:** 230270

**Comments:** Hole collapsed at 1.20m and dipped dry.

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Alyssa Malamatenios | **NZTM 2000 N, E (m):** | 5941787.20, 1747277.38 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | MKJ167 | **WGS84 (deg):** | -36.658135,174.647738 | **Date of Test:** | 6/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 10cm$^2$ Compression | **Location Method:** | Handheld GPS | **Depth (m):** | 6.12 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.79 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Limit of reaction force | | |

**Client Reference:**

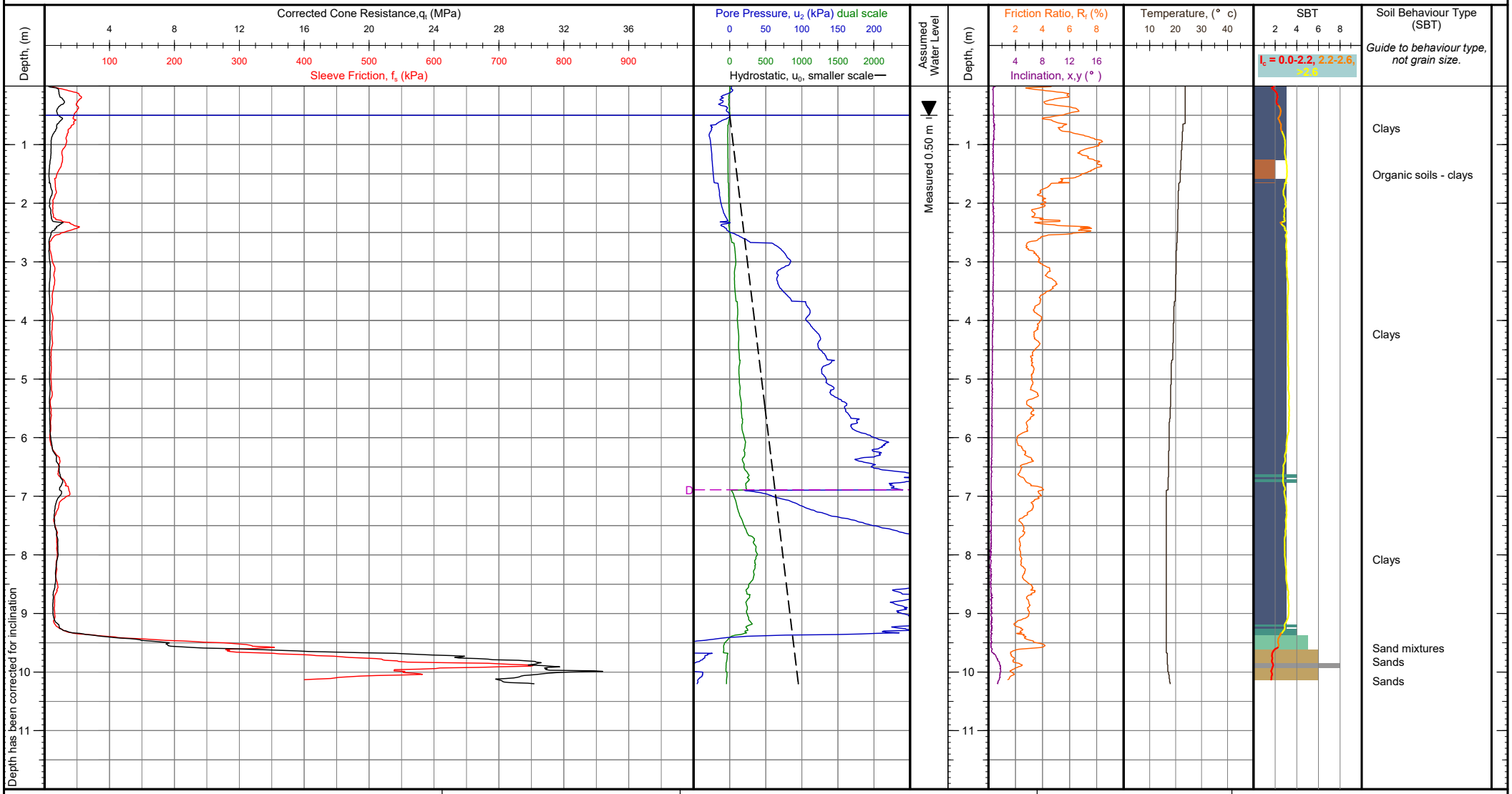
**Test Number:** **CPT-12**

**G.I. Job Ref:** 230270

**Comments:** Dissipation performed at 2.88m.

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Alyssa Malamatenios | **NZTM 2000 N, E (m):** | 5941735.37, 1747413.29 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | MKJ167 | **WGS84 (deg):** | -36.658617,174.649299 | **Date of Test:** | 6/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 10cm$^2$ Compression | **Location Method:** | Handheld GPS | **Depth (m):** | 10.20 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.79 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Limit of reaction force | **G.I. Job Ref:** | 230270 |

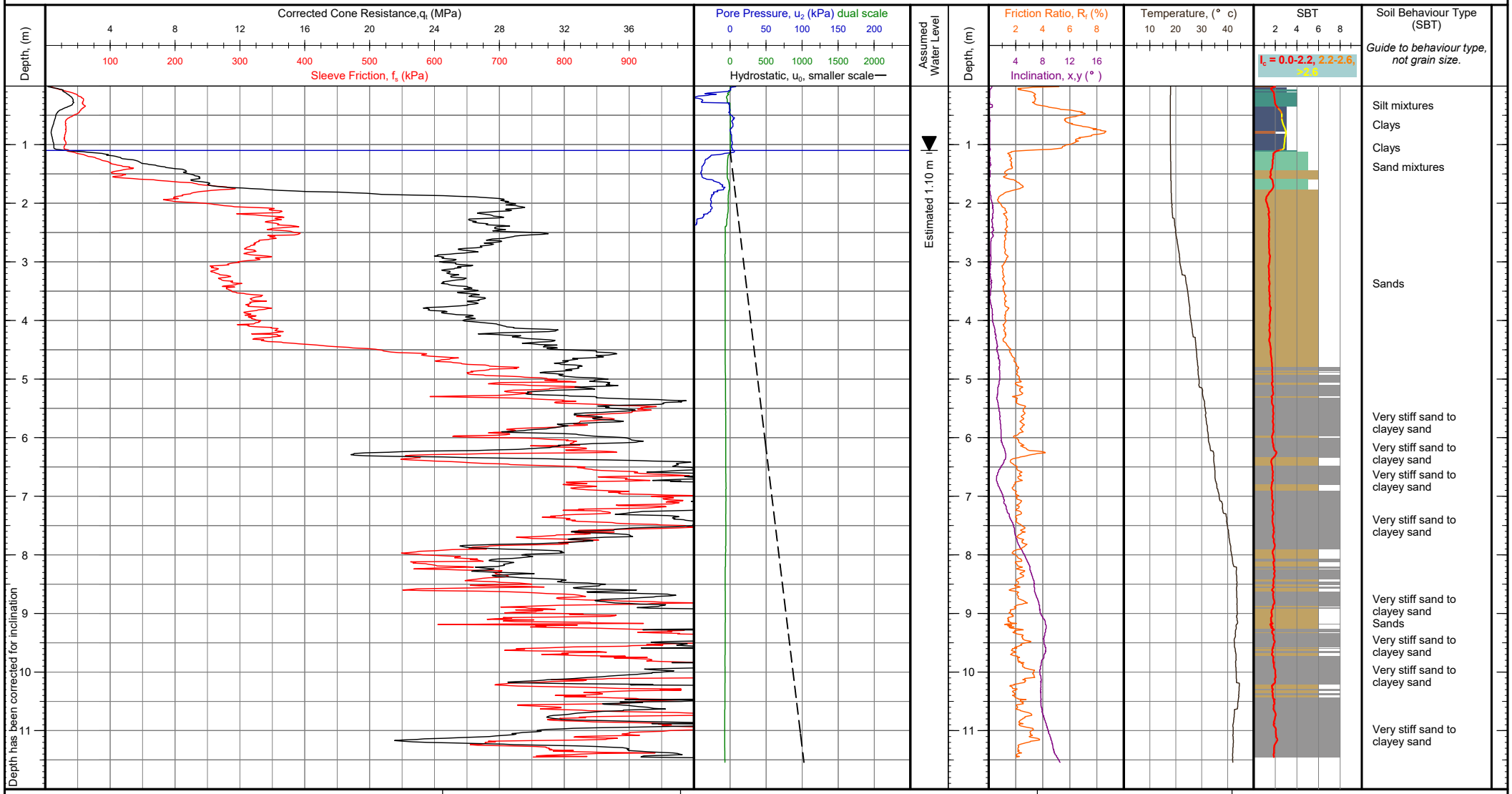
**Client Reference:**

**Test Number:** **CPT-13**

**Comments:** Dissipation performed at 6.89m.

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Marcelo Martinez | **NZTM 2000 N, E (m):** | 5941803.69, 1747550.72 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | 71136 | **WGS84 (deg):** | -36.657934,174.650887 | **Date of Test:** | 6/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 15cm$^2$ Subtraction | **Location Method:** | Handheld GPS | **Depth (m):** | 11.54 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.75 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Danger of buckling rods | | |

**Client Reference:**

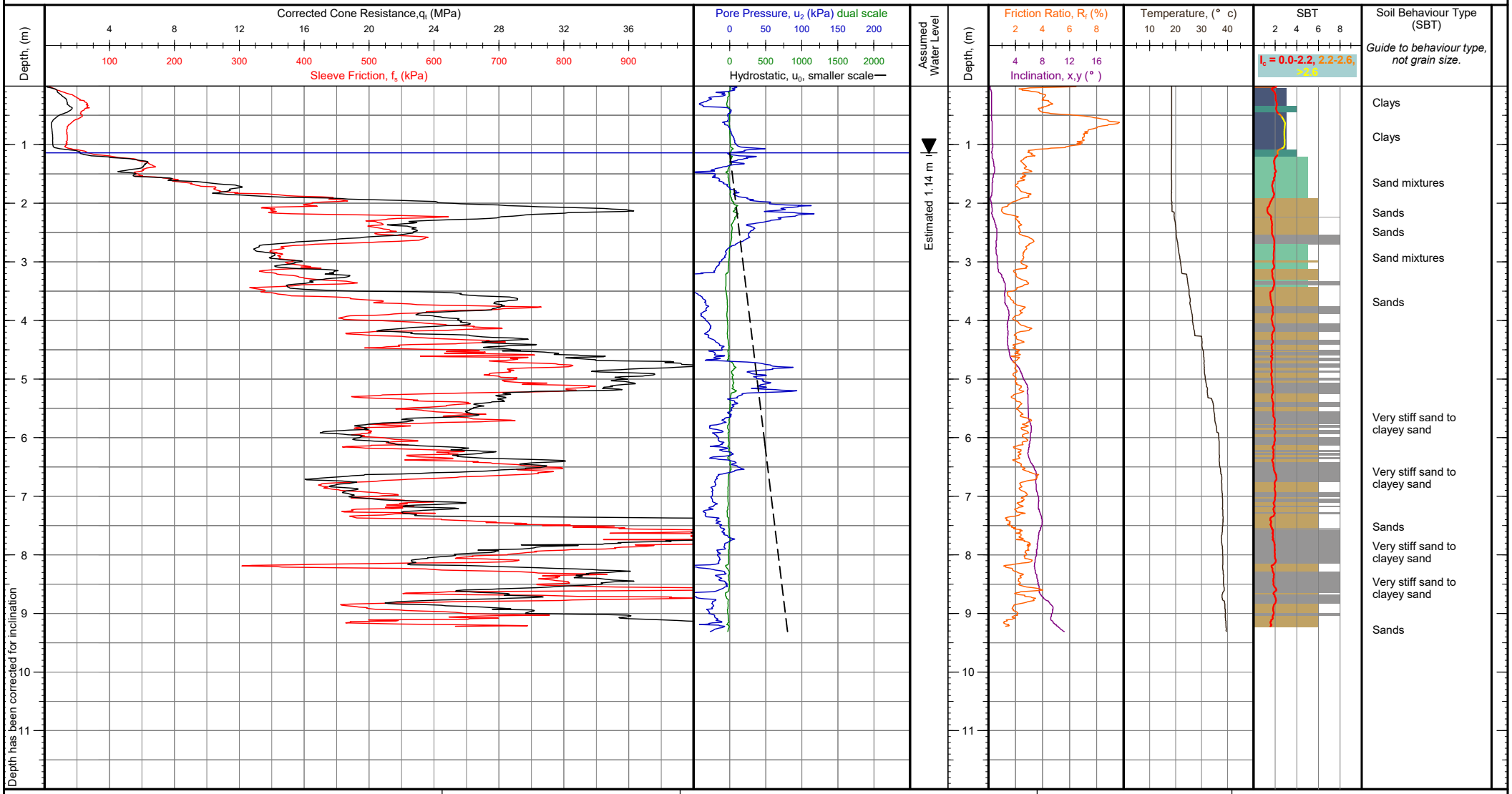
**Test Number:** **CPT-14**

**G.I. Job Ref:** 230270

**Comments:** Hole collapsed at 0.10m and dipped dry.

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CONE PENETRATION TEST (CPT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Marcelo Martinez | **NZTM 2000 N, E (m):** | 5941835.30, 1747654.99 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Cone Ref:** | 71137 | **WGS84 (deg):** | -36.657633,174.652047 | **Date of Test:** | 6/04/2023 |
| **Location:** | Dairy Flat | **Cone Type:** | 15cm$^2$ Subtraction | **Location Method:** | Handheld GPS | **Depth (m):** | 9.31 |
| **Engineer:** | Suresh Nuthalapati | **Area Ratio:** | 0.75 | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **Filter Type:** | $u_2$ | **Termination Reason:** | Danger of buckling rods | | |

**Client Reference:**

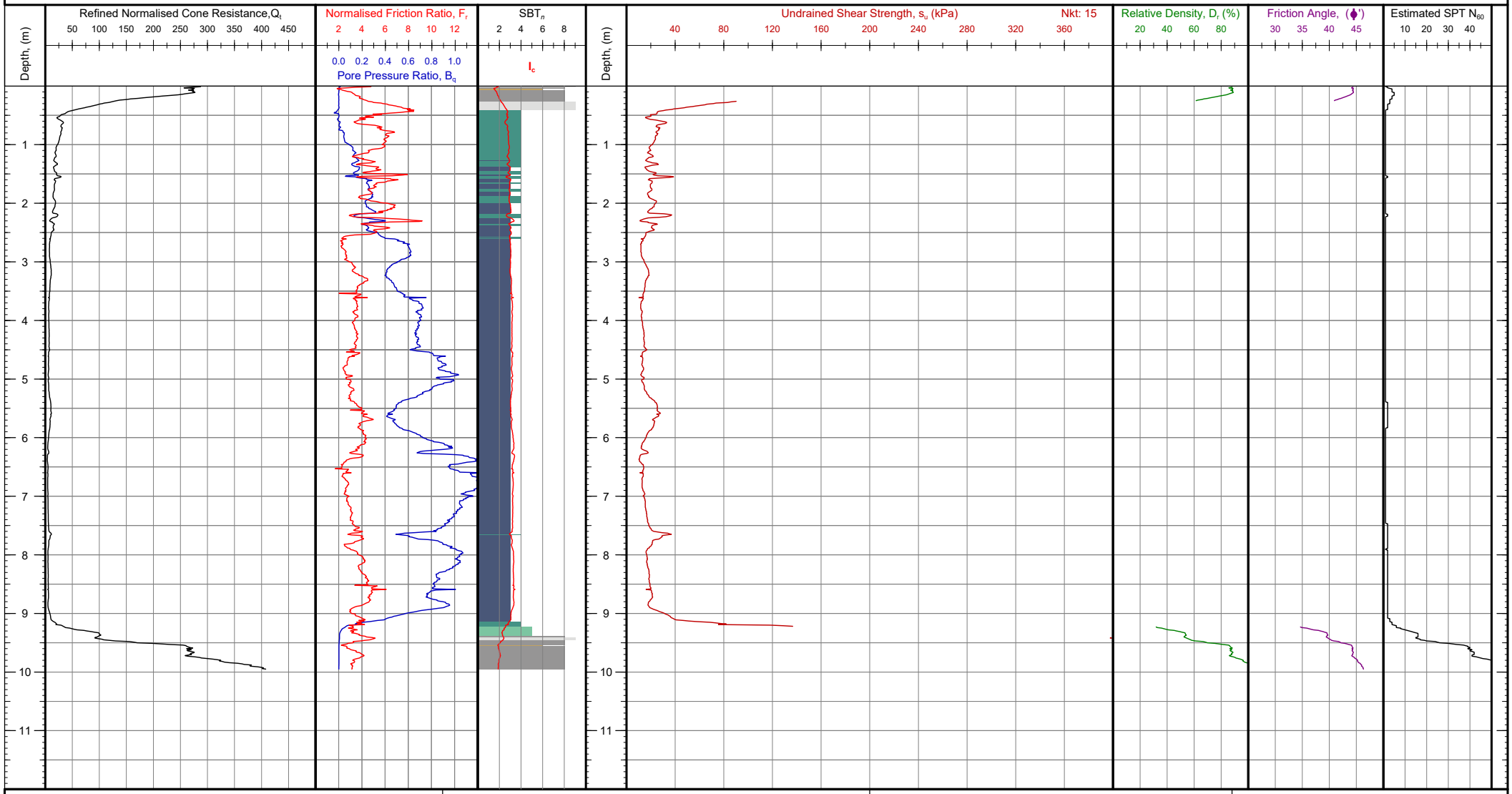
**Test Number:** **CPT-15**

**G.I. Job Ref:** 230270

**Comments:** Hole collapsed at 0.10m and dipped dry.

Where possible GWL is measured after testing, or estimated in the office. This may not represent the true GWL

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

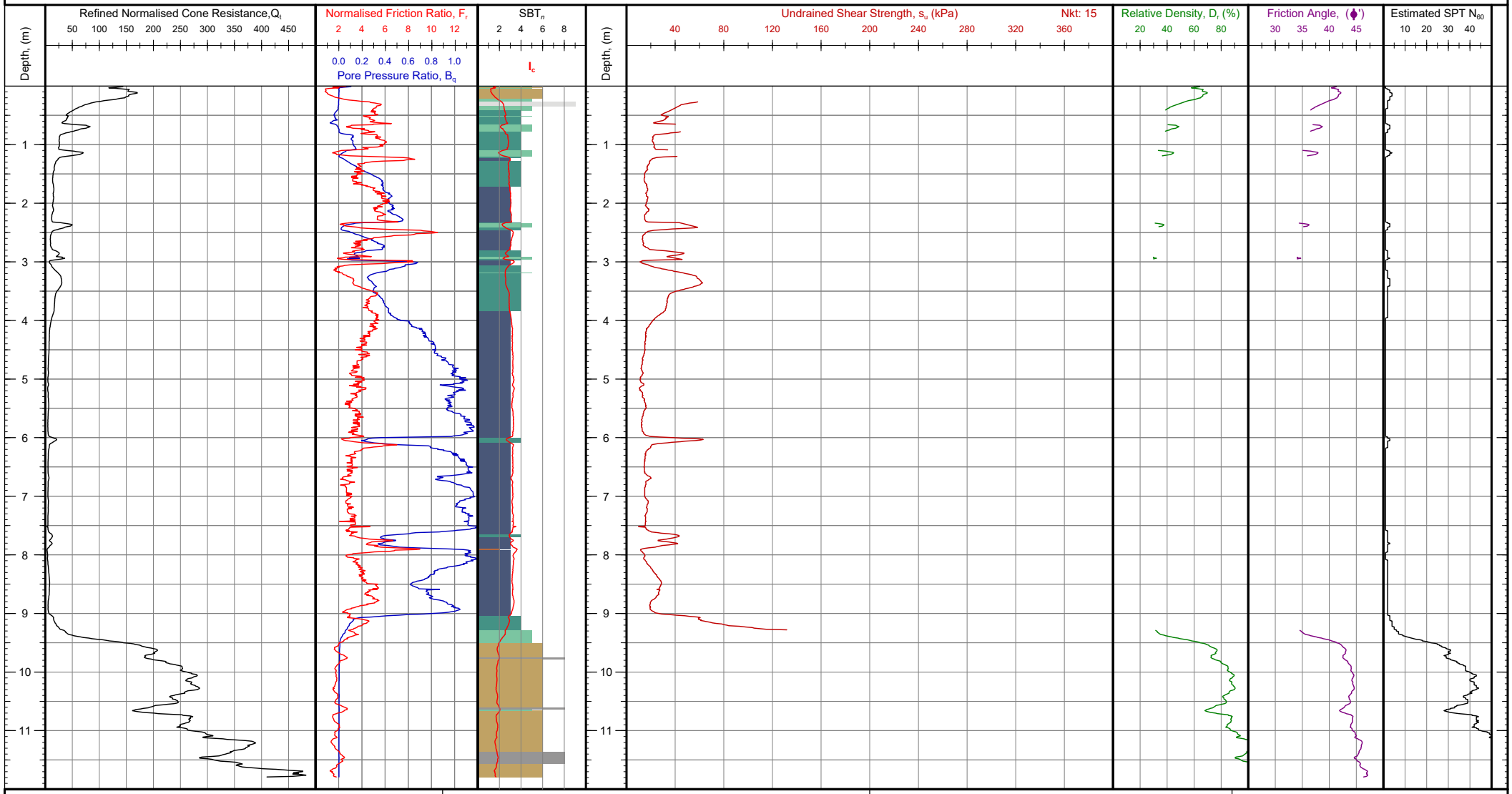
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-01**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

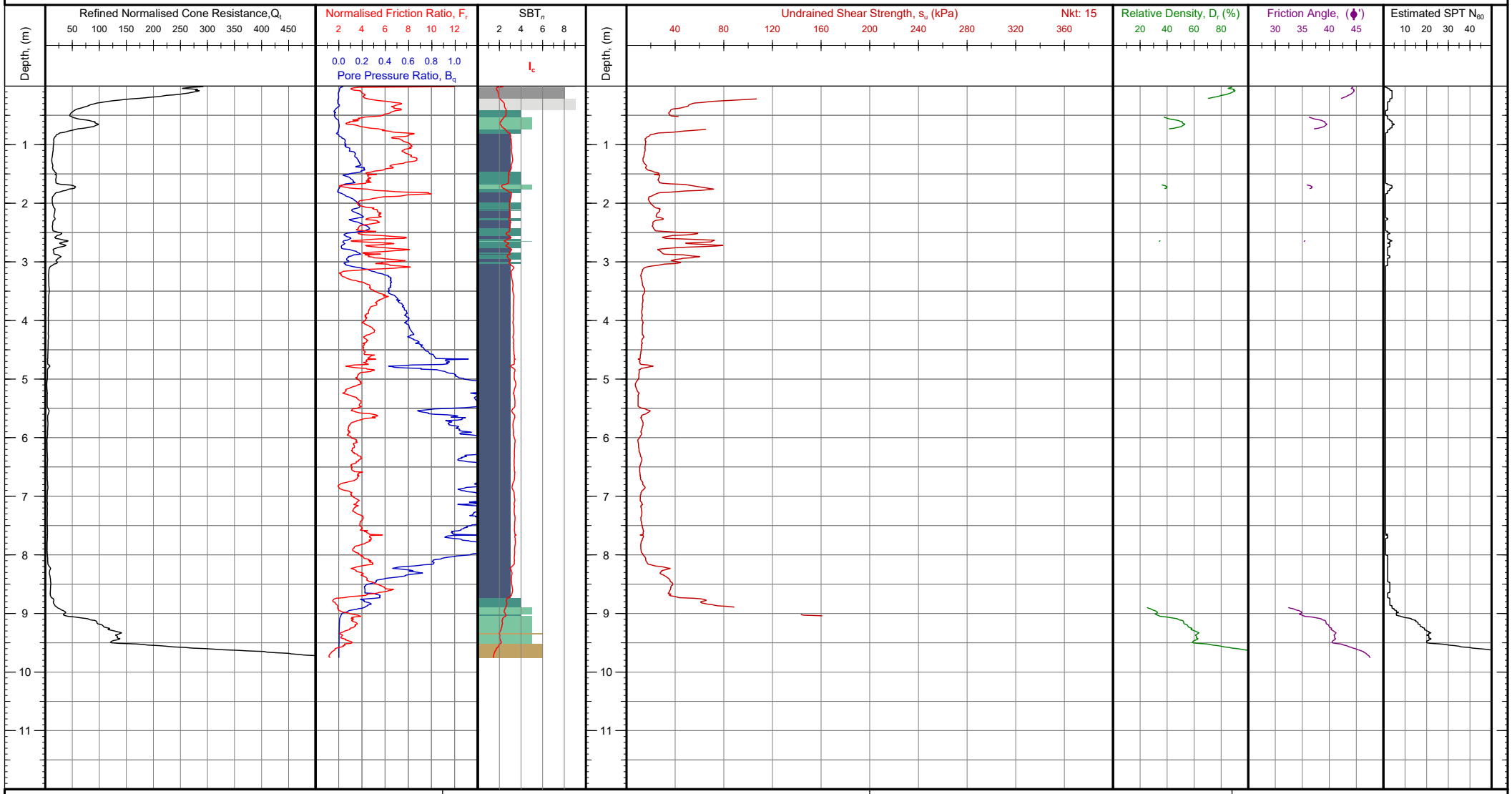
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-02**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

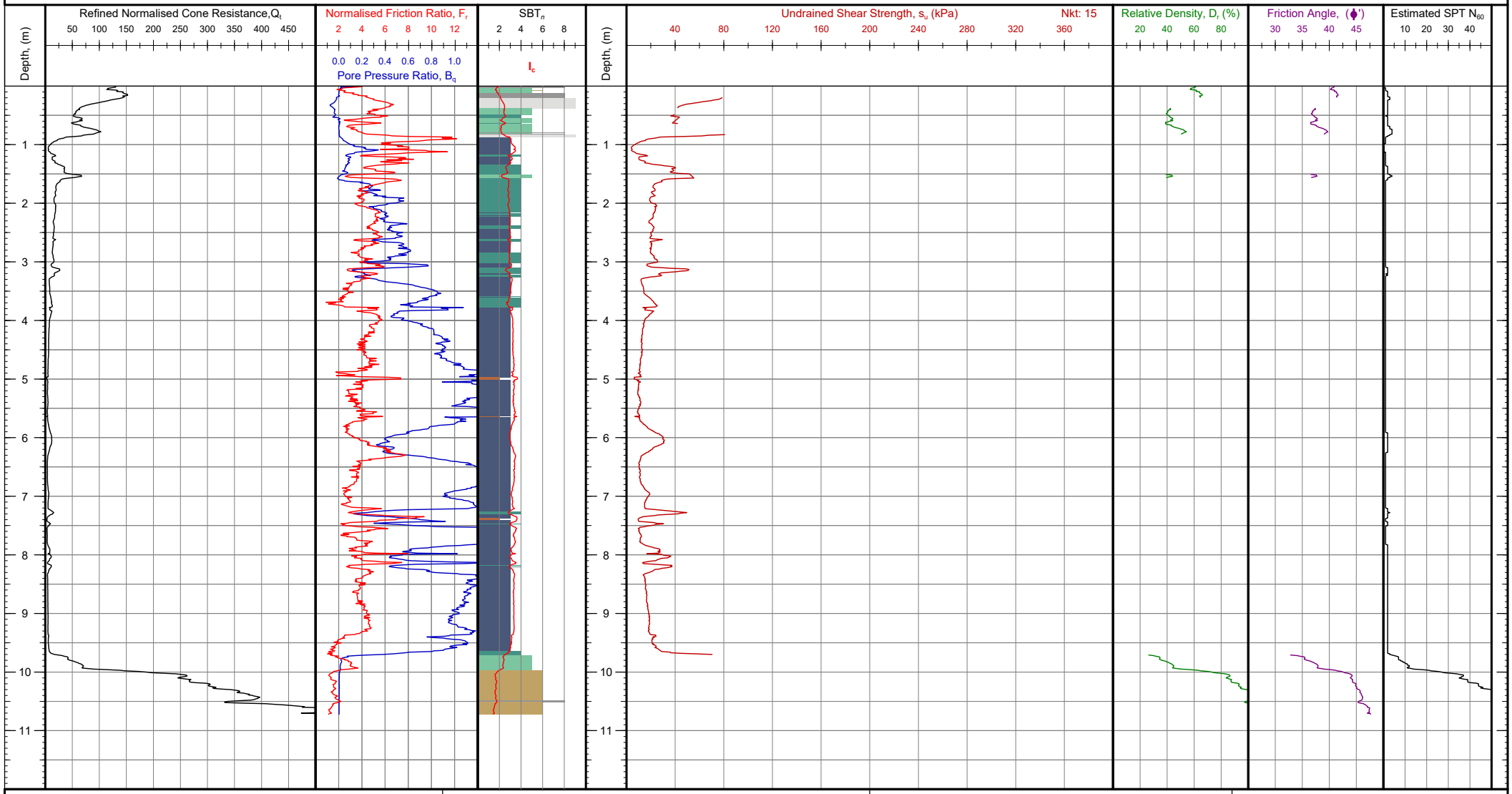
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-03**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

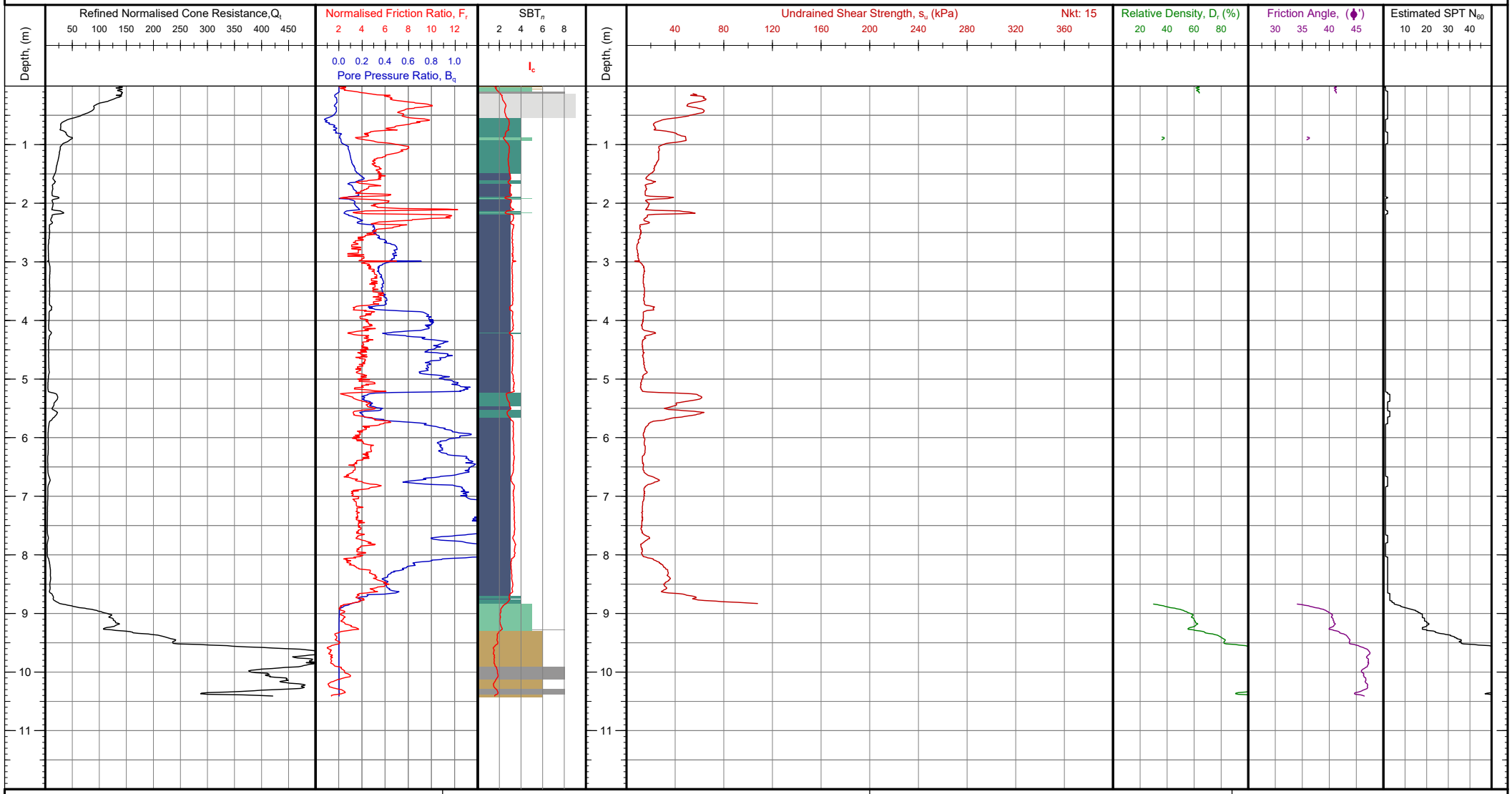
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-04**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

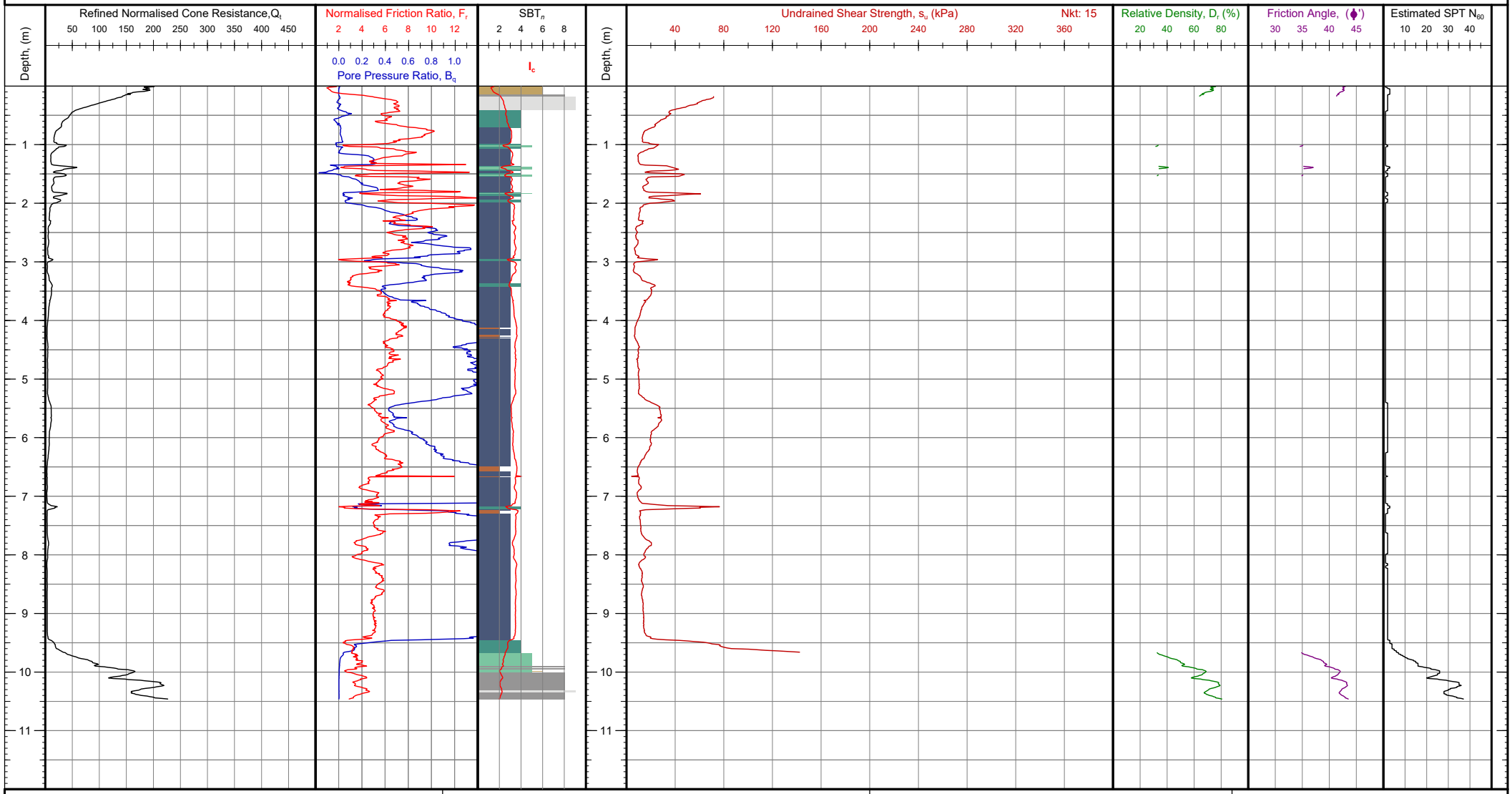
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-05**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

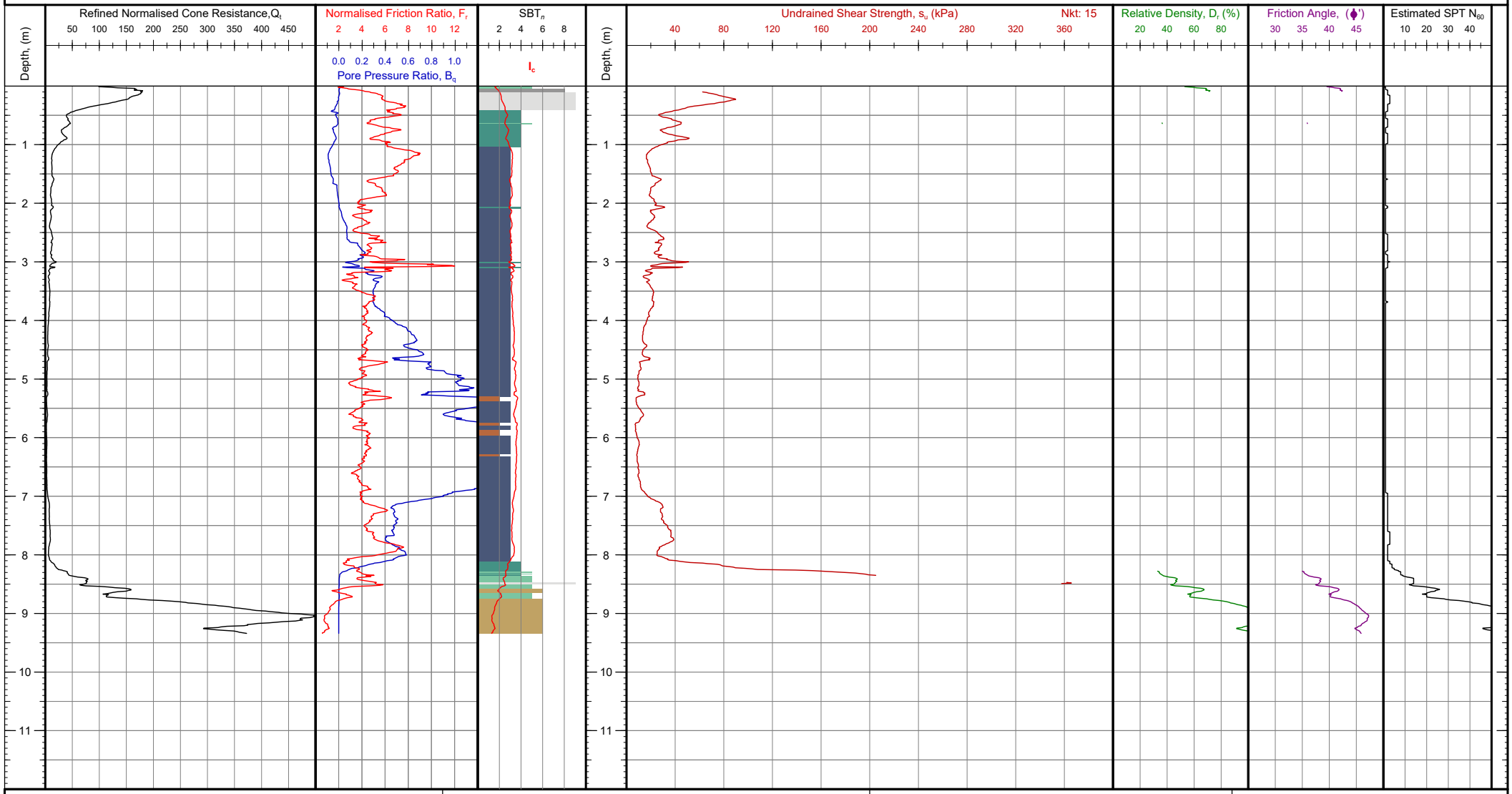
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-06**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

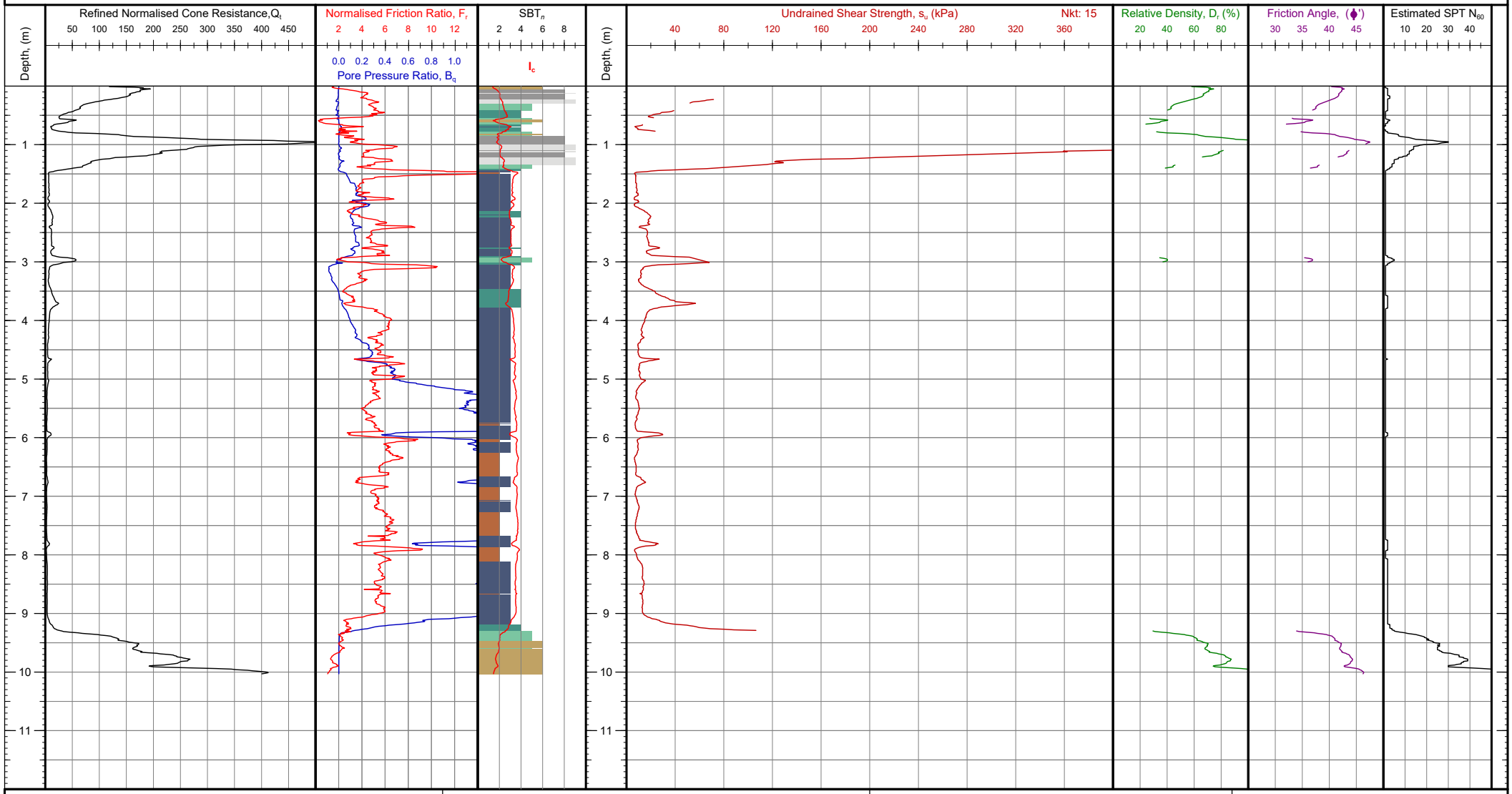
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-07**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

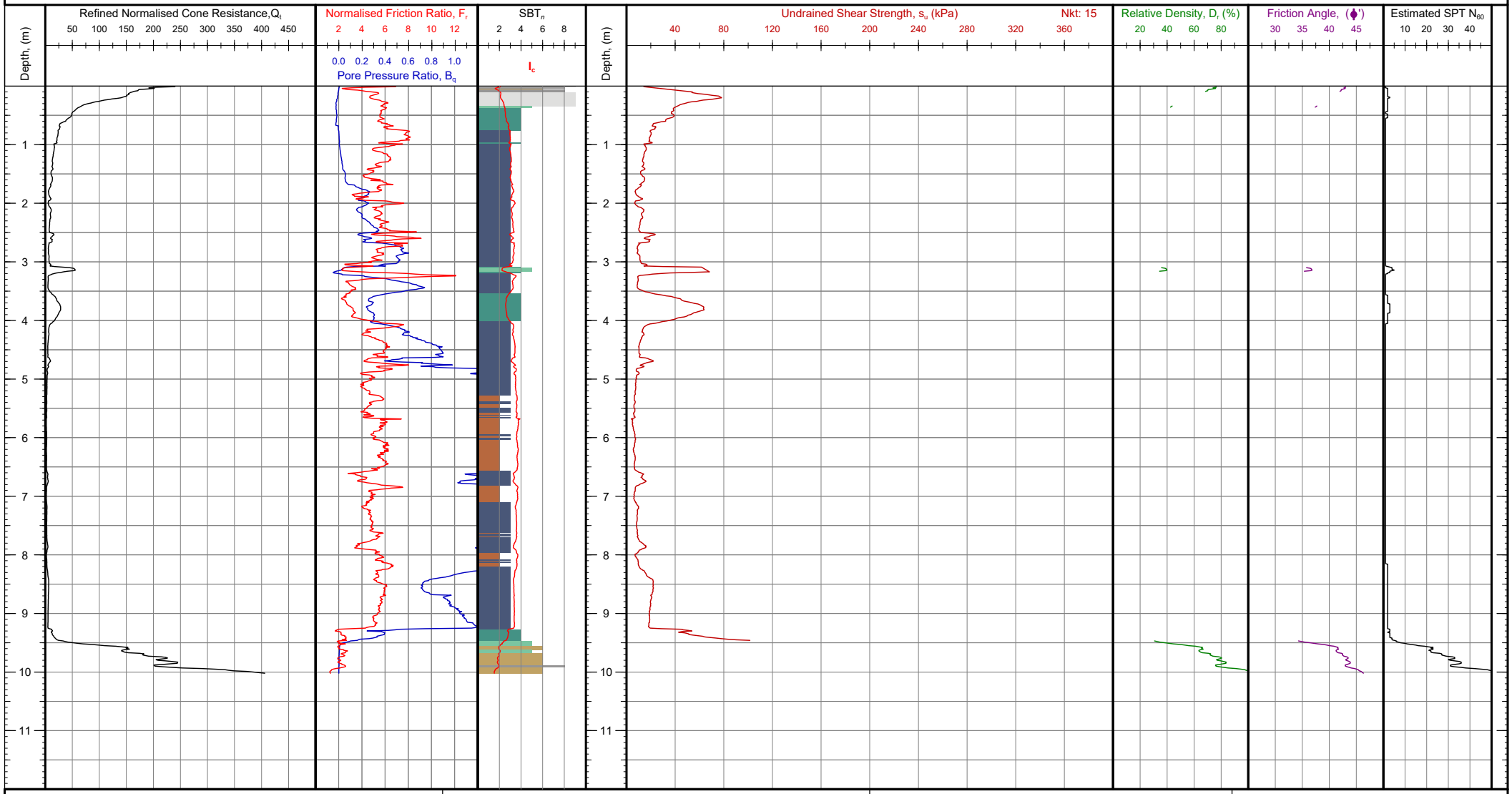
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-08**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

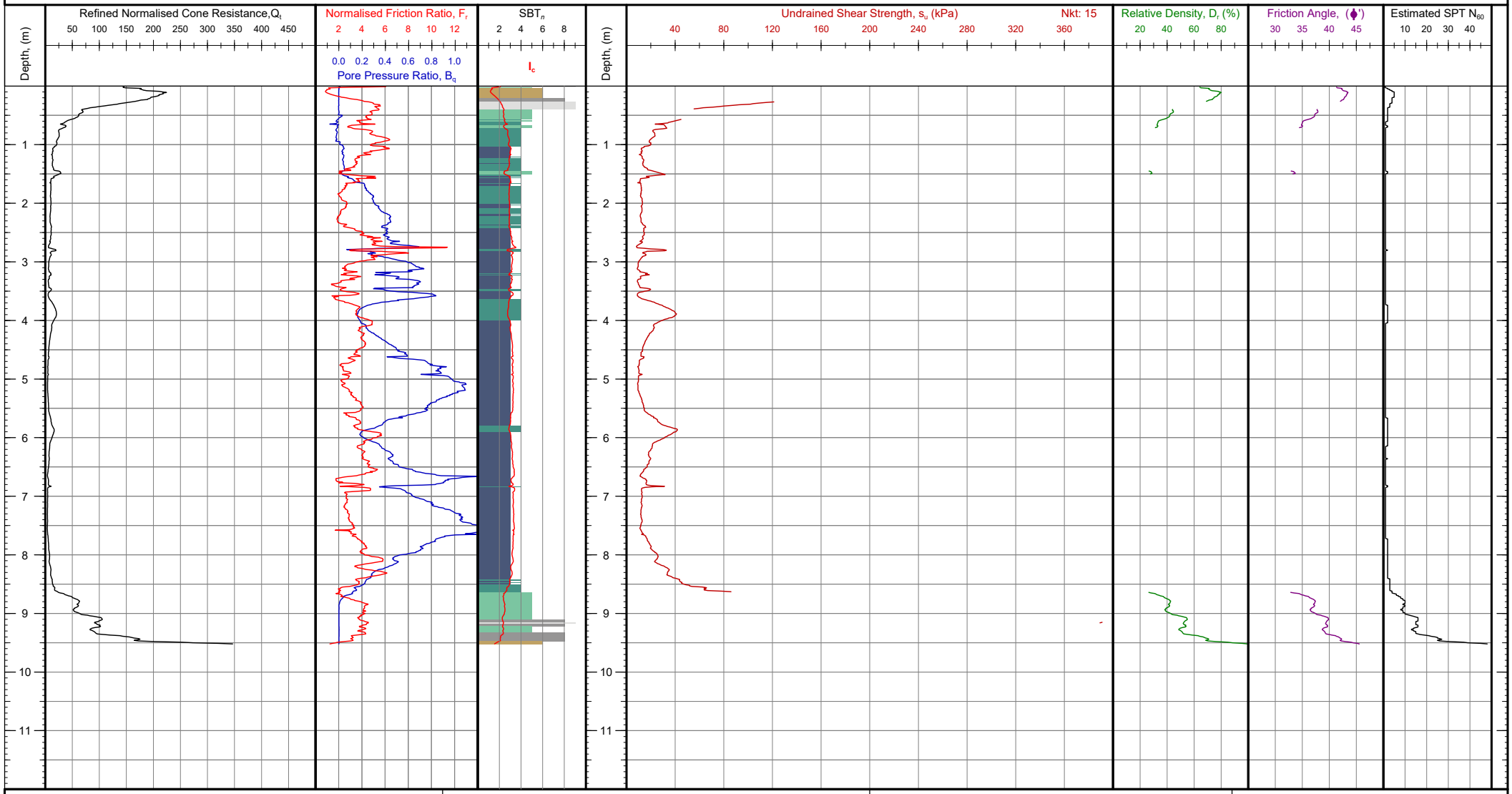
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-09**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

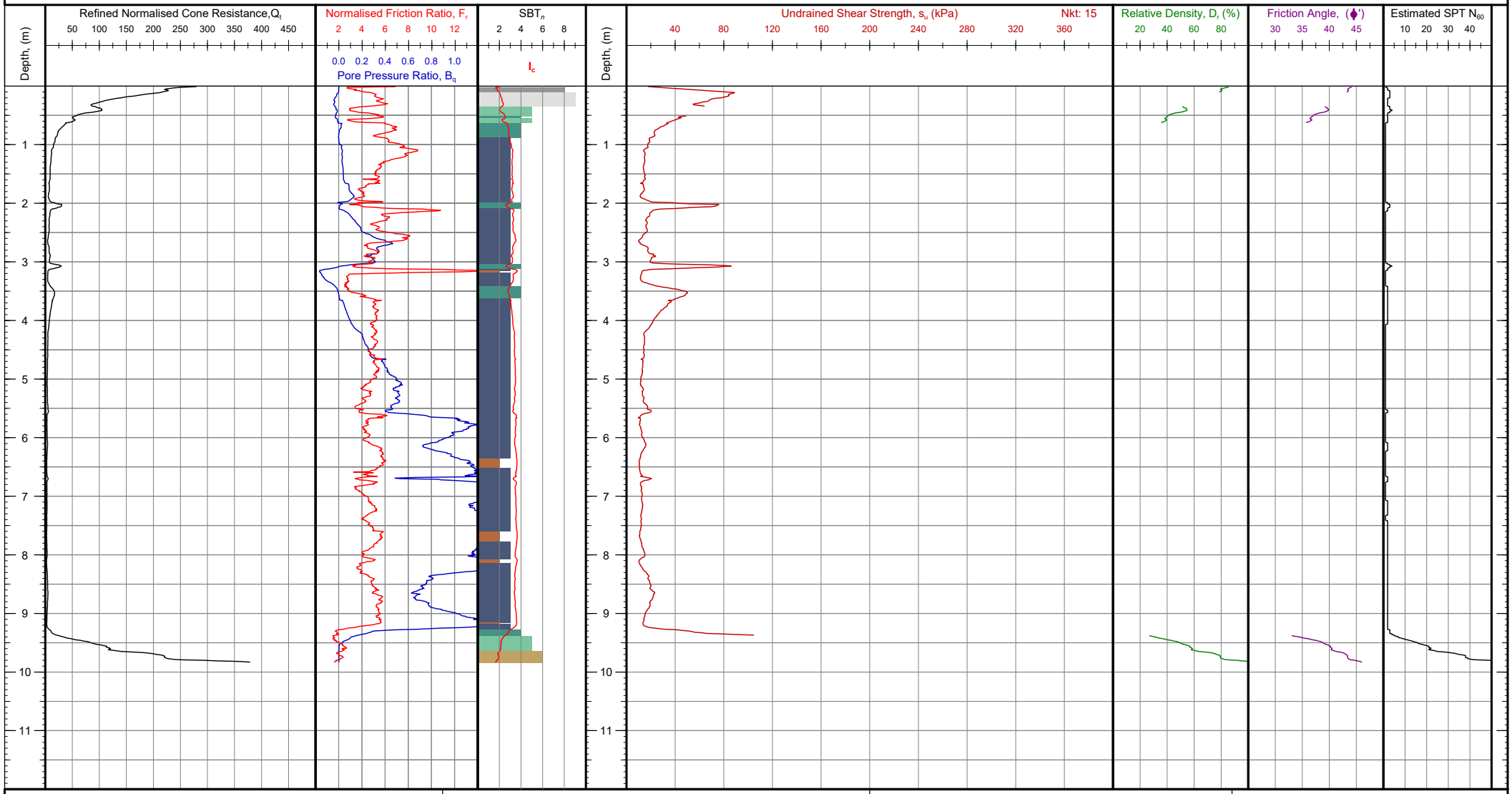
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-10**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

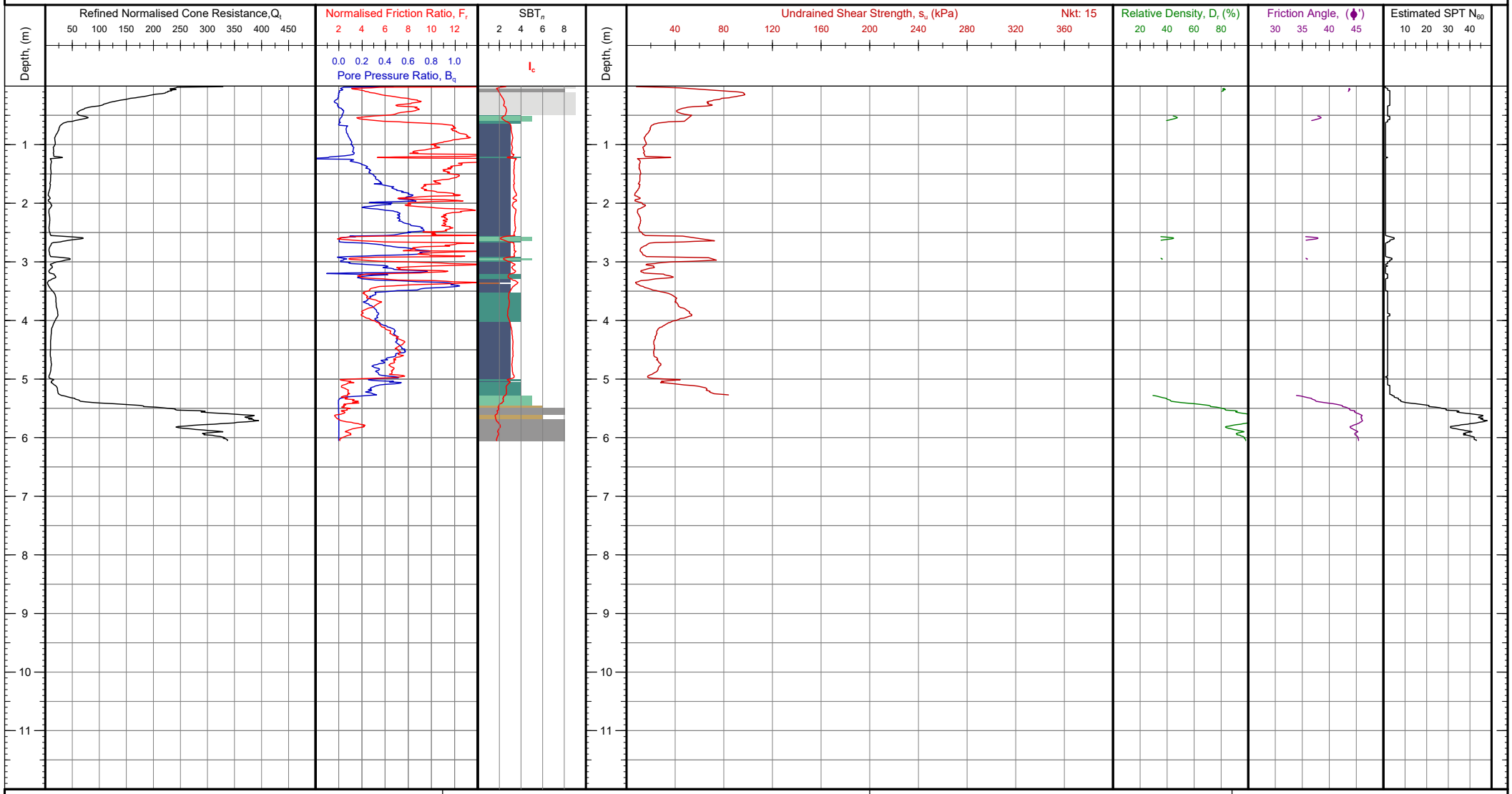
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-11**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

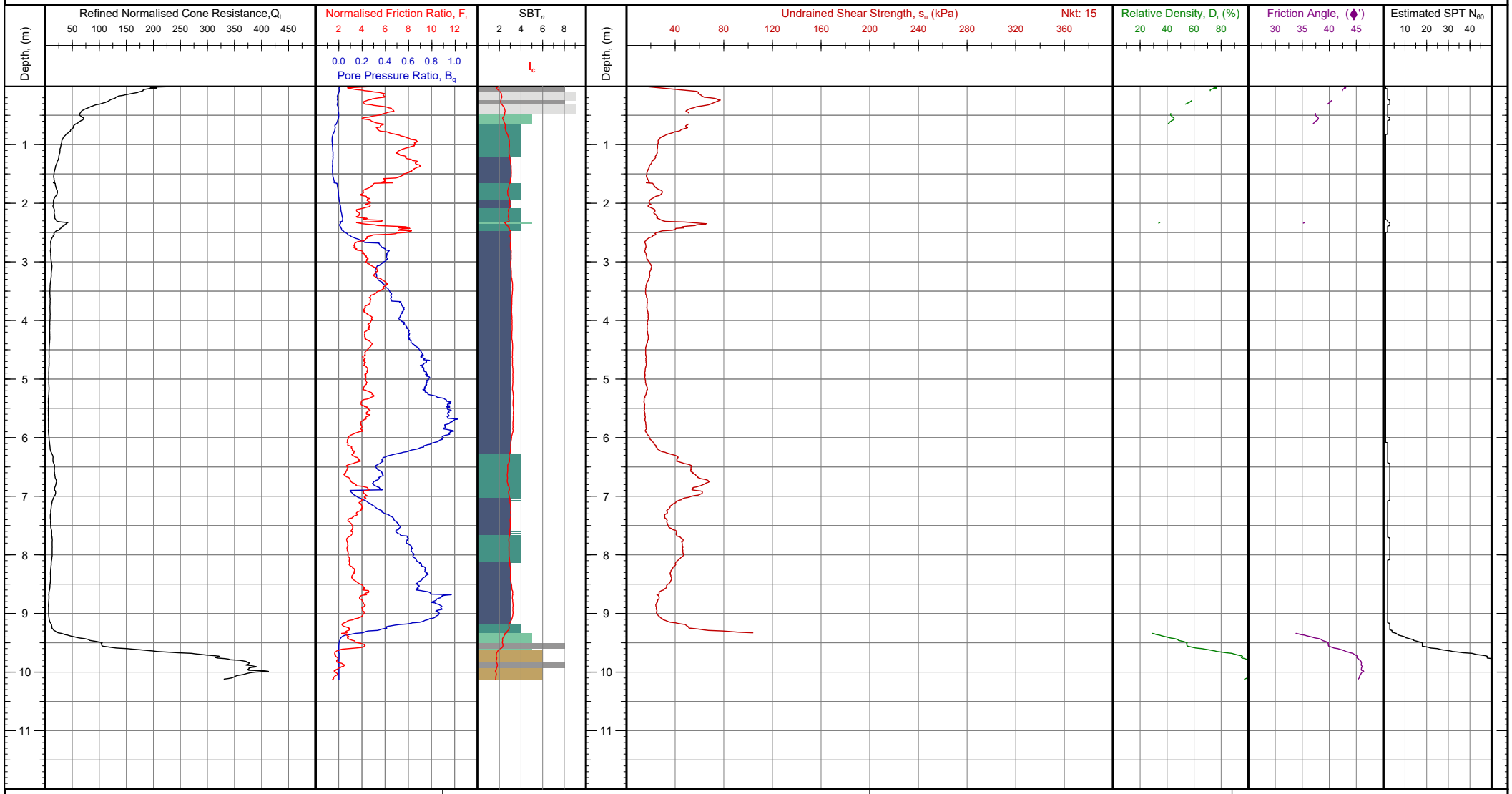
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-12**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

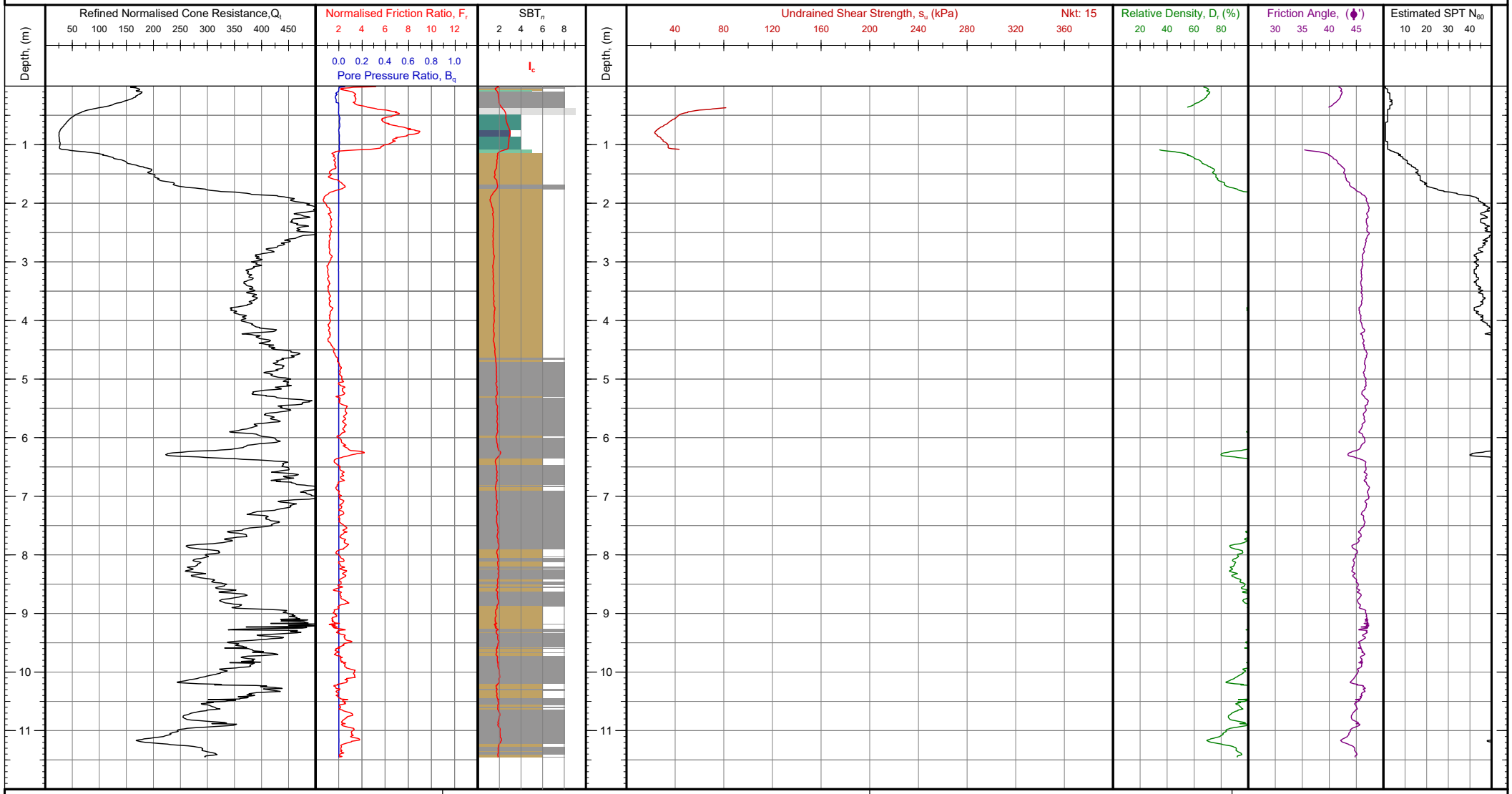
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-13**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

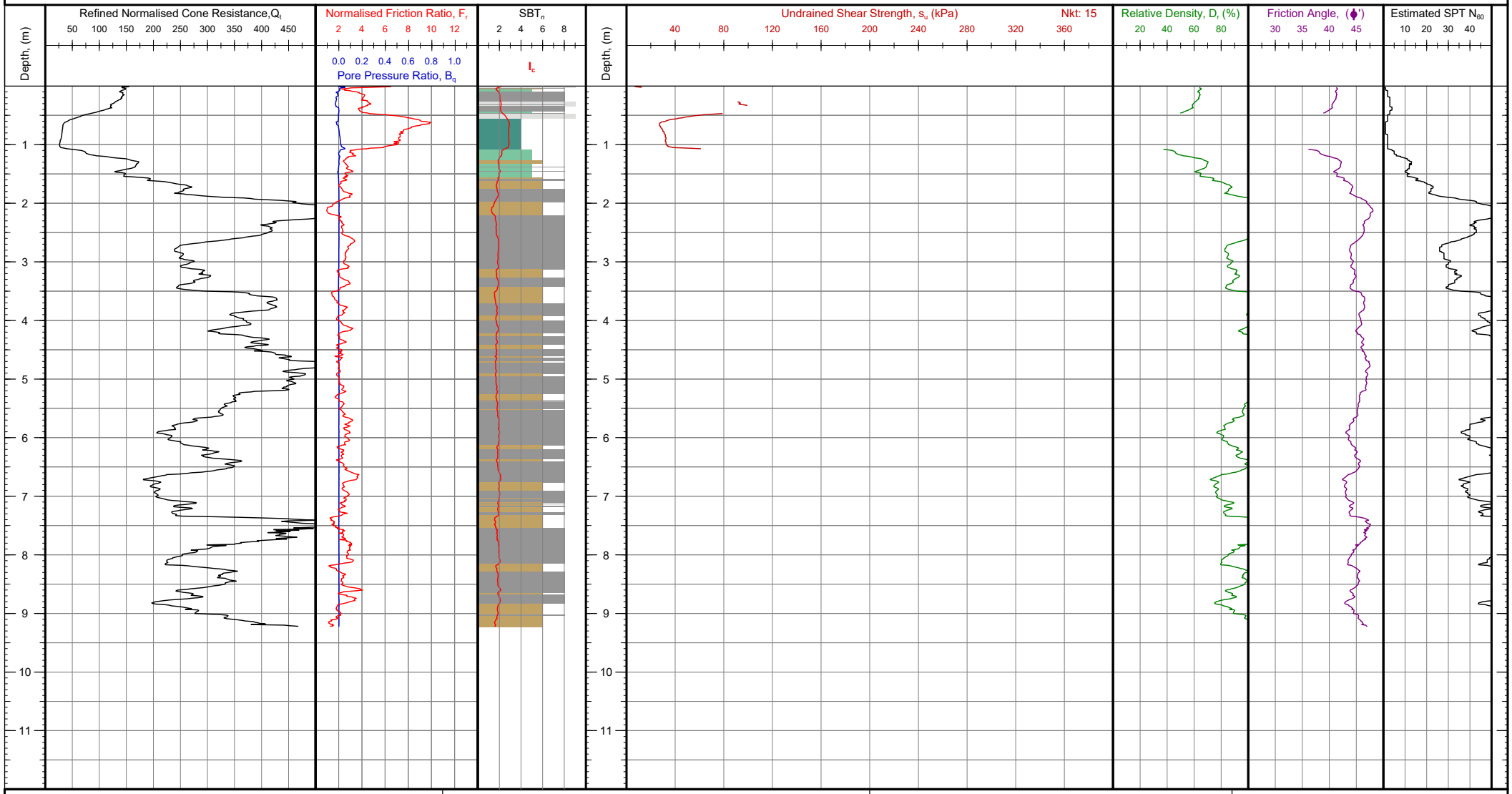
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-14**

**G.I. Job Ref:** 230270

# CPT PARAMETER LOG




**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**Soil Behaviour Type $SBT_n$ - Robertson et al. 1990**

| | | | |
|---|---|---|---|
| 0 | Undefined | 5 | Sand mixtures: silty sand to sandy silt |
| 1 | Sensitive fine grained | 6 | Sands: clean sands to silty sands |
| 2 | Organic: Organic clay/silt, peat | 7 | Dense sand to gravelly sand |
| 3 | Clay: clay to silty clay | 8 | Stiff sand to clayey sand |
| 4 | Silt mixtures: clayey silt & silty clay | 9 | Stiff silt/clay |

**Notes and Limitations:**

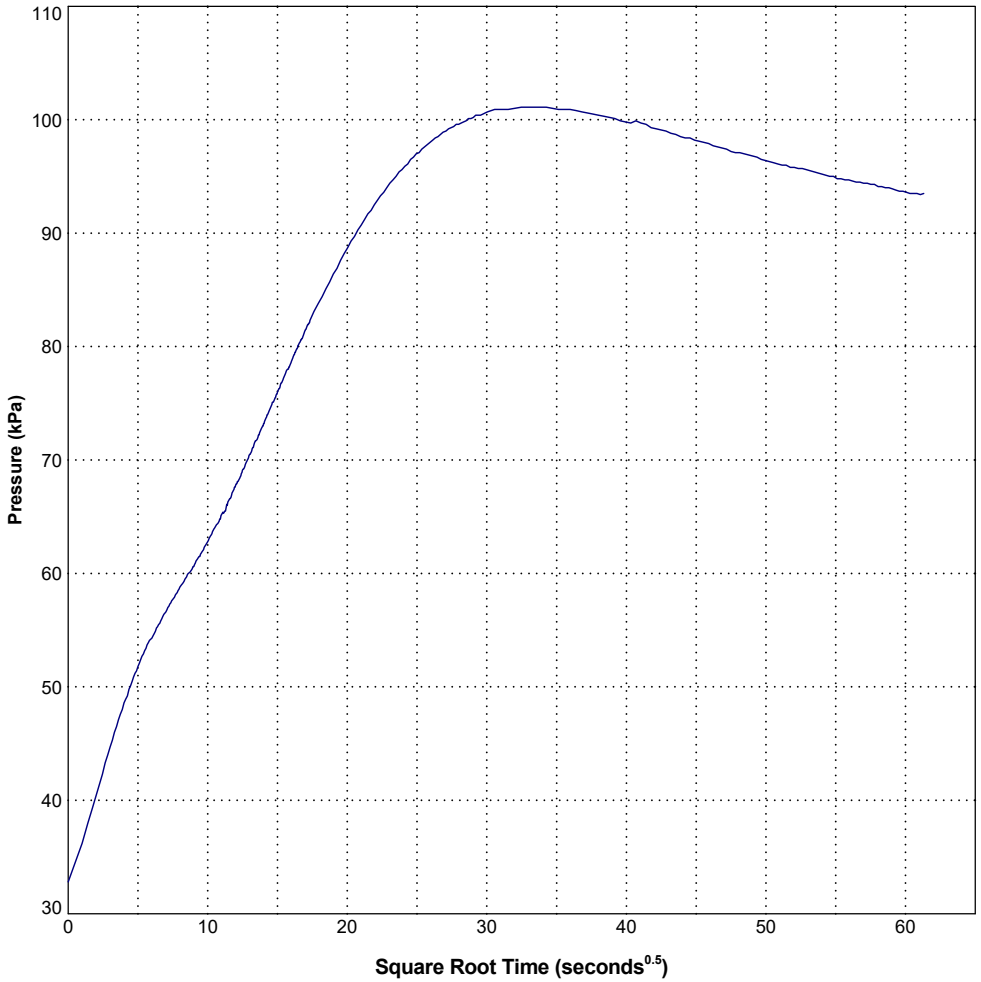
Data shown on this report has been assessed to provide a basic interpretation in terms of Soil Behaviour Type (SBT) and various geotechnical soil and design parameters using methods published in P.K. Robertson and K.L. Cabel (2010), Guide to Cone Penetration Testing for Geotechnical Engineering, 7th Edition. The interpretations are presented only as a guide for geotechnical use and should be carefully reviewed by the user. Ground Investigation Ltd. does not warrant the correctness or applicability of any of the geotechnical soil and design parameter shown and does not assume any liability for any use of the results in any design or review. The user should be fully aware of the techniques and limitations of any method used to derive data shown in this report.

**Client Reference:**

**Test Number:** **CPT-15**

**G.I. Job Ref:** 230270

# CPT DISSIPATION TEST




**CPT Number:** CPT-01

**Depth:** 9.27 m

**Water Depth:** 0.6 m Measured

**Comments:**

**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

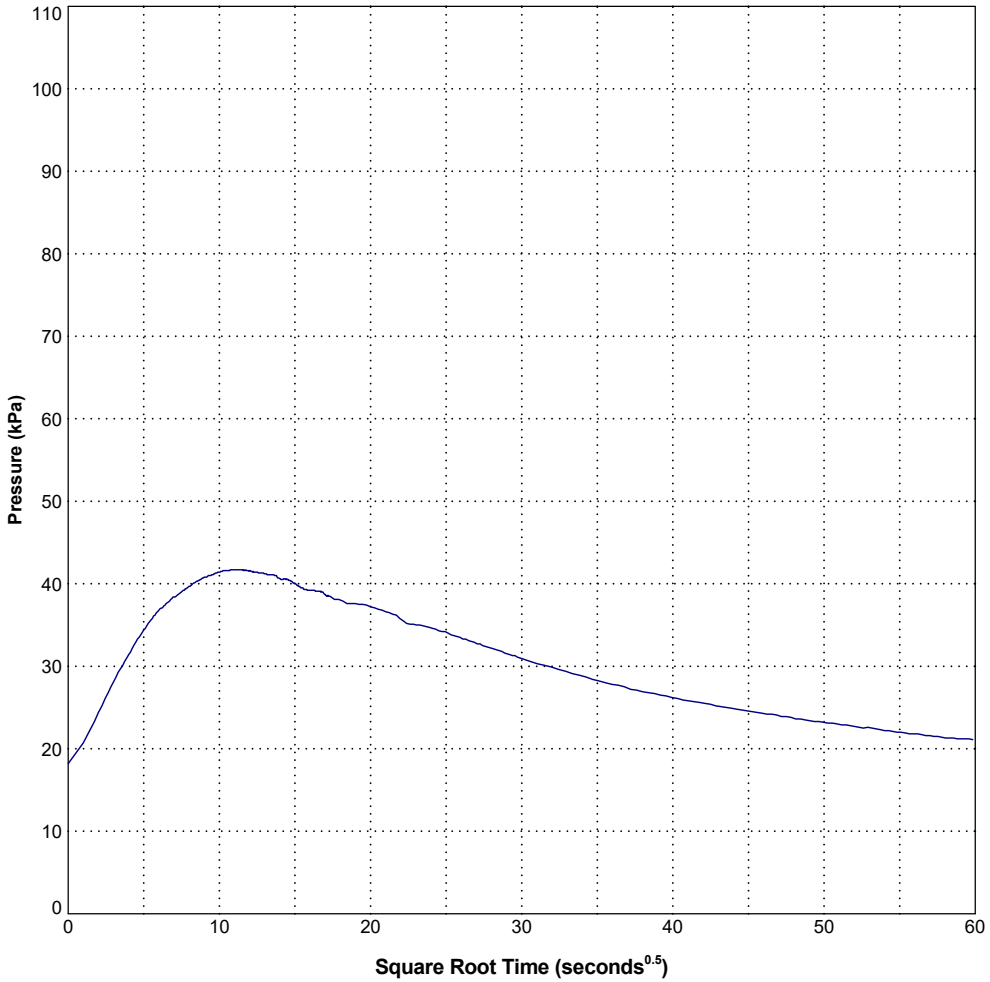
**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**G.I. Job Ref:** 230270

# CPT DISSIPATION TEST




**CPT Number:** CPT-03

**Depth:** 1.5 m

**Water Depth:** 0.8 m Measured

**Comments:**

**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

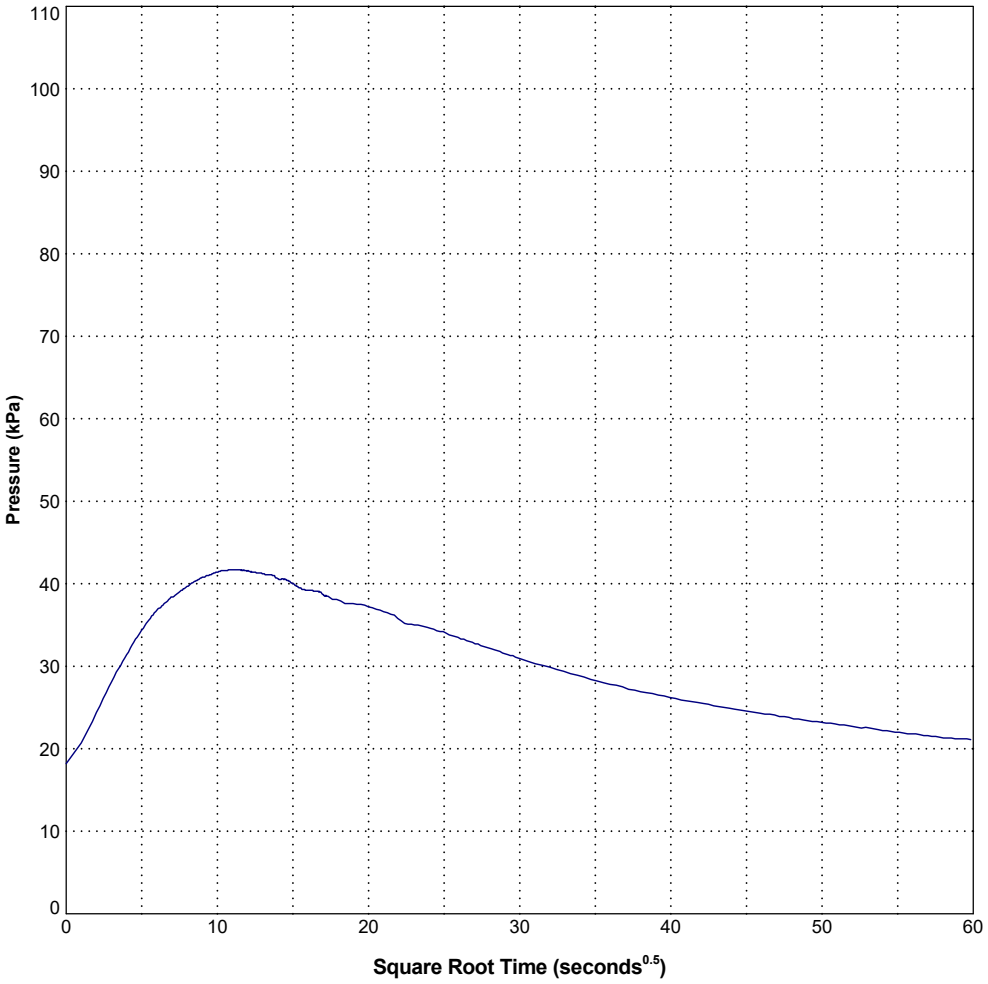
**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**G.I. Job Ref:** 230270

# CPT DISSIPATION TEST

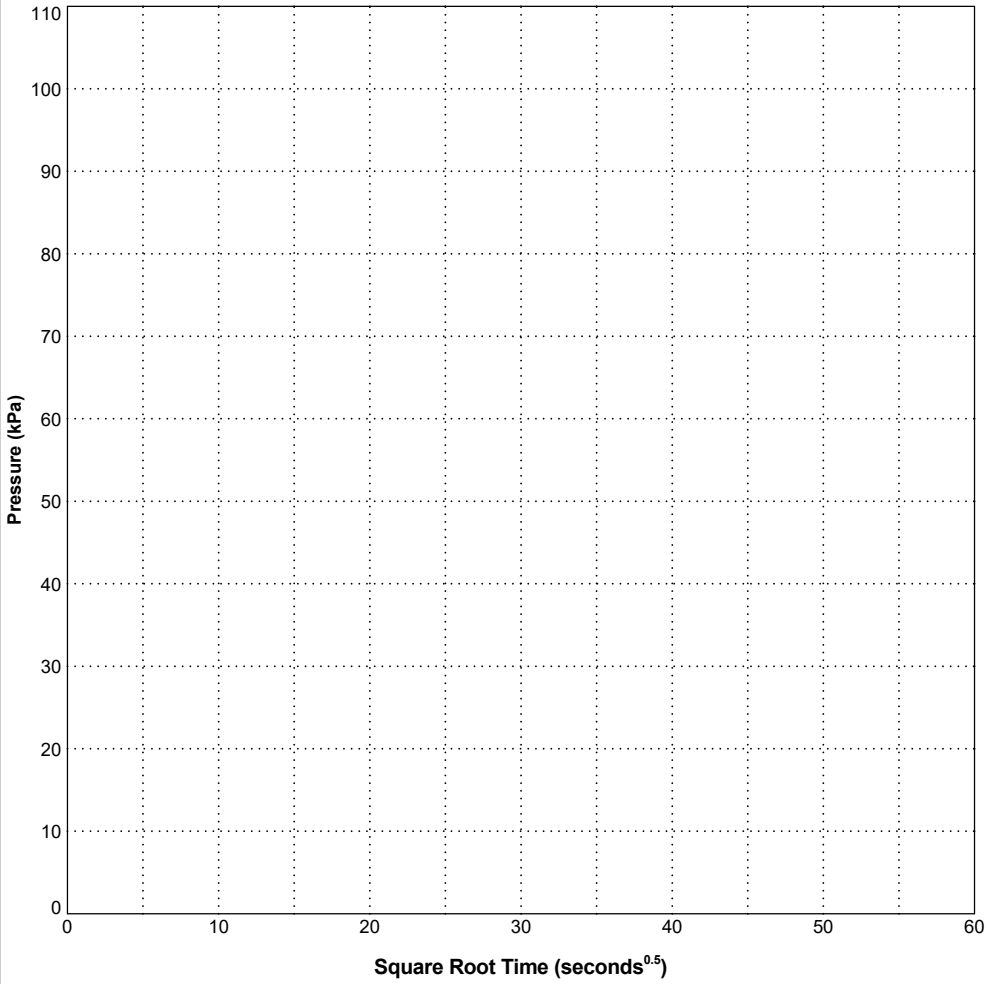



**CPT Number:** CPT-03

**Depth:** 1.5 m

**Water Depth:** 0.8 m Measured

**Comments:**




**CPT Number:** CPT-03

**Depth:** 4.65 m

**Water Depth:** 0.8 m Measured

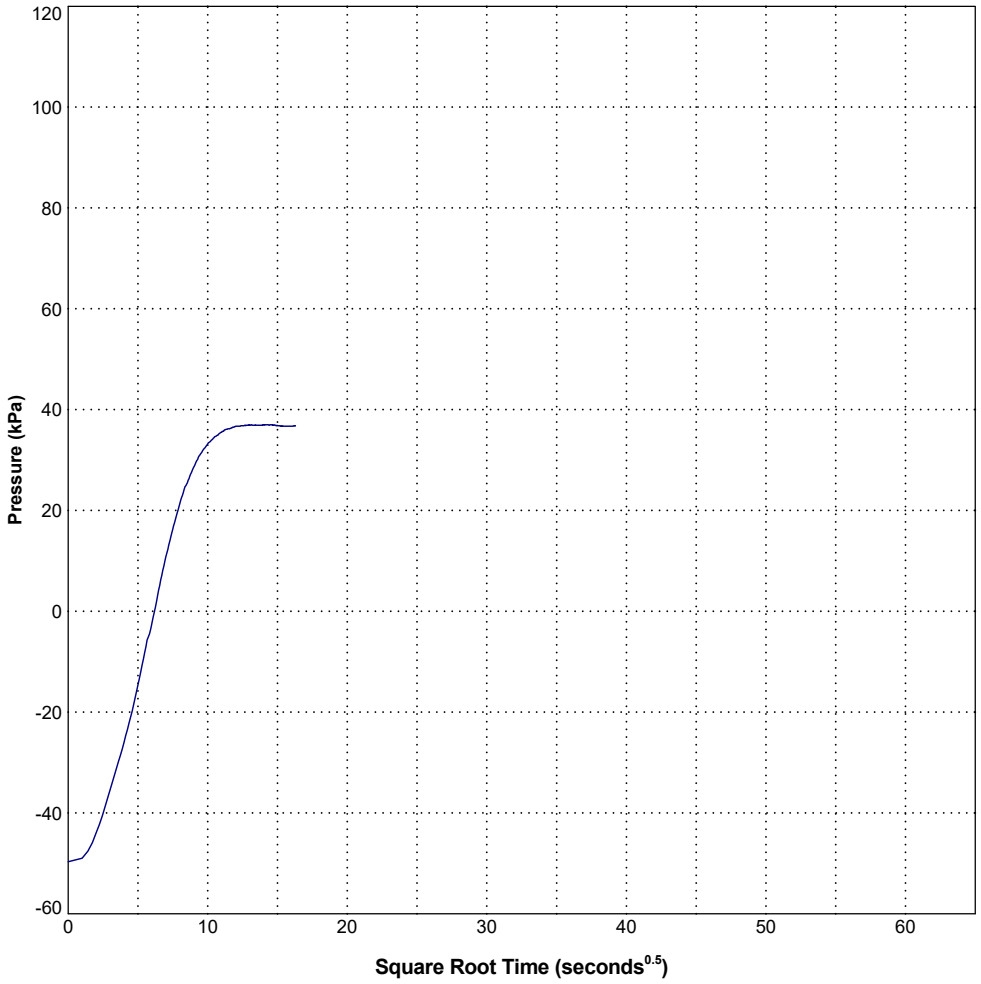
**Comments:**

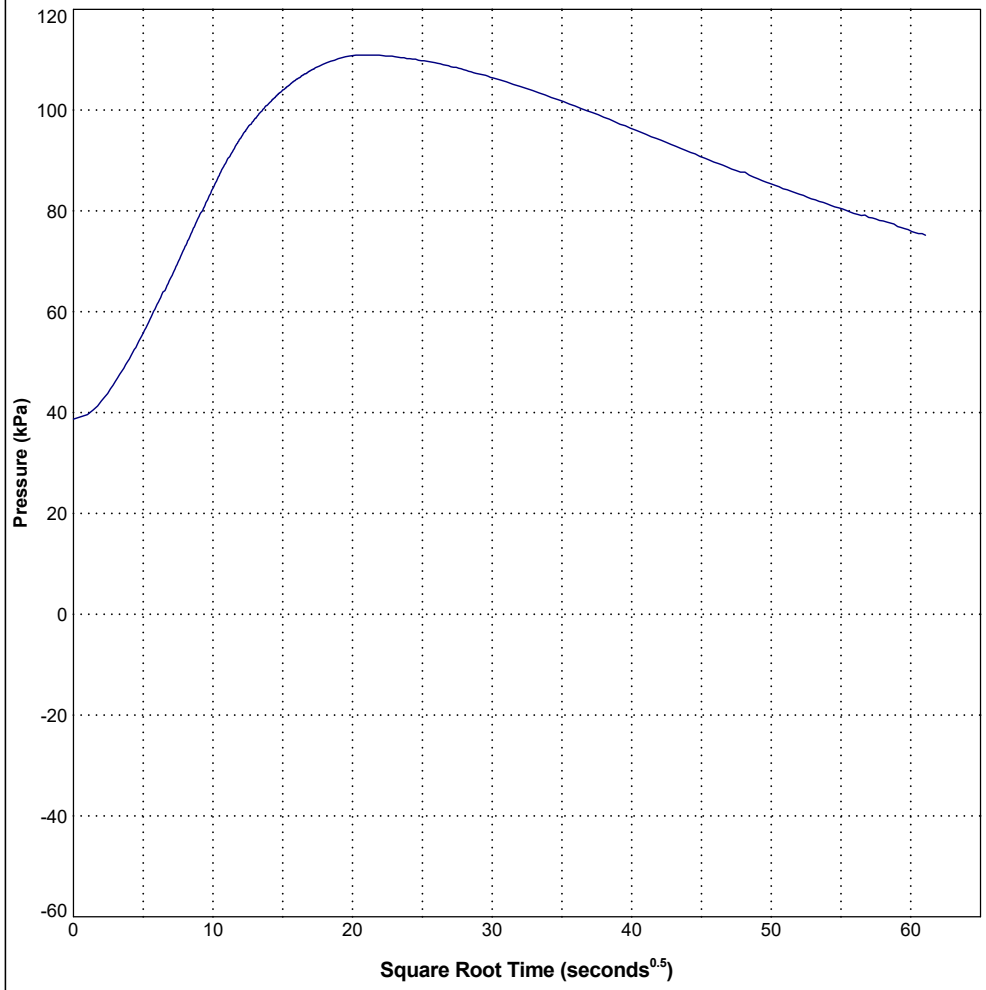
**Client:** Aurecon
**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat
**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd
**G.I. Job Ref:** 230270

# CPT DISSIPATION TEST




**CPT Number:** CPT-08 **Comments:**

**Depth:** 3.01 m

**Water Depth:** 0.6 m Measured

**CPT Number:** CPT-08 **Comments:**

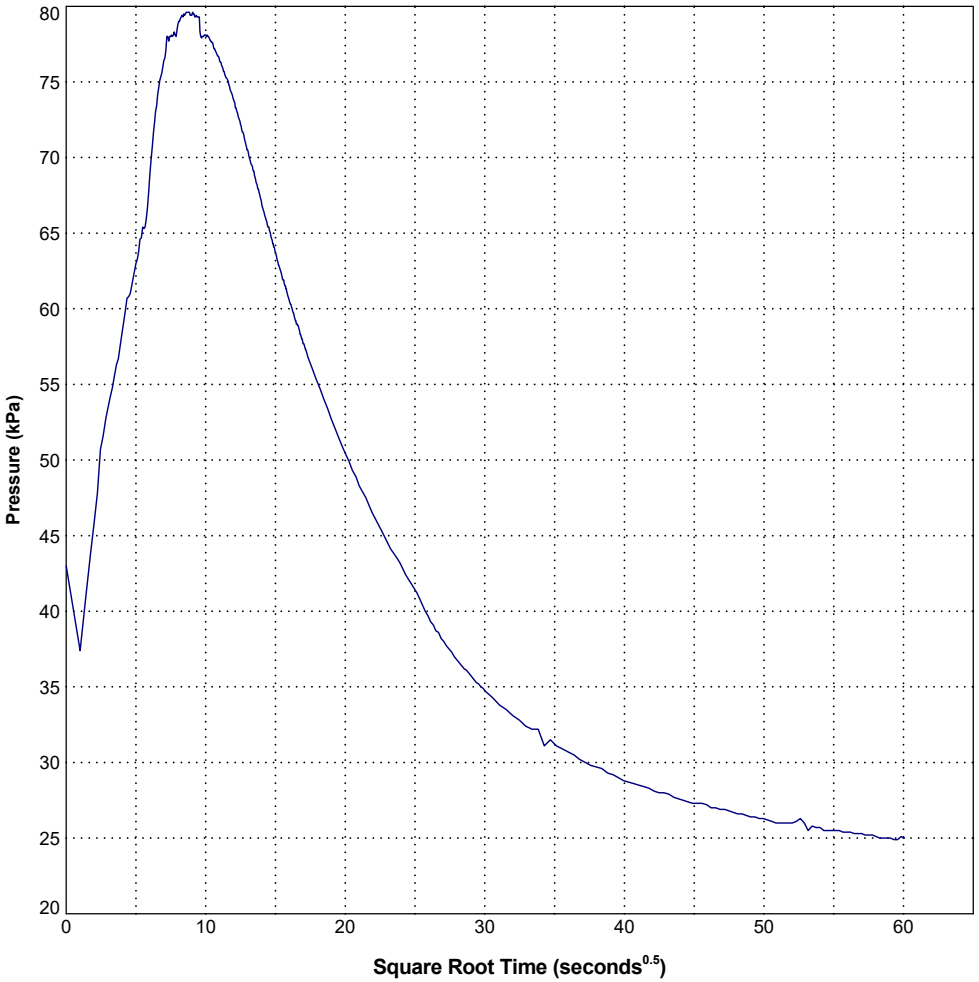
**Depth:** 5 m

**Water Depth:** 0.6 m Measured

**Client:** Aurecon **Location:** Dairy Flat **Contractor:** Ground Investigation Ltd

**Project:** 1350 Dairy Flat Highway **Engineer:** Suresh Nuthalapati **G.I. Job Ref:** 230270

# CPT DISSIPATION TEST




**CPT Number:** CPT-12

**Depth:** 2.88 m

**Water Depth:** 0.6 m Measured

**Comments:**

**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

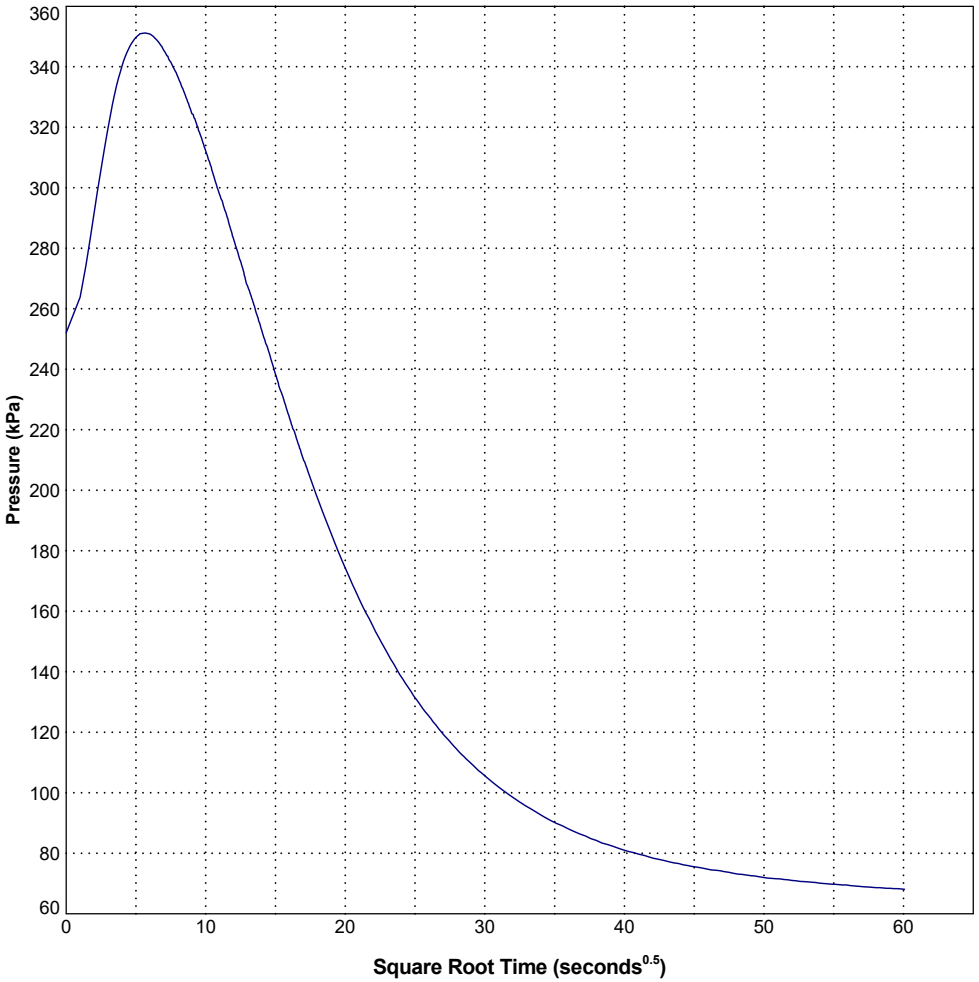
**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**G.I. Job Ref:** 230270

# CPT DISSIPATION TEST




**CPT Number:** CPT-13

**Depth:** 6.89 m

**Water Depth:** 0.5 m Measured

**Comments:**

**Client:** Aurecon

**Project:** 1350 Dairy Flat Highway

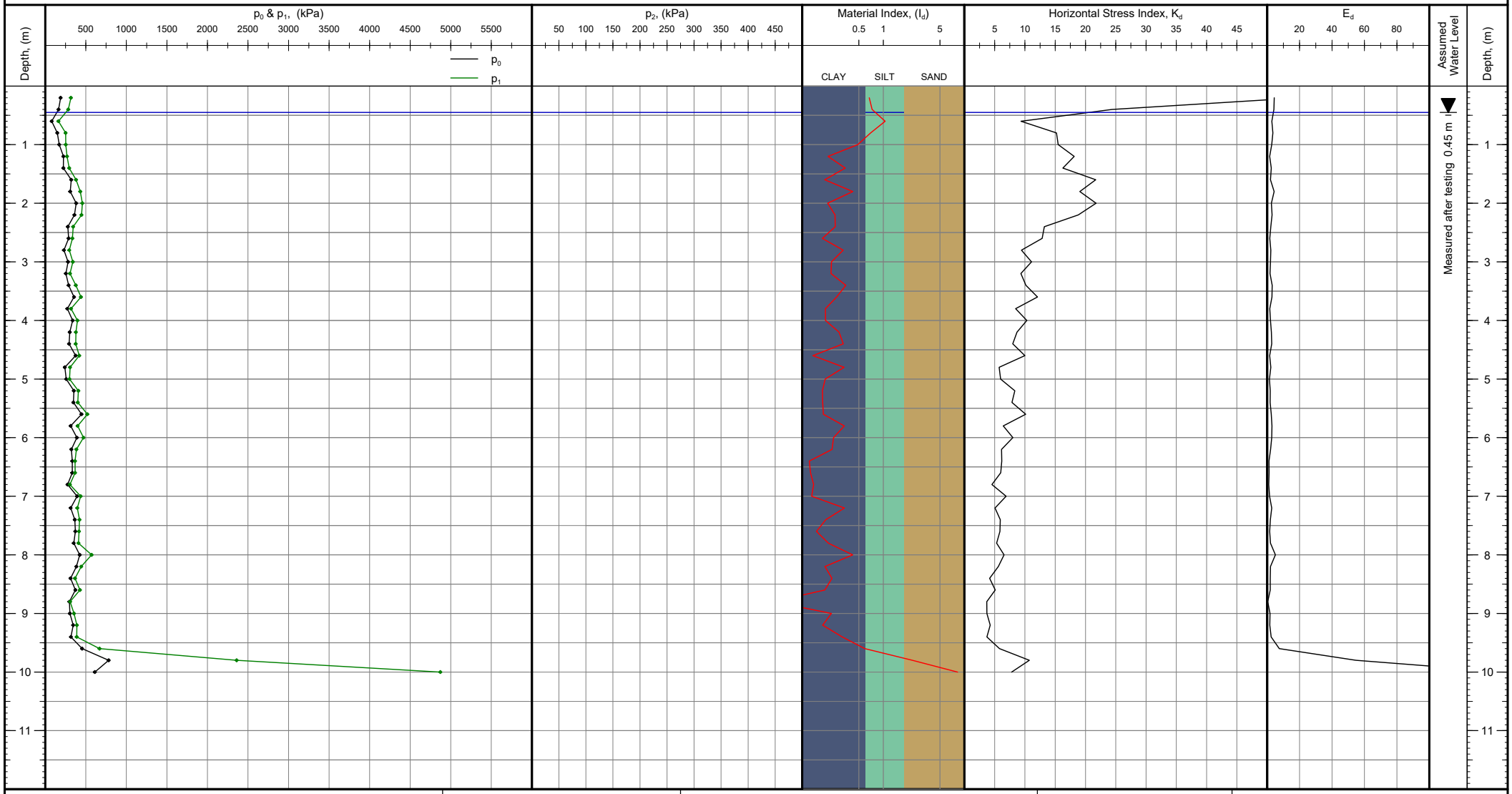
**Location:** Dairy Flat

**Engineer:** Suresh Nuthalapati

**Contractor:** Ground Investigation Ltd

**G.I. Job Ref:** 230270

# FLAT DILATOMETER TEST (DMT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Marcelo Martinez | **NZTM 2000 N, E (m):** | 5941912.02, 1747336.93 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Blade Reference:** | N/A | **WGS84 (deg):** | -36.656991,174.648475 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Diaphragm Thickness:** | 0.25 mm | **Location Method:** | Handheld GPS | **Depth (m):** | 10.00 |
| **Engineer:** | Suresh Nuthalapati | **A-Reading Calibration:** | 13 kPa | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **B-Reading Calibration:** | 44 kPa | **Termination Reason:** | Danger of buckling rods | | |

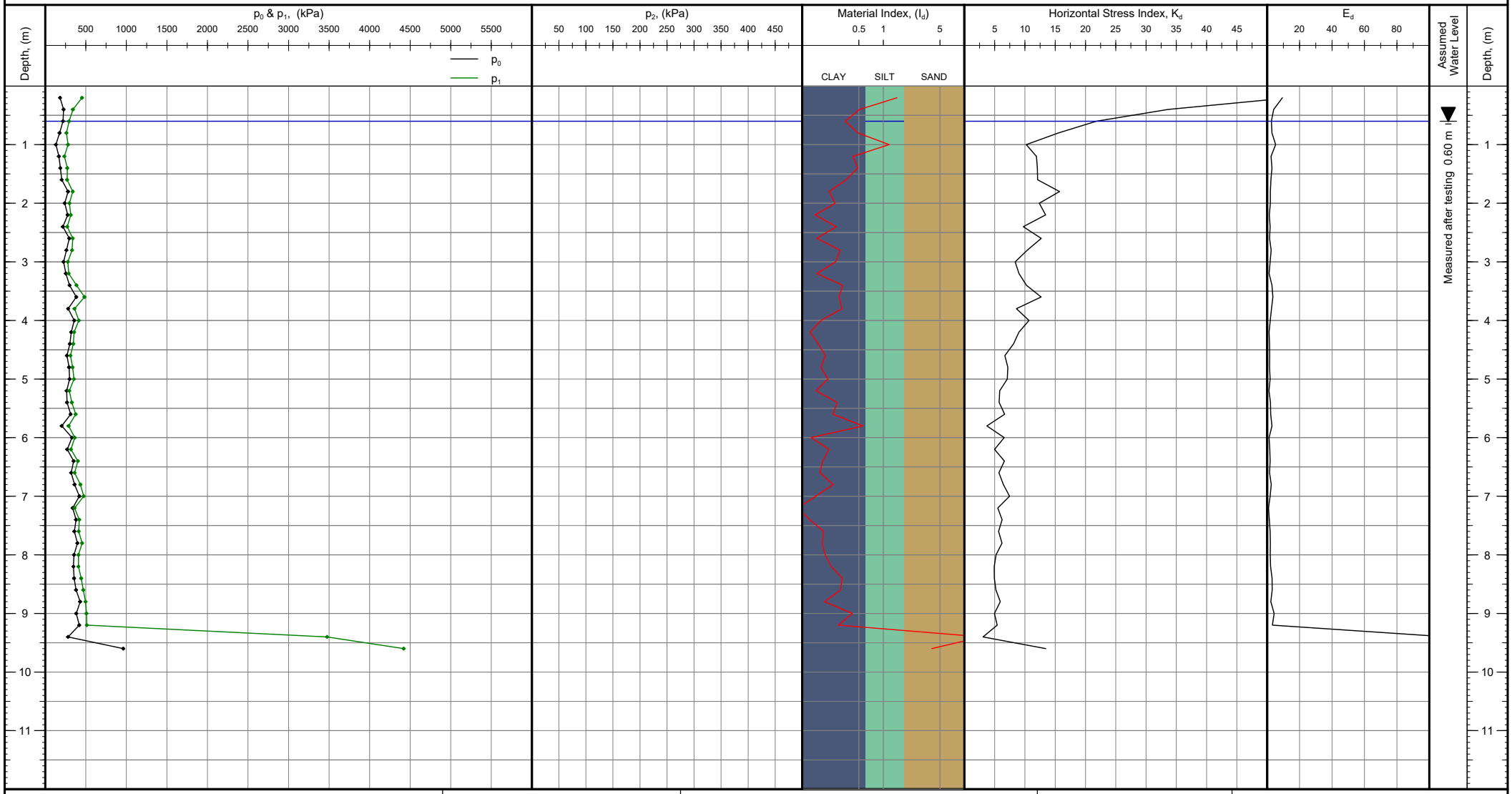
**Client Reference:**

**Test Number:** **SDMT-01**

**G.I. Job Ref:** 230270

**Comments:**

# FLAT DILATOMETER TEST (DMT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Marcelo Martinez | **NZTM 2000 N, E (m):** | 5941860.95, 1747363.95 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Blade Reference:** | N/A | **WGS84 (deg):** | -36.657447,174.648787 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Diaphragm Thickness:** | 0.25 mm | **Location Method:** | Handheld GPS | **Depth (m):** | 9.60 |
| **Engineer:** | Suresh Nuthalapati | **A-Reading Calibration:** | 15 kPa | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **B-Reading Calibration:** | 43 kPa | **Termination Reason:** | Danger of buckling rods | | |

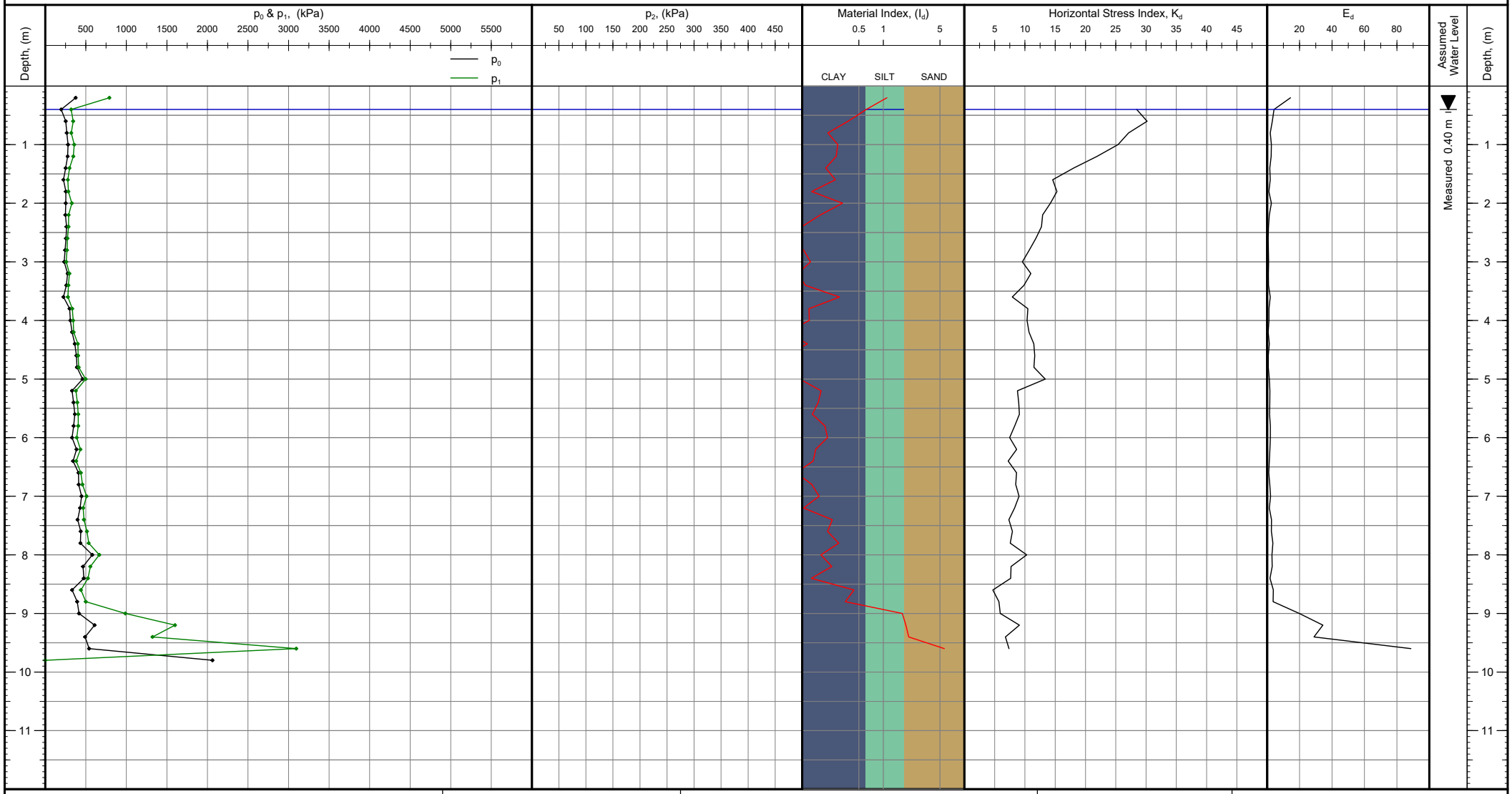
**Client Reference:**

**Test Number:** **SDMT-02**

**G.I. Job Ref:** 230270

**Comments:**

# FLAT DILATOMETER TEST (DMT) LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Marcelo Martinez | **NZTM 2000 N, E (m):** | 5941795.97, 1747412.54 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Blade Reference:** | N/A | **WGS84 (deg):** | -36.658025,174.649343 | **Date of Test:** | 6/04/2023 |
| **Location:** | Dairy Flat | **Diaphragm Thickness:** | 0.25 mm | **Location Method:** | Handheld GPS | **Depth (m):** | 9.80 |
| **Engineer:** | Suresh Nuthalapati | **A-Reading Calibration:** | 12 kPa | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **B-Reading Calibration:** | 41 kPa | **Termination Reason:** | High nominal pressure | | |

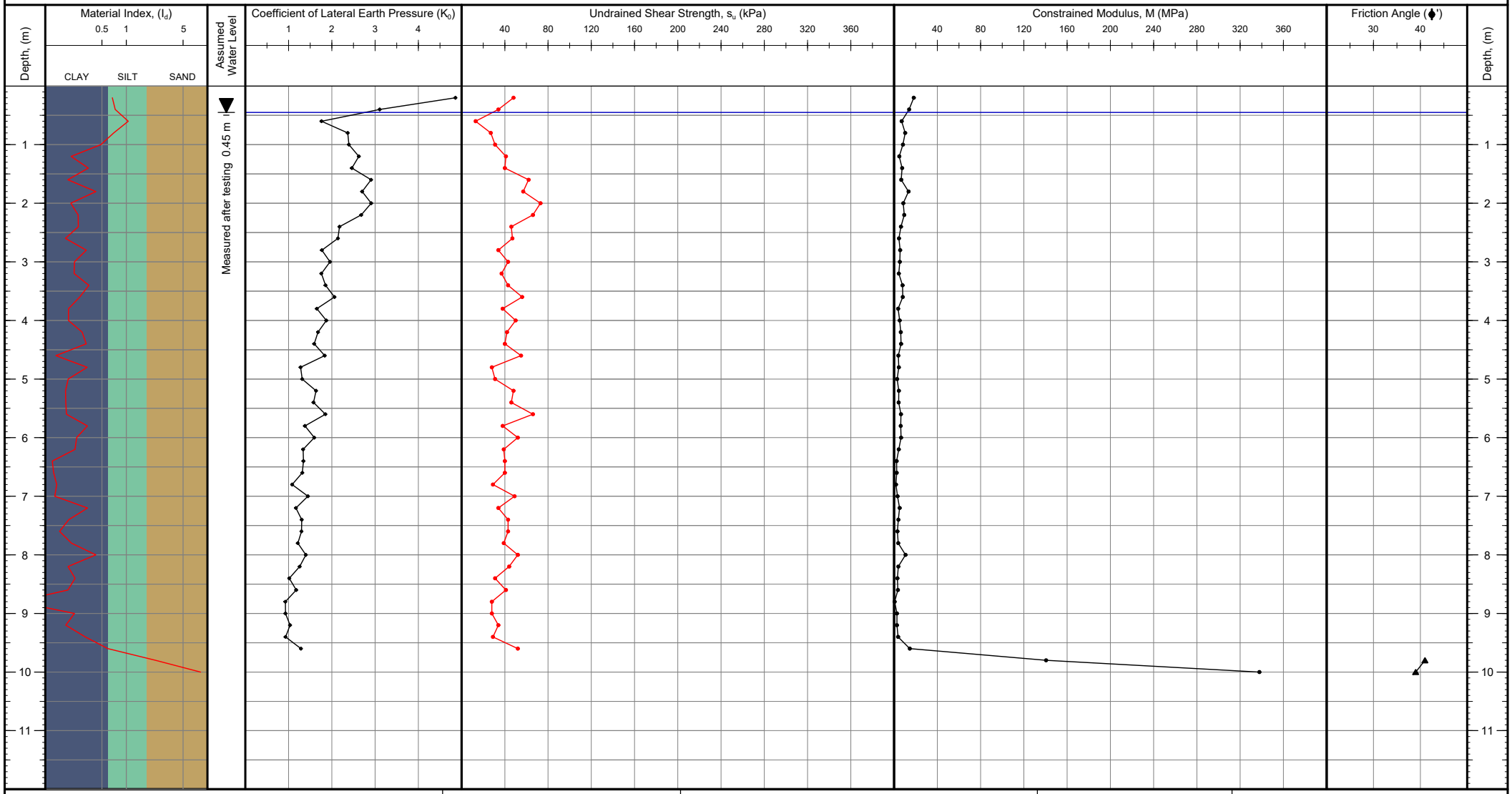
**Client Reference:**

**Test Number:** **SDMT-03**

**G.I. Job Ref:** 230270

**Comments:** DMT readings at 9.80m: A=20.50 bar, B>50.30 bar.

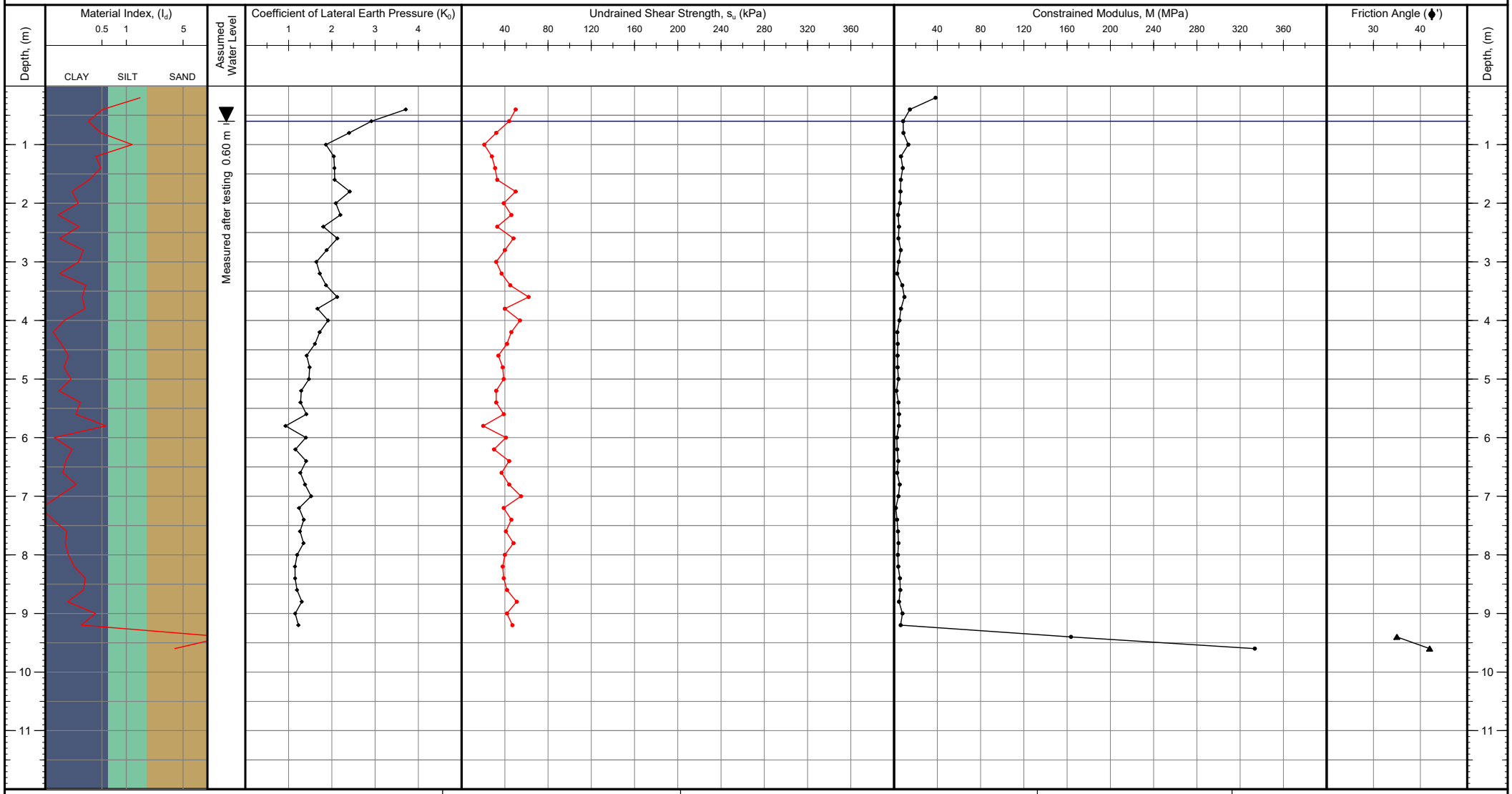
# DMT PARAMETER LOG




| | | | | | |
|---|---|---|---|---|---|
| **Client:** Aurecon | **Operator:** Marcelo Martinez | **NZTM 2000 N, E (m):** 5941912.02, 1747336.93 | **Elevation (m):** Unknown | **Client Reference:** | |
| **Project:** 1350 Dairy Flat Highway | **Blade Reference:** N/A | **WGS84 (deg):** -36.656991,174.648475 | **Date of Test:** 4/04/2023 | **Test Number:** **SDMT-01** | |
| **Location:** Dairy Flat | **Diaphragm Thickness:** 0.25 mm | **Location Method:** Handheld GPS | **Depth (m):** 10.00 | | |
| **Engineer:** Suresh Nuthalapati | **A-Reading Calibration:** 13 kPa | **Surveyor:** | **Pre Drill (m):** N/A | | |
| **Contractor:** Ground Investigation Ltd | **B-Reading Calibration:** 44 kPa | **Termination Reason:** Danger of buckling rods | | **G.I. Job Ref:** 230270 | |

**Comments:**

# DMT PARAMETER LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | **Operator:** | Marcelo Martinez | **NZTM 2000 N, E (m):** | 5941860.95, 1747363.95 | **Elevation (m):** | Unknown |
| **Project:** | 1350 Dairy Flat Highway | **Blade Reference:** | N/A | **WGS84 (deg):** | -36.657447,174.648787 | **Date of Test:** | 4/04/2023 |
| **Location:** | Dairy Flat | **Diaphragm Thickness:** | 0.25 mm | **Location Method:** | Handheld GPS | **Depth (m):** | 9.60 |
| **Engineer:** | Suresh Nuthalapati | **A-Reading Calibration:** | 15 kPa | **Surveyor:** | | **Pre Drill (m):** | N/A |
| **Contractor:** | Ground Investigation Ltd | **B-Reading Calibration:** | 43 kPa | **Termination Reason:** | Danger of buckling rods | | |

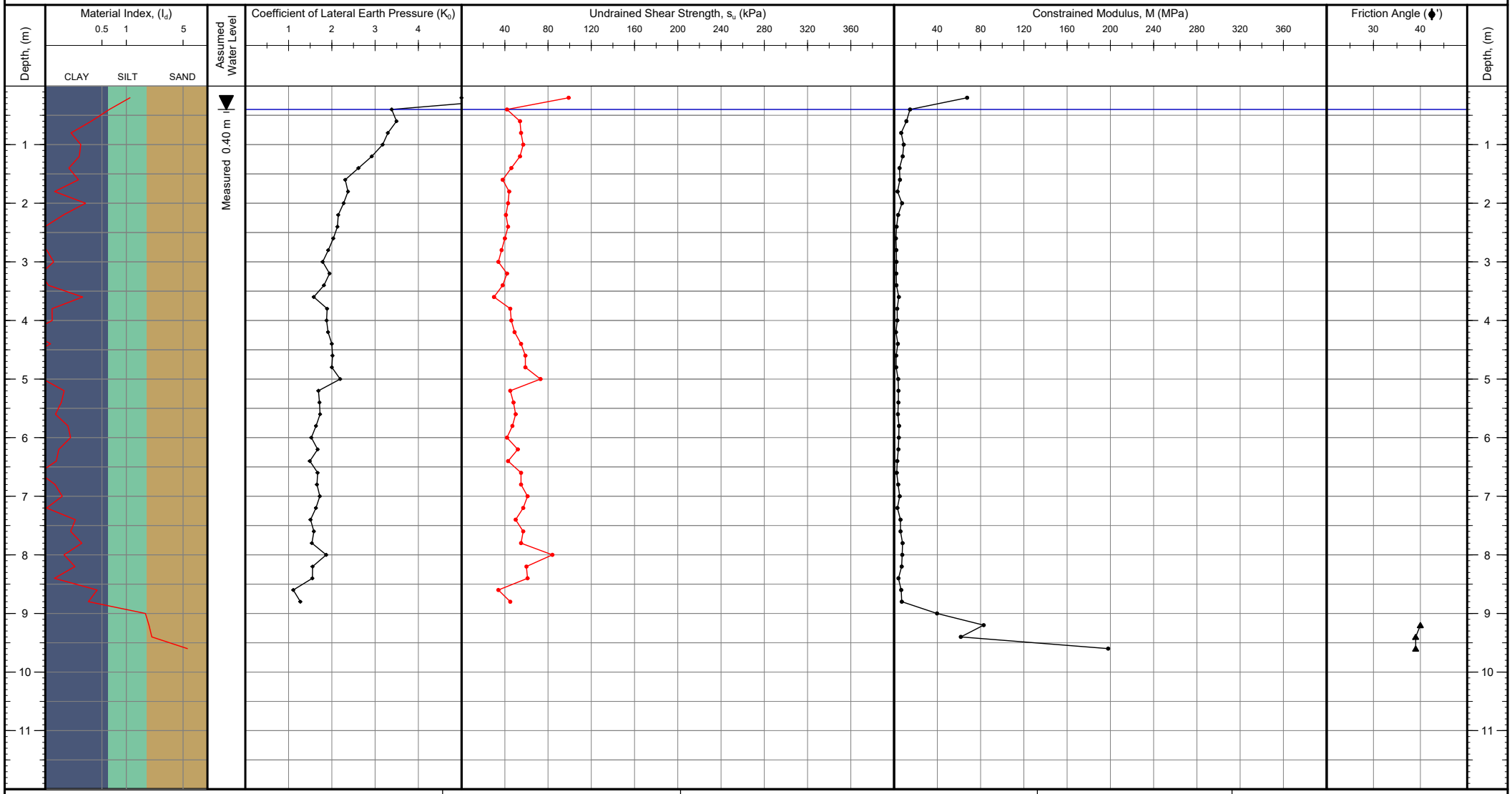
**Client Reference:**

**Test Number:** **SDMT-02**

**G.I. Job Ref:** 230270

**Comments:**

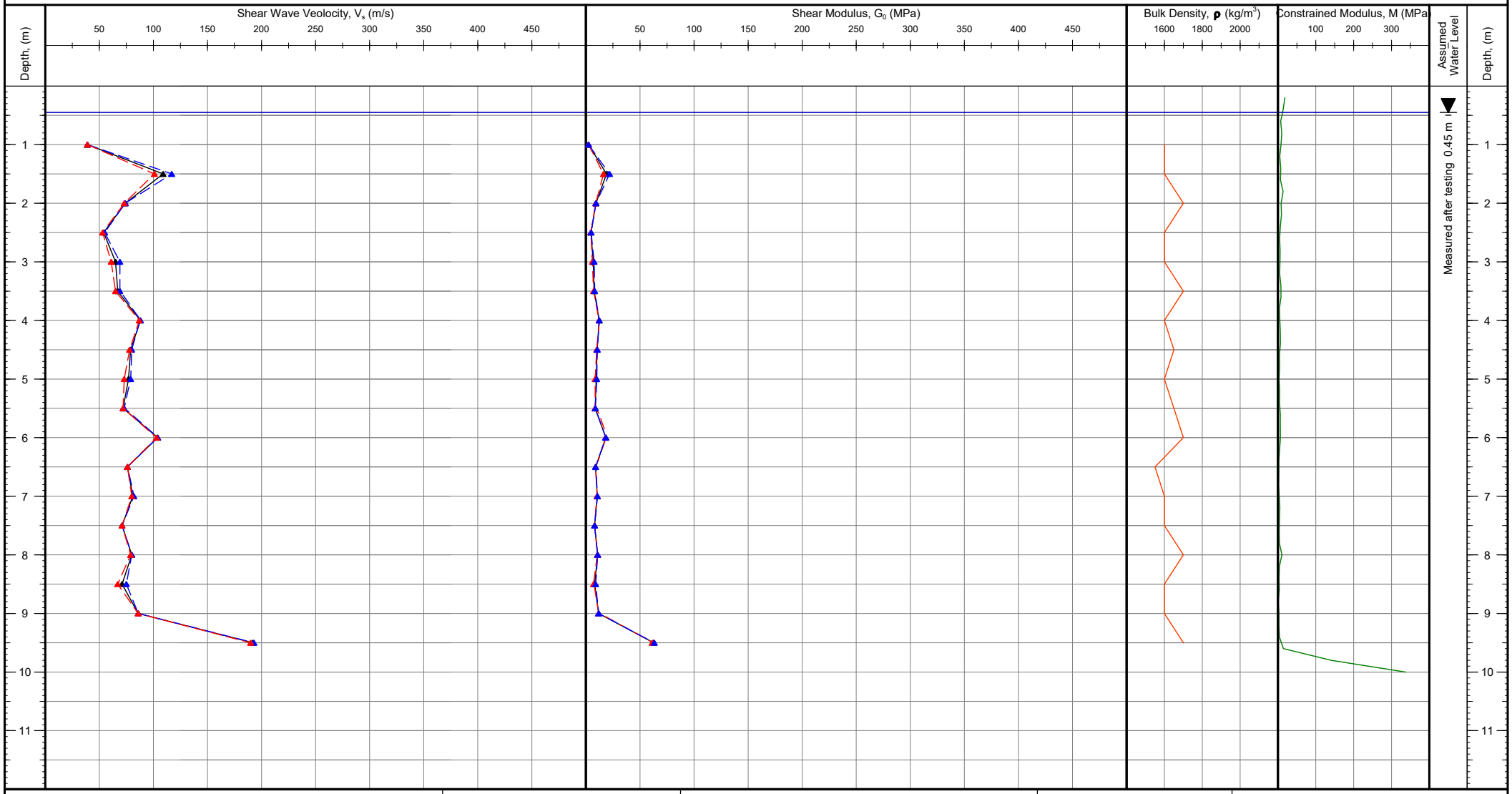
# DMT PARAMETER LOG




| | | | | | |
|---|---|---|---|---|---|
| **Client:** Aurecon | **Operator:** Marcelo Martinez | **NZTM 2000 N, E (m):** 5941795.97, 1747412.54 | **Elevation (m):** Unknown | **Client Reference:** | |
| **Project:** 1350 Dairy Flat Highway | **Blade Reference:** N/A | **WGS84 (deg):** -36.658025,174.649343 | **Date of Test:** 6/04/2023 | **Test Number:** | **SDMT-03** |
| **Location:** Dairy Flat | **Diaphragm Thickness:** 0.25 mm | **Location Method:** Handheld GPS | **Depth (m):** 9.80 | | |
| **Engineer:** Suresh Nuthalapati | **A-Reading Calibration:** 12 kPa | **Surveyor:** | **Pre Drill (m):** N/A | | |
| **Contractor:** Ground Investigation Ltd | **B-Reading Calibration:** 41 kPa | **Termination Reason:** High nominal pressure | | **G.I. Job Ref:** 230270 | |

**Comments:** DMT readings at 9.80m: A=20.50 bar, B>50.30 bar.

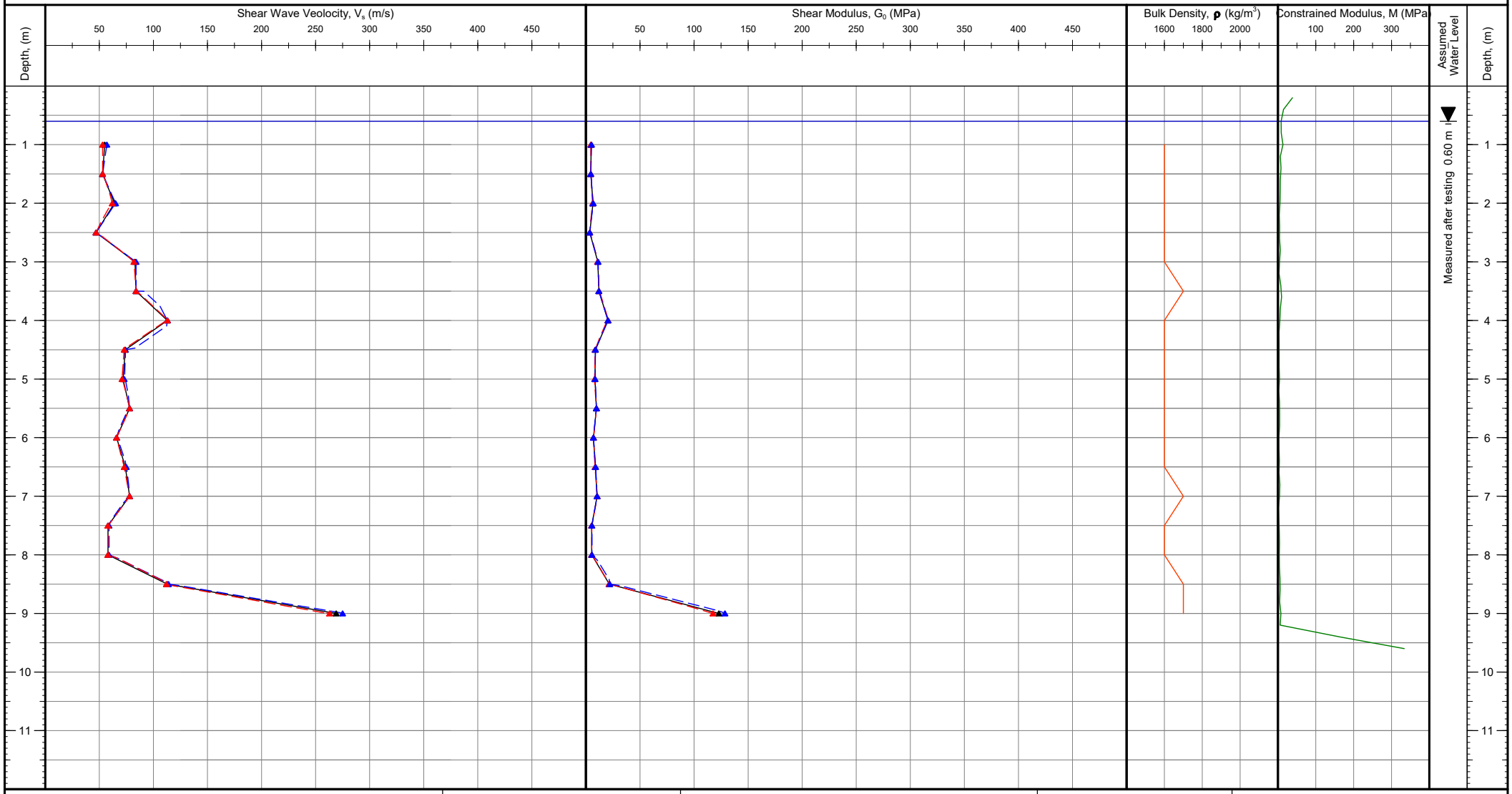
# FLAT DILATOMETER TEST (DMT) SEISMIC LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | Estimated from DMT | **NZTM 2000 N, E (m):** | 5941912.02, 1747336.93 | **Elevation (m):** | Unknown | **Client Reference:** |
| **Project:** | 1350 Dairy Flat Highway | Measured Lower Bound | **WGS84 (deg):** | -36.656991,174.648475 | **Date of Test:** | 4/04/2023 | **Test Number:** **SDMT-01** |
| **Location:** | Dairy Flat | Measured Average Bound | **Location Method:** | Handheld GPS | **Depth (m):** | 10.00 | |
| **Engineer:** | Suresh Nuthalapati | Measured Upper Bound | **Surveyor:** | | **Pre Drill (m):** | N/A | |
| **Contractor:** | Ground Investigation Ltd | ρ from $G_0$ Calculation | **Termination Reason:** | Danger of buckling rods | | | **G.I. Job Ref:** 230270 |

**Comments:**

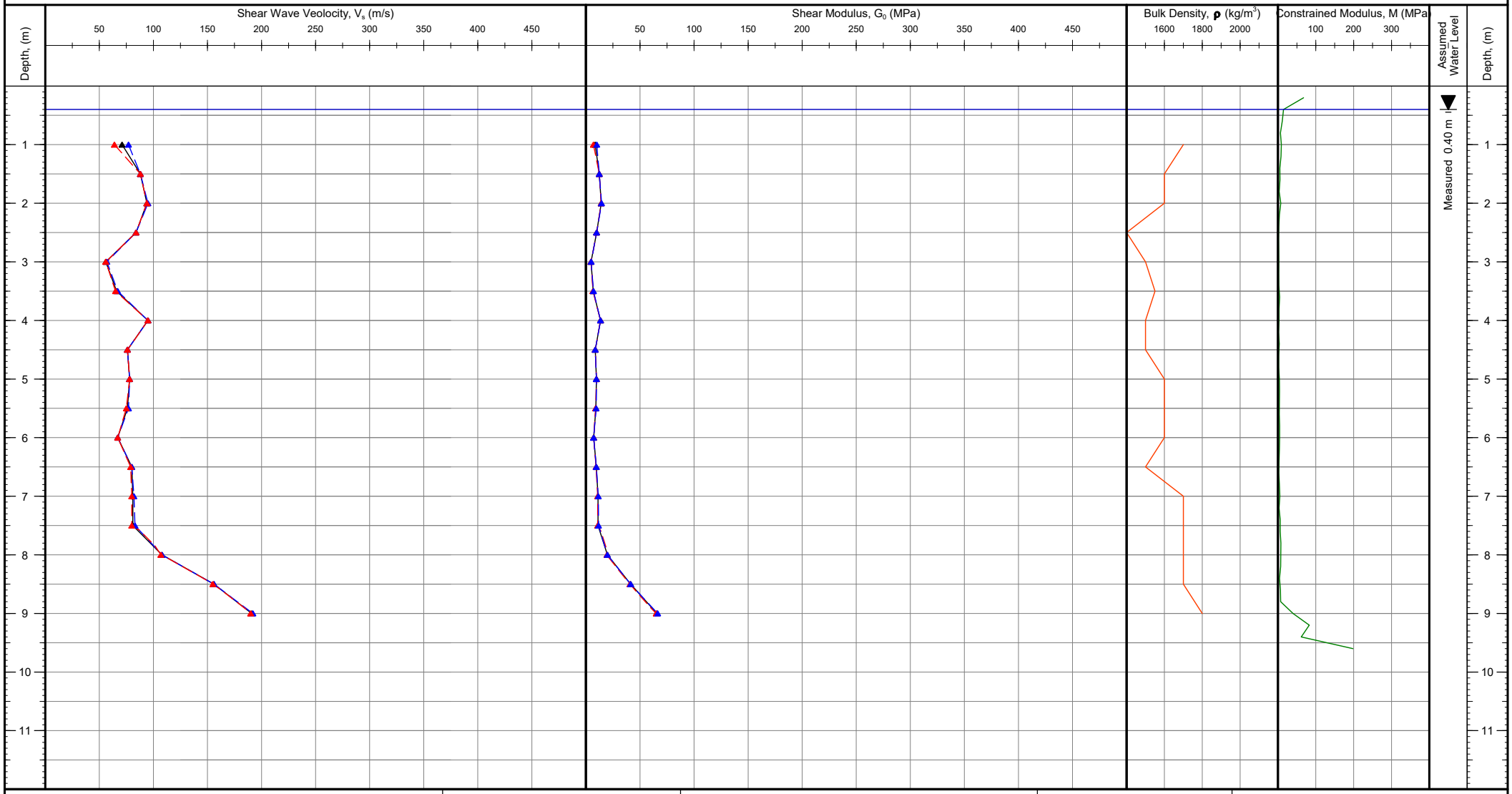
# FLAT DILATOMETER TEST (DMT) SEISMIC LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | Estimated from DMT | **NZTM 2000 N, E (m):** | 5941860.95, 1747363.95 | **Elevation (m):** | Unknown | **Client Reference:** |
| **Project:** | 1350 Dairy Flat Highway | Measured Lower Bound | **WGS84 (deg):** | -36.657447,174.648787 | **Date of Test:** | 4/04/2023 | **Test Number:** **SDMT-02** |
| **Location:** | Dairy Flat | Measured Average Bound | **Location Method:** | Handheld GPS | **Depth (m):** | 9.60 | |
| **Engineer:** | Suresh Nuthalapati | Measured Upper Bound | **Surveyor:** | | **Pre Drill (m):** | N/A | |
| **Contractor:** | Ground Investigation Ltd | ρ from $G_0$ Calculation | **Termination Reason:** | Danger of buckling rods | | | **G.I. Job Ref:** 230270 |

**Comments:**

# FLAT DILATOMETER TEST (DMT) SEISMIC LOG




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Client:** | Aurecon | Estimated from DMT | **NZTM 2000 N, E (m):** | 5941795.97, 1747412.54 | **Elevation (m):** | Unknown | **Client Reference:** |
| **Project:** | 1350 Dairy Flat Highway | Measured Lower Bound | **WGS84 (deg):** | -36.658025,174.649343 | **Date of Test:** | 6/04/2023 | **Test Number:** **SDMT-03** |
| **Location:** | Dairy Flat | Measured Average Bound | **Location Method:** | Handheld GPS | **Depth (m):** | 9.80 | |
| **Engineer:** | Suresh Nuthalapati | Measured Upper Bound | **Surveyor:** | | **Pre Drill (m):** | N/A | |
| **Contractor:** | Ground Investigation Ltd | ρ from $G_0$ Calculation | **Termination Reason:** | High nominal pressure | | | **G.I. Job Ref:** 230270 |

**Comments:** DMT readings at 9.80m: A=20.50 bar, B>50.30 bar.

aurecon

# CPT ZEROS AND DRIFT

GROUND INVESTIGATION

**G.I. Job Ref:** 230270

| Cone Reference | CPT Name | Push | Tip Resistance | | | | | Local Friction | | | | | Pore Pressure | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial (MPa) | Final (MPa) | Cleaned (MPa) | I - F Difference (kPa) | I - C Difference (kPa) | Initial (MPa) | Final (MPa) | Cleaned (MPa) | I - F Difference (kPa) | I - C Difference (kPa) | Initial (MPa) | Final (MPa) | Cleaned (MPa) | I - F Difference (kPa) | I - C Difference (kPa) |
| MKJ167 | CPT-01 | 1 | 18.519 | 18.524 | N/A | 5.2 | N/A | 0.2530 | 0.2528 | N/A | -0.2 | N/A | 2.8903 | 2.8904 | N/A | 0.1 | N/A |
| 71137 | CPT-02 | 1 | 0.650 | 0.650 | N/A | 0.3 | N/A | 0.0419 | 0.0418 | N/A | -0.1 | N/A | 0.7667 | 0.7662 | N/A | -0.4 | N/A |
| MKJ333 | CPT-03 | 1 | 20.652 | 20.637 | N/A | -15.7 | N/A | 0.3038 | 0.3036 | N/A | -0.2 | N/A | 1.8814 | 1.8838 | N/A | 2.4 | N/A |
| 71062 | CPT-04 | 1 | 0.706 | 0.707 | N/A | 1.0 | N/A | 0.0458 | 0.0455 | N/A | -0.3 | N/A | 0.8247 | 0.8253 | N/A | 0.7 | N/A |
| 70169 | CPT-05 | 1 | 0.693 | 0.684 | N/A | -9.1 | N/A | 0.0454 | 0.0449 | N/A | -0.6 | N/A | 0.9024 | 0.9042 | N/A | 1.8 | N/A |
| MKJ167 | CPT-06 | 1 | 18.545 | 18.524 | N/A | -20.9 | N/A | 0.2524 | 0.2529 | N/A | 0.5 | N/A | 2.8912 | 2.8914 | N/A | 0.2 | N/A |
| MKJ167 | CPT-07 | 1 | 18.618 | 18.577 | N/A | -41.7 | N/A | 0.2530 | 0.2518 | N/A | -1.2 | N/A | 2.8915 | 2.8919 | N/A | 0.5 | N/A |
| MKJ167 | CPT-08 | 1 | 18.603 | 18.561 | N/A | -41.7 | N/A | 0.2517 | 0.2513 | N/A | -0.4 | N/A | 2.8912 | 2.8916 | N/A | 0.5 | N/A |
| MKJ167 | CPT-09 | 1 | 18.597 | 18.561 | N/A | -36.5 | N/A | 0.2526 | 0.2529 | N/A | 0.2 | N/A | 2.8915 | 2.8916 | N/A | 0.2 | N/A |
| MKJ333 | CPT-10 | 1 | 20.621 | 20.621 | N/A | 0.0 | N/A | 0.3040 | 0.3041 | N/A | 0.1 | N/A | 1.8829 | 1.8838 | N/A | 0.9 | N/A |
| MKJ333 | CPT-11 | 1 | 20.668 | 20.626 | N/A | -41.7 | N/A | 0.3041 | 0.3038 | N/A | -0.2 | N/A | 1.8820 | 1.8840 | N/A | 2.0 | N/A |
| MKJ167 | CPT-12 | 1 | 18.524 | 18.540 | N/A | 15.7 | N/A | 0.2530 | 0.2527 | N/A | -0.2 | N/A | 2.8902 | 2.8902 | N/A | 0.0 | N/A |
| MKJ167 | CPT-13 | 1 | 18.577 | 18.540 | N/A | -36.5 | N/A | 0.2524 | 0.2521 | N/A | -0.3 | N/A | 2.8900 | 2.8903 | N/A | 0.4 | N/A |
| 71136 | CPT-14 | 1 | 0.648 | 0.635 | N/A | -12.2 | N/A | 0.0451 | 0.0445 | N/A | -0.6 | N/A | 0.8401 | 0.8445 | N/A | 4.3 | N/A |

**Client:** Aurecon
**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat
**Engineer:** Suresh Nuthalapati

Note: Zero difference colour-coded based on application classes following ISO 22476-1:2012. Blue indicates Class 1, green Class 2, orange Class 3 and red Class 4. Grey represents if a test is below Class 4.

# CPT ZEROS AND DRIFT

**G.I. Job Ref:** 230270

| Cone Reference | CPT Name | Push | Tip Resistance | | | | | Local Friction | | | | | Pore Pressure | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Initial (MPa) | Final (MPa) | Cleaned (MPa) | I - F Difference (kPa) | I - C Difference (kPa) | Initial (MPa) | Final (MPa) | Cleaned (MPa) | I - F Difference (kPa) | I - C Difference (kPa) | Initial (MPa) | Final (MPa) | Cleaned (MPa) | I - F Difference (kPa) | I - C Difference (kPa) |
| 71137 | CPT-15 | 1 | 0.648 | 0.642 | N/A | -6.0 | N/A | 0.0417 | 0.0413 | N/A | -0.3 | N/A | 0.7645 | 0.7636 | N/A | -0.9 | N/A |

**Client:** Aurecon
**Project:** 1350 Dairy Flat Highway

**Location:** Dairy Flat
**Engineer:** Suresh Nuthalapati

Note: Zero difference colour-coded based on application classes following ISO 22476-1:2012. Blue indicates Class 1, green Class 2, orange Class 3 and red Class 4. Grey represents if a test is below Class 4.

# Appendix D Initia Laboratory Test Results

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wec@babbage.co.nz

Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
Ponsonby,
Auckland 1144

Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: WEC

10th May 2023

# ATTERBERG LIMITS & LINEAR SHRINKAGE TESTING

Dear Sir,

***Re: ASP***
***Your Reference: P-001537***
***Report Number: 63578#L/AL ASP***

The following report presents the results of Atterberg Limits & Linear Shrinkage testing at BGL of soil samples delivered to this laboratory on the 14th of April 2023. Test results are summarised below, with page 3 & 4 showing where the samples plot on the Unified Soil Classification System (Casagrande) Chart.

Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **Liquid Limit:** | NZS4402:1986:Test 2.2 |
| **Plastic Limit:** | NZS4402:1986:Test 2.3 |
| **Plasticity Index:** | NZS4402:1986:Test 2.4 |
| **Linear Shrinkage:** | NZS4402:1986:Test 2.6 |

| Borehole Number | Sample Number | Depth (m) | Water Content (%) | Liquid Limit | Plastic Limit | Plasticity Index | Linear Shrinkage (%)* |
|---|---|---|---|---|---|---|---|
| TP16 | TP16-01 | 1.00 – 1.50 | 78.5 | 123 | 44 | 79 | 22 |
| TP17 | TP17-01 | 1.00 – 1.50 | 55.6 | 106 | 34 | 72 | - |
| TP19 | TP19-01 | 0.50 – 1.00 | 35.2 | 65 | 22 | 43 | 17 |
| TP20 | TP20-01 | 1.50 – 2.00 | 32.3 | 84 | 27 | 57 | - |

***The amount of shrinkage of the sample as a percentage of the original sample length.***

| Borehole Number | Sample Number | Depth (m) | Water Content (%) | Liquid Limit | Plastic Limit | Plasticity Index | Linear Shrinkage (%)* |
|---|---|---|---|---|---|---|---|
| TP21 | TP21-01 | 0.50 – 1.00 | 56.5 | 106 | 32 | 74 | 18 |
| TP22 | TP22-01 | 2.00 – 2.50 | 92.7 | 146 | 42 | 104 | - |
| TP23 | TP23-01 | 1.00 – 1.50 | 45.0 | 63 | 25 | 38 | - |
| TP24 | TP24-01 | 1.00 – 1.50 | 64.1 | 104 | 34 | 70 | 18 |
| TP26 | TP26-01 | 1.00 – 1.50 | 33.4 | 43 | 19 | 24 | 12 |
| TP27 | TP27-01 | 1.00 – 1.50 | 44.9 | 73 | 28 | 45 | 14 |
| TP28 | TP28-01 | 1.50 – 2.00 | 34.0 | 39 ◆ | 18 ◆ | 21 ◆ | - |
| HA03 | HA03-01 | 1.00 – 1.30 | 29.8 | 55 | 22 | 33 | 14 |
| HA04 | HA04-01 | 1.00 – 1.40 | 46.8 | 81 | 36 | 45 | 17 |
| HA09 | HA09-01 | 1.00 – 1.30 | 56.3 | 73 | 29 | 44 | - |
| HA10 | HA10-01 | 1.00 – 1.30 | 36.9 | 54 | 24 | 30 | - |
| HA13 | HA13-01 | 2.00 – 2.20 | 51.2 | 104 | 29 | 75 | - |
| HA14 | HA14-01 | 1.00 – 1.30 | 46.1 | 107 | 30 | 77 | - |
| MBH02 | MBH02-01 | 1.00 – 1.50 | 42.8 | 67 | 22 | 45 | 16 |
| MBH03 | MBH03-01 | 1.30 – 1.50 | 42.7 | 94 | 30 | 64 | - |
| MBH05 | MBH05-01 | 1.30 – 1.50 | 60.1 | 93 | 33 | 60 | 16 |

***The amount of shrinkage of the sample as a percentage of the original sample length.***

◆ = ***The soil fraction passing a 425$\mu$m sieve was used for the liquid limit, plastic limit & linear shrinkage tests.***

Please note that the linear shrinkage test was not carried out for the samples with a dash in the Linear Shrinkage column.

The whole soils were used for the water content tests (the soils were in a natural state), and for the liquid limit, plastic limit & linear shrinkage tests without a diamond beside them. The soil fractions passing a 0.425mm sieve were used for the liquid limit, plastic limit & linear shrinkage tests with a diamond (◆) beside them. The soils were wet up and dried where required for the liquid limit, plastic limit & linear shrinkage tests.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. Test 2.2: liquid limit, test 2.3: plastic limit, and test 2.6: linear shrinkage are reported to the nearest whole number.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

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№ 126

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

Babbage Geotechnical Laboratory

**Project:** ASP

# DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

**Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4**

| | | |
|---|---|---|
| Tested By: | TL / WEC | April / May 2023 |
| Compiled By: | JF | 10/05/2023 |
| Checked By: | JF | 10/05/2023 |

## SUMMARY OF TESTING

| Borehole Number | Sample Number | Depth (m) | Liquid Limit | Plastic Limit | Plasticity Index | Soil Classification Based on USCS Chart Below |
|---|---|---|---|---|---|---|
| TP16 | TP16-01 | 1.00 - 1.50 | 123 | 44 | 79 | CH |
| TP17 | TP17-01 | 1.00 - 1.50 | 106 | 34 | 72 | CH |
| TP19 | TP19-01 | 0.50 - 1.00 | 65 | 22 | 43 | CH |
| TP20 | TP20-01 | 1.50 - 2.00 | 84 | 27 | 57 | CH |
| TP21 | TP21-01 | 0.50 - 1.00 | 106 | 32 | 74 | CH |
| TP22 | TP22-01 | 2.00 - 2.50 | 146 | 42 | 104 | OH - organic clay |
| TP23 | TP23-01 | 1.00 - 1.50 | 63 | 25 | 38 | CH |
| TP24 | TP24-01 | 1.00 - 1.50 | 104 | 34 | 70 | CH |
| TP26 | TP26-01 | 1.00 - 1.50 | 43 | 19 | 24 | CL |
| TP27 | TP27-01 | 1.00 - 1.50 | 73 | 28 | 45 | CH |

*The chart below & soil classification terminology is taken from ASTM D2487-17$^{e1}$ "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", April 2020, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.*

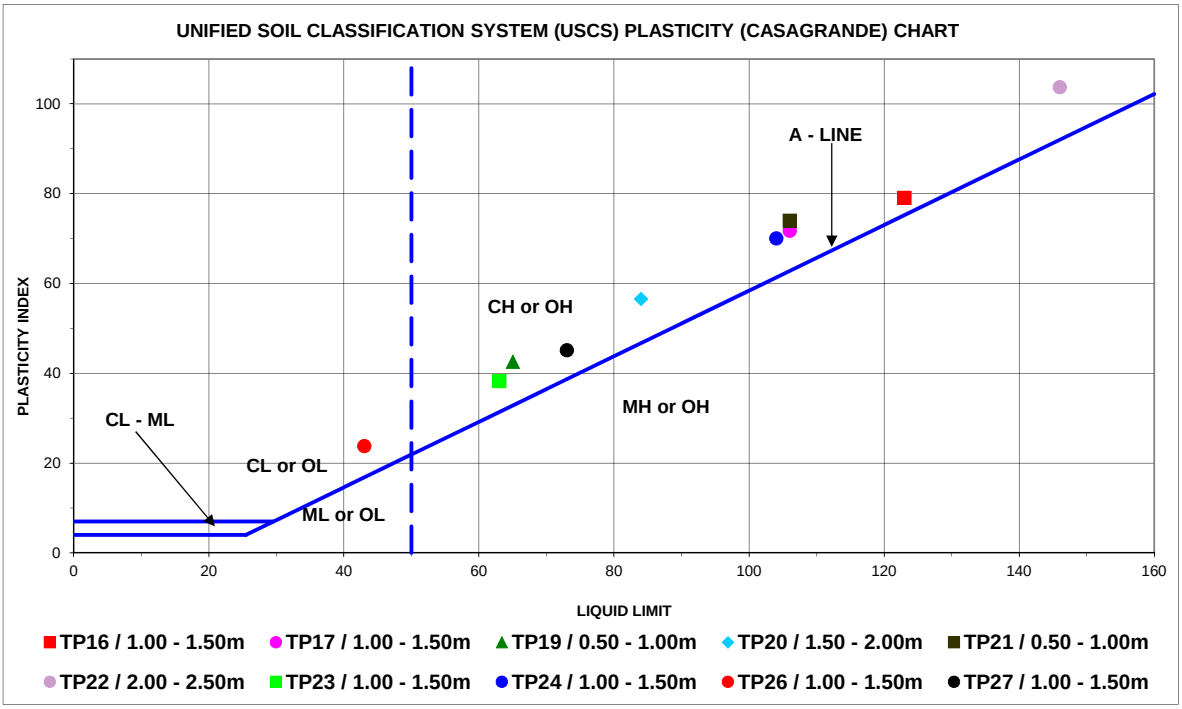



CHART LEGEND

CL = CLAY, low plasticity ('lean' clay)
CH = CLAY, high plasticity ('fat' clay)
OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit
OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit
ML = SILT, low liquid limit
MH = SILT, high liquid limit ('elastic silt')
CL - ML = SILTY CLAY

| | | | |
|---|---|---|---|
| Babbage Geotechnical Laboratory | Job Number: 63578#L | Sheet 1 of 1 | Page 5 of 5 |
| | Reg. Number: 2819 | Version No: | 7 |
| | Report No: 63578#L/AL ASP | Version Date: | July 2022 |
| | Project: ASP | | |

# DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4

| | | |
|---|---|---|
| Tested By: | TL / WEC | April / May 2023 |
| Compiled By: | JF | 10/05/2023 |
| Checked By: | JF | 10/05/2023 |

## SUMMARY OF TESTING

| Borehole Number | Sample Number | Depth (m) | Liquid Limit | Plastic Limit | Plasticity Index | Soil Classification Based on USCS Chart Below |
|---|---|---|---|---|---|---|
| TP28 | TP28-01 | 1.50 - 2.00 | 39 | 18 | 21 | CL |
| HA03 | HA03-01 | 1.00 - 1.30 | 55 | 22 | 33 | CH |
| HA04 | HA04-01 | 1.00 - 1.40 | 81 | 36 | 45 | CH / MH |
| HA09 | HA09-01 | 1.00 - 1.30 | 73 | 29 | 44 | CH |
| HA10 | HA10-01 | 1.00 - 1.30 | 54 | 24 | 30 | CH |
| HA13 | HA13-01 | 2.00 - 2.20 | 104 | 29 | 75 | CH |
| HA14 | HA14-01 | 1.00 - 1.30 | 107 | 30 | 77 | CH |
| MBH02 | MBH02-01 | 1.00 - 1.50 | 67 | 22 | 45 | CH |
| MBH03 | MBH03-01 | 1.30 - 1.50 | 94 | 30 | 64 | CH |
| MBH05 | MBH05-01 | 1.30 - 1.50 | 93 | 33 | 60 | CH |

*The chart below & soil classification terminology is taken from ASTM D2487-17$^{e1}$ "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", April 2020, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.*

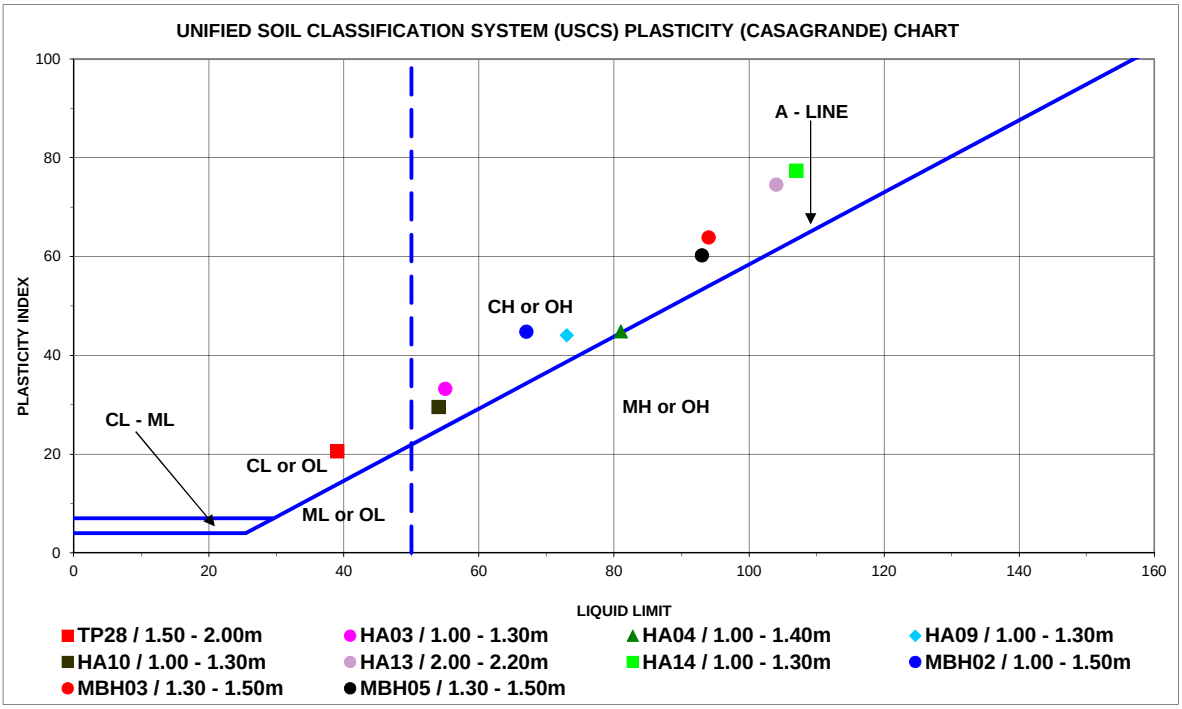



CHART LEGEND

CL = CLAY, low plasticity ('lean' clay)
CH = CLAY, high plasticity ('fat' clay)
OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit
OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit
ML = SILT, low liquid limit
MH = SILT, high liquid limit ('elastic silt')
CL - ML = SILTY CLAY

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Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
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Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: WEC

29th May 2023

# DRY DENSITY / WATER CONTENT RELATIONSHIP (COMPACTION CURVE) TESTING

Dear Sir,

***Re: ASP***

***Your Reference: P-001537***
***Report Number: 63578#L/CC ASP***

The following report presents the results of compaction curve testing at BGL of bulk soil samples delivered to this laboratory on the 14th of April 2023. Test results are summarised below, with the following pages showing graphs and detailed results.

A single shear vane test was carried out on each compacted sample while it was still in the proctor mould, and these results are included on the results tables and water content / density graphs. The shear vane results are included for your information only, and are not included in the IANZ endorsement for this report.

Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **NZ Standard Compaction:** | NZS4402:1986:Test 4.1.1 |
| **Vane Shear Strength:** | NZ Geotechnical Society Guideline 2001 |

| Sample Details | Maximum Dry Density (t/m$^3$) | Optimum Water Content (%) | Natural Water Content (%) |
|---|---|---|---|
| **TP18 / TP18-01 / 1.00 – 1.50m** | **1.30** | **35** | **51.3** |
| | CLAY, highly plastic, grey, very moist. | | |
| **TP19 / TP19-01 / 0.50 – 1.00m** | **1.44** | **27** | **37.1** |
| | CLAY, highly plastic, grey with black organic mottles & orange staining, moist. | | |

*Note that sample descriptions are not part of BGL IANZ Accreditation.*

| Sample Details | Maximum Dry Density (t/m$^3$) | Optimum Water Content (%) | Natural Water Content (%) |
|---|---|---|---|
| **TP20 / TP20-01 / 1.50 – 2.00m** | **1.26** | **36** | **46.9** |
| | CLAY, highly plastic, grey with black organic mottles, very moist, common roots & wood fragments. | | |
| **TP21 / TP21-01 / 0.50 – 1.00m** | **1.30** | **33** | **56.4** |
| | CLAY, highly plastic, light brown & light grey, very moist. | | |
| **TP24 / TP24-01 / 1.00 – 1.50m** | **1.28** | **34** | **60.7** |
| | CLAY, organic stained, highly plastic, dark brown & dark grey, very moist. | | |

*Note that sample descriptions are not part of BGL IANZ Accreditation.*

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 4.1.1: New Zealand Standard Compaction Test, maximum dry density is reported to the nearest 0.01t/m$^3$, optimum water content is reported to the nearest 0.2% for values below 5%, to the nearest 0.5% for values from 5 to 10%, and to the nearest whole number for values greater than 10%.

For calculating the air voids percentages a solid density of 2.59t/m$^3$ was assumed for sample TP18, a solid density of 2.63t/m$^3$ was assumed for sample TP19, a solid density of 2.60t/m$^3$ was assumed for sample TP20, a solid density of 2.55t/m$^3$ was assumed for sample TP21 and a solid density of 2.46t/m$^3$ was assumed for sample TP24. Note that these assumed values are not part of the IANZ endorsement for this report.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test. Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

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| | | | | | |
|---|---|---|---|---|---|
| BGL Babbage Geotechnical Laboratory | Job No: | 63578#L | Reg. No: | 2819 | Version No: 5 |
| | Report No: | 63578#L/CC ASP | | | Issue Date: Feb 2023 |
| | PROJECT: | ASP | | | |

**Determination of the Dry Density / Water Content Relationship by Standard Compaction**

**Test Method: NZS4402: 1986: Test 4.1.1**

| | | |
|---|---|---|
| **Tested By:** | WEC | May 2023 |
| **Compiled By:** | WEC | 24/05/2023 |
| **Checked By:** | JF | 24/05/2023 |

**Sample No:** TP18 / TP18-01 **Sample Depth:** 1.00 - 1.50m

**Sample History:** Air-dried from natural water content

**Compaction Used:** New Zealand Standard Compaction

**Test Performed On:** Whole Soil / ~~Fraction Passing the 19mm Sieve~~

**Solid Density of Soil Particles:** 2.59 $t/m^3$ (~~measured~~ / assumed)

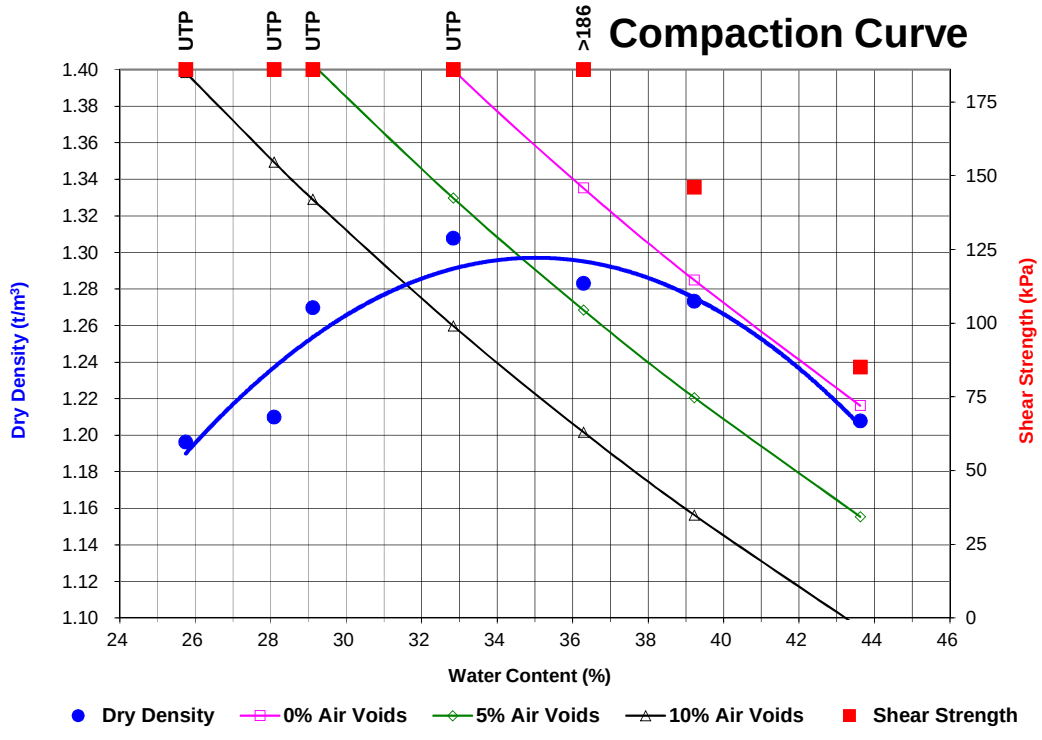
**Natural Water Content (%): 51.3**

## TEST RESULTS

| Water Content (%) | 25.7 | 28.1 | 29.1 | 32.8 | 36.3 | 39.2 | 43.6 |
|---|---|---|---|---|---|---|---|
| Bulk Density ($t/m^3$) | 1.50 | 1.55 | 1.64 | 1.74 | 1.75 | 1.77 | 1.73 |
| Dry Density ($t/m^3$) | 1.20 | 1.21 | 1.27 | 1.31 | 1.28 | 1.27 | 1.21 |
| Air Voids (%) | 23.0 | 19.3 | 14.0 | 6.6 | 3.9 | 0.9 | 0.7 |
| Shear Strength (kPa) | UTP* | UTP* | UTP* | UTP* | >186 | 146 | 85 |

***UTP = unable to penetrate sample with the shear vane.***

| Maximum Dry Density: | 1.30 $t/m^3$ | Optimum Water Content: | 35 % |
|---|---|---|---|



Babbage Geotechnical Laboratory

| | | | | | |
|---|---|---|---|---|---|
| Job No: | 63578#L | Reg. No: | 2819 | Version No: | 5 |
| Report No: | 63578#L/CC ASP | | | Issue Date: | Feb 2023 |
| PROJECT: | ASP | | | | |

**Determination of the Dry Density / Water Content Relationship by Standard Compaction**

Test Method: NZS4402: 1986: Test 4.1.1

| | | |
|---|---|---|
| Tested By: | TL / WC | May 2023 |
| Compiled By: | WEC | 24/05/2023 |
| Checked By: | WEC | 24/05/2023 |

**Sample No:** TP19 / TP19-01 **Sample Depth:** 0.50 - 1.00m

**Sample History:** Air-dried from natural water content

**Compaction Used:** New Zealand Standard Compaction

**Test Performed On:** Whole Soil / ~~Fraction Passing the 19mm Sieve~~

**Solid Density of Soil Particles:** 2.63 $t/m^3$ (~~measured~~ / assumed)

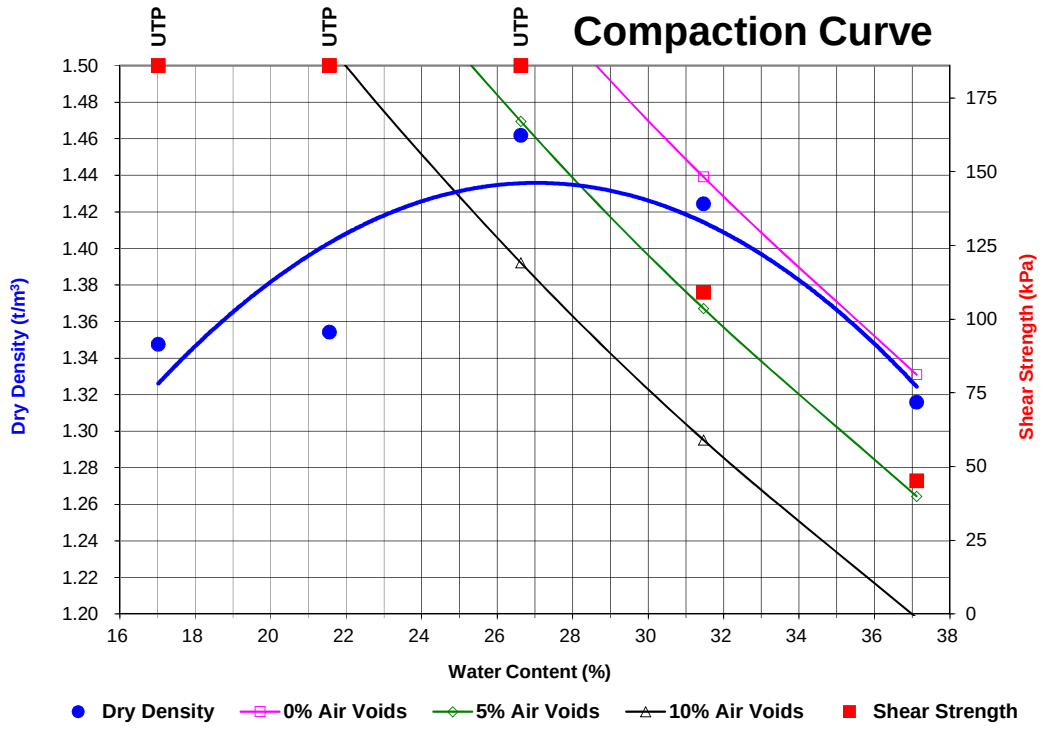
**Natural Water Content (%): 37.1**

## TEST RESULTS

| Water Content (%) | 17.0 | 21.6 | 26.6 | 31.5 | 37.1 |
|---|---|---|---|---|---|
| Bulk Density ($t/m^3$) | 1.58 | 1.65 | 1.85 | 1.87 | 1.80 |
| Dry Density ($t/m^3$) | 1.35 | 1.35 | 1.46 | 1.42 | 1.32 |
| Air Voids (%) | 25.8 | 19.3 | 5.5 | 1.0 | 1.1 |
| Shear Strength (kPa) | UTP* | UTP* | UTP* | 109 | 45 |

***UTP = unable to penetrate sample with the shear vane.***

**Maximum Dry Density:** 1.44 $t/m^3$ **Optimum Water Content:** 27 %



| | | | | | |
|---|---|---|---|---|---|
| BGL Babbage Geotechnical Laboratory | Job No: | 63578#L | Reg. No: | 2819 | Page 5 of 7 |
| | | | | | Version No: 5 |
| | Report No: | 63578#L/CC ASP | | | Issue Date: Feb 2023 |
| | PROJECT: | ASP | | | |

**Determination of the Dry Density / Water Content Relationship by Standard Compaction**

**Test Method: NZS4402: 1986: Test 4.1.1**

| | | |
|---|---|---|
| Tested By: | WEC | May 2023 |
| Compiled By: | WEC | 29/05/2023 |
| Checked By: | JF | 29/05/2023 |

**Sample No: TP20 / TP20-01** **Sample Depth: 1.50 - 2.00m**

**Sample History:** Air-dried from natural water content

**Compaction Used:** New Zealand Standard Compaction

**Test Performed On:** Whole Soil / ~~Fraction Passing the 19mm Sieve~~

**Solid Density of Soil Particles:** 2.60 $t/m^3$ (~~measured~~ / assumed)

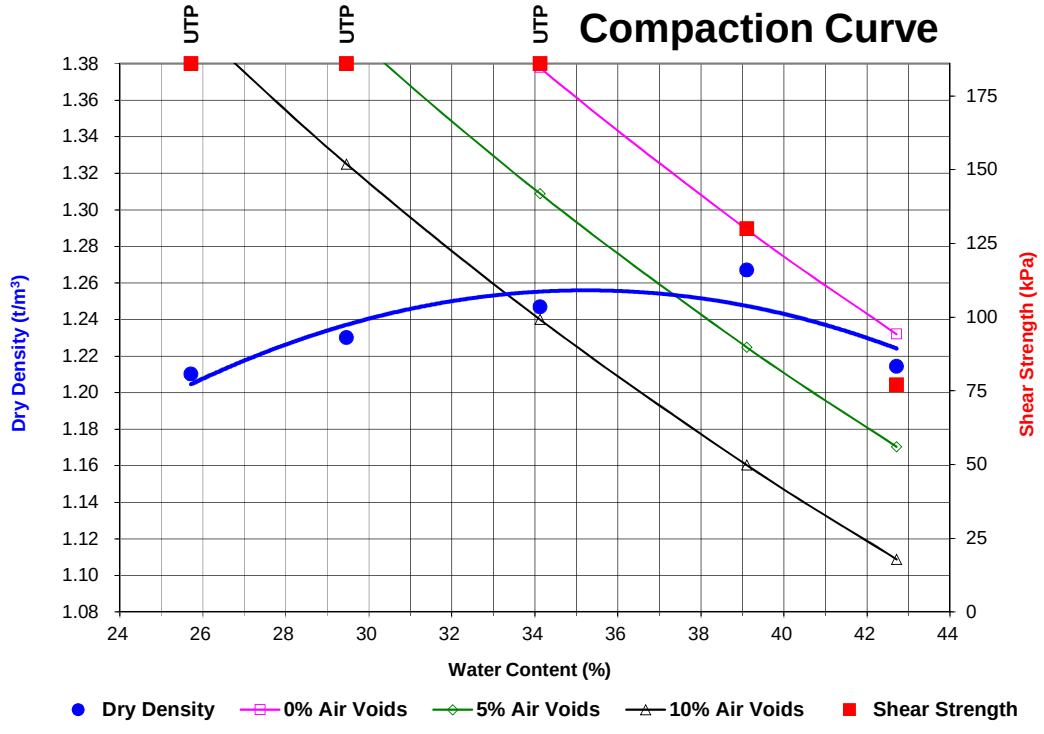
**Natural Water Content (%): 46.9**

## TEST RESULTS

| Water Content (%) | 25.7 | 29.5 | 34.1 | 39.1 | 42.7 |
|---|---|---|---|---|---|
| Bulk Density ($t/m^3$) | 1.52 | 1.59 | 1.67 | 1.76 | 1.73 |
| Dry Density ($t/m^3$) | 1.21 | 1.23 | 1.25 | 1.27 | 1.21 |
| Air Voids (%) | 22.3 | 16.4 | 9.5 | 1.7 | 1.4 |
| Shear Strength (kPa) | UTP* | UTP* | UTP* | 130 | 77 |

***UTP = unable to penetrate sample with the shear vane.***

| Maximum Dry Density: | 1.26 $t/m^3$ | Optimum Water Content: | 36 % |
|---|---|---|---|



| | | | | | |
|---|---|---|---|---|---|
| Babbage Geotechnical Laboratory | Job No: | 63578#L | Reg. No: | 2819 | Version No: 5 |
| | Report No: | 63578#L/CC ASP | | | Issue Date: Feb 2023 |
| | PROJECT: | ASP | | | |

**Determination of the Dry Density / Water Content Relationship by Standard Compaction**

**Test Method: NZS4402: 1986: Test 4.1.1**

| | | |
|---|---|---|
| Tested By: | CB / WEC | May 2023 |
| Compiled By: | WEC | 11-May-23 |
| Checked By: | TL | 11-May-23 |

**Sample No: TP21 / TP21-01** **Sample Depth: 0.50 - 1.00m**

**Sample History:** Air-dried from natural water content

**Compaction Used:** New Zealand Standard Compaction

**Test Performed On:** Whole Soil / ~~Fraction Passing the 19mm Sieve~~

**Solid Density of Soil Particles:** 2.55 $t/m^3$ (~~measured~~ / assumed)

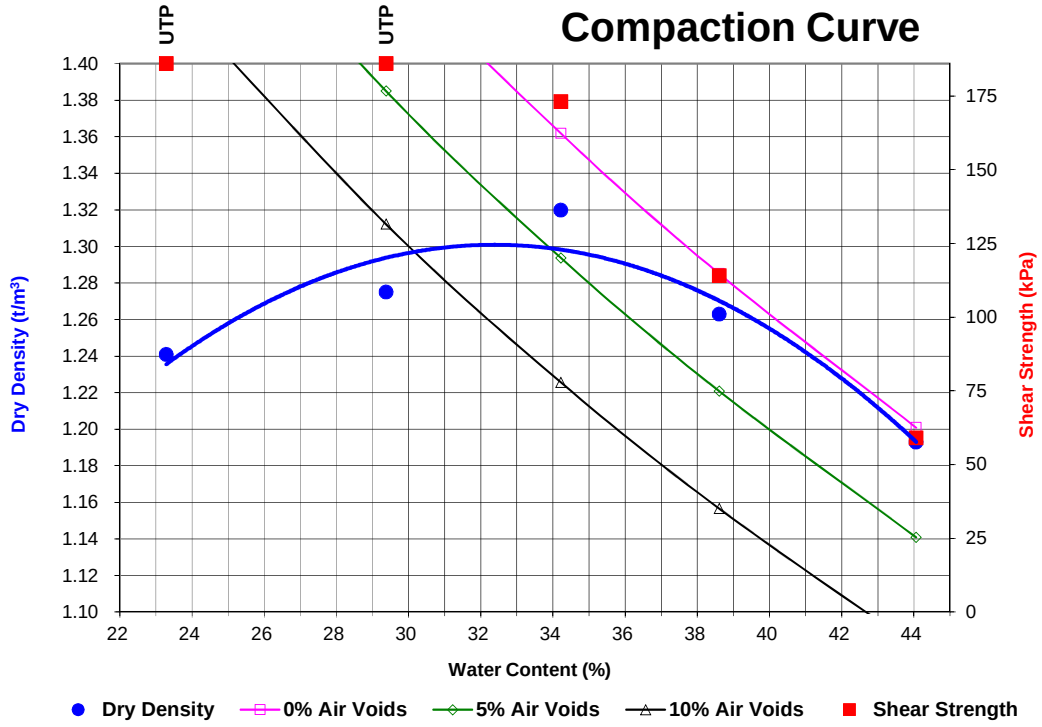
**Natural Water Content (%): 56.4**

## TEST RESULTS

| Water Content (%) | 23.3 | 29.4 | 34.2 | 38.6 | 44.1 |
|---|---|---|---|---|---|
| Bulk Density ($t/m^3$) | 1.53 | 1.65 | 1.77 | 1.75 | 1.72 |
| Dry Density ($t/m^3$) | 1.24 | 1.27 | 1.32 | 1.26 | 1.19 |
| Air Voids (%) | 22.5 | 12.6 | 3.1 | 1.7 | 0.7 |
| Shear Strength (kPa) | UTP* | UTP* | 173 | 114 | 59 |

***UTP = unable to penetrate sample with the shear vane.***

**Maximum Dry Density: 1.30 $t/m^3$** **Optimum Water Content: 33 %**



# Determination of the Dry Density / Water Content Relationship by Standard Compaction

Test Method: NZS4402: 1986: Test 4.1.1

| | | |
|---|---|---|
| Tested By: | CB / WEC | May 2023 |
| Compiled By: | WEC | 11-May-23 |
| Checked By: | TL | 11-May-23 |

**Sample No:** TP24 / TP24-01 **Sample Depth:** 1.00 - 1.50m

**Sample History:** Air-dried from natural water content

**Compaction Used:** New Zealand Standard Compaction

**Test Performed On:** Whole Soil / ~~Fraction Passing the 19mm Sieve~~

**Solid Density of Soil Particles:** 2.46 t/m$^3$ (~~measured~~ / assumed)

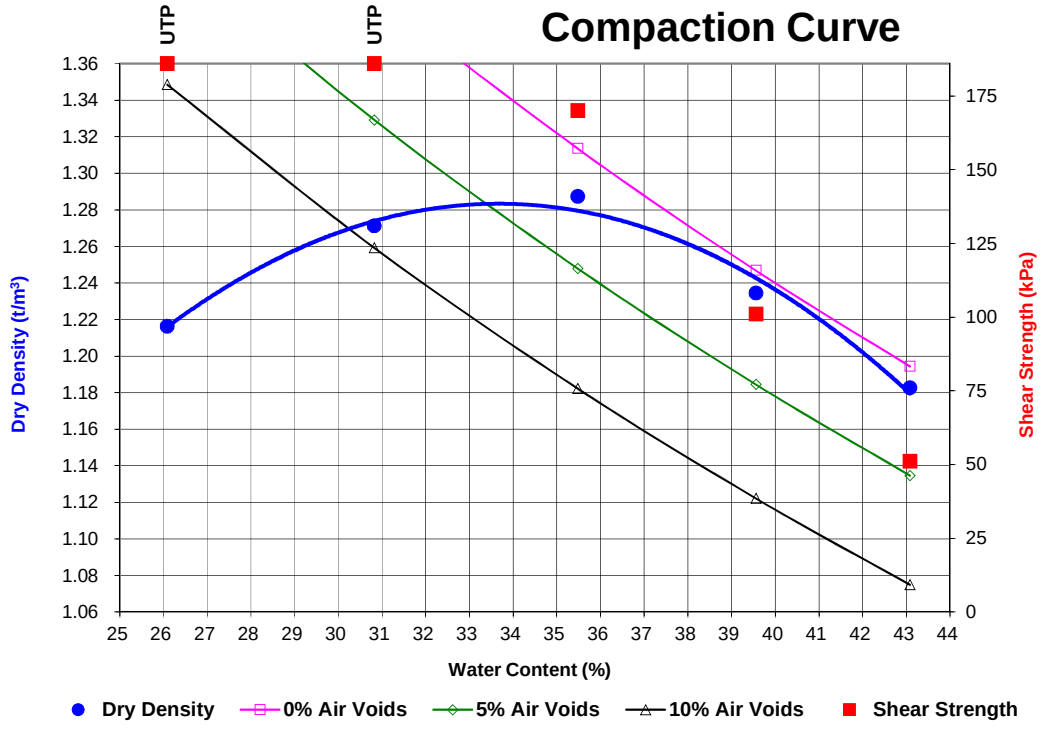
**Natural Water Content (%): 60.7**

## TEST RESULTS

| Water Content (%) | 26.1 | 30.8 | 35.5 | 39.6 | 43.1 |
|---|---|---|---|---|---|
| Bulk Density (t/m$^3$) | 1.53 | 1.66 | 1.74 | 1.72 | 1.69 |
| Dry Density (t/m$^3$) | 1.22 | 1.27 | 1.29 | 1.23 | 1.18 |
| Air Voids (%) | 18.8 | 9.1 | 2.0 | 1.0 | 1.0 |
| Shear Strength (kPa) | UTP* | UTP* | 170 | 101 | 51 |

***UTP = unable to penetrate sample with the shear vane.***

| Maximum Dry Density: | 1.28 t/m$^3$ | Optimum Water Content: | 34 % |
|---|---|---|---|



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Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: WEC

12th June 2023

# LIME & CEMENT REACTIVITY TESTING

Dear Sir,

## *Re: ASP*

***Your Reference: P-001537***
***Report Number: 63578#L/STABILISED CBR ASP***

The following report presents the results of lime & cement reactivity testing at BGL of bulk soil samples delivered to this laboratory on the 14th of April 2023. Test results are summarised below, with the following pages showing graphs and detailed results. Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **NZ Standard Compaction:** | NZS4402:1986:Test 4.1.1 |
| **California Bearing Ratio (CBR) – Remoulded:** | NZS4402:1986:Test 6.1.1 (soaked) |
| **Lime / Cement Stabilisation:** | National Roads Board Road Research Unit: RRU TR7 1985 – Test 8: Determination of the Californian Bearing Ratio (CBR) of Samples of Stabilised Soil in the Laboratory |

Each bulk sample was sieved through a 9.5mm aperture sieve to break up the soil (which is a departure from the NZS4402 Standard which requires a 4.75mm sieve to be used). As the samples were very moist, and were unable to be compacted at the as-received water content, they were dried back to a condition estimated to be near the optimum water content for each sample (as per your instructions).

One of the sieved TP29 1.00 – 1.50m samples was then mixed with 1% lime & 3% cement (*the mass of lime & cement used was a percentage of the dry mass of the sub-sample*). The lime used was CaO, also known as 'quicklime'. A small amount of water was mixed in with the soil and lime & cement to provide water for the hydration reaction of the quicklime (slaking process). The stabilised sample was placed in a large plastic bag and allowed to cure for one hour. The stabilised sample was then compacted into a CBR mould using the NZ Standard Compaction method. The other TP29 1.00 – 1.50m sieved sample (*non-stabilised*) was also compacted into a CBR mould. The compacted stabilised sample was then cured for four days, and soaked for three days before being tested. The compacted non-stabilised sample was soaked for four days before being tested.

TP15 1.50 – 2.00m, TP26 1.00 – 1.50m, TP30/HA08 1.00 – 1.50m and TP31 0.70 – 1.20m were also sieved through a 9.5mm aperture sieve to break up the soil. As with the TP29 samples, the water contents of these bulk samples were dried back to a condition estimated to be near the optimum water content for each sample.

TP15 was mixed with 2% lime & 2% cement before being cured & compacted into a CBR mould. It was then cured for three days & soaked for 4 days before being tested.

TP31 was mixed with 2% lime & 2% cement before being cured & compacted into a CBR mould. It was then cured for four days & soaked for 3 days before being tested.

TP30 was mixed with 3% lime & 1% cement before being cured & compacted into a CBR mould. It was then cured for three days & soaked for 4 days before being tested.

TP26 was not stabilised before being compacted. It was soaked for 4 days before being tested.

The CBR values were measured using a plunger penetration rate of 1mm per minute.

| Sample Identification & % Stabiliser | Water Content (%) | | | | Dry Density (t/m$^3$) | CBR (soaked) | Swell (%) |
|---|---|---|---|---|---|---|---|
| | As-received | After Adjustment to Estimated OWC* | After Mixing in Stabiliser | After Test (under plunger) | | | |
| **TP15 / 1.50 – 2.00m** | **57.5** | **38.6** | **38.5** | **44.7** | **1.20** | **13** | **1.8** |
| **2% Lime & 2% Cement** | CLAY, highly plastic, grey & dark grey with black organic mottles, common wood fragments, very moist. | | | | | | |
| **TP26 / 1.00 – 1.50m** | **35.1** | **24.4** | | **28.1** | **1.50** | **3.0** | **2.2** |
| **No stabiliser** | CLAY, highly plastic, grey & dark grey with black organic mottles, occasional light grey silt laminations, very moist. | | | | | | |
| **TP29 / 1.00 – 1.50m** | **40.5** | **25.4** | | **36.2** | **1.40** | **1.0** | **5.2** |
| **No stabiliser** | CLAY, organic stained, common silt pockets & laminations, highly plastic, brown with black & light grey mottles, very moist, occasional wood fragments. | | | | | | |
| **TP29 / 1.00 – 1.50m** | **39.2** | **26.0** | **27.2** | **29.0** | **1.44** | **30** | **0.0** |
| **1% Lime & 3% Cement** | CLAY, organic stained, common silt pockets & laminations, highly plastic, brown with black & light grey mottles, very moist, occasional wood fragments. | | | | | | |
| **TP30/HA08 / 1.00 – 1.50m** | **50.1** | **30.2** | **28.7** | **35.5** | **1.30** | **20** | **0.8** |
| **3% Lime & 1% Cement** | CLAY, highly plastic, grey with black organic mottles, common wood & roots, very moist. | | | | | | |
| **TP31 / 0.70 – 1.20m** | **54.0** | **33.1** | **35.7** | **36.1** | **1.30** | **30** | **0.0** |
| **2% Lime & 2% Cement** | CLAY, highly plastic, grey & dark grey with common black organic mottles, common wood & roots, very moist. | | | | | | |

**OWC = optimum water content.*

*Note that sample descriptions are not part of BGL IANZ Accreditation.*

Note that a solid density value of 2.65t/m$^3$ was used in the calculation of the air voids for these compacted samples. This value is assumed, and is not part of the IANZ endorsement for this report. As per the reporting requirements of NZS4402: 1986: Test 6.1.1, dry density is reported to the nearest 0.02t/m$^3$, swell to the nearest 0.2%, CBR's > 20 to the nearest 5, CBR's between 5 and 20 to the nearest 1, and for CBR's < 5 to the nearest 0.5. As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

ACCREDITED
IANZ
TESTING LABORATORY
№ 126

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

| Babbage Geotechnical Laboratory | JOB NUMBER: | 63578#L | REPORT NUMBER: | Page 4 of 9 |
|---|---|---|---|---|
| | REG. NUMBER: | 2819 | 63578#L/STABILISED CBR ASP | Version 4, Sept 2022 |
| | PROJECT: | ASP | | |

## CALIFORNIA BEARING RATIO TEST:
## REMOULDED SAMPLE, SOAKED

**Test Method: NZS4402:1986:Test 6.1.1**
**NZS4402:1986:Test 2.1 Moisture Content**

| | Initials | Date |
|---|---|---|
| Tested By: | WEC / TL | 6/06/2023 |
| Compiled By: | TL | 6/06/2023 |
| Checked By: | JF | 7/06/2023 |

**Sample Number:** TP15 / TP15-01
**Sample Depth (m):** 1.50 - 2.00m
**Sample History:** dried / ~~wetted~~ / lime added / cement added / ~~unknown / natural~~
**Compaction Used:** NZ Standard / ~~NZ Heavy~~

| | |
|---|---|
| Proving Ring No: | 122-3-508 |
| Calibration Factor: | 99.59 |

(dial divisions / kN: from calibration worksheet)

## SOAKED CBR: 2% LIME & 2% CEMENT

| | | |
|---|---|---|
| Soil Sieved Through: | 9.50 | mm sieve |
| Surcharge Used: | 4.00 | kg |
| Mould Number: | B4 | |

***BULK DENSITY***

| | | |
|---|---|---|
| Mass Mould + Base + Soil | 10,781.00 | (g) |
| Mass Mould + Base | 6,917.90 | (g) |
| Volume Mould (from calibration) | 2,308.00 | (ml) |
| **Bulk Density** | **1.67** | ($t/m^3$) |

***WATER CONTENT***

| | Before (trimmings) | After (under plunger) |
|---|---|---|
| Mass Wet Soil + Tin (g) | 387.291 | 319.508 |
| Mass Dry Soil + Tin (g) | 309.422 | 253.777 |
| Mass Tin (g) | 107.015 | 106.801 |
| **Water Content (%)** | **38.5** | **44.7** |
| **Dry Density ($t/m^3$)** | **1.20** | |

***DETERMINATION OF SWELL***

| | |
|---|---|
| Initial Reading (mm) | 6.39 |
| Final Reading (mm) | 8.78 |
| Change in Height (mm) | 2.39 |
| Initial Height (mm) | 126.94 |
| **Swell (%)** | **1.8** |

| | | |
|---|---|---|
| Air Voids: | 7.9 | % |
| Time of Soaking: | 4 | days |
| Plunger Penetration Rate: | 1.0 | mm / minute |

***DETERMINATION OF BEARING VALUE***

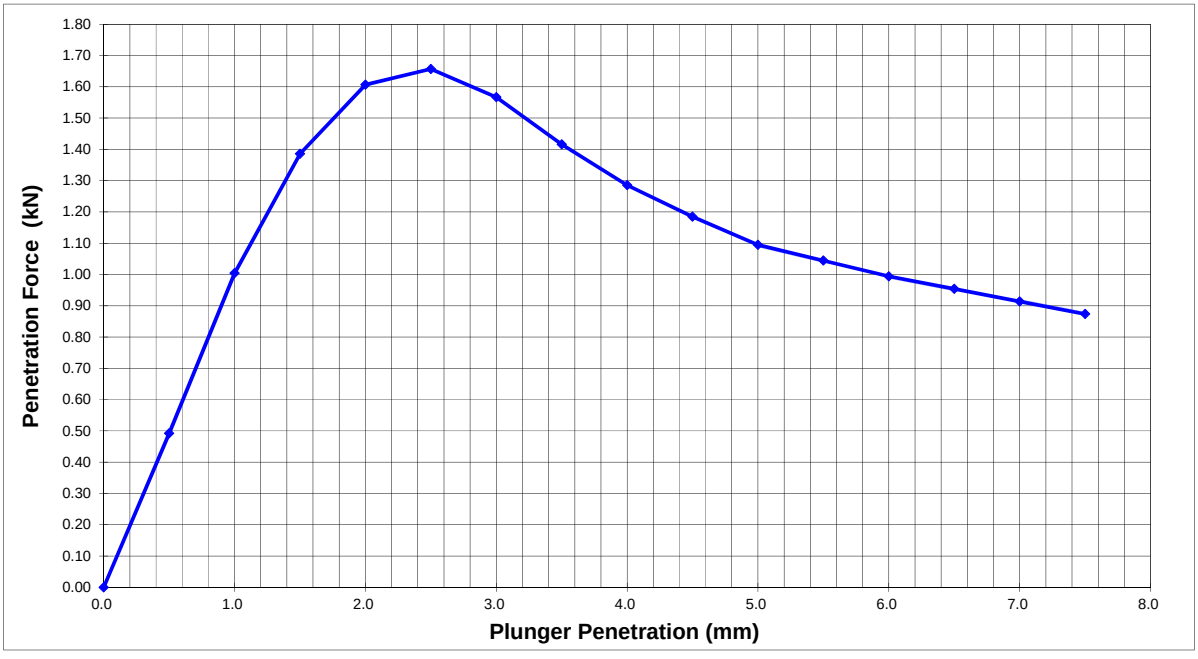
| Plunger Penetration (mm) | Proving Ring Dial (divisions) | Force (kN) |
|---|---|---|
| 0.0 | 0.0 | 0.00 |
| 0.5 | 49.0 | 0.49 |
| 1.0 | 100.0 | 1.00 |
| 1.5 | 138.0 | 1.39 |
| 2.0 | 160.0 | 1.61 |
| **2.5** | **165.0** | **1.66** |
| 3.0 | 156.0 | 1.57 |
| 3.5 | 141.0 | 1.42 |
| 4.0 | 128.0 | 1.29 |
| 4.5 | 118.0 | 1.18 |
| **5.0** | **109.0** | **1.09** |
| 5.5 | 104.0 | 1.04 |
| 6.0 | 99.0 | 0.99 |
| 6.5 | 95.0 | 0.95 |
| 7.0 | 91.0 | 0.91 |
| 7.5 | 87.0 | 0.87 |

| | |
|---|---|
| **2.5mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **12.6** |
| ***with curve shape correction (if needed)*** | **12.6** |
| **5.0mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **5.5** |
| ***with curve shape correction (if needed)*** | **5.5** |

**FINAL CBR VALUE: 13**

| | | |
|---|---|---|
| Lime Added: | 2.0 | % |
| Cement Added: | 2.0 | % |

## CBR FORCE-PENETRATION CURVE



| Babbage Geotechnical Laboratory | JOB NUMBER: | 63578#L | REPORT NUMBER: | Page 5 of 9 |
|---|---|---|---|---|
| | REG. NUMBER: | 2819 | 63578#L/STABILISED CBR ASP | Version 4, Sept 2022 |
| | PROJECT: | ASP | | |

## CALIFORNIA BEARING RATIO TEST:
## REMOULDED SAMPLE, SOAKED

**Test Method: NZS4402:1986:Test 6.1.1**
**NZS4402:1986:Test 2.1 Moisture Content**

| | Initials | Date |
|---|---|---|
| Tested By: | WEC | 6/06/2023 |
| Compiled By: | TL | 6/06/2023 |
| Checked By: | JF | 7/06/2023 |

**Sample Number:** TP26 / TP26-01
**Sample Depth (m):** 1.00 - 1.50m
**Sample History:** dried / ~~wetted / lime added / cement added / unknown / natural~~
**Compaction Used:** NZ Standard / ~~NZ Heavy~~

| | |
|---|---|
| Proving Ring No: | 122-3-508 |
| Calibration Factor: | 99.59 |

(dial divisions / kN: from calibration worksheet)

## SOAKED CBR: NO STABILISER

| | | |
|---|---|---|
| Soil Sieved Through: | 9.50 | mm sieve |
| Surcharge Used: | 4.00 | kg |
| Mould Number: | B1 | |

***BULK DENSITY***

| | | |
|---|---|---|
| Mass Mould + Base + Soil | 10,963.40 | (g) |
| Mass Mould + Base | 6,629.20 | (g) |
| Volume Mould (from calibration) | 2,308.00 | (ml) |
| **Bulk Density** | **1.88** | ($t/m^3$) |

***WATER CONTENT***

| | Before (trimmings) | After (under plunger) |
|---|---|---|
| Mass Wet Soil + Tin (g) | 489.381 | 356.058 |
| Mass Dry Soil + Tin (g) | 414.011 | 300.610 |
| Mass Tin (g) | 105.055 | 103.430 |
| **Water Content (%)** | **24.4** | **28.1** |
| **Dry Density ($t/m^3$)** | **1.50** | |

***DETERMINATION OF SWELL***

| | |
|---|---|
| Initial Reading (mm) | 6.62 |
| Final Reading (mm) | 9.47 |
| Change in Height (mm) | 2.85 |
| Initial Height (mm) | 126.94 |
| **Swell (%)** | **2.2** |

| | | |
|---|---|---|
| Air Voids: | 6.2 | % |
| Time of Soaking: | 4 | days |
| Plunger Penetration Rate: | 1.0 | mm / minute |

***DETERMINATION OF BEARING VALUE***

| Plunger Penetration (mm) | Proving Ring Dial (divisions) | Force (kN) |
|---|---|---|
| 0.0 | 0.0 | 0.00 |
| 0.5 | 12.0 | 0.12 |
| 1.0 | 21.0 | 0.21 |
| 1.5 | 28.0 | 0.28 |
| 2.0 | 35.0 | 0.35 |
| **2.5** | **42.0** | **0.42** |
| 3.0 | 47.0 | 0.47 |
| 3.5 | 49.0 | 0.49 |
| 4.0 | 53.0 | 0.53 |
| 4.5 | 56.0 | 0.56 |
| **5.0** | **60.0** | **0.60** |
| 5.5 | 64.0 | 0.64 |
| 6.0 | 67.0 | 0.67 |
| 6.5 | 70.5 | 0.71 |
| 7.0 | 74.0 | 0.74 |
| 7.5 | 77.0 | 0.77 |

**2.5mm PENETRATION BEARING VALUE**

| | |
|---|---|
| ***uncorrected*** | **3.2** |
| ***with curve shape correction (if needed)*** | **3.2** |

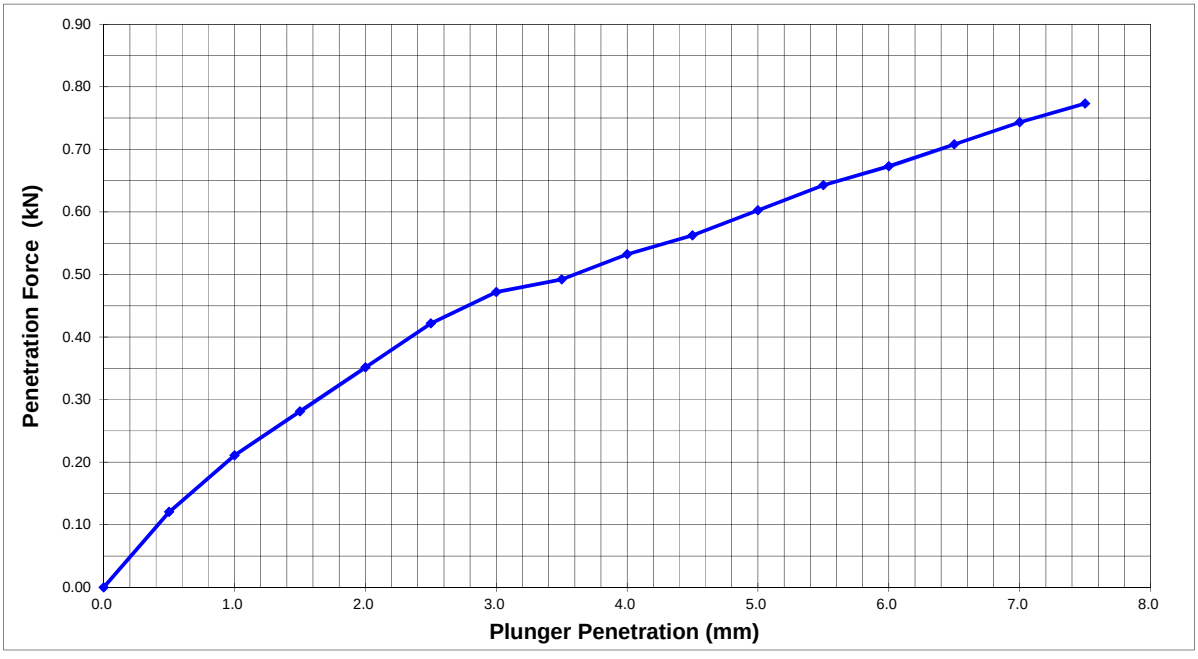
**5.0mm PENETRATION BEARING VALUE**

| | |
|---|---|
| ***uncorrected*** | **3.0** |
| ***with curve shape correction (if needed)*** | **3.0** |

**FINAL CBR VALUE: 3.0**

| | | |
|---|---|---|
| Lime Added: | 0.0 | % |
| Cement Added: | 0.0 | % |

## CBR FORCE-PENETRATION CURVE



| BGL Babbage Geotechnical Laboratory | JOB NUMBER: | 63578#L | REPORT NUMBER: | Page 6 of 9 |
|---|---|---|---|---|
| | REG. NUMBER: | 2819 | 63578#L/STABILISED CBR ASP | Version 4, Sept 2022 |
| | PROJECT: | ASP | | |

# CALIFORNIA BEARING RATIO TEST:
# REMOULDED SAMPLE, SOAKED

**Test Method: NZS4402:1986:Test 6.1.1**
**NZS4402:1986:Test 2.1 Moisture Content**

| | Initials | Date |
|---|---|---|
| Tested By: | WEC | 6/06/2023 |
| Compiled By: | TL | 6/06/2023 |
| Checked By: | JF | 7/06/2023 |

**Sample Number:** TP29 / TP29-01
**Sample Depth (m):** 1.00 - 1.50m
**Sample History:** dried / ~~wetted / lime added / cement added / unknown / natural~~
**Compaction Used:** NZ Standard / ~~NZ Heavy~~

| | |
|---|---|
| Proving Ring No: | 122-3-508 |
| Calibration Factor: | 99.59 |

(dial divisions / kN: from calibration worksheet)

## SOAKED CBR: NO STABILISER

| | | |
|---|---|---|
| Soil Sieved Through: | 9.50 | mm sieve |
| Surcharge Used: | 4.00 | kg |
| Mould Number: | B5 | |

***BULK DENSITY***

| | | |
|---|---|---|
| Mass Mould + Base + Soil | 10,812.40 | (g) |
| Mass Mould + Base | 6,758.20 | (g) |
| Volume Mould (from calibration) | 2,309.00 | (ml) |
| **Bulk Density** | **1.76** | ($t/m^3$) |

***WATER CONTENT***

| | Before (trimmings) | After (under plunger) |
|---|---|---|
| Mass Wet Soil + Tin (g) | 470.624 | 361.862 |
| Mass Dry Soil + Tin (g) | 396.588 | 292.985 |
| Mass Tin (g) | 104.910 | 102.794 |
| **Water Content (%)** | **25.4** | **36.2** |
| **Dry Density ($t/m^3$)** | **1.40** | |

***DETERMINATION OF SWELL***

| | |
|---|---|
| Initial Reading (mm) | 10.98 |
| Final Reading (mm) | 17.71 |
| Change in Height (mm) | 6.73 |
| Initial Height (mm) | 127.17 |
| **Swell (%)** | **5.2** |

| | | |
|---|---|---|
| Air Voids: | 11.6 | % |
| Time of Soaking: | 4 | days |
| Plunger Penetration Rate: | 1.0 | mm / minute |

## *DETERMINATION OF BEARING VALUE*

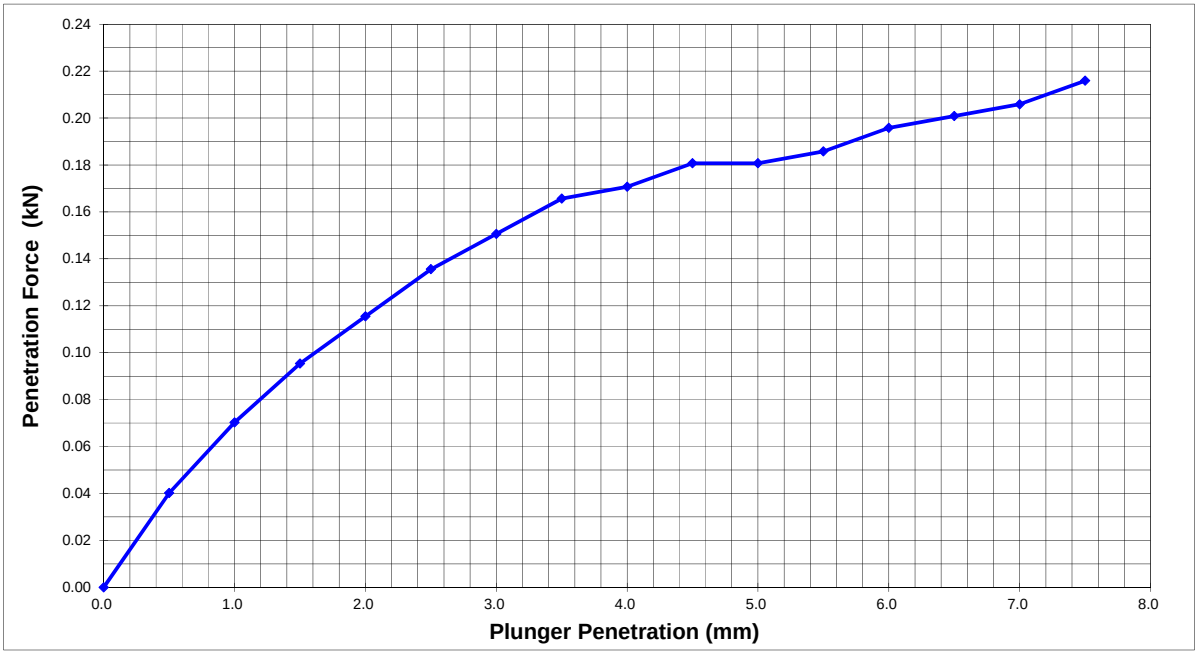
| Plunger Penetration (mm) | Proving Ring Dial (divisions) | Force (kN) |
|---|---|---|
| 0.0 | 0.0 | 0.00 |
| 0.5 | 4.0 | 0.04 |
| 1.0 | 7.0 | 0.07 |
| 1.5 | 9.5 | 0.10 |
| 2.0 | 11.5 | 0.12 |
| **2.5** | **13.5** | **0.14** |
| 3.0 | 15.0 | 0.15 |
| 3.5 | 16.5 | 0.17 |
| 4.0 | 17.0 | 0.17 |
| 4.5 | 18.0 | 0.18 |
| **5.0** | **18.0** | **0.18** |
| 5.5 | 18.5 | 0.19 |
| 6.0 | 19.5 | 0.20 |
| 6.5 | 20.0 | 0.20 |
| 7.0 | 20.5 | 0.21 |
| 7.5 | 21.5 | 0.22 |

| | |
|---|---|
| **2.5mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **1.0** |
| ***with curve shape correction (if needed)*** | **1.0** |
| **5.0mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **0.9** |
| ***with curve shape correction (if needed)*** | **0.9** |

**FINAL CBR VALUE: 1.0**

| | | |
|---|---|---|
| Lime Added: | 0.0 | % |
| Cement Added: | 0.0 | % |

## CBR FORCE-PENETRATION CURVE



| BGL Babbage Geotechnical Laboratory | JOB NUMBER: | 63578#L | REPORT NUMBER: | Page 7 of 9 |
|---|---|---|---|---|
| | REG. NUMBER: | 2819 | 63578#L/STABILISED CBR ASP | Version 4, Sept 2022 |
| | PROJECT: | ASP | | |

## CALIFORNIA BEARING RATIO TEST:
## REMOULDED SAMPLE, SOAKED

**Test Method: NZS4402:1986:Test 6.1.1**
**NZS4402:1986:Test 2.1 Moisture Content**

| | Initials | Date |
|---|---|---|
| Tested By: | WEC | 9/06/2023 |
| Compiled By: | WEC | 9/06/2023 |
| Checked By: | JF | 12/06/2023 |

**Sample Number:** TP29 / TP29-01
**Sample Depth (m):** 1.00 - 1.50m
**Sample History:** dried / ~~wetted~~ / lime added / cement added / ~~unknown / natural~~
**Compaction Used:** NZ Standard / ~~NZ Heavy~~

| | |
|---|---|
| Proving Ring No: | 122-3-508 |
| Calibration Factor: | 99.59 |
| (dial divisions / kN: from calibration worksheet) | |

## SOAKED CBR: 1% LIME & 3% CEMENT

| | | |
|---|---|---|
| Soil Sieved Through: | 9.50 | mm sieve |
| Surcharge Used: | 4.00 | kg |
| Mould Number: | B7 | |

***BULK DENSITY***

| | | |
|---|---|---|
| Mass Mould + Base + Soil | 10,945.00 | (g) |
| Mass Mould + Base | 6,698.70 | (g) |
| Volume Mould (from calibration) | 2,305.00 | (ml) |
| **Bulk Density** | **1.84** | ($t/m^3$) |

***WATER CONTENT***

| | Before (trimmings) | After (under plunger) |
|---|---|---|
| Mass Wet Soil + Tin (g) | 354.618 | 297.406 |
| Mass Dry Soil + Tin (g) | 300.034 | 247.647 |
| Mass Tin (g) | 99.708 | 76.009 |
| **Water Content (%)** | **27.2** | **29.0** |
| **Dry Density ($t/m^3$)** | **1.44** | |

***DETERMINATION OF SWELL***

| | |
|---|---|
| Initial Reading (mm) | 1.32 |
| Final Reading (mm) | 1.27 |
| Change in Height (mm) | -0.05 |
| Initial Height (mm) | 127.03 |
| **Swell (%)** | **0.0** |

| | | |
|---|---|---|
| Air Voids: | 5.9 | % |
| Time of Soaking: | 3 | days |
| Plunger Penetration Rate: | 1.0 | mm / minute |

## *DETERMINATION OF BEARING VALUE*

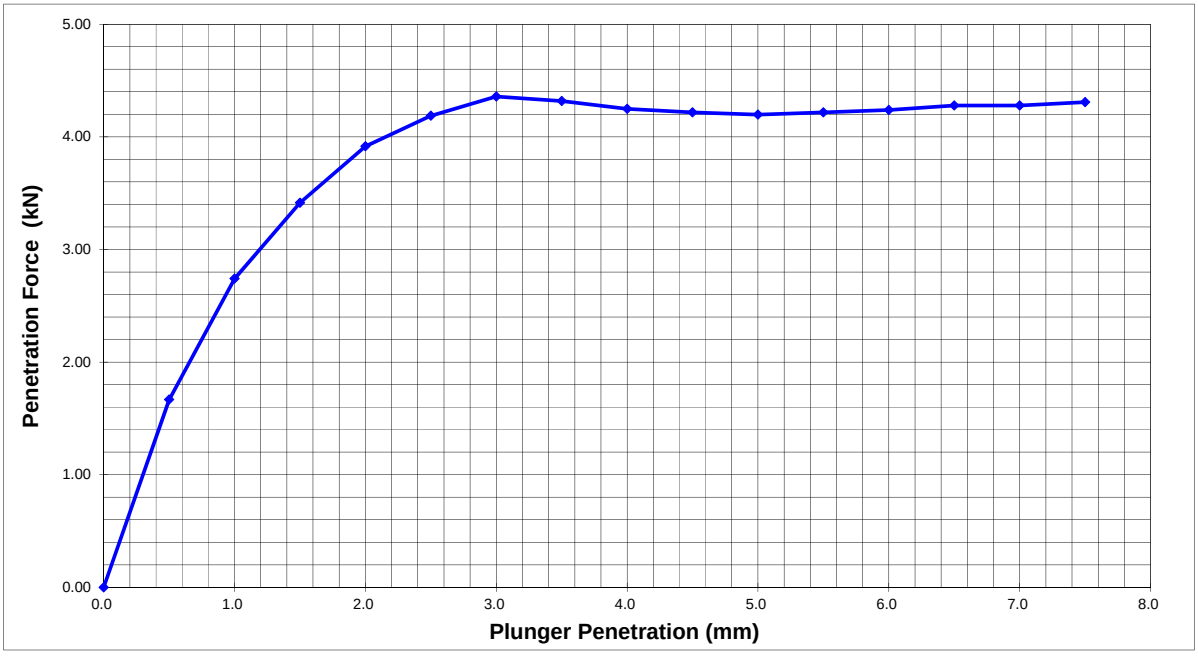
| Plunger Penetration (mm) | Proving Ring Dial (divisions) | Force (kN) |
|---|---|---|
| 0.0 | 0.0 | 0.00 |
| 0.5 | 166.0 | 1.67 |
| 1.0 | 273.0 | 2.74 |
| 1.5 | 340.0 | 3.41 |
| 2.0 | 390.0 | 3.92 |
| **2.5** | **417.0** | **4.19** |
| 3.0 | 434.0 | 4.36 |
| 3.5 | 430.0 | 4.32 |
| 4.0 | 423.0 | 4.25 |
| 4.5 | 420.0 | 4.22 |
| **5.0** | **418.0** | **4.20** |
| 5.5 | 420.0 | 4.22 |
| 6.0 | 422.0 | 4.24 |
| 6.5 | 426.0 | 4.28 |
| 7.0 | 426.0 | 4.28 |
| 7.5 | 429.0 | 4.31 |

| | |
|---|---|
| **2.5mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **31.7** |
| ***with curve shape correction (if needed)*** | **31.7** |
| **5.0mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **21.0** |
| ***with curve shape correction (if needed)*** | **21.0** |

**FINAL CBR VALUE: 30**

| | | |
|---|---|---|
| Lime Added: | 1.0 | % |
| Cement Added: | 3.0 | % |

## CBR FORCE-PENETRATION CURVE



| Babbage Geotechnical Laboratory | JOB NUMBER: | 63578#L | REPORT NUMBER: | Page 8 of 9 |
|---|---|---|---|---|
| | REG. NUMBER: | 2819 | 63578#L/STABILISED CBR ASP | Version 4, Sept 2022 |
| | PROJECT: | ASP | | |

## CALIFORNIA BEARING RATIO TEST:
## REMOULDED SAMPLE, SOAKED

**Test Method: NZS4402:1986:Test 6.1.1**
**NZS4402:1986:Test 2.1 Moisture Content**

| | Initials | Date |
|---|---|---|
| Tested By: | WEC / TL | 6/06/2023 |
| Compiled By: | TL | 6/06/2023 |
| Checked By: | JF | 7/06/2023 |

**Sample Number:** TP30/HA08 / TP30-01

**Sample Depth (m):** 1.00 - 1.50m

**Sample History:** dried / ~~wetted~~ / lime added / cement added / ~~unknown / natural~~

**Compaction Used:** NZ Standard / ~~NZ Heavy~~

| | |
|---|---|
| Proving Ring No: | 122-3-508 |
| Calibration Factor: | 99.59 |

(dial divisions / kN: from calibration worksheet)

## SOAKED CBR: 3% LIME & 1% CEMENT

| | | |
|---|---|---|
| Soil Sieved Through: | 9.50 | mm sieve |
| Surcharge Used: | 4.00 | kg |
| Mould Number: | B9 | |

***BULK DENSITY***

| | | |
|---|---|---|
| Mass Mould + Base + Soil | 10,587.80 | (g) |
| Mass Mould + Base | 6,721.90 | (g) |
| Volume Mould (from calibration) | 2,309.00 | (ml) |
| **Bulk Density** | **1.67** | ($t/m^3$) |

***WATER CONTENT***

| | Before (trimmings) | After (under plunger) |
|---|---|---|
| Mass Wet Soil + Tin (g) | 398.096 | 299.128 |
| Mass Dry Soil + Tin (g) | 331.490 | 248.326 |
| Mass Tin (g) | 99.705 | 105.049 |
| **Water Content (%)** | **28.7** | **35.5** |
| **Dry Density ($t/m^3$)** | **1.30** | |

***DETERMINATION OF SWELL***

| | |
|---|---|
| Initial Reading (mm) | 12.00 |
| Final Reading (mm) | 12.90 |
| Change in Height (mm) | 0.90 |
| Initial Height (mm) | 127.19 |
| **Swell (%)** | **0.8** |

| | | |
|---|---|---|
| Air Voids: | 13.6 | % |
| Time of Soaking: | 4 | days |
| Plunger Penetration Rate: | 1.0 | mm / minute |

## *DETERMINATION OF BEARING VALUE*

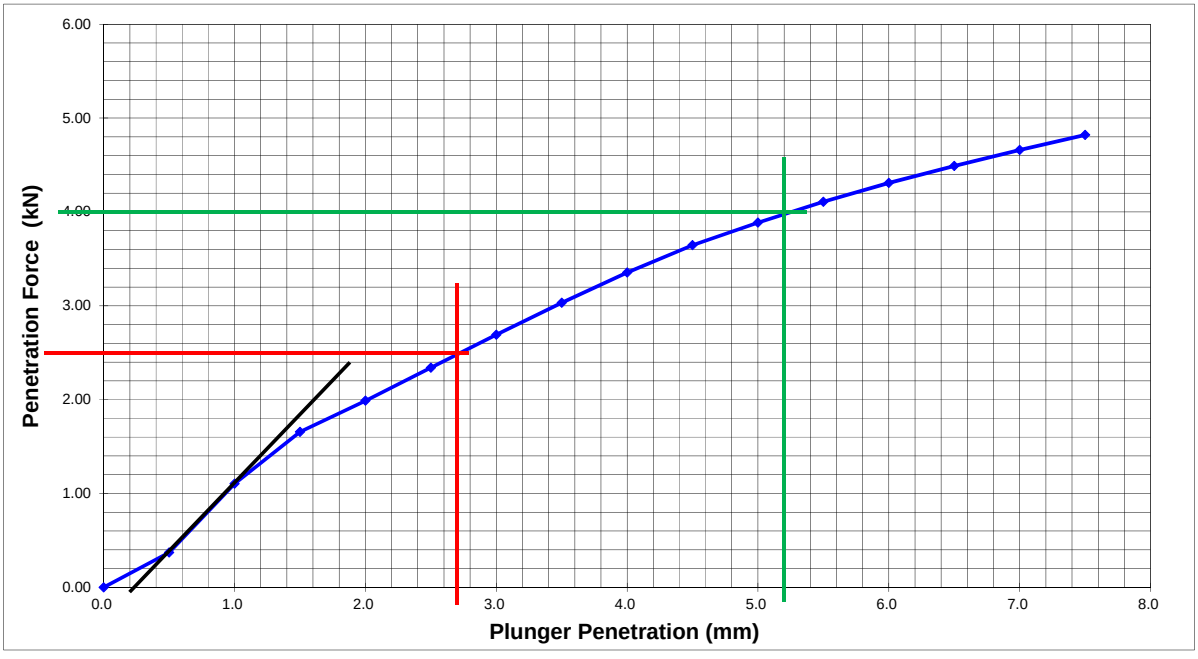
| Plunger Penetration (mm) | Proving Ring Dial (divisions) | Force (kN) |
|---|---|---|
| 0.0 | 0.0 | 0.00 |
| 0.5 | 37.0 | 0.37 |
| 1.0 | 110.0 | 1.10 |
| 1.5 | 165.0 | 1.66 |
| 2.0 | 198.0 | 1.99 |
| **2.5** | **233.0** | **2.34** |
| 3.0 | 268.0 | 2.69 |
| 3.5 | 302.0 | 3.03 |
| 4.0 | 334.0 | 3.35 |
| 4.5 | 363.0 | 3.65 |
| **5.0** | **387.0** | **3.89** |
| 5.5 | 409.0 | 4.11 |
| 6.0 | 429.0 | 4.31 |
| 6.5 | 447.0 | 4.49 |
| 7.0 | 464.0 | 4.66 |
| 7.5 | 480.0 | 4.82 |

| | |
|---|---|
| **2.5mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **17.7** |
| ***with curve shape correction (if needed)*** | **18.9** |
| **5.0mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **19.4** |
| ***with curve shape correction (if needed)*** | **20.0** |

## FINAL CBR VALUE: 20

| | | |
|---|---|---|
| Lime Added: | 3.0 | % |
| Cement Added: | 1.0 | % |

## CBR FORCE-PENETRATION CURVE



| BGL Babbage Geotechnical Laboratory | JOB NUMBER: | 63578#L | REPORT NUMBER: | Page 9 of 9 |
|---|---|---|---|---|
| | REG. NUMBER: | 2819 | 63578#L/STABILISED CBR ASP | Version 4, Sept 2022 |
| | PROJECT: | ASP | | |

# CALIFORNIA BEARING RATIO TEST:
# REMOULDED SAMPLE, SOAKED

**Test Method: NZS4402:1986:Test 6.1.1**
**NZS4402:1986:Test 2.1 Moisture Content**

| | Initials | Date |
|---|---|---|
| Tested By: | WEC | 9/06/2023 |
| Compiled By: | WEC | 9/06/2023 |
| Checked By: | JF | 12/06/2023 |

**Sample Number:** TP31 / TP31-01
**Sample Depth (m):** 0.70 - 1.20m
**Sample History:** dried / ~~wetted~~ / lime added / cement added / ~~unknown / natural~~
**Compaction Used:** NZ Standard / ~~NZ Heavy~~

| | |
|---|---|
| Proving Ring No: | 122-3-508 |
| Calibration Factor: | 99.59 |

(dial divisions / kN: from calibration worksheet)

## SOAKED CBR: 2% LIME & 2% CEMENT

| | | |
|---|---|---|
| Soil Sieved Through: | 9.50 | mm sieve |
| Surcharge Used: | 4.00 | kg |
| Mould Number: | B2 | |

***BULK DENSITY***

| | | |
|---|---|---|
| Mass Mould + Base + Soil | 10,799.00 | (g) |
| Mass Mould + Base | 6,760.50 | (g) |
| Volume Mould (from calibration) | 2,303.00 | (ml) |
| **Bulk Density** | **1.75** | ($t/m^3$) |

***WATER CONTENT***

| | Before (trimmings) | After (under plunger) |
|---|---|---|
| Mass Wet Soil + Tin (g) | 388.996 | 286.002 |
| Mass Dry Soil + Tin (g) | 314.878 | 229.624 |
| Mass Tin (g) | 107.018 | 73.436 |
| **Water Content (%)** | **35.7** | **36.1** |
| **Dry Density ($t/m^3$)** | **1.30** | |

***DETERMINATION OF SWELL***

| | |
|---|---|
| Initial Reading (mm) | 8.52 |
| Final Reading (mm) | 8.62 |
| Change in Height (mm) | 0.10 |
| Initial Height (mm) | 127.02 |
| **Swell (%)** | **0.0** |

| | | |
|---|---|---|
| Air Voids: | 5.1 | % |
| Time of Soaking: | 3 | days |
| Plunger Penetration Rate: | 1.0 | mm / minute |

## *DETERMINATION OF BEARING VALUE*

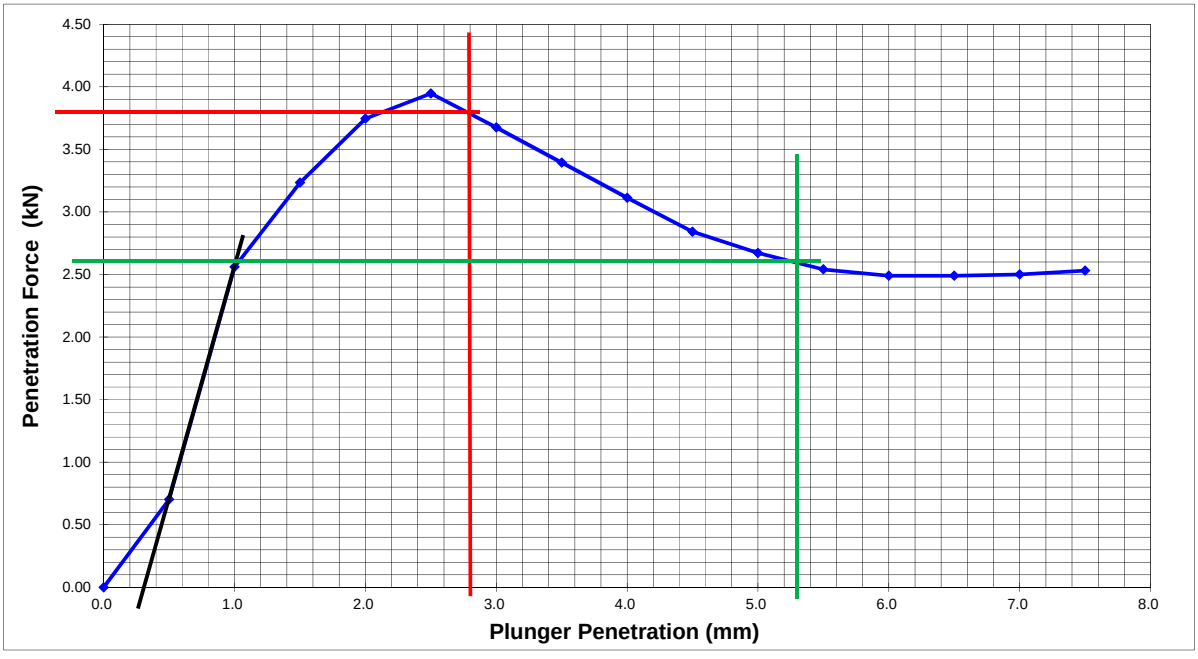
| Plunger Penetration (mm) | Proving Ring Dial (divisions) | Force (kN) |
|---|---|---|
| 0.0 | 0.0 | 0.00 |
| 0.5 | 70.0 | 0.70 |
| 1.0 | 255.0 | 2.56 |
| 1.5 | 322.0 | 3.23 |
| 2.0 | 373.0 | 3.75 |
| **2.5** | **393.0** | **3.95** |
| 3.0 | 366.0 | 3.68 |
| 3.5 | 338.0 | 3.39 |
| 4.0 | 310.0 | 3.11 |
| 4.5 | 283.0 | 2.84 |
| **5.0** | **266.0** | **2.67** |
| 5.5 | 253.0 | 2.54 |
| 6.0 | 248.0 | 2.49 |
| 6.5 | 248.0 | 2.49 |
| 7.0 | 249.0 | 2.50 |
| 7.5 | 252.0 | 2.53 |

| | |
|---|---|
| **2.5mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **29.9** |
| ***with curve shape correction (if needed)*** | **28.8** |
| **5.0mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **13.4** |
| ***with curve shape correction (if needed)*** | **13.0** |

**FINAL CBR VALUE: 30**

| | | |
|---|---|---|
| Lime Added: | 2.0 | % |
| Cement Added: | 2.0 | % |

## CBR FORCE-PENETRATION CURVE



Babbage Geotechnical Laboratory
Level 4
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E-mail

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New Zealand
64-9-367 4954
wec@babbage.co.nz

Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
Ponsonby,
Auckland 1144

Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: JF

1st May 2023

# ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

***Re: ASP***
***Your Reference: P-001537***
***Report Number: 63578#L/Consol ASP MBH01 4.50 – 5.00m***

## Borehole No: MBH01 Sample No: MBH01-02 Depth: 4.50 – 5.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 14th of April 2023. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give just the $\sqrt{T_{90}}$ values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **One Dimensional Consolidation:** | NZS4402:1986:Test 7.1 |

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of $m_v$ shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m$^3$ was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation ($c_v$'s), and coefficients of volume compressibility ($m_v$'s) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

**Sample Description** (***not part of BGL IANZ Accreditation***)

**MBH01 / MBH01-02 / 4.50 – 5.00m:**

CLAY, stiff, highly plastic, greenish light grey with black rootlets, moist.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
**Key Technical Person**
**Laboratory Manager**
**Babbage Geotechnical Laboratory**

ACCREDITED
IANZ
TESTING LABORATORY
№ 126

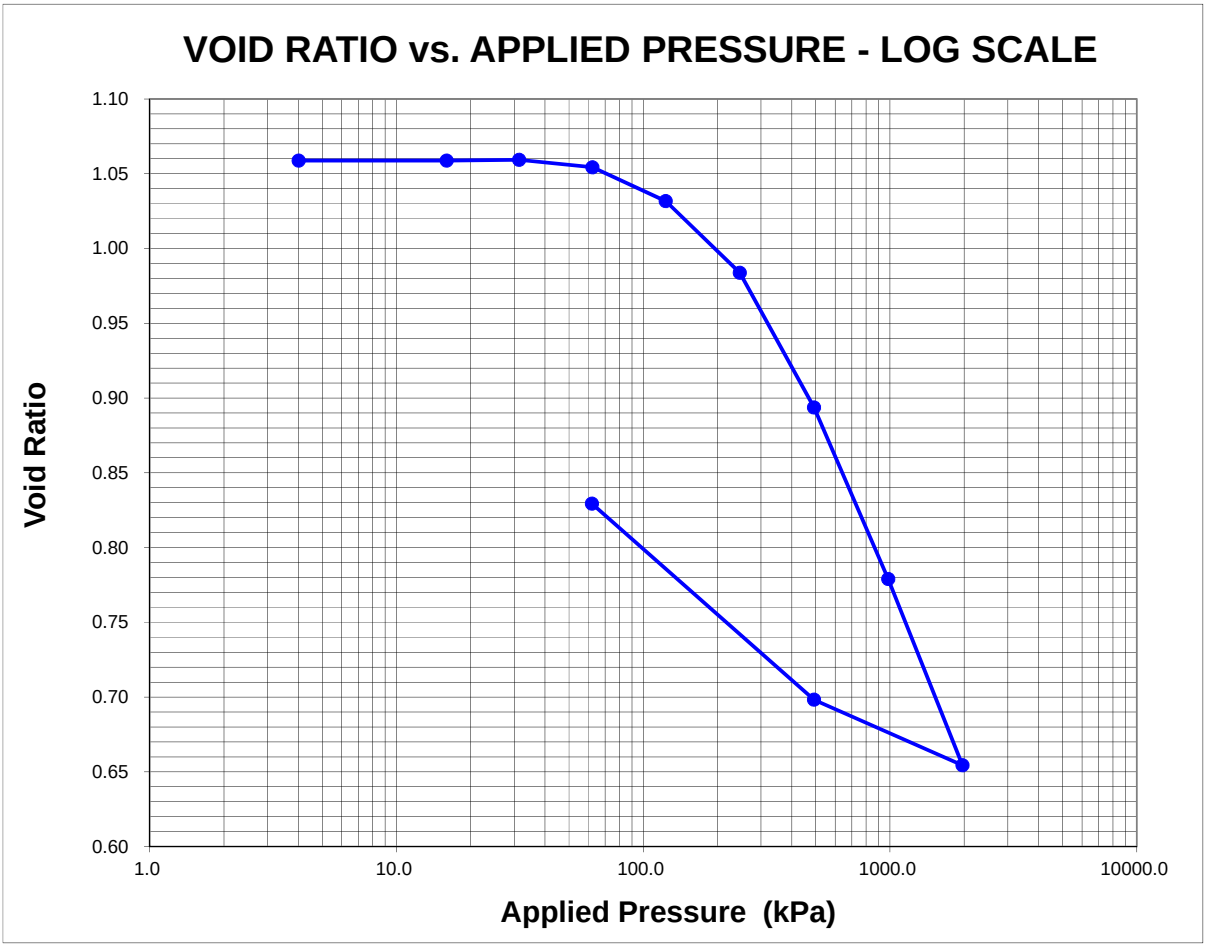
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

| Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 3 |
|---|---|---|---|---|---|---|
| | 63578#L | 2819 | 3 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | April 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 1-May-23 |
| | Checked By: | JF | 1-May-23 |

**Borehole No:** MBH01 **Sample No:** MBH01-02 **Depth:** 4.50 - 5.00m




### *SAMPLE HISTORY & PREPARATION*

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

### *TEST DETAILS*

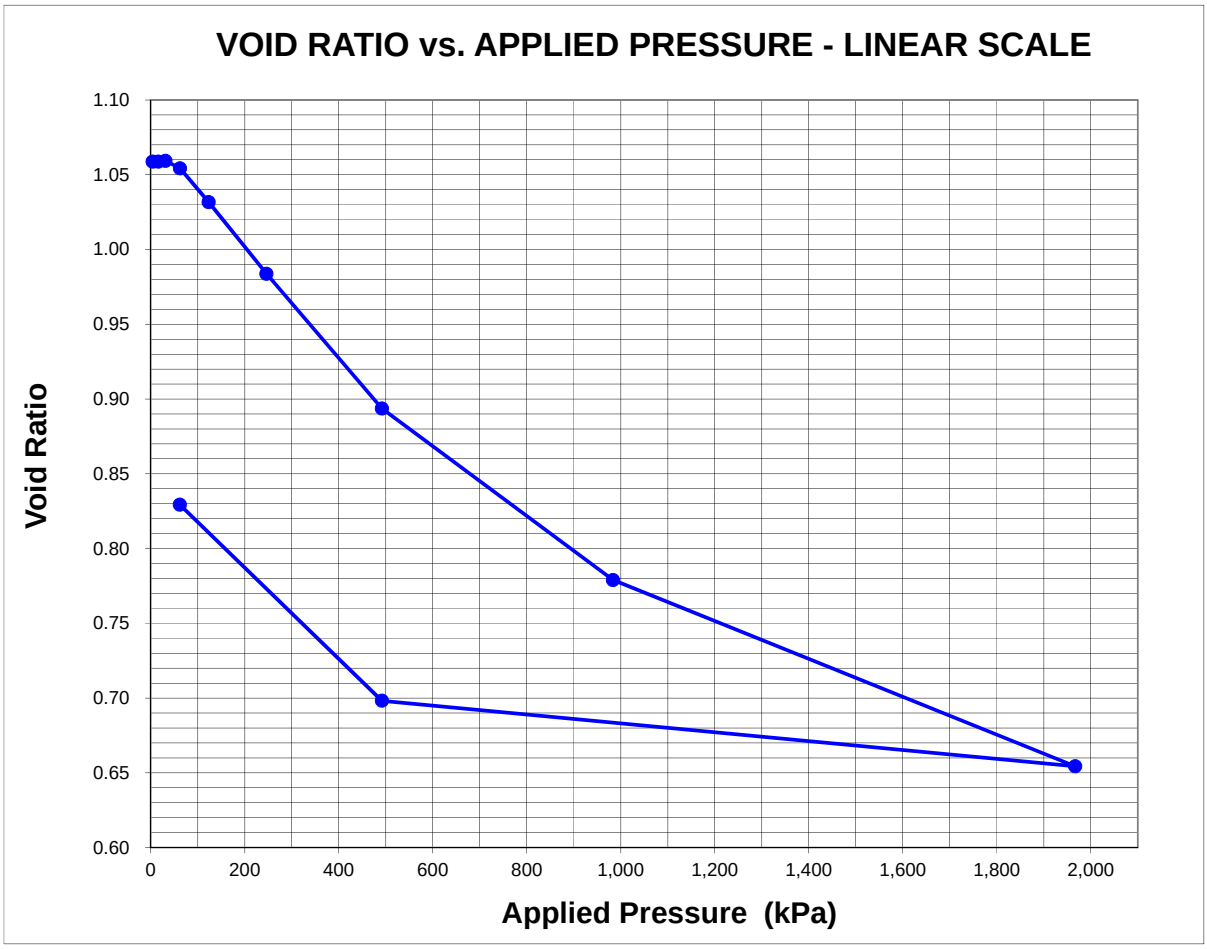
| | | | | | |
|---|---|---|---|---|---|
| Consol machine number: | 3 | | Surface area of sample top: | 1995 | $mm^2$ |
| Consol ring number: | 3b | | Sample mass: | 72.155 | g |
| Sample diameter: | 50.40 | mm | Initial bulk density: | 1.81 | $t/m^3$ |
| Sample height: | 20.01 | mm | Assumed solid density of soil particles: | 2.65 | $t/m^3$ |

| BGL Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 3 |
|---|---|---|---|---|---|---|
| | 63578#L | 2819 | 4 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | April 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 1-May-23 |
| | Checked By: | JF | 1-May-23 |

**Borehole No:** MBH01 **Sample No:** MBH01-02 **Depth:** 4.50 - 5.00m




***PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING***



| Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 3 |
|---|---|---|---|---|---|---|
| | 63578#L | 2819 | 5 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

# ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | April 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 1-May-23 |
| | Checked By: | JF | 1-May-23 |

Borehole No: **MBH01** Sample No: **MBH01-02** Depth: **4.50 - 5.00m**

| Applied Pressure | Incremental Deflection | Sample Height | Compression Ratio | Height of Voids | Void Ratio | Coefficient of Volume Compressibility $m_v$ | Coefficient of Consolidation - $c_v$ (sqrt time) |
|---|---|---|---|---|---|---|---|
| kPa | mm | mm | | mm | e | $m^2$/MN | $m^2$/year |
| 4.0 | 0.000 | 20.010 | 1.000 | 10.291 | 1.059 | | |
| 16.0 | 0.000 | 20.010 | 1.000 | 10.291 | 1.059 | sample swelled after initial consolidation | |
| 31.4 | -0.005 | 20.015 | 1.000 | 10.296 | 1.059 | sample swelled | |
| 62.2 | 0.049 | 19.966 | 0.998 | 10.247 | 1.054 | 0.079 | 12 |
| 123.4 | 0.220 | 19.746 | 0.987 | 10.027 | 1.032 | 0.18 | 4.6 |
| 246.3 | 0.466 | 19.280 | 0.964 | 9.561 | 0.984 | 0.19 | 1.7 |
| 492.1 | 0.876 | 18.404 | 0.920 | 8.685 | 0.894 | 0.18 | 0.74 |
| 983.6 | 1.114 | 17.290 | 0.864 | 7.571 | 0.779 | 0.12 | 0.62 |
| 1966.8 | 1.211 | 16.079 | 0.804 | 6.360 | 0.654 | 0.071 | 0.45 |
| 492.1 | -0.426 | 16.505 | 0.825 | 6.786 | 0.698 | BACKLOAD 1 | |
| 62.0 | -1.274 | 17.779 | 0.889 | 8.060 | 0.829 | BACKLOAD 2 | |

| Coefficient of Secondary Compression - $C_{sec}$ | |
|---|---|
| Applied Pressure | $C_{sec}$ |
| | |

| Coefficient of Permeability - k | |
|---|---|
| Applied Pressure | k (m/s) |
| | |

| | INITIAL | FINAL |
|---|---|---|
| Mass of dry sample (g) | 51.38 | 51.38 |
| Height of sample (mm) | 20.010 | 16.079 (after consolidation)<br>17.779 (after rebound) |
| Water Content (%) | 40.4 | 32.3 |
| Dry Density ($t/m^3$) | 1.29 | 1.60 |
| Height of soil particles (mm) | 9.719 | 9.719 |
| Void Ratio | 1.059 | 0.654 (after consolidation)<br>0.829 (after rebound) |
| Degree of saturation (%) | - | - |

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Please reply to: W.E. Campton



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Ponsonby,
Auckland 1144

Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: JF

1st May 2023

# ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

***Re: ASP***
***Your Reference: P-001537***
***Report Number: 63578#L/Consol ASP MBH02 3.00 – 3.50m***

## Borehole No: MBH02 Sample No: MBH02-02 Depth: 3.00 – 3.50m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 14th of April 2023. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give just the $\sqrt{T_{90}}$ values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **One Dimensional Consolidation:** | NZS4402:1986:Test 7.1 |

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of $m_v$ shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m$^3$ was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation ($c_v$'s), and coefficients of volume compressibility ($m_v$'s) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

**Sample Description** (***not part of BGL IANZ Accreditation***)

**MBH02 / MBH02-02 / 3.00 – 3.50m:**

CLAY, firm to stiff, highly plastic, light brownish grey with numerous black rootlets, moist.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
**Key Technical Person**
**Laboratory Manager**
**Babbage Geotechnical Laboratory**

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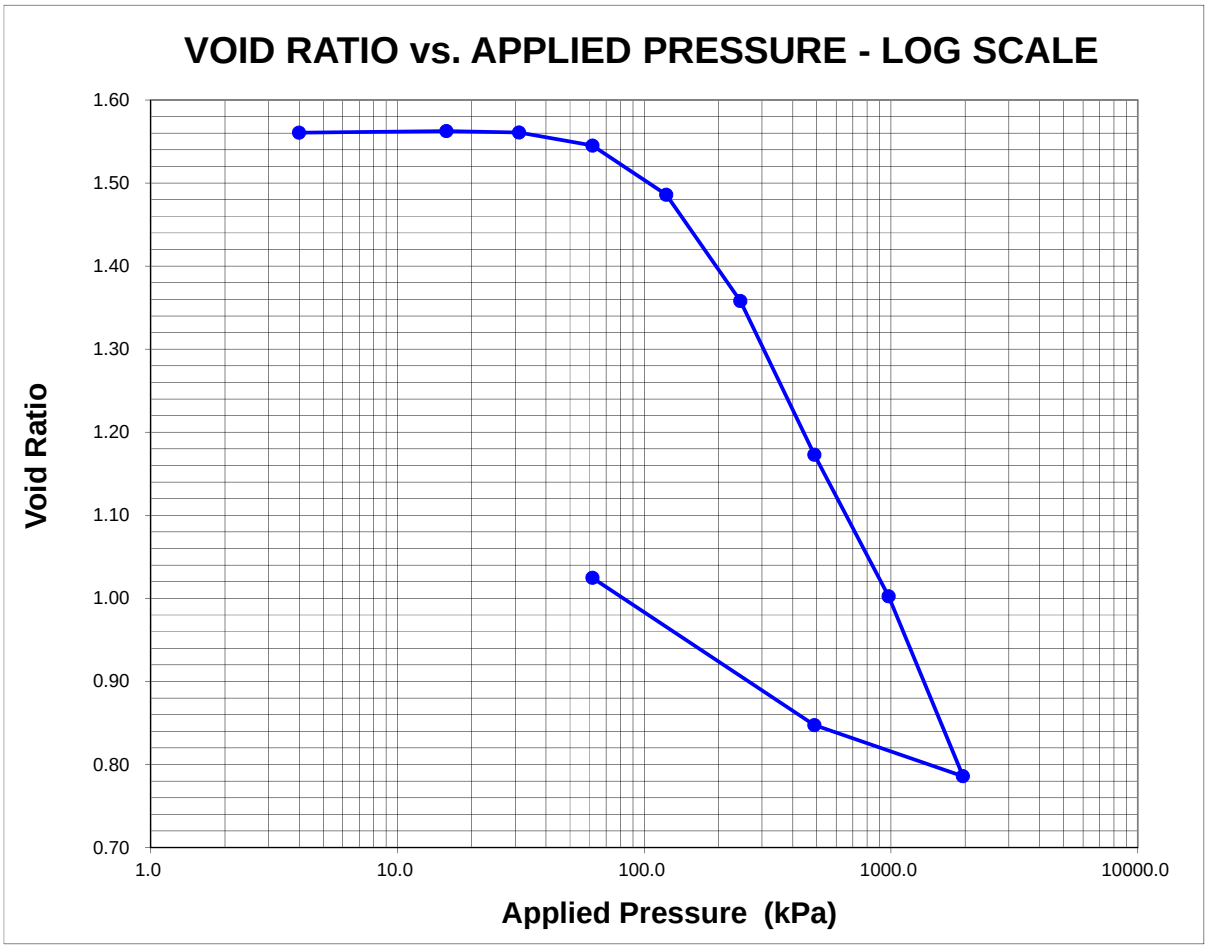
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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | April 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 1-May-23 |
| | Checked By: | JF | 1-May-23 |

**Borehole No:** MBH02 **Sample No:** MBH02-02 **Depth:** 3.00 - 3.50m




### *SAMPLE HISTORY & PREPARATION*

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

### *TEST DETAILS*

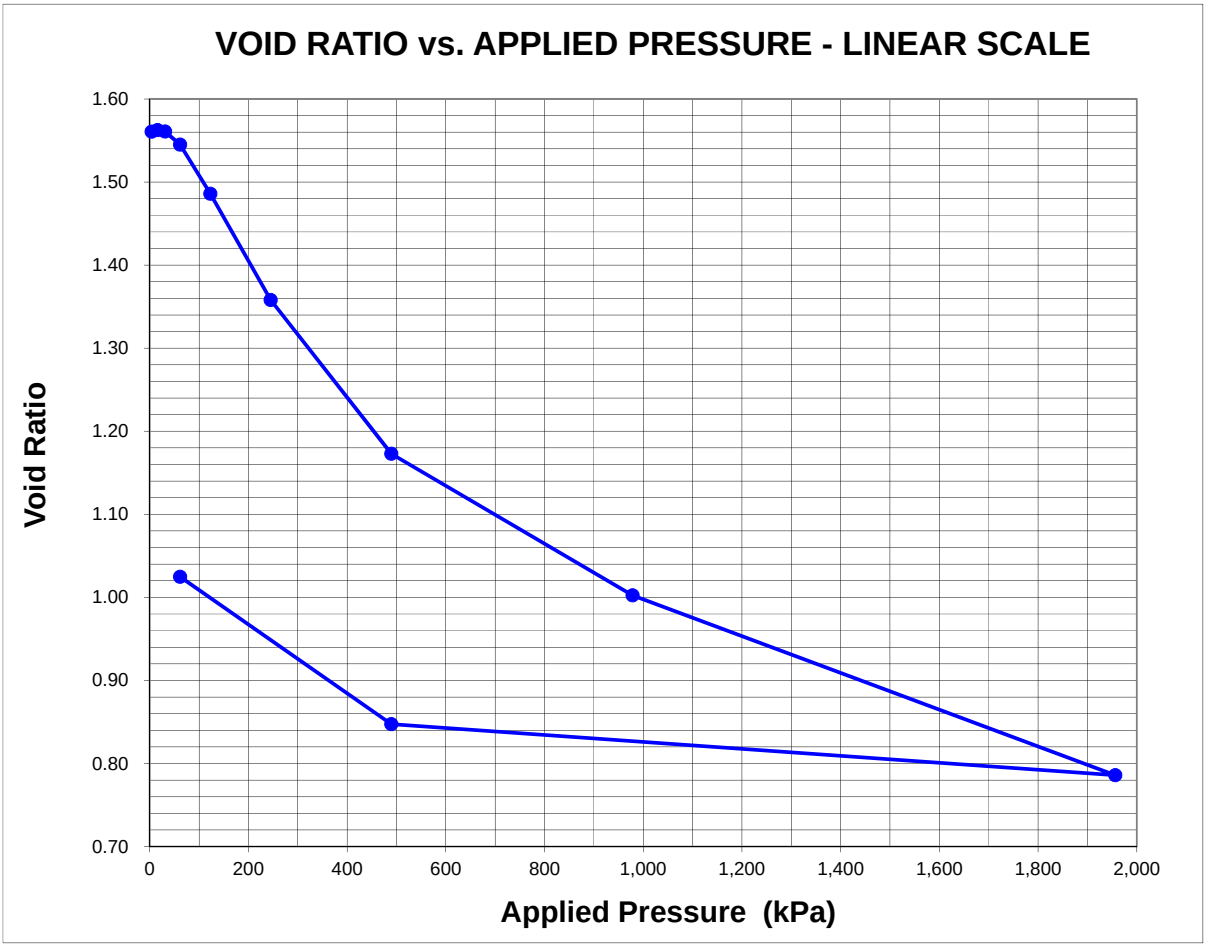
| | | | | | |
|---|---|---|---|---|---|
| Consol machine number: | 4 | | Surface area of sample top: | 2005 | $mm^2$ |
| Consol ring number: | 4c | | Sample mass: | 64.640 | g |
| Sample diameter: | 50.53 | mm | Initial bulk density: | 1.65 | $t/m^3$ |
| Sample height: | 19.59 | mm | Assumed solid density of soil particles: | 2.65 | $t/m^3$ |

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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | April 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 1-May-23 |
| | Checked By: | JF | 1-May-23 |

**Borehole No:** MBH02 **Sample No:** MBH02-02 **Depth:** 3.00 - 3.50m




***PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING***



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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

# ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | April 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 1-May-23 |
| | Checked By: | JF | 1-May-23 |

**Borehole No:** MBH02 **Sample No:** MBH02-02 **Depth:** 3.00 - 3.50m

| Applied Pressure | Incremental Deflection | Sample Height | Compression Ratio | Height of Voids | Void Ratio | Coefficient of Volume Compressibility $m_v$ | Coefficient of Consolidation - $c_v$ (sqrt time) |
|---|---|---|---|---|---|---|---|
| kPa | mm | mm | | mm | e | $m^2$/MN | $m^2$/year |
| 4.0 | 0.000 | 19.590 | 1.000 | 11.940 | 1.561 | | |
| 15.8 | -0.015 | 19.605 | 1.001 | 11.954 | 1.563 | sample swelled | |
| 31.1 | 0.013 | 19.592 | 1.000 | 11.941 | 1.561 | 0.043 | 17 |
| 61.7 | 0.120 | 19.471 | 0.994 | 11.821 | 1.545 | 0.20 | 4.7 |
| 122.8 | 0.452 | 19.019 | 0.971 | 11.369 | 1.486 | 0.38 | 1.3 |
| 245.0 | 0.979 | 18.040 | 0.921 | 10.390 | 1.358 | 0.42 | 0.73 |
| 489.6 | 1.416 | 16.624 | 0.849 | 8.973 | 1.173 | 0.32 | 0.54 |
| 978.6 | 1.304 | 15.319 | 0.782 | 7.669 | 1.002 | 0.16 | 1.4 |
| 1956.6 | 1.656 | 13.663 | 0.697 | 6.012 | 0.786 | 0.11 | 0.37 |
| 489.6 | -0.470 | 14.133 | 0.721 | 6.482 | 0.847 | Backload Cycle 1 | |
| 61.7 | -1.357 | 15.490 | 0.791 | 7.840 | 1.025 | Backload Cycle 2 | |

| Coefficient of Secondary Compression - $C_{sec}$ | |
|---|---|
| Applied Pressure | $C_{sec}$ |
| | |

| Coefficient of Permeability - k | |
|---|---|
| Applied Pressure | k (m/s) |
| | |

| | INITIAL | FINAL |
|---|---|---|
| Mass of dry sample (g) | 40.66 | 40.66 |
| Height of sample (mm) | 19.590 | 13.663 (after consolidation)<br>15.490 (after rebound) |
| Water Content (%) | 59.0 | 40.5 |
| Dry Density ($t/m^3$) | 1.03 | 1.48 |
| Height of soil particles (mm) | 7.650 | 7.650 |
| Void Ratio | 1.561 | 0.786 (after consolidation)<br>1.025 (after rebound) |
| Degree of saturation (%) | - | - |

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Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
Ponsonby,
Auckland 1144

Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: JF

11th May 2023

# ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

***Re: ASP***
***Your Reference: P-001537***
***Report Number: 63578#L/Consol ASP MBH02 6.00 – 6.50m***

## Borehole No: MBH02 Sample No: MBH02-03 Depth: 6.00 – 6.50m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 14th of April 2023. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give just the $\sqrt{T_{90}}$ values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **One Dimensional Consolidation:** | NZS4402:1986:Test 7.1 |

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of $m_v$ shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m$^3$ was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation ($c_v$'s), and coefficients of volume compressibility ($m_v$'s) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

**Sample Description** (***not part of BGL IANZ Accreditation***)

**MBH02 / MBH02-03 / 6.00 – 6.50m:**

CLAY, stiff, highly plastic, light bluish grey with occasional black organics & yellow staining, slightly moist.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
**Key Technical Person**
**Laboratory Manager**
**Babbage Geotechnical Laboratory**

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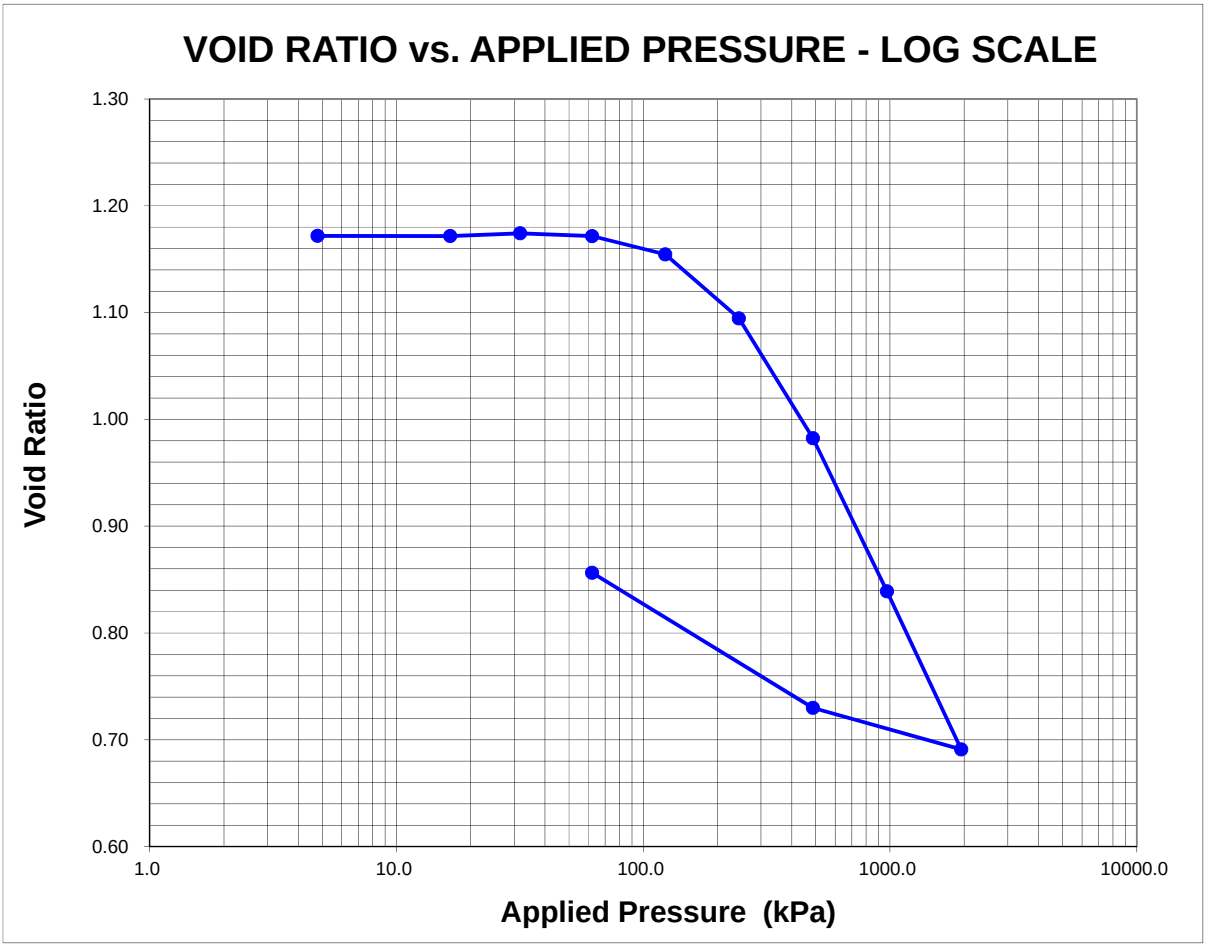
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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 11-May-23 |
| | Checked By: | JF | 11-May-23 |

**Borehole No:** MBH02 **Sample No:** MBH02-03 **Depth:** 6.00 - 6.50m




### *SAMPLE HISTORY & PREPARATION*

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

### *TEST DETAILS*

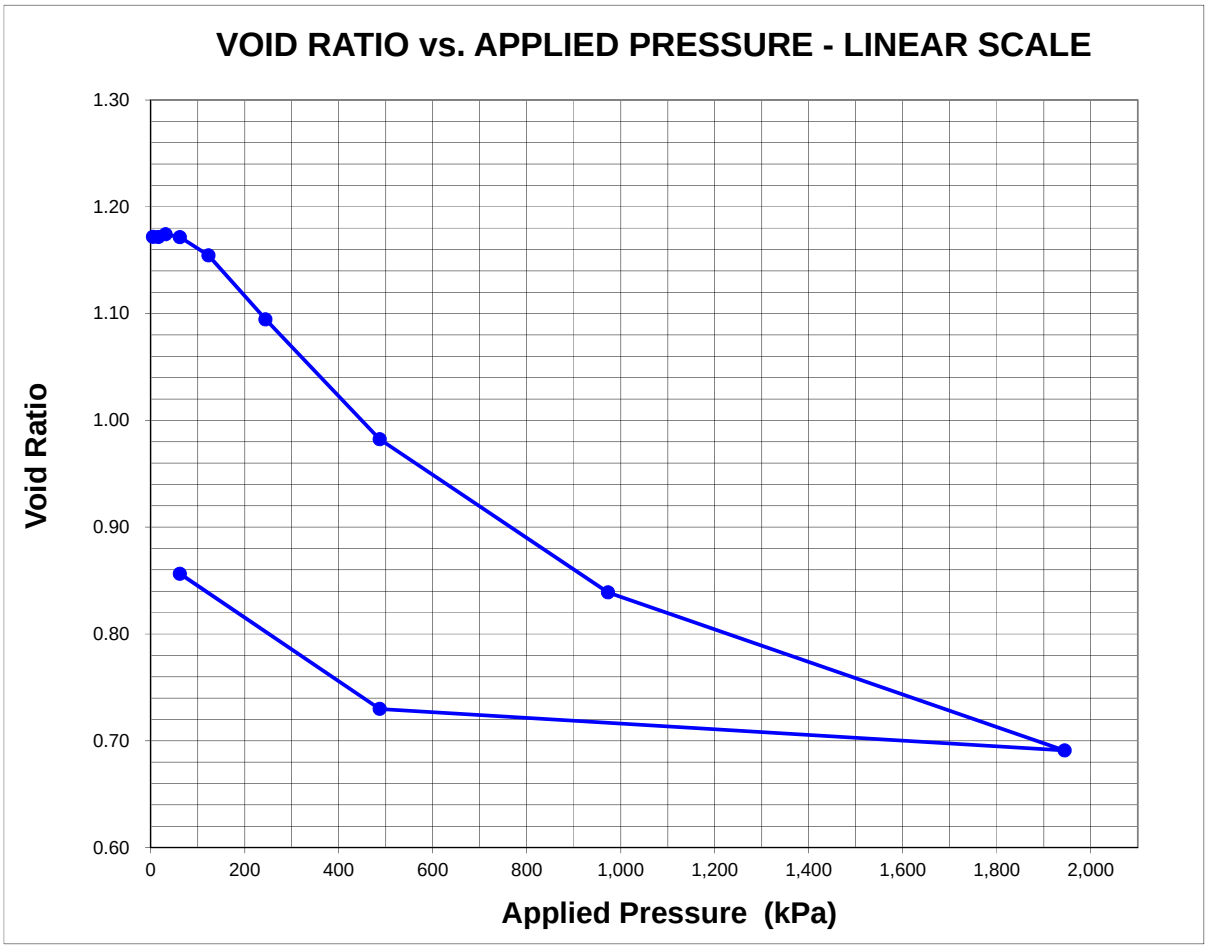
| | | | | | |
|---|---|---|---|---|---|
| Consol machine number: | 2 | | Surface area of sample top: | 2019 | $mm^2$ |
| Consol ring number: | 2a | | Sample mass: | 69.877 | g |
| Sample diameter: | 50.70 | mm | Initial bulk density: | 1.74 | $t/m^3$ |
| Sample height: | 19.93 | mm | Assumed solid density of soil particles: | 2.65 | $t/m^3$ |

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| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 11-May-23 |
| | Checked By: | JF | 11-May-23 |

**Borehole No:** MBH02 **Sample No:** MBH02-03 **Depth:** 6.00 - 6.50m




***PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING***



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| | ASP | | | | | |

# ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 11-May-23 |
| | Checked By: | JF | 11-May-23 |

**Borehole No:** MBH02 **Sample No:** MBH02-03 **Depth:** 6.00 - 6.50m

| Applied Pressure | Incremental Deflection | Sample Height | Compression Ratio | Height of Voids | Void Ratio | Coefficient of Volume Compressibility $m_v$ | Coefficient of Consolidation - $c_v$ (sqrt time) |
|---|---|---|---|---|---|---|---|
| kPa | mm | mm | | mm | e | $m^2$/MN | $m^2$/year |
| 4.8 | 0.000 | 19.930 | 1.000 | 10.754 | 1.172 | | |
| 16.5 | 0.002 | 19.928 | 1.000 | 10.752 | 1.172 | sample swelled after initial consolidation | |
| 31.7 | -0.023 | 19.952 | 1.001 | 10.775 | 1.174 | sample swelled | |
| 62.1 | 0.024 | 19.928 | 1.000 | 10.751 | 1.172 | 0.039 | 31 |
| 122.8 | 0.157 | 19.771 | 0.992 | 10.594 | 1.155 | 0.13 | 20 |
| 244.2 | 0.550 | 19.221 | 0.964 | 10.045 | 1.095 | 0.23 | 6.4 |
| 487.1 | 1.030 | 18.192 | 0.913 | 9.015 | 0.982 | 0.22 | 0.91 |
| 972.9 | 1.317 | 16.875 | 0.847 | 7.698 | 0.839 | 0.15 | 0.60 |
| 1944.4 | 1.358 | 15.517 | 0.779 | 6.340 | 0.691 | 0.083 | 0.49 |
| 487.1 | -0.357 | 15.874 | 0.796 | 6.698 | 0.730 | BACKLOAD 1 | |
| 62.1 | -1.161 | 17.035 | 0.855 | 7.859 | 0.856 | BACKLOAD 2 | |

| Coefficient of Secondary Compression - $C_{sec}$ | |
|---|---|
| Applied Pressure | $C_{sec}$ |
| | |

| Coefficient of Permeability - k | |
|---|---|
| Applied Pressure | k (m/s) |
| | |

| | INITIAL | FINAL |
|---|---|---|
| Mass of dry sample (g) | 49.09 | 49.09 |
| Height of sample (mm) | 19.930 | 15.517 (after consolidation)<br>17.035 (after rebound) |
| Water Content (%) | 42.3 | 33.3 |
| Dry Density ($t/m^3$) | 1.22 | 1.57 |
| Height of soil particles (mm) | 9.176 | 9.176 |
| Void Ratio | 1.172 | 0.691 (after consolidation)<br>0.856 (after rebound) |
| Degree of saturation (%) | 95.7 | - |

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Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
Ponsonby,
Auckland 1144

Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: JF

27th April 2023

# ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

***Re: ASP***
***Your Reference: P-001537***
***Report Number: 63578#L/Consol ASP MBH02 7.50 – 8.00m***

## Borehole No: MBH02 Sample No: MBH02-04 Depth: 7.50 – 8.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 14th of April 2023. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give just the $\sqrt{T_{90}}$ values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **One Dimensional Consolidation:** | NZS4402:1986:Test 7.1 |

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of $m_v$ shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m$^3$ was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation ($c_v$'s), and coefficients of volume compressibility ($m_v$'s) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

**Sample Description** (***not part of BGL IANZ Accreditation***)

**MBH02 / MBH02-04 / 7.50 – 8.00m:**

CLAY, stiff, highly plastic, light bluish grey with thin orangish brown staining.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
**Key Technical Person**
**Laboratory Manager**
**Babbage Geotechnical Laboratory**

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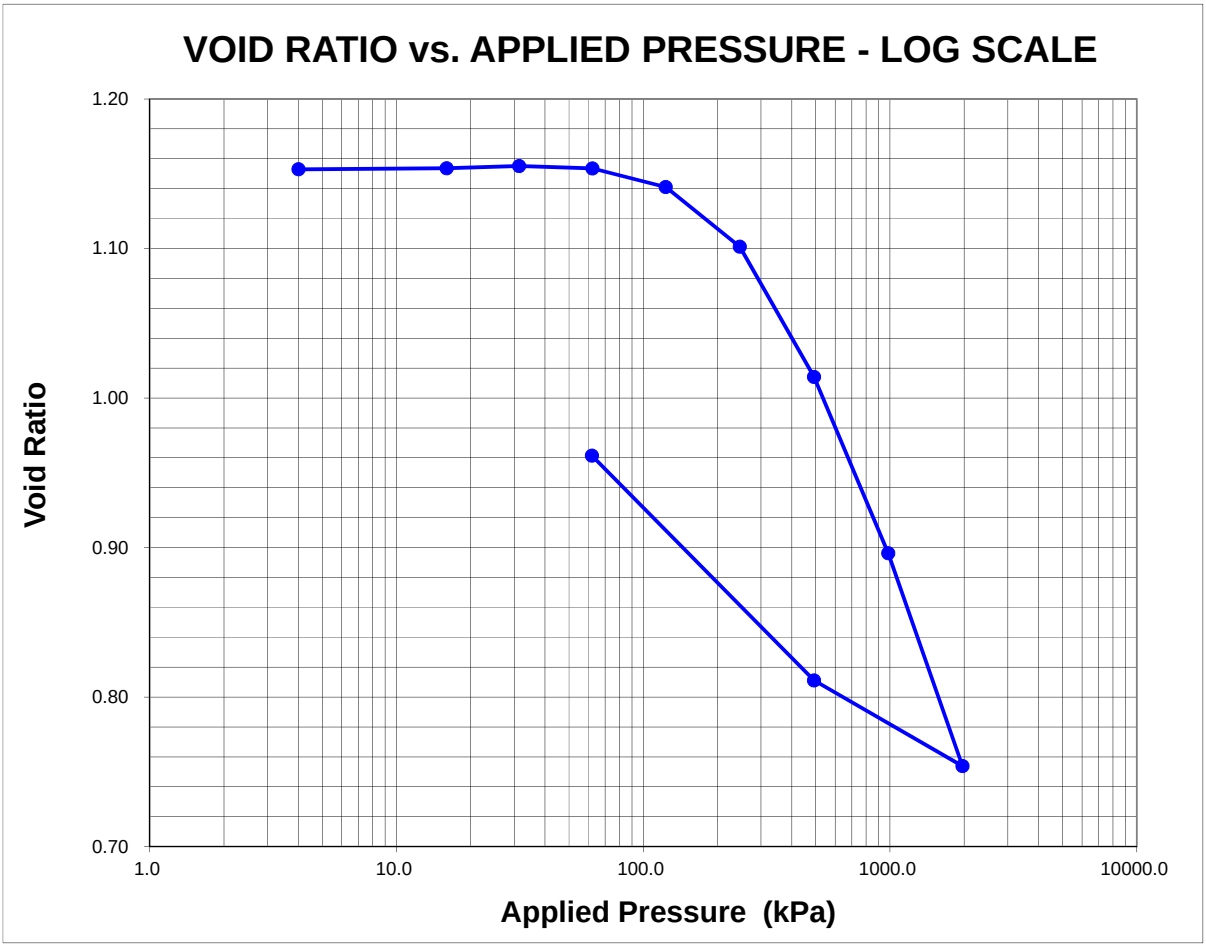
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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | April 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 27-Apr-23 |
| | Checked By: | JF | 27-Apr-23 |

**Borehole No:** MBH02 **Sample No:** MBH02-04 **Depth:** 7.50 - 8.00m




### *SAMPLE HISTORY & PREPARATION*

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

### *TEST DETAILS*

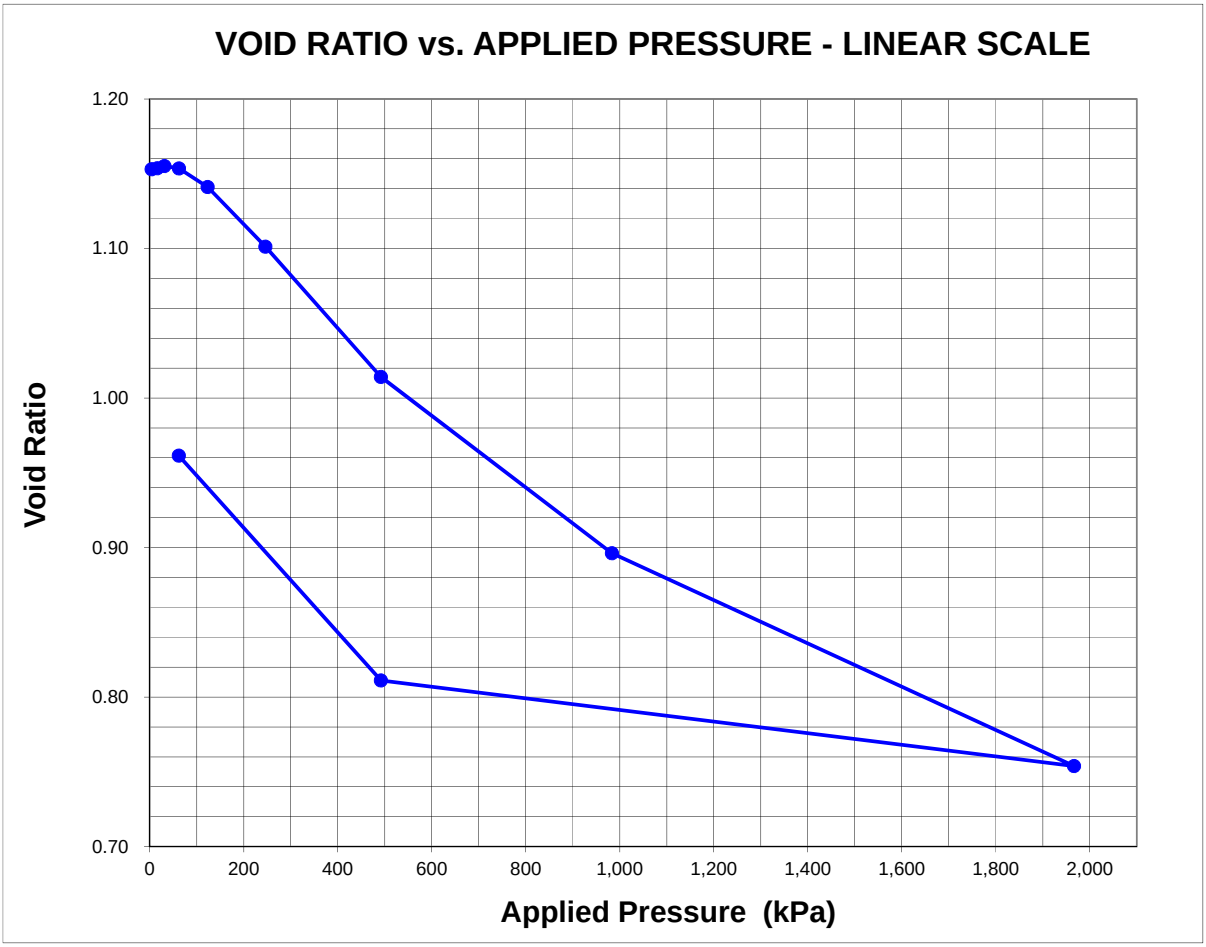
| | | | | | |
|---|---|---|---|---|---|
| Consol machine number: | 3 | | Surface area of sample top: | 1995 | $mm^2$ |
| Consol ring number: | 3d | | Sample mass: | 70.787 | g |
| Sample diameter: | 50.40 | mm | Initial bulk density: | 1.78 | $t/m^3$ |
| Sample height: | 19.97 | mm | Assumed solid density of soil particles: | 2.65 | $t/m^3$ |

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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | April 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 27-Apr-23 |
| | Checked By: | JF | 27-Apr-23 |

**Borehole No:** MBH02 **Sample No:** MBH02-04 **Depth:** 7.50 - 8.00m




***PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING***



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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

# ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | April 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 27-Apr-23 |
| | Checked By: | JF | 27-Apr-23 |

**Borehole No:** MBH02 **Sample No:** MBH02-04 **Depth:** 7.50 - 8.00m

| Applied Pressure | Incremental Deflection | Sample Height | Compression Ratio | Height of Voids | Void Ratio | Coefficient of Volume Compressibility $m_v$ | Coefficient of Consolidation - $c_v$ (sqrt time) |
|---|---|---|---|---|---|---|---|
| kPa | mm | mm | | mm | e | $m^2$/MN | $m^2$/year |
| 4.0 | 0.000 | 19.970 | 1.000 | 10.694 | 1.153 | | |
| 16.0 | -0.006 | 19.976 | 1.000 | 10.701 | 1.154 | sample swelled | |
| 31.4 | -0.014 | 19.991 | 1.001 | 10.715 | 1.155 | sample swelled | |
| 62.2 | 0.015 | 19.975 | 1.000 | 10.700 | 1.154 | 0.025 | 37 |
| 123.4 | 0.116 | 19.860 | 0.994 | 10.584 | 1.141 | 0.095 | 11 |
| 246.3 | 0.370 | 19.490 | 0.976 | 10.214 | 1.101 | 0.15 | 2.2 |
| 492.1 | 0.808 | 18.682 | 0.935 | 9.406 | 1.014 | 0.17 | 0.64 |
| 983.6 | 1.094 | 17.588 | 0.881 | 8.312 | 0.896 | 0.12 | 0.58 |
| 1966.7 | 1.320 | 16.268 | 0.815 | 6.992 | 0.754 | 0.076 | 0.54 |
| 492.1 | -0.531 | 16.799 | 0.841 | 7.524 | 0.811 | BACKLOAD 1 | |
| 62.0 | -1.394 | 18.194 | 0.911 | 8.918 | 0.961 | BACKLOAD 2 | |

| Coefficient of Secondary Compression - $C_{sec}$ | |
|---|---|
| Applied Pressure | $C_{sec}$ |
| | |

| Coefficient of Permeability - k | |
|---|---|
| Applied Pressure | k (m/s) |
| | |

| | INITIAL | FINAL |
|---|---|---|
| Mass of dry sample (g) | 49.04 | 49.04 |
| Height of sample (mm) | 19.970 | 16.268 (after consolidation)<br>18.194 (after rebound) |
| Water Content (%) | 44.3 | 38.1 |
| Dry Density ($t/m^3$) | 1.23 | 1.51 |
| Height of soil particles (mm) | 9.276 | 9.276 |
| Void Ratio | 1.153 | 0.754 (after consolidation)<br>0.961 (after rebound) |
| Degree of saturation (%) | - | - |

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Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
Ponsonby,
Auckland 1144

Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: JF

11th May 2023

# ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

***Re: ASP***
***Your Reference: P-001537***
***Report Number: 63578#L/Consol ASP MBH03 1.50 – 2.00m***

## Borehole No: MBH03 Sample No: MBH03-02 Depth: 1.50 – 2.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 14th of April 2023. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give just the $\sqrt{T_{90}}$ values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **One Dimensional Consolidation:** | NZS4402:1986:Test 7.1 |

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of $m_v$ shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m$^3$ was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation ($c_v$'s), and coefficients of volume compressibility ($m_v$'s) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

**Sample Description** (***not part of BGL IANZ Accreditation***)

**MBH03 / MBH03-02 / 1.50 – 2.00m:**

CLAY, stiff, highly plastic, organic stained light brown & light grey with dark brown & black streaks, slightly moist.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
**Key Technical Person**
**Laboratory Manager**
**Babbage Geotechnical Laboratory**

ACCREDITED
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TESTING LABORATORY
№ 126

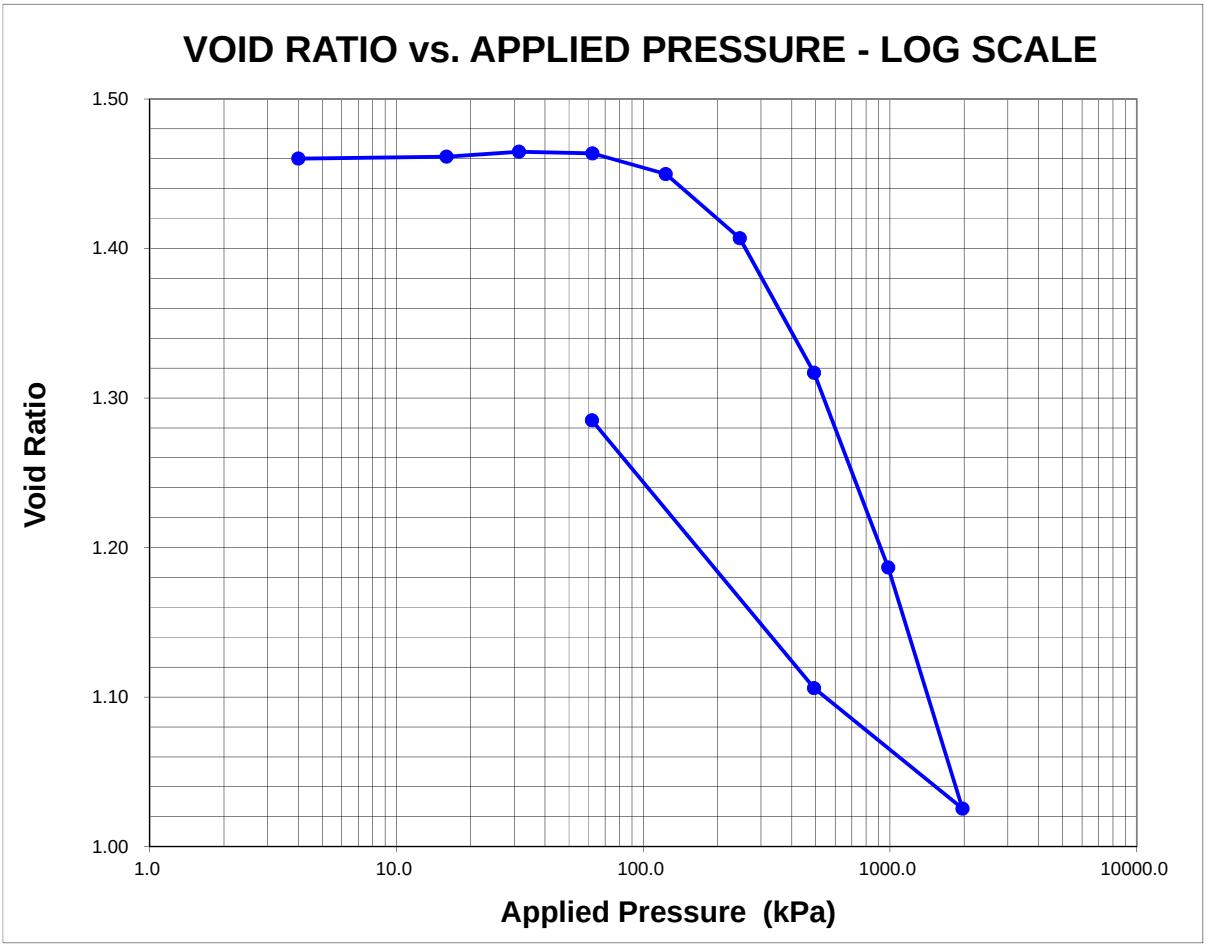
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 11-May-23 |
| | Checked By: | JF | 11-May-23 |

**Borehole No:** MBH03 **Sample No:** MBH03-02 **Depth:** 1.50 - 2.00m




### *SAMPLE HISTORY & PREPARATION*

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

### *TEST DETAILS*

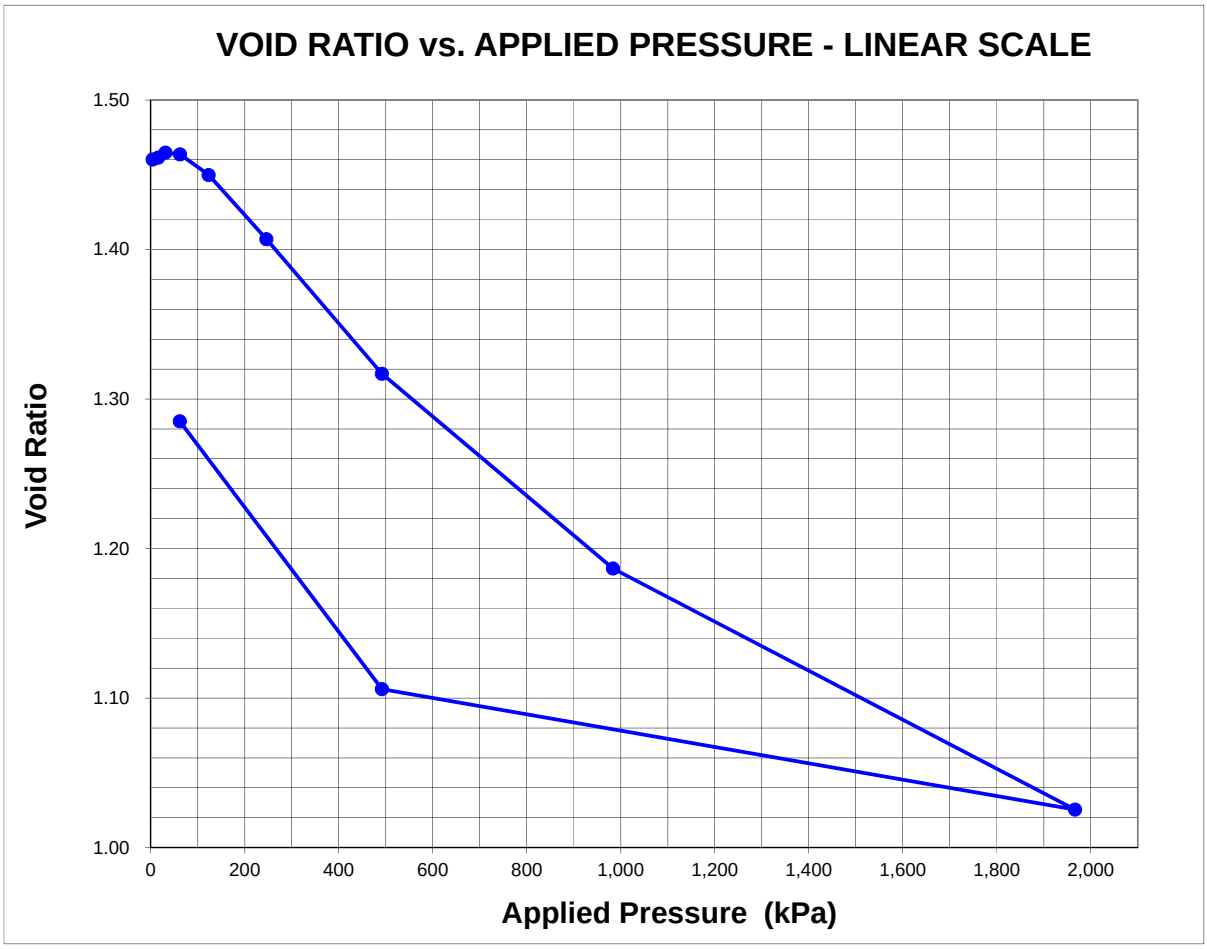
| | | | | | |
|---|---|---|---|---|---|
| Consol machine number: | 3 | | Surface area of sample top: | 1995 | $mm^2$ |
| Consol ring number: | 3a | | Sample mass: | 66.746 | g |
| Sample diameter: | 50.40 | mm | Initial bulk density: | 1.67 | $t/m^3$ |
| Sample height: | 19.99 | mm | Assumed solid density of soil particles: | 2.65 | $t/m^3$ |

| Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 3 |
|---|---|---|---|---|---|---|
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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 11-May-23 |
| | Checked By: | JF | 11-May-23 |

**Borehole No:** MBH03 **Sample No:** MBH03-02 **Depth:** 1.50 - 2.00m




***PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING***



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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

# ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 11-May-23 |
| | Checked By: | JF | 11-May-23 |

Borehole No: **MBH03** Sample No: **MBH03-02** Depth: **1.50 - 2.00m**

| Applied Pressure | Incremental Deflection | Sample Height | Compression Ratio | Height of Voids | Void Ratio | Coefficient of Volume Compressibility $m_v$ | Coefficient of Consolidation - $c_v$ (sqrt time) |
|---|---|---|---|---|---|---|---|
| kPa | mm | mm | | mm | e | $m^2$/MN | $m^2$/year |
| 4.0 | 0.000 | 19.990 | 1.000 | 11.864 | 1.460 | | |
| 16.0 | -0.011 | 20.001 | 1.001 | 11.875 | 1.461 | sample swelled | |
| 31.4 | -0.027 | 20.027 | 1.002 | 11.902 | 1.465 | sample swelled | |
| 62.2 | 0.009 | 20.019 | 1.001 | 11.893 | 1.464 | 0.014 | 26 |
| 123.4 | 0.112 | 19.906 | 0.996 | 11.781 | 1.450 | 0.092 | 11 |
| 246.3 | 0.349 | 19.557 | 0.978 | 11.432 | 1.407 | 0.14 | 3.8 |
| 492.1 | 0.731 | 18.826 | 0.942 | 10.700 | 1.317 | 0.15 | 1.4 |
| 983.6 | 1.058 | 17.768 | 0.889 | 9.642 | 1.187 | 0.11 | 1.2 |
| 1966.7 | 1.310 | 16.458 | 0.823 | 8.332 | 1.025 | 0.075 | 0.91 |
| 492.1 | -0.654 | 17.112 | 0.856 | 8.987 | 1.106 | BACKLOAD 1 | |
| 62.0 | -1.456 | 18.568 | 0.929 | 10.442 | 1.285 | BACKLOAD 2 | |

| Coefficient of Secondary Compression - $C_{sec}$ | |
|---|---|
| Applied Pressure | $C_{sec}$ |
| | |

| Coefficient of Permeability - k | |
|---|---|
| Applied Pressure | k (m/s) |
| | |

| | INITIAL | FINAL |
|---|---|---|
| Mass of dry sample (g) | 42.96 | 42.96 |
| Height of sample (mm) | 19.990 | 16.458 (after consolidation)<br>18.568 (after rebound) |
| Water Content (%) | 55.4 | 50.8 |
| Dry Density ($t/m^3$) | 1.08 | 1.31 |
| Height of soil particles (mm) | 8.126 | 8.126 |
| Void Ratio | 1.460 | 1.025 (after consolidation)<br>1.285 (after rebound) |
| Degree of saturation (%) | - | - |

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Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
Ponsonby,
Auckland 1144

Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: JF

12th May 2023

# ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

***Re: ASP***
***Your Reference: P-001537***
***Report Number: 63578#L/Consol ASP MBH04 4.50 – 5.00m***

## Borehole No: MBH04 Sample No: MBH04-01 Depth: 4.50 – 5.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 60mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 14th of April 2023. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give just the $\sqrt{T_{90}}$ values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **One Dimensional Consolidation:** | NZS4402:1986:Test 7.1 |

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of $m_v$ shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m$^3$ was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation ($c_v$'s), and coefficients of volume compressibility ($m_v$'s) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

**Sample Description** (***not part of BGL IANZ Accreditation***)

**MBH04 / MBH04-01 / 4.50 – 5.00m:**

CLAY, firm, highly plastic, light greenish grey with occasional black organics.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
**Key Technical Person**
**Laboratory Manager**
**Babbage Geotechnical Laboratory**

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TESTING LABORATORY
№ 126

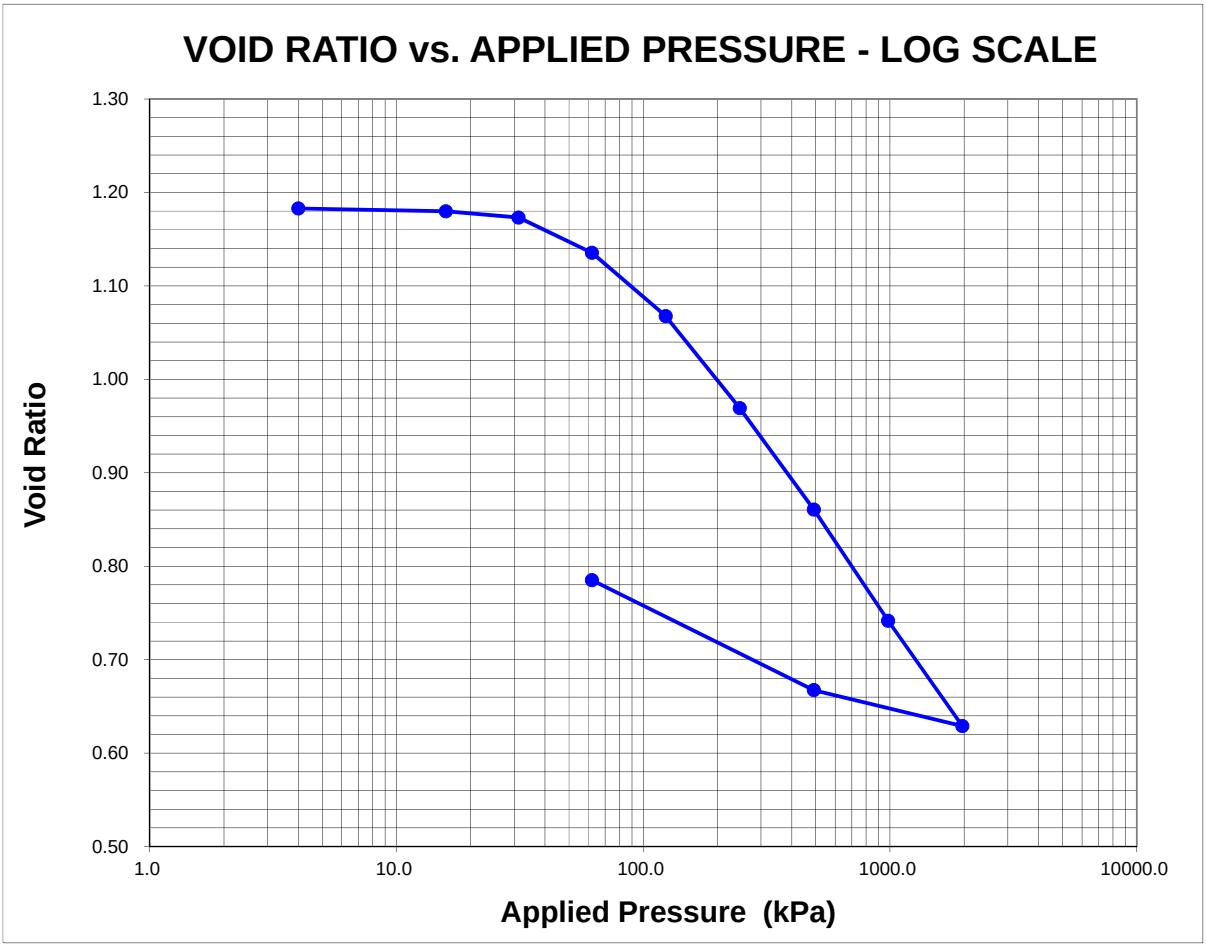
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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 12-May-23 |
| | Checked By: | JF | 12-May-23 |

**Borehole No:** MBH04 **Sample No:** MBH04-01 **Depth:** 4.50 - 5.00m




### *SAMPLE HISTORY & PREPARATION*

undisturbed / ~~disturbed~~

Sample from 60mm diameter push-tube

Extruded from 60mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

### *TEST DETAILS*

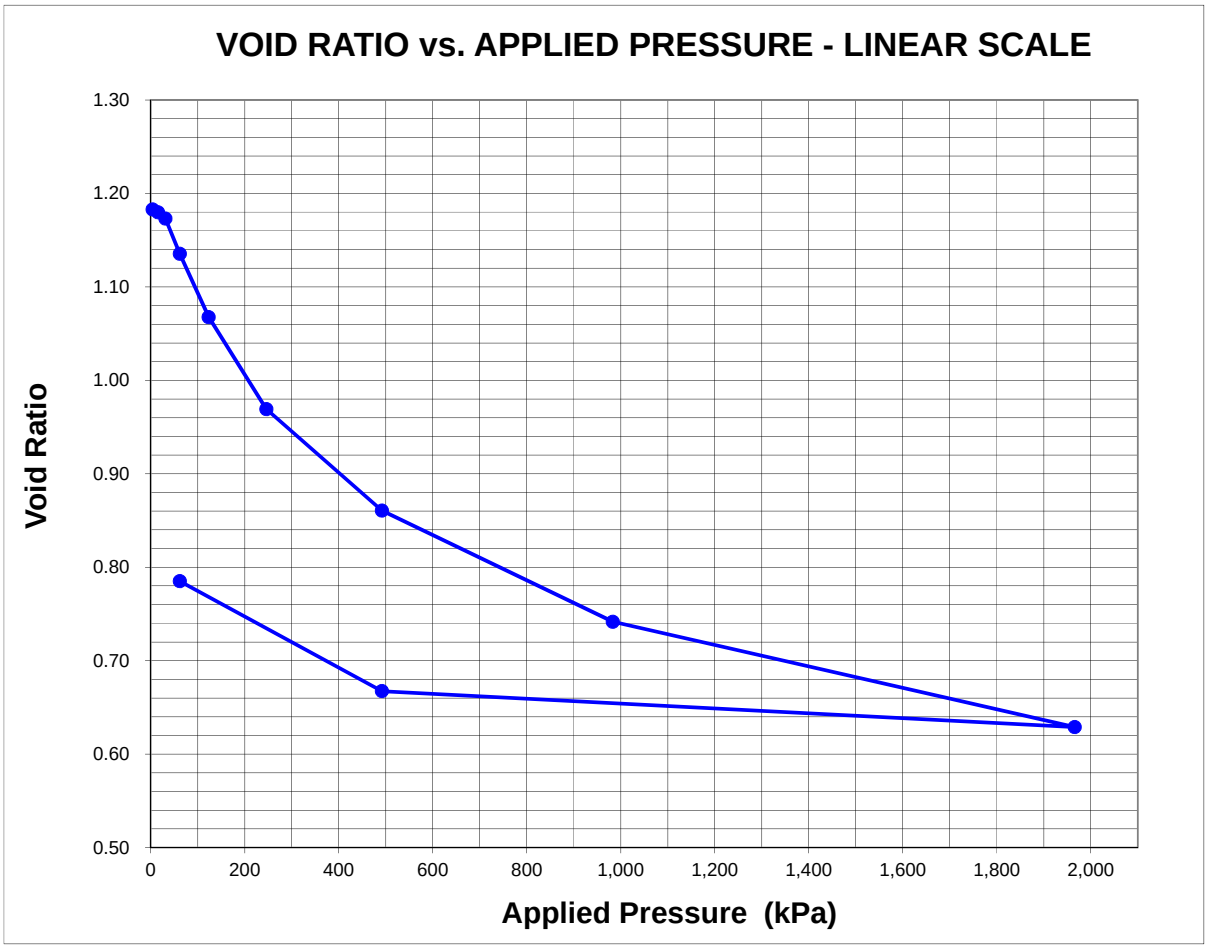
| | | | | | |
|---|---|---|---|---|---|
| Consol machine number: | 4 | | Surface area of sample top: | 1996 | $mm^2$ |
| Consol ring number: | 4d | | Sample mass: | 70.670 | g |
| Sample diameter: | 50.41 | mm | Initial bulk density: | 1.76 | $t/m^3$ |
| Sample height: | 20.09 | mm | Assumed solid density of soil particles: | 2.65 | $t/m^3$ |

| Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 3 |
|---|---|---|---|---|---|---|
| | 63578#L | 2819 | 4 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 12-May-23 |
| | Checked By: | JF | 12-May-23 |

**Borehole No:** MBH04 **Sample No:** MBH04-01 **Depth:** 4.50 - 5.00m




***PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING***



| Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 3 |
|---|---|---|---|---|---|---|
| | 63578#L | 2819 | 5 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

# ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 12-May-23 |
| | Checked By: | JF | 12-May-23 |

**Borehole No:** MBH04 **Sample No:** MBH04-01 **Depth:** 4.50 - 5.00m

| Applied Pressure | Incremental Deflection | Sample Height | Compression Ratio | Height of Voids | Void Ratio | Coefficient of Volume Compressibility $m_v$ | Coefficient of Consolidation - $c_v$ (sqrt time) |
|---|---|---|---|---|---|---|---|
| kPa | mm | mm | | mm | e | $m^2$/MN | $m^2$/year |
| 4.0 | 0.000 | 20.090 | 1.000 | 10.886 | 1.183 | | |
| 15.9 | 0.028 | 20.062 | 0.999 | 10.859 | 1.180 | sample swelled after initial consolidation | |
| 31.2 | 0.061 | 20.001 | 0.996 | 10.797 | 1.173 | 0.20 | 12 |
| 62.0 | 0.347 | 19.654 | 0.978 | 10.450 | 1.135 | 0.57 | 0.64 |
| 123.4 | 0.624 | 19.030 | 0.947 | 9.826 | 1.068 | 0.52 | 0.37 |
| 246.2 | 0.907 | 18.123 | 0.902 | 8.920 | 0.969 | 0.39 | 0.42 |
| 491.9 | 0.999 | 17.124 | 0.852 | 7.921 | 0.861 | 0.22 | 0.39 |
| 983.2 | 1.095 | 16.030 | 0.798 | 6.826 | 0.742 | 0.13 | 0.37 |
| 1966.0 | 1.037 | 14.992 | 0.746 | 5.789 | 0.629 | 0.066 | 0.32 |
| 491.9 | -0.354 | 15.346 | 0.764 | 6.143 | 0.667 | BACKLOAD 1 | |
| 62.0 | -1.083 | 16.429 | 0.818 | 7.225 | 0.785 | BACKLOAD 2 | |

| Coefficient of Secondary Compression - $C_{sec}$ | |
|---|---|
| Applied Pressure | $C_{sec}$ |
| | |

| Coefficient of Permeability - k | |
|---|---|
| Applied Pressure | k (m/s) |
| | |

| | INITIAL | FINAL |
|---|---|---|
| Mass of dry sample (g) | 48.68 | 48.68 |
| Height of sample (mm) | 20.090 | 14.992 (after consolidation)<br>16.429 (after rebound) |
| Water Content (%) | 45.2 | 31.2 |
| Dry Density ($t/m^3$) | 1.21 | 1.63 |
| Height of soil particles (mm) | 9.204 | 9.204 |
| Void Ratio | 1.183 | 0.629 (after consolidation)<br>0.785 (after rebound) |
| Degree of saturation (%) | - | - |

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Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
Ponsonby,
Auckland 1144

Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: JF

15th May 2023

# ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

***Re: ASP***
***Your Reference: P-001537***
***Report Number: 63578#L/Consol ASP MBH05 3.00 – 3.50m***

## Borehole No: MBH05 Sample No: MBH05-02 Depth: 3.00 – 3.50m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 14th of April 2023. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give just the $\sqrt{T_{90}}$ values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **One Dimensional Consolidation:** | NZS4402:1986:Test 7.1 |

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of $m_v$ shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m$^3$ was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation ($c_v$'s), and coefficients of volume compressibility ($m_v$'s) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

**Sample Description** (***not part of BGL IANZ Accreditation***)

**MBH05 / MBH05-02 / 3.00 – 3.50m:**

ORGANIC CLAY, soft to firm, highly plastic, greyish brown with black organic inclusions, very moist.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
**Key Technical Person**
**Laboratory Manager**
**Babbage Geotechnical Laboratory**

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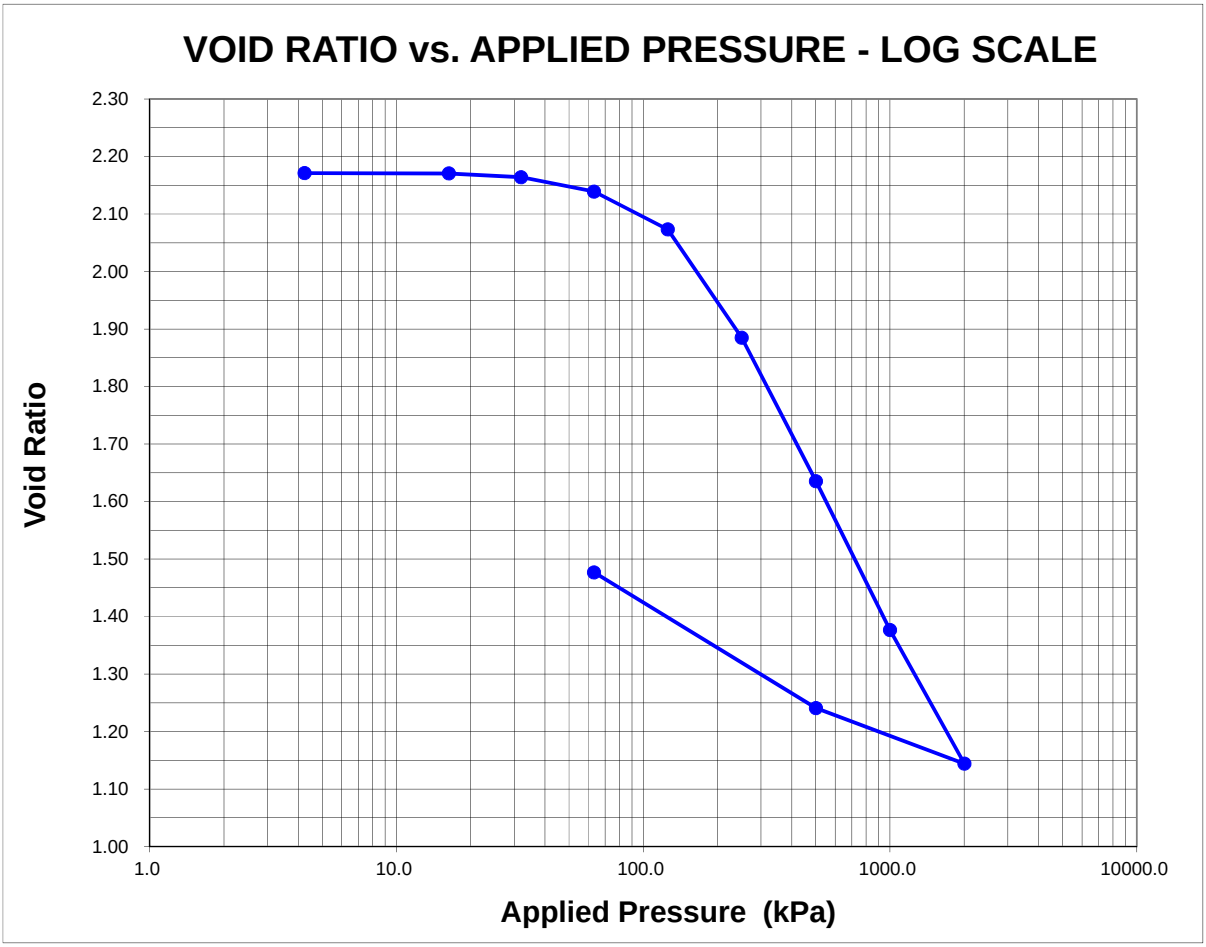
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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

# ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 15-May-23 |
| | Checked By: | JF | 15-May-23 |

**Borehole No:** MBH05 **Sample No:** MBH05-02 **Depth:** 3.00 - 3.50m




## *SAMPLE HISTORY & PREPARATION*

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

## *TEST DETAILS*

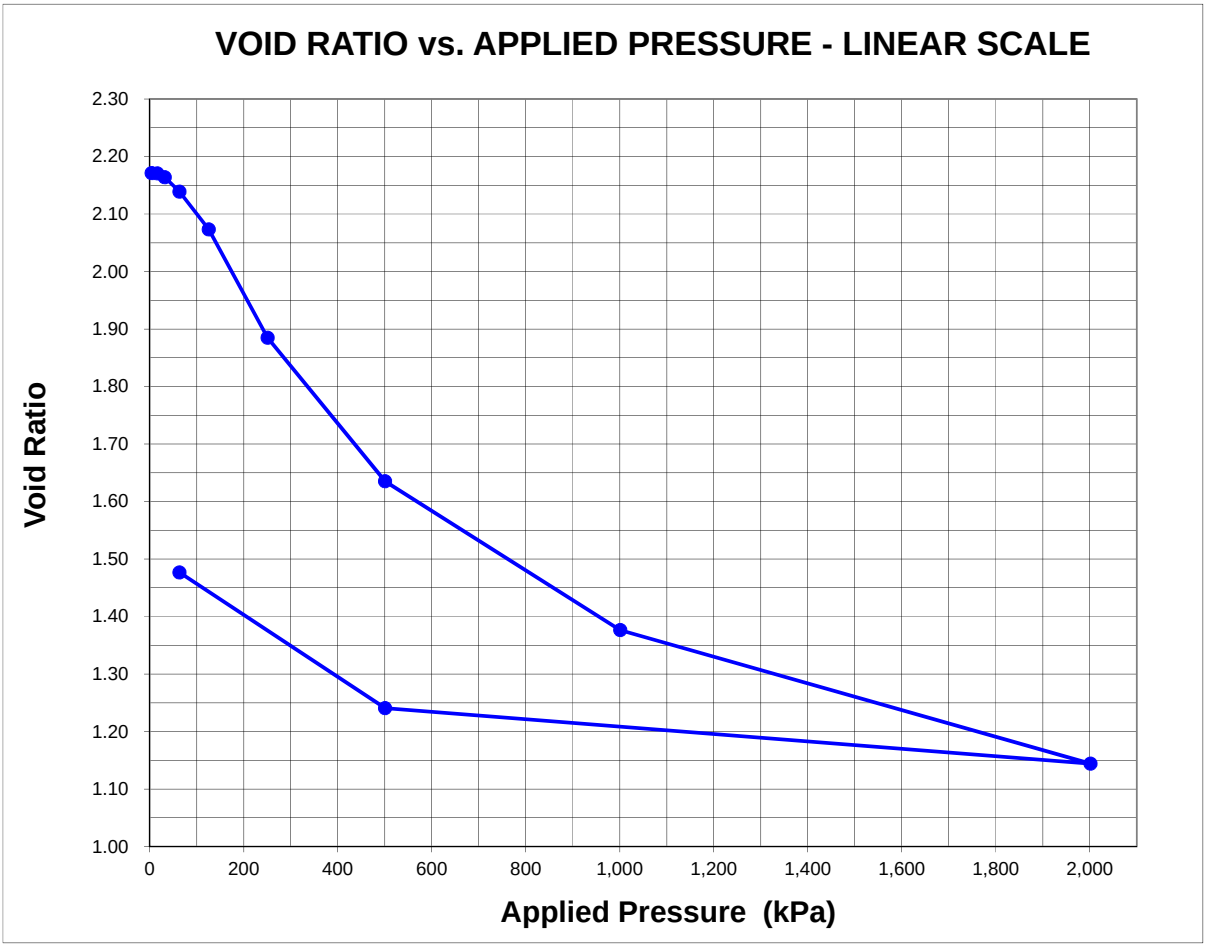
| | | | | | |
|---|---|---|---|---|---|
| Consol machine number: | 1 | | Surface area of sample top: | 1960 | $mm^2$ |
| Consol ring number: | 1A | | Sample mass: | 63.404 | g |
| Sample diameter: | 49.96 | mm | Initial bulk density: | 1.53 | $t/m^3$ |
| Sample height: | 21.16 | mm | Assumed solid density of soil particles: | 2.65 | $t/m^3$ |

| Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 3 |
|---|---|---|---|---|---|---|
| | 63578#L | 2819 | 4 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 15-May-23 |
| | Checked By: | JF | 15-May-23 |

**Borehole No:** MBH05 **Sample No:** MBH05-02 **Depth:** 3.00 - 3.50m




***PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING***



| BGL Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 3 |
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| | 63578#L | 2819 | 5 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

# ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 15-May-23 |
| | Checked By: | JF | 15-May-23 |

**Borehole No:** MBH05 **Sample No:** MBH05-02 **Depth:** 3.00 - 3.50m

| Applied Pressure | Incremental Deflection | Sample Height | Compression Ratio | Height of Voids | Void Ratio | Coefficient of Volume Compressibility $m_v$ | Coefficient of Consolidation - $c_v$ (sqrt time) |
|---|---|---|---|---|---|---|---|
| kPa | mm | mm | | mm | e | $m^2$/MN | $m^2$/year |
| 4.2 | 0.000 | 21.160 | 1.000 | 14.487 | 2.171 | | |
| 16.3 | 0.003 | 21.157 | 1.000 | 14.484 | 2.171 | sample swelled after initial consolidation | |
| 32.0 | 0.044 | 21.113 | 0.998 | 14.440 | 2.164 | 0.13 | 32 |
| 63.2 | 0.167 | 20.946 | 0.990 | 14.273 | 2.139 | 0.25 | 11 |
| 125.8 | 0.440 | 20.507 | 0.969 | 13.834 | 2.073 | 0.34 | 1.9 |
| 250.8 | 1.256 | 19.251 | 0.910 | 12.578 | 1.885 | 0.49 | 0.68 |
| 501.0 | 1.667 | 17.584 | 0.831 | 10.911 | 1.635 | 0.35 | 0.68 |
| 1001.2 | 1.726 | 15.858 | 0.749 | 9.185 | 1.376 | 0.20 | 1.1 |
| 2001.7 | 1.550 | 14.308 | 0.676 | 7.635 | 1.144 | 0.098 | 0.86 |
| 501.0 | -0.645 | 14.952 | 0.707 | 8.279 | 1.241 | BACKLOAD 1 | |
| 63.2 | -1.575 | 16.527 | 0.781 | 9.854 | 1.477 | BACKLOAD 2 | |

| Coefficient of Secondary Compression - $C_{sec}$ | |
|---|---|
| Applied Pressure | $C_{sec}$ |
| | |

| Coefficient of Permeability - k | |
|---|---|
| Applied Pressure | k (m/s) |
| | |

| | INITIAL | FINAL |
|---|---|---|
| Mass of dry sample (g) | 34.67 | 34.67 |
| Height of sample (mm) | 21.160 | 14.308 (after consolidation)<br>16.527 (after rebound) |
| Water Content (%) | 82.9 | 56.3 |
| Dry Density ($t/m^3$) | 0.84 | 1.24 |
| Height of soil particles (mm) | 6.673 | 6.673 |
| Void Ratio | 2.171 | 1.144 (after consolidation)<br>1.477 (after rebound) |
| Degree of saturation (%) | - | - |

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Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
Ponsonby,
Auckland 1144

Attention: **QUIN SORENSEN**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: JF

16th May 2023

# ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

***Re: ASP***
***Your Reference: P-001537***
***Report Number: 63578#L/Consol ASP MBH05 6.00 – 6.50m***

## Borehole No: MBH05 Sample No: MBH05-03 Depth: 6.00 – 6.50m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 14th of April 2023. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give just the $\sqrt{T_{90}}$ values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **One Dimensional Consolidation:** | NZS4402:1986:Test 7.1 |

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of $m_v$ shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m$^3$ was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation ($c_v$'s), and coefficients of volume compressibility ($m_v$'s) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

**Sample Description** (***not part of BGL IANZ Accreditation***)

**MBH05 / MBH05-03 / 6.00 – 6.50m:**

CLAY with organic inclusions, firm, highly plastic, mottled grey, brown & black, very moist.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
**Key Technical Person**
**Laboratory Manager**
**Babbage Geotechnical Laboratory**

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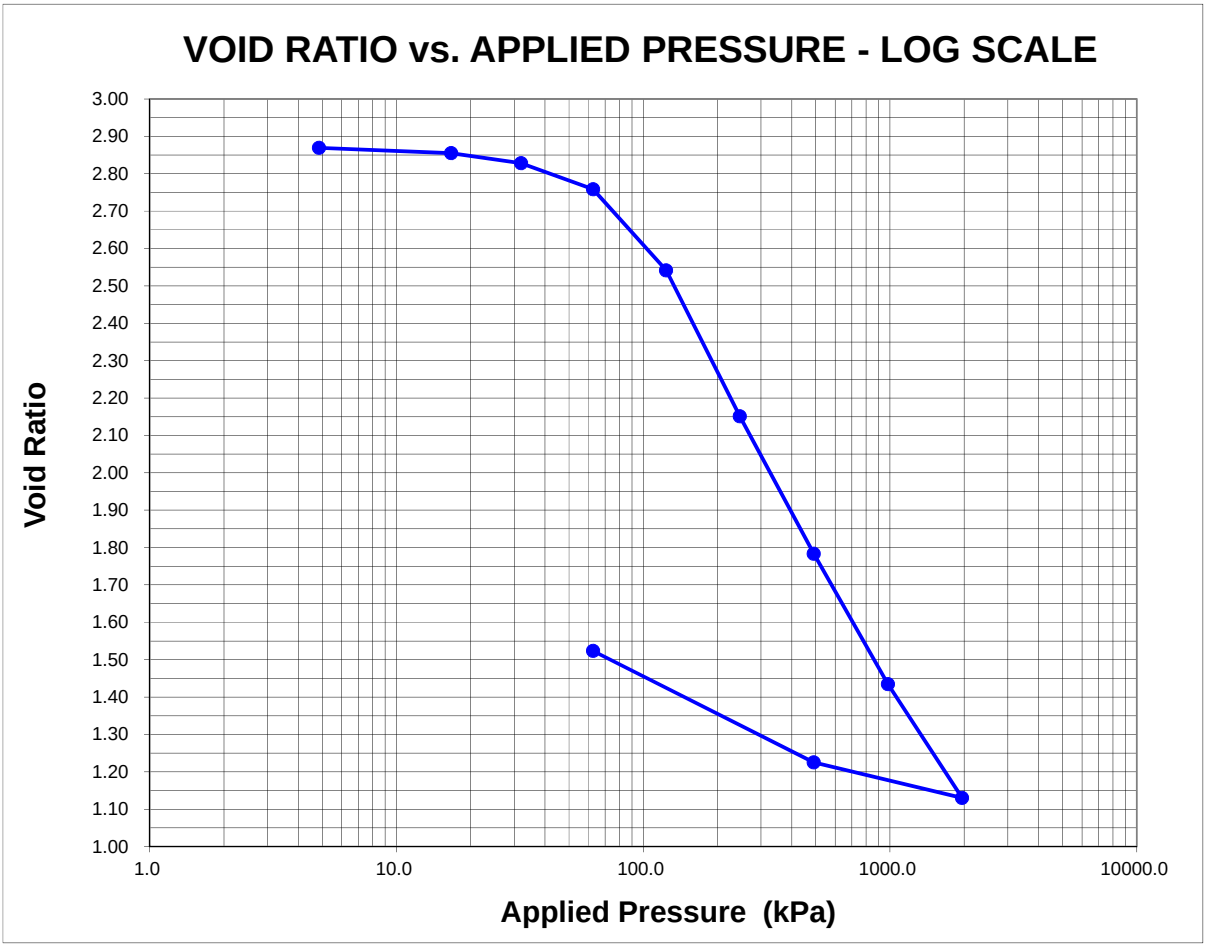
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## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 16-May-23 |
| | Checked By: | JF | 16-May-23 |

**Borehole No:** MBH05 **Sample No:** MBH05-03 **Depth:** 6.00 - 6.50m




### *SAMPLE HISTORY & PREPARATION*

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

### *TEST DETAILS*

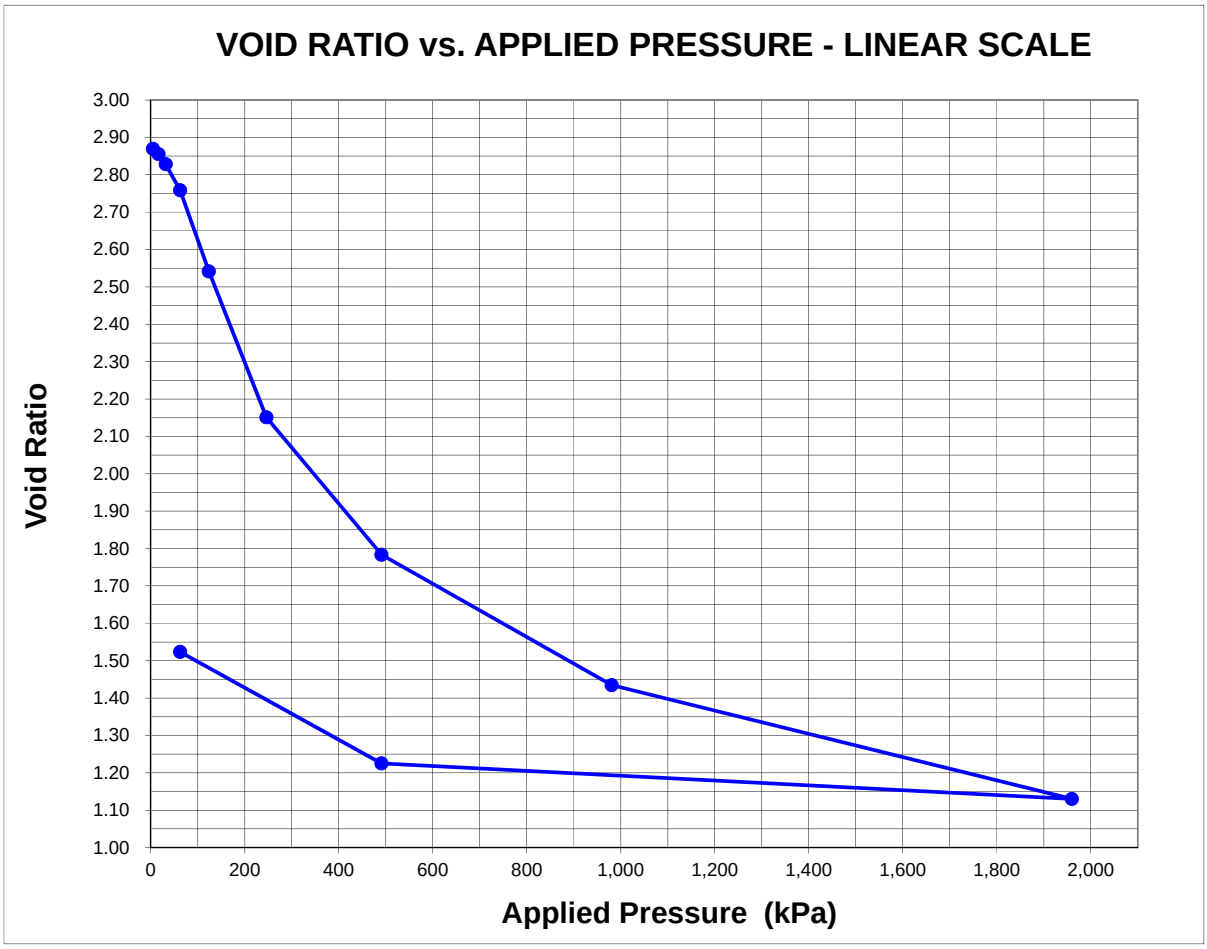
| | | | | | |
|---|---|---|---|---|---|
| Consol machine number: | 2 | | Surface area of sample top: | 2003 | $mm^2$ |
| Consol ring number: | 2b | | Sample mass: | 55.147 | g |
| Sample diameter: | 50.50 | mm | Initial bulk density: | 1.39 | $t/m^3$ |
| Sample height: | 19.80 | mm | Assumed solid density of soil particles: | 2.65 | $t/m^3$ |

| | | | | | | |
|---|---|---|---|---|---|---|
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| | ASP | | | | | |

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 16-May-23 |
| | Checked By: | JF | 16-May-23 |

**Borehole No:** MBH05 **Sample No:** MBH05-03 **Depth:** 6.00 - 6.50m




***PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING***



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| | PROJECT: | | | | Auth. By: | WEC |
| | ASP | | | | | |

# ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 16-May-23 |
| | Checked By: | JF | 16-May-23 |

**Borehole No:** MBH05 **Sample No:** MBH05-03 **Depth:** 6.00 - 6.50m

| Applied Pressure | Incremental Deflection | Sample Height | Compression Ratio | Height of Voids | Void Ratio | Coefficient of Volume Compressibility $m_v$ | Coefficient of Consolidation - $c_v$ (sqrt time) |
|---|---|---|---|---|---|---|---|
| kPa | mm | mm | | mm | e | $m^2$/MN | $m^2$/year |
| 4.9 | 0.000 | 19.800 | 1.000 | 14.683 | 2.869 | | |
| 16.7 | 0.072 | 19.728 | 0.996 | 14.611 | 2.855 | sample swelled after initial consolidation | |
| 32.0 | 0.138 | 19.590 | 0.989 | 14.473 | 2.828 | 0.46 | 12 |
| 62.6 | 0.357 | 19.234 | 0.971 | 14.116 | 2.759 | 0.59 | 11 |
| 123.8 | 1.111 | 18.123 | 0.915 | 13.006 | 2.542 | 0.94 | 3.0 |
| 246.2 | 1.997 | 16.126 | 0.814 | 11.008 | 2.151 | 0.90 | 0.92 |
| 491.0 | 1.881 | 14.244 | 0.719 | 9.127 | 1.784 | 0.48 | 0.45 |
| 980.6 | 1.786 | 12.458 | 0.629 | 7.341 | 1.434 | 0.26 | 0.30 |
| 1959.8 | 1.558 | 10.900 | 0.551 | 5.783 | 1.130 | 0.13 | 0.20 |
| 491.0 | -0.487 | 11.387 | 0.575 | 6.270 | 1.225 | | BACKLOAD 1 |
| 62.6 | -1.526 | 12.913 | 0.652 | 7.796 | 1.523 | | BACKLOAD 2 |

| Coefficient of Secondary Compression - $C_{sec}$ | |
|---|---|
| Applied Pressure | $C_{sec}$ |
| | |

| Coefficient of Permeability - k | |
|---|---|
| Applied Pressure | k (m/s) |
| | |

| | INITIAL | FINAL |
|---|---|---|
| Mass of dry sample (g) | 27.16 | 27.16 |
| Height of sample (mm) | 19.800 | 10.900 (after consolidation)<br>12.913 (after rebound) |
| Water Content (%) | 103 | 57.6 |
| Dry Density ($t/m^3$) | 0.68 | 1.24 |
| Height of soil particles (mm) | 5.117 | 5.117 |
| Void Ratio | 2.869 | 1.130 (after consolidation)<br>1.523 (after rebound) |
| Degree of saturation (%) | 95.2 | - |

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Please reply to: W.E. Campton



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Auckland 1144

Attention: **KIERAN BURSELL**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: WEC

8th September 2025

# ATTERBERG LIMITS & LINEAR SHRINKAGE TESTING

Dear Kieran,

## *Re: AUCKLAND SURF PARK, DAIRY FLAT*

***Your Reference: P-001537-2***
***Report Number: 63578#L/AL Auckland Surf Park***

The following report presents the results of Atterberg Limits & Linear Shrinkage testing at BGL of soil samples delivered to this laboratory on the 14th of August 2025. Test results are summarised below, with pages 3 & 4 showing where the samples plot on the Unified Soil Classification System (Casagrande) Chart.

Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402: 1986: Test 2.1 |
| **Liquid Limit:** | NZS4402: 1986: Test 2.2 |
| **Plastic Limit:** | NZS4402: 1986: Test 2.3 |
| **Plasticity Index:** | NZS4402: 1986: Test 2.4 |
| **Linear Shrinkage:** | NZS4402: 1986: Test 2.6 |

| Borehole Number | Sample Number | Depth (m) | Water Content (%) | Liquid Limit | Plastic Limit | Plasticity Index | Linear Shrinkage (%)* |
|---|---|---|---|---|---|---|---|
| TP101 | BULK | 0.50 – 1.00 | 37.0 | 78 | 25 | 53 | 19 |
| TP107 | BULK | 1.00 – 1.50 | 88.0 | 99 | 35 | 64 | 18 |
| TP108 | BULK | 0.50 – 1.00 | 127 | 148 | 53 | 95 | 22 |
| TP108 | BULK | 2.00 – 2.50 | 112 | - | - | - | - |

***The amount of shrinkage of the sample as a percentage of the original sample length.***

| Borehole Number | Sample Number | Depth (m) | Water Content (%) | Liquid Limit | Plastic Limit | Plasticity Index | Linear Shrinkage (%)* |
|---|---|---|---|---|---|---|---|
| HA102 | BAG | 1.20 – 1.40 | 35.3 | 74 | 19 | 55 | 17 |
| HA104 | BAG | 0.50 – 0.80 | 63.0 | 146 | 29 | 117 | 28 |
| HA114 | BAG | 0.40 – 0.70 | 59.6 | 144 | 28 | 116 | 24 |
| HA116 | BAG | 1.10 – 1.40 | 46.4 | 88 ◆ | 20 ◆ | 68 ◆ | 22 ◆ |
| HA121 | BAG | 0.30 – 0.60 | 51.7 | 131 | 19 | 112 | 25 |
| HA122 | BAG | 0.50 – 0.80 | 43.4 | 104 | 17 | 87 | 23 |
| HA128 | BAG | 0.50 – 0.80 | 33.8 | 62 | 22 | 40 | 14 |
| HA133 | BAG | 1.20 – 1.40 | 31.9 | 66 ◆ | 21 ◆ | 45 ◆ | 16 ◆ |
| HA140 | BAG | 0.30 – 0.50 | 28.4 | 55 | 33 | 22 | 12 |

***The amount of shrinkage of the sample as a percentage of the original sample length.***

◆ = ***The soil fraction passing a 0.425mm sieve was used for the liquid limit, plastic limit & linear shrinkage tests.***

The whole soils were used for the water content tests (the soils were in an unknown state), and for the liquid limit, plastic limit & linear shrinkage tests without a diamond beside them. The soil fractions passing a 0.425mm sieve were used for the liquid limit, plastic limit & linear shrinkage tests with a diamond (◆) beside them. The soils were wet up and dried where required for the liquid limit, plastic limit & linear shrinkage tests.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. Test 2.2: liquid limit, test 2.3: plastic limit, and test 2.6: linear shrinkage are reported to the nearest whole number.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test. Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

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| | | | | |
|---|---|---|---|---|
| BGL Babbage Geotechnical Laboratory | Job Number: | 63578#L | Sheet 1 of 1 | Page 3 of 4 |
| | Registration Number: | 2819 | | |
| | Report Number: | 63578#L/AL Auckland Surf Park | | |
| | Project: | AUCKLAND SURF PARK, DAIRY FLAT | | |

# DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4

| | | | | | |
|---|---|---|---|---|---|
| Tested By: | WC/JL/SG/CB | Aug / Sept 2025 | | | |
| Compiled By: | JF | 8/09/2025 | | | |
| Checked By: | JF | 8/09/2025 | | | |
| Version Number: | 8 | Version Date: | August 2025 | Authorised By: | Wayne Campton |

## SUMMARY OF TESTING

| Borehole Number | Sample Number | Depth (m) | Liquid Limit | Plastic Limit | Plasticity Index | Soil Classification Based on USCS Chart Below |
|---|---|---|---|---|---|---|
| TP101 | BULK | 0.50 - 1.00 | 78 | 25 | 53 | CH |
| TP107 | BULK | 1.00 - 1.50 | 99 | 35 | 64 | OH |
| TP108 | BULK | 0.50 - 1.00 | 148 | 53 | 95 | OH |
| HA102 | BAG | 1.20 - 1.40 | 74 | 19 | 55 | CH |
| HA104 | BAG | 0.50 - 0.80 | 146 | 29 | 117 | CH |
| HA114 | BAG | 0.40 - 0.70 | 144 | 28 | 116 | CH |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

*The chart below & soil classification terminology is taken from ASTM D2487-17 (Reapproved 2025) "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", February 2025, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.*

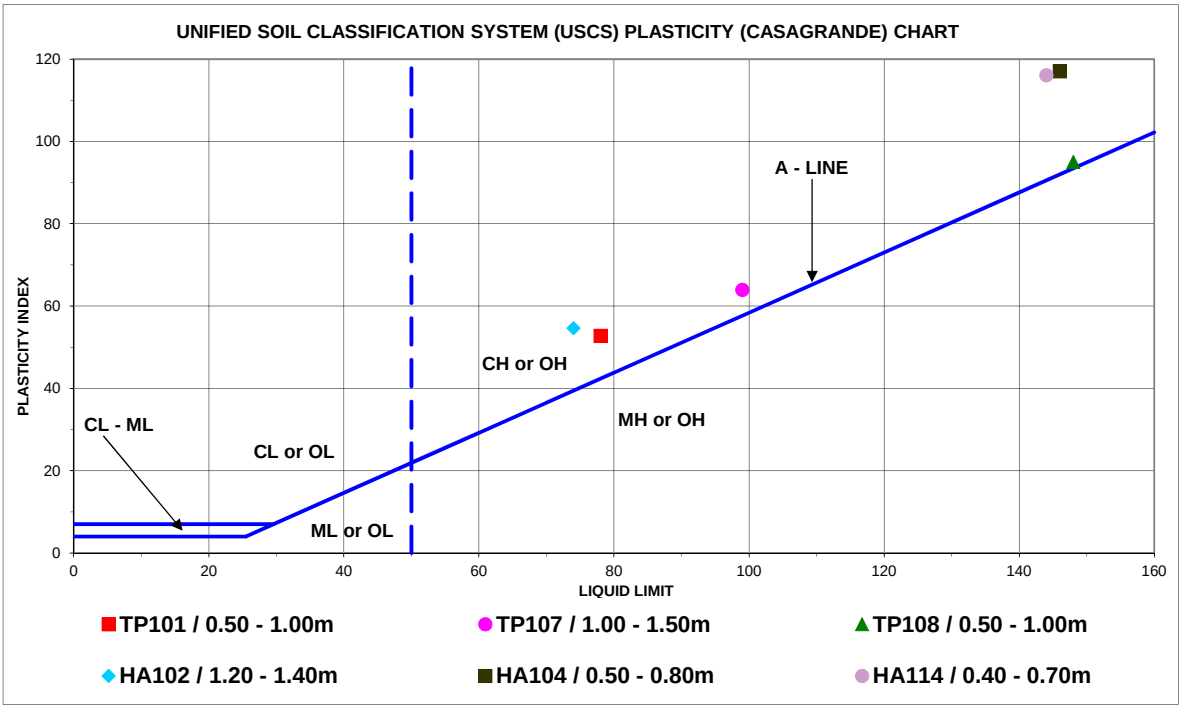



CHART LEGEND

CL = CLAY, low plasticity ('lean' clay)
OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit
ML = SILT, low liquid limit
CL - ML = SILTY CLAY
CH = CLAY, high plasticity ('fat' clay)
OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit
MH = SILT, high liquid limit ('elastic silt')

| | | | | | |
|---|---|---|---|---|---|
| BGL Babbage Geotechnical Laboratory | Job Number: | 63578#L | Sheet 1 of 1 | Page 4 of 4 | |
| | Registration Number: | 2819 | | | |
| | Report Number: | 63578#L/AL Auckland Surf Park | | | |
| | Project: | AUCKLAND SURF PARK, DAIRY FLAT | | | |

# DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4

| | | | |
|---|---|---|---|
| Tested By: | WC/JL/SG/CB | Aug / Sept 2025 | |
| Compiled By: | JF | 8/09/2025 | |
| Checked By: | JF | 8/09/2025 | |
| Version Number: | 8 | Version Date: | August 2025 |
| Authorised By: | Wayne Campton | | |

## SUMMARY OF TESTING

| Borehole Number | Sample Number | Depth (m) | Liquid Limit | Plastic Limit | Plasticity Index | Soil Classification Based on USCS Chart Below |
|---|---|---|---|---|---|---|
| HA116 | BAG | 1.10 - 1.40 | 88 | 20 | 68 | CH |
| HA121 | BAG | 0.30 - 0.60 | 131 | 19 | 112 | CH |
| HA122 | BAG | 0.50 - 0.80 | 104 | 17 | 87 | CH |
| HA128 | BAG | 0.50 - 0.80 | 62 | 22 | 40 | CH |
| HA133 | BAG | 1.20 - 1.40 | 66 | 21 | 45 | CH |
| HA140 | BAG | 0.30 - 0.50 | 55 | 33 | 22 | MH |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

*The chart below & soil classification terminology is taken from ASTM D2487-17 (Reapproved 2025) "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", February 2025, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.*

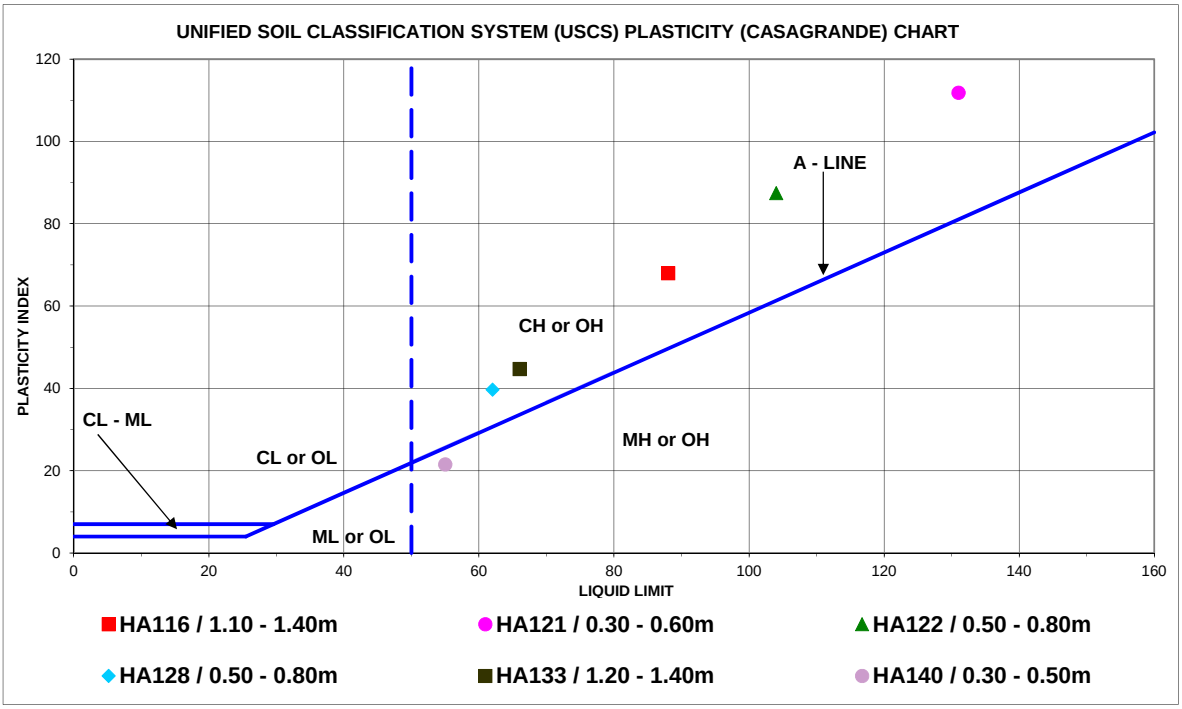



CHART LEGEND

CL = CLAY, low plasticity ('lean' clay)
OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit
ML = SILT, low liquid limit
CL - ML = SILTY CLAY
CH = CLAY, high plasticity ('fat' clay)
OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit
MH = SILT, high liquid limit ('elastic silt')

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Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
Ponsonby,
Auckland 1144

Attention: **KIERAN BURSELL**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: WEC

8th September 2025

# DRY DENSITY / WATER CONTENT RELATIONSHIP (COMPACTION CURVE) TESTING

Dear Kieran,

## *Re: AUCKLAND SURF PARK, DAIRY FLAT*

***Your Reference: P-001537-2***
***Report Number: 63578#L/CC Auckland Surf Park***

The following report presents the results of compaction curve testing at BGL of a bulk soil sample delivered to this laboratory on the 14th of August 2025. Test results are summarised below, with page 3 showing a graph and detailed results.

A single shear vane test was carried out on each compacted sample while it was still in the proctor mould, and these results are included on the results table and water content / density graph. The shear vane results are included for your information only, and are not included in the IANZ endorsement for this report.

Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402: 1986: Test 2.1 |
| **NZ Standard Compaction:** | NZS4402: 1986: Test 4.1.1 |
| **Vane Shear Strength:** | NZ Geotechnical Society Guideline 2001 |

| Sample Identification | Maximum Dry Density ($t/m^3$) | Optimum Water Content (%) | As-received Water Content (%) | Assumed Solid Density ($t/m^3$) |
|---|---|---|---|---|
| **TP101 / BULK / 0.50 – 1.00m** | **1.40** | **29** | **34.5** | **2.61** |
| | CLAY, fine sandy, moderately to highly plastic, light grey with orange mottles, moist. | | | |

*Note that sample descriptions are not part of BGL IANZ Accreditation.*

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 4.1.1: New Zealand Standard Compaction Test, maximum dry density is reported to the nearest 0.01t/m$^3$, optimum water content is reported to the nearest 0.2% for values below 5%, to the nearest 0.5% for values from 5 to 10%, and to the nearest whole number for values greater than 10%.

For calculating the air voids percentages the assumed solid density in the table above was used. Please note that this assumed values is not part of the IANZ endorsement for this report.

Please note that the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

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IANZ
TESTING LABORATORY
№ 126

Tests indicated as not accredited are outside the scope of the laboratory's accreditation. This report may not be reproduced except in full & with written approval from BGL.

| | | | |
|---|---|---|---|
| Babbage Geotechnical Laboratory | Job Number: | 63578#L | Page 3 of 3 |
| | Registration Number: | 2819 | |
| | Report Number: | 63578#L/CC Auckland Surf Park | |
| | PROJECT: | AUCKLAND SURF PARK, DAIRY FLAT | |

**Determination of the Dry Density / Water Content Relationship by Standard Compaction**

Test Method: NZS4402: 1986: Test 4.1.1

| | | | |
|---|---|---|---|
| Tested By: | SG | Aug / Sept 25 | |
| Compiled By: | SG | 5/09/2025 | |
| Checked By: | JF | 8/09/2025 | |

| Version Number: | 5 | Version Date: | February 2023 | Authorised By: | W. Campton |
|---|---|---|---|---|---|

**Sample ID:** TP101 / BULK **Sample Depth:** 0.50 - 1.00m

**Sample History:** Air-dried and wetted from as-received water content

**Compaction Used:** New Zealand Standard Compaction

**Test Performed On:** Whole Soil / ~~Fraction Passing the 19mm Sieve~~

**Solid Density of Soil Particles:** 2.61 t/m$^3$ (~~measured~~ / assumed)

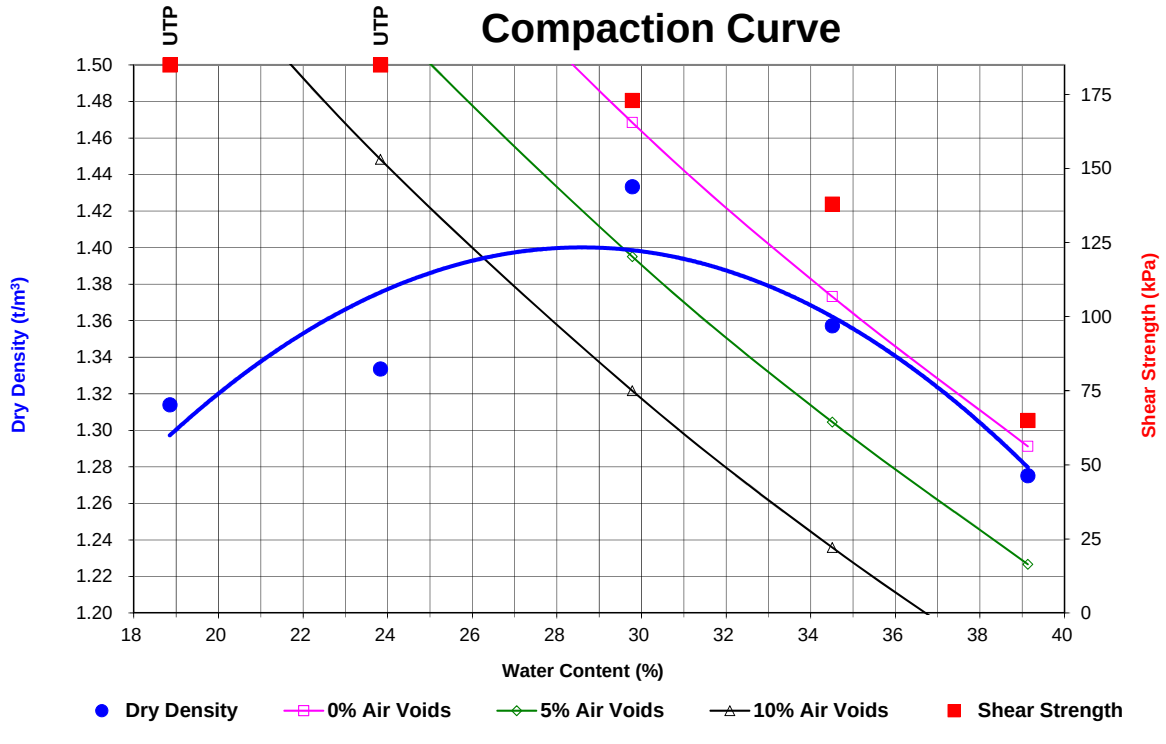
**As-received Water Content (%): 34.5**

## TEST RESULTS

| Water Content (%) | 18.8 | 23.8 | 29.8 | 34.5 | 39.1 |
|---|---|---|---|---|---|
| Bulk Density (t/m$^3$) | 1.56 | 1.65 | 1.86 | 1.83 | 1.77 |
| Dry Density (t/m$^3$) | 1.31 | 1.33 | 1.43 | 1.36 | 1.28 |
| Air Voids (%) | 24.9 | 17.1 | 2.4 | 1.2 | 1.2 |
| Shear Strength (kPa) | UTP* | UTP* | 173 | 138 | 65 |

***UTP = unable to penetrate sample with the shear vane.***

| Maximum Dry Density: | 1.40 t/m$^3$ | Optimum Water Content: | 29 % |
|---|---|---|---|



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Please reply to: W.E. Campton



INITIA LTD.
PO Box 47647,
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Auckland 1144

Attention: **KIERAN BURSELL**

Job Number: 63578#L
BGL Registration Number: 2819
Checked by: WEC

3rd September 2025

# SOAKED CALIFORNIA BEARING RATIO (CBR) TESTING

Dear Kieran,

## *Re: AUCKLAND SURF PARK, DAIRY FLAT*

***Your Reference: P-001537-2***
***Report Number: 63578#L/CBR Auckland Surf Park***

The following report presents the results of soaked California Bearing Ratio testing at BGL of bulk soil samples delivered to this laboratory on the 14th of August 2025. Test results are summarised below, with the following pages showing graphs and detailed results.

Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402: 1986: Test 2.1 |
| **NZ Standard Compaction:** | NZS4402: 1986: Test 4.1.1 |
| **California Bearing Ratio (CBR) – Remoulded:** | NZS4402: 1986: Test 6.1.1 (soaked) |

The bulk samples were sieved through a 19.0mm sieve to remove any oversized material if present, and then through a 9.5mm aperture sieve to break up the soil (*which is a departure from the NZS4402 Standard which requires a 4.75mm sieve to be used*). The samples were then compacted into CBR moulds using the NZ Standard Compaction method. The compacted samples were then soaked for four days. The CBR values were then measured using a plunger penetration rate of 1mm per minute.

| Sample Details | Water Content (%) | | Dry Density ($t/m^3$) | CBR (soaked) | Swell (%) |
|---|---|---|---|---|---|
| | Initial (trimmings) | After Testing (under plunger) | | | |
| **TP101 / BULK / 0.50 – 1.00m** | **34.2** | **38.8** | **1.34** | **2.5** | **2.2** |
| | CLAY, fine sandy, moderately to highly plastic, light grey with orange mottles, moist. | | | | |

*Note that sample descriptions are not part of BGL IANZ Accreditation.*

| Sample Details | Water Content (%) | | Dry Density ($t/m^3$) | CBR (soaked) | Swell (%) |
|---|---|---|---|---|---|
| | Initial (trimmings) | After Testing (under plunger) | | | |
| **TP112 / BULK / 1.00 – 1.50m** | **42.7** | **41.9** | **1.22** | **1.0** | **0.6** |
| | CLAY, highly plastic, light grey with orange & brown mottles, very moist, organic inclusions. | | | | |

*Note that sample descriptions are not part of BGL IANZ Accreditation.*

Note that a solid density value of 2.65t/m$^3$ was used in the calculation of the air voids for these compacted samples. This value is assumed, and is not part of the IANZ endorsement for this report.

As per the reporting requirements of NZS4402: 1986: Test 6.1.1, dry density is reported to the nearest 0.02t/m$^3$, swell to the nearest 0.2%, CBR's > 20 to the nearest 5, CBR's between 5 and 20 to the nearest 1, and for CBR's < 5 to the nearest 0.5. As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

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All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

| | | | |
|---|---|---|---|
| Babbage Geotechnical Laboratory | Job Number: | 63578#L | Report Number: |
| | Registration Number: | 2819 | 63578#L/CBR Auckland Surf Park |
| | PROJECT: | AUCKLAND SURF PARK, DAIRY FLAT | |

# CALIFORNIA BEARING RATIO TEST: REMOULDED SAMPLE, SOAKED

**Test Methods: NZS4402: 1986: Test 6.1.1 - California Bearing Ratio / NZS4402: 1986: Test 2.1 - Water Content**

| | Initials | Date |
|---|---|---|
| Tested By: | SG | 2/09/2025 |
| Compiled By: | SG | 3/09/2025 |
| Checked By: | JF | 3/09/2025 |

| Version Number: | 4 | Version Date: | September 2022 | Authorised By: | Wayne Campton |
|---|---|---|---|---|---|

| | |
|---|---|
| Sample Identification: | TP101 / BULK |
| Sample Depth (m): | 0.50 - 1.00m |
| Sample History: | ~~dried / wetted / lime added / cement added /~~ unknown ~~/ natural~~ |
| Compaction Used: | NZ Standard Compaction / ~~NZ Heavy Compaction~~ |

| | |
|---|---|
| Proving Ring Number: | 122-3-508 |
| Ring Calibration Factor: | 99.84 |
| (dial divisions / kN: from calibration worksheet) | |

## SOAKED CBR

| | | |
|---|---|---|
| Soil Sieved Through: | 19.0 & 9.5 | mm sieves |
| Surcharge Used: | 4.00 | kg |
| Mould Number: | B1 | |

### BULK DENSITY

| | | |
|---|---|---|
| Mass Mould + Base + Soil | 10,767.60 | (g) |
| Mass Mould + Base | 6,624.60 | (g) |
| Volume Mould (from calibration) | 2,308.00 | (ml) |
| **Bulk Density** | **1.80** | ($t/m^3$) |

| WATER CONTENT | Before (trimmings) | After (under plunger) |
|---|---|---|
| Mass Wet Soil + Tin (g) | 475.943 | 363.148 |
| Mass Dry Soil + Tin (g) | 380.380 | 290.492 |
| Mass Tin (g) | 101.355 | 103.402 |
| **Water Content (%)** | **34.2** | **38.8** |
| **Dry Density ($t/m^3$)** | **1.34** | |

### DETERMINATION OF SWELL

| | |
|---|---|
| Initial Reading (mm) | 15.21 |
| Final Reading (mm) | 18.07 |
| Change in Height (mm) | 2.86 |
| Initial Height (mm) | 126.94 |
| **Swell (%)** | **2.2** |

| | | |
|---|---|---|
| Air Voids: | 3.7 | % |
| Time of Soaking: | 4 | days |
| Plunger Penetration Rate: | 1.0 | mm / minute |

### DETERMINATION OF BEARING VALUE

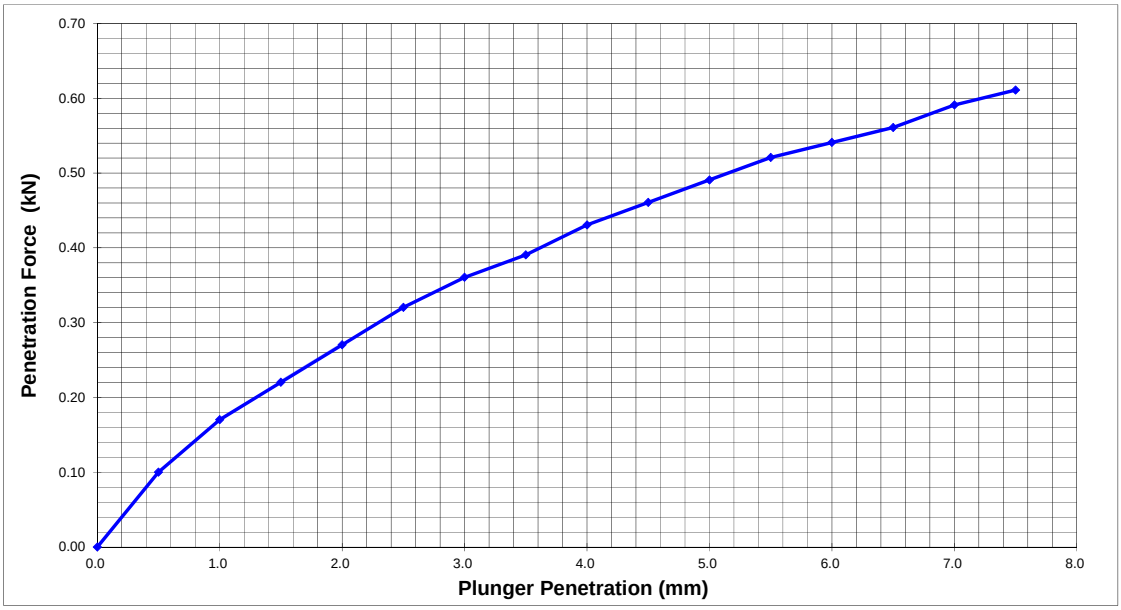
| Plunger Penetration (mm) | Proving Ring Dial (divisions) | Force (kN) |
|---|---|---|
| 0.0 | 0.0 | 0.00 |
| 0.5 | 10.0 | 0.10 |
| 1.0 | 17.0 | 0.17 |
| 1.5 | 22.0 | 0.22 |
| 2.0 | 27.0 | 0.27 |
| 2.5 | 32.0 | 0.32 |
| 3.0 | 36.0 | 0.36 |
| 3.5 | 39.0 | 0.39 |
| 4.0 | 43.0 | 0.43 |
| 4.5 | 46.0 | 0.46 |
| 5.0 | 49.0 | 0.49 |
| 5.5 | 52.0 | 0.52 |
| 6.0 | 54.0 | 0.54 |
| 6.5 | 56.0 | 0.56 |
| 7.0 | 59.0 | 0.59 |
| 7.5 | 61.0 | 0.61 |

| | |
|---|---|
| **2.5mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **2.4** |
| ***with curve shape correction (if needed)*** | **2.4** |
| **5.0mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **2.5** |
| ***with curve shape correction (if needed)*** | **2.5** |

**FINAL CBR VALUE: 2.5**

| | | |
|---|---|---|
| Lime Added: | 0.0 | % |
| Cement Added: | 0.0 | % |

## CBR FORCE-PENETRATION CURVE



| | | | |
|---|---|---|---|
| Babbage Geotechnical Laboratory | Job Number: | 63578#L | Report Number: |
| | Registration Number: | 2819 | 63578#L/CBR Auckland Surf Park |
| | PROJECT: | AUCKLAND SURF PARK, DAIRY FLAT | |

# CALIFORNIA BEARING RATIO TEST: REMOULDED SAMPLE, SOAKED

**Test Methods: NZS4402: 1986: Test 6.1.1 - California Bearing Ratio / NZS4402: 1986: Test 2.1 - Water Content**

| | Initials | Date |
|---|---|---|
| Tested By: | SG | 2/09/2025 |
| Compiled By: | SG | 3/09/2025 |
| Checked By: | JF | 3/09/2025 |

| Version Number: | 4 | Version Date: | September 2022 | Authorised By: | Wayne Campton |
|---|---|---|---|---|---|

| | |
|---|---|
| Sample Identification: | TP112 / BULK |
| Sample Depth (m): | 1.00 - 1.50m |
| Sample History: | ~~dried / wetted / lime added / cement added /~~ unknown ~~/ natural~~ |
| Compaction Used: | NZ Standard Compaction / ~~NZ Heavy Compaction~~ |

| | |
|---|---|
| Proving Ring Number: | 122-3-508 |
| Ring Calibration Factor: | 99.84 |
| (dial divisions / kN: from calibration worksheet) | |

## SOAKED CBR

| | | |
|---|---|---|
| Soil Sieved Through: | 19.0 & 9.5 | mm sieves |
| Surcharge Used: | 4.00 | kg |
| Mould Number: | B4 | |

### BULK DENSITY

| | | |
|---|---|---|
| Mass Mould + Base + Soil | 10,935.60 | (g) |
| Mass Mould + Base | 6,915.00 | (g) |
| Volume Mould (from calibration) | 2,308.00 | (ml) |
| **Bulk Density** | **1.74** | ($t/m^3$) |

| WATER CONTENT | Before (trimmings) | After (under plunger) |
|---|---|---|
| Mass Wet Soil + Tin (g) | 337.125 | 387.234 |
| Mass Dry Soil + Tin (g) | 268.230 | 303.419 |
| Mass Tin (g) | 106.842 | 103.249 |
| **Water Content (%)** | **42.7** | **41.9** |
| **Dry Density ($t/m^3$)** | **1.22** | |

### DETERMINATION OF SWELL

| | |
|---|---|
| Initial Reading (mm) | 9.80 |
| Final Reading (mm) | 10.45 |
| Change in Height (mm) | 0.65 |
| Initial Height (mm) | 126.94 |
| **Swell (%)** | **0.6** |

| | | |
|---|---|---|
| Air Voids: | 1.8 | % |
| Time of Soaking: | 4 | days |
| Plunger Penetration Rate: | 1.0 | mm / minute |

### DETERMINATION OF BEARING VALUE

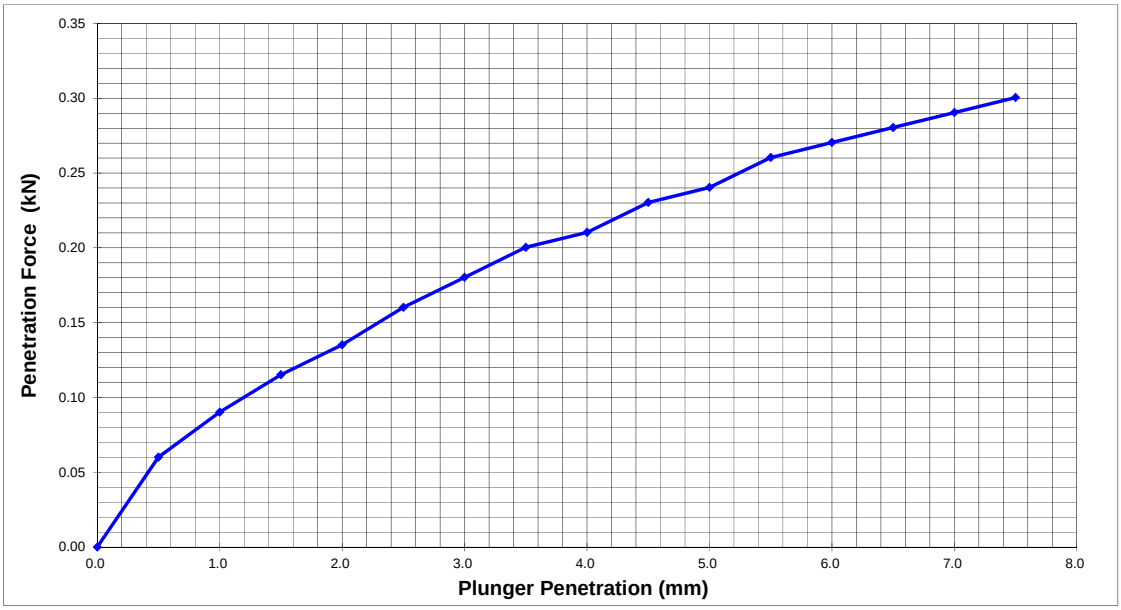
| Plunger Penetration (mm) | Proving Ring Dial (divisions) | Force (kN) |
|---|---|---|
| 0.0 | 0.0 | 0.00 |
| 0.5 | 6.0 | 0.06 |
| 1.0 | 9.0 | 0.09 |
| 1.5 | 11.5 | 0.12 |
| 2.0 | 13.5 | 0.14 |
| 2.5 | 16.0 | 0.16 |
| 3.0 | 18.0 | 0.18 |
| 3.5 | 20.0 | 0.20 |
| 4.0 | 21.0 | 0.21 |
| 4.5 | 23.0 | 0.23 |
| 5.0 | 24.0 | 0.24 |
| 5.5 | 26.0 | 0.26 |
| 6.0 | 27.0 | 0.27 |
| 6.5 | 28.0 | 0.28 |
| 7.0 | 29.0 | 0.29 |
| 7.5 | 30.0 | 0.30 |

| | |
|---|---|
| **2.5mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **1.2** |
| ***with curve shape correction (if needed)*** | **1.2** |
| **5.0mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **1.2** |
| ***with curve shape correction (if needed)*** | **1.2** |

**FINAL CBR VALUE: 1.0**

| | | |
|---|---|---|
| Lime Added: | 0.0 | % |
| Cement Added: | 0.0 | % |

## CBR FORCE-PENETRATION CURVE



R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

**0508 HILL LAB** (44 555 22)
+64 7 858 2000
mail@hill-labs.co.nz
www.hill-labs.co.nz

# Certificate of Analysis



| | | | |
|---|---|---|---|
| **Client:** | Initia Limited | **Lab No:** | 3963527 SPv1 |
| **Contact:** | Kieran Bursell | **Date Received:** | 18-Aug-2025 |
| | C/- Initia Limited | **Date Reported:** | 29-Aug-2025 |
| | PO Box 47647 | **Quote No:** | 137100 |
| | Ponsonby | **Order No:** | P-001537-2 |
| | Auckland 1144 | **Client Reference:** | Surf Park Stage 2 |
| | | **Submitted By:** | Kieran Bursell |

**Sample Type: Soil**

| | | | | |
|---|---|---|---|---|
| **Sample Name:** | | TP107-1 (1-1.5m depth) 07-Aug-2025 | TP108-1 (0.5-1m depth) 07-Aug-2025 | TP108-2 (2-2.5m depth) 07-Aug-2025 |
| **Lab Number:** | | 3963527.1 | 3963527.2 | 3963527.3 |
| Organic Matter Content | % | 9.7 | 12.7 | 11.8 |

# Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively simple matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis. A detection limit range indicates the lowest and highest detection limits in the associated suite of analytes. A full listing of compounds and detection limits are available from the laboratory upon request. Unless otherwise indicated, analyses were performed at Hill Labs, 28 Duke Street, Frankton, Hamilton 3204.

**Sample Type: Soil**

| Test | Method Description | Default Detection Limit | Sample No |
|---|---|---|---|
| Organic Matter titration | Organic Matter Content by Titration<br>Determination of the Organic Matter Content; Standard Method by Titration; Methods of Testing Soils for Civil Engineering Purposes; Part 3 Soil Chemical Tests; Standard Association of New Zealand: NZS 4402: 1986: Test 3.1.1. | 0.2 % | 1-3 |

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Testing was completed on 29-Aug-2025. For completion dates of individual analyses please contact the laboratory.

Samples are held at the laboratory after reporting for a length of time based on the stability of the samples and analytes being tested (considering any preservation used), and the storage space available. Once the storage period is completed, the samples are discarded unless otherwise agreed with the customer. Extended storage times may incur additional charges.

This certificate of analysis must not be reproduced, except in full, without the written consent of the signatory.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

# Appendix E Aurecon Laboratory Testing Results

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wec@babbage.co.nz

Please reply to: W.E. Campton



Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Attention: **DAVID BOSSE**

Job Number: 64746#L
BGL Registration Number: 2931
Checked by: WEC

19th May 2023

# ATTERBERG LIMITS & LINEAR SHRINKAGE TESTING

Dear Sir,

## *Re: SPARK DC*

***Your Reference: P523578***
***Report Number: 64746#L/AL Spark DC***

The following report presents the results of Atterberg Limits & Linear Shrinkage testing at BGL of soil samples delivered to this laboratory on the 2nd of May 2023. Test results are summarised below, with page 3 showing where the samples plot on the Unified Soil Classification System (Casagrande) Chart. Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **Liquid Limit:** | NZS4402:1986:Test 2.2 |
| **Plastic Limit:** | NZS4402:1986:Test 2.3 |
| **Plasticity Index:** | NZS4402:1986:Test 2.4 |
| **Linear Shrinkage:** | NZS4402:1986:Test 2.6 |

| Borehole Number | Sample Number | Depth (m) | Water Content (%) | Liquid Limit | Plastic Limit | Plasticity Index | Linear Shrinkage (%)* |
|---|---|---|---|---|---|---|---|
| AU23-BH01 | PT1 | 1.00 – 1.50 | 263 | 170 | 99 | 71 | 31 |
| AU23-BH02 | BS1 | 0.50 – 0.70 | 32.0 | 53 | 27 | 26 | 9 |
| AU23-BH02 | PT1 | 7.00 – 7.50 | 94.0 | 157 | 34 | 123 | - |
| AU23-BH06 | PT1 | 0.50 – 1.00 | 35.4 | 68 ◆ | 25 ◆ | 43 ◆ | 21 ◆ |
| AU23-BH06 | BS2 | 7.95 – 8.20 | 69.8 | 101 | 28 | 73 | - |
| AU23-BH08 | PT1 | 3.00 – 3.45 | 113 | 176 | 44 | 132 | - |

***The amount of shrinkage of the sample as a percentage of the original sample length.***

◆ = ***The soil fraction passing a 425$\mu$m sieve was used for the liquid limit, plastic limit & linear shrinkage tests.***

Please note that the linear shrinkage test was not carried out for the samples with a dash in the Linear Shrinkage column.

The whole soils were used for the water content tests (the soils were in a natural state), and for the liquid limit, plastic limit & linear shrinkage tests without a diamond beside them. The soil fractions passing a 0.425mm sieve were used for the liquid limit, plastic limit & linear shrinkage tests with a diamond (◆) beside them. The soils were wet up and dried where required for the liquid limit, plastic limit & linear shrinkage tests.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. Test 2.2: liquid limit, test 2.3: plastic limit, and test 2.6: linear shrinkage are reported to the nearest whole number.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

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IANZ
TESTING LABORATORY
№ 126

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| | | | |
|---|---|---|---|
| Babbage Geotechnical Laboratory | Job Number: 64746#L | Sheet 1 of 1 | Page 3 of 3 |
| | Reg. Number: 2931 | Version No: | 7 |
| | Report No: 64746#L/AL Spark DC | Version Date: | July 2022 |
| | Project: | SPARK DC | |

# DETERMINATION OF THE LIQUID LIMIT, PLASTIC LIMIT & THE PLASTICITY INDEX

Test Methods: NZS4402: 1986: Test 2.2, Test 2.3 and Test 2.4

| | | |
|---|---|---|
| Tested By: | TL | May 2023 |
| Compiled By: | JF | 19/05/2023 |
| Checked By: | JF | 19/05/2023 |

## SUMMARY OF TESTING

| Borehole Number | Sample Number | Depth (m) | Liquid Limit | Plastic Limit | Plasticity Index | Soil Classification Based on USCS Chart Below |
|---|---|---|---|---|---|---|
| AU23-BH01 | PT1 | 1.00 - 1.50 | 170 | 99 | 71 | OH - fibrous peat |
| AU23-BH02 | BS1 | 0.50 - 0.70 | 53 | 27 | 26 | CH |
| AU23-BH02 | PT1 | 7.00 - 7.50 | 157 | 34 | 123 | OH - organic clay |
| AU23-BH06 | PT1 | 0.50 - 1.00 | 68 | 25 | 43 | OH - organic clay |
| AU23-BH06 | BS2 | 7.95 - 8.20 | 101 | 28 | 73 | CH |
| AU23-BH08 | PT1 | 3.00 - 3.45 | 176 | 44 | 132 | OH - organic clay |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

*The chart below & soil classification terminology is taken from ASTM D2487-17$^{e1}$ "Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)", April 2020, & is based on the classification scheme developed by A. Casagrande in the 1940's (Casagrande, A., 1948: Classification and identification of soil. Transactions of the American Society of Civil Engineers, v. 113, p. 901-930). The chart below & the soil classification given in the table above are included for your information only, and are not included in the IANZ endorsement for this report.*

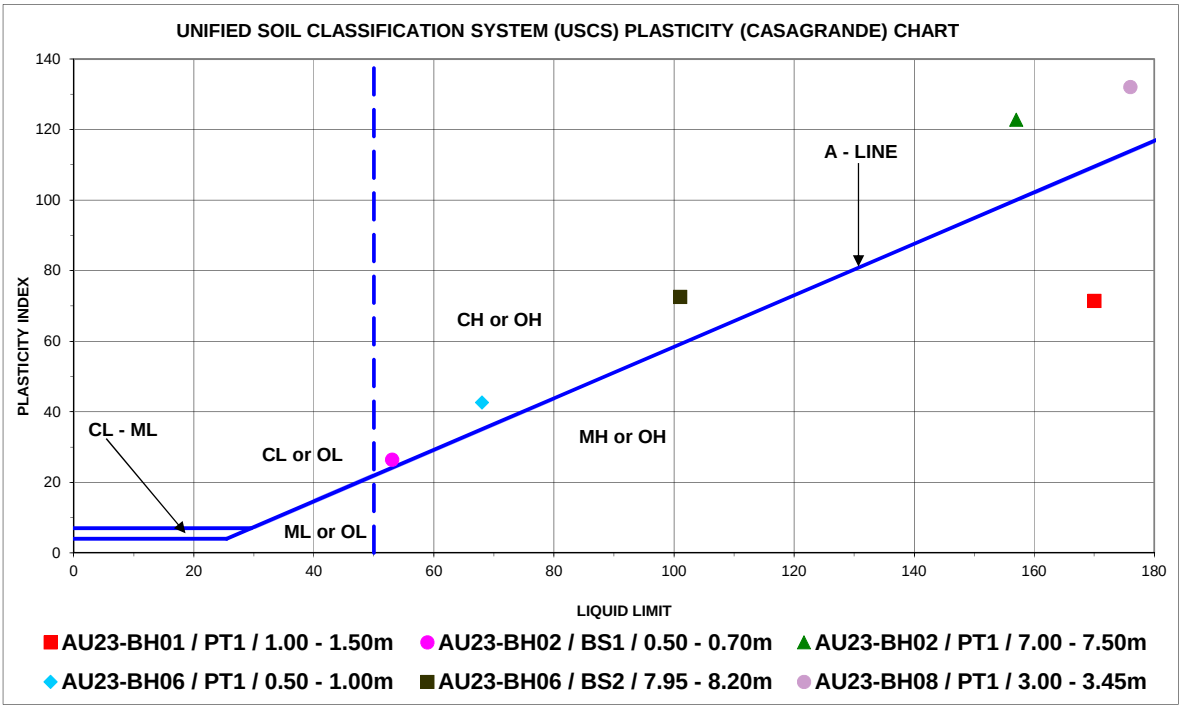



CHART LEGEND

CL = CLAY, low plasticity ('lean' clay)
CH = CLAY, high plasticity ('fat' clay)
OL = ORGANIC CLAY or ORGANIC SILT, low liquid limit
OH = ORGANIC CLAY or ORGANIC SILT, high liquid limit
ML = SILT, low liquid limit
MH = SILT, high liquid limit ('elastic silt')
CL - ML = SILTY CLAY

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Please reply to: W.E. Campton



Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Attention: **DAVID BOSSE**

Job Number: 64746#L
BGL Registration Number: 2931
Checked by: WEC

23rd May 2023

# HYDROMETER PARTICLE-SIZE DISTRIBUTION TESTING

Dear Sir,

## *Re: SPARK DC*

***Your Reference: P523578***
***Report Number: 64746#L/HYD Spark DC***

The following report presents the results of hydrometer particle-size distribution testing at BGL of soil samples delivered to this laboratory on the 2nd of May 2023. Test results are summarised below, with the following pages showing graphs and detailed results. Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **Wet Sieve Test:** | NZS4402:1986:Test 2.8.1 |
| **Hydrometer Test:** | NZS4402:1986:Test 2.8.4 |

| Borehole Number | Sample Number | Depth (m) | Hydrometer Grading (% of Dry Mass) | | | |
|---|---|---|---|---|---|---|
| | | | GRAVEL (2 – <9.50mm) | SAND (0.06 – 2mm) | SILT FRACTION (0.002 – 0.06mm) | CLAY FRACTION (< 0.002mm) |
| AU23-BH02 | PT1 | 7.00 – 7.50 | 0 | 1 | 25 | 74 |
| AU23-BH06 | BS1 | 1.00 – 1.20 | 0 | 1 | 10 | 89 |
| AU23-BH06 | BS2 | 7.95 – 8.20 | 0 | 5 | 51 | 44 |
| AU23-BH07 | PT1 | 4.50 – 5.00 | 0 | 5 | 54 | 41 |

The whole soils were used for these hydrometer tests. As the organic content of the soils tested was very low, peroxide pretreatment was not carried out. A solid density of 2.65t/m$^3$ was assumed for these hydrometer tests, and is not part of the IANZ endorsement for this report.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. Test 2.8.1: wet sieve & Test 2.8.4: hydrometer, the 'percentages passing' and 'percentages finer than' are reported to nearest 1%.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

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|---|---|---|---|---|
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| | Report No: | 64746#L/HYD Spark DC | Issue Date: | July 2022 |
| | Project: | SPARK DC | | |

# PARTICLE-SIZE DISTRIBUTION BY HYDROMETER

Test Methods: NZS4402: 1986: Test 2.1, Test 2.8.1, Test 2.8.4

| | | |
|---|---|---|
| Tested By: | WEC | 22-May-23 |
| Compiled By: | WEC | 23-May-23 |
| Checked By: | JF | 23-May-23 |

**BH:** AU23-BH02 **Sample No:** PT1 **Depth:** 7.00 - 7.50m

***Water Content (%):*** **94.0**

Sample History: Natural / ~~Air Dried / Oven Dried / Unknown~~

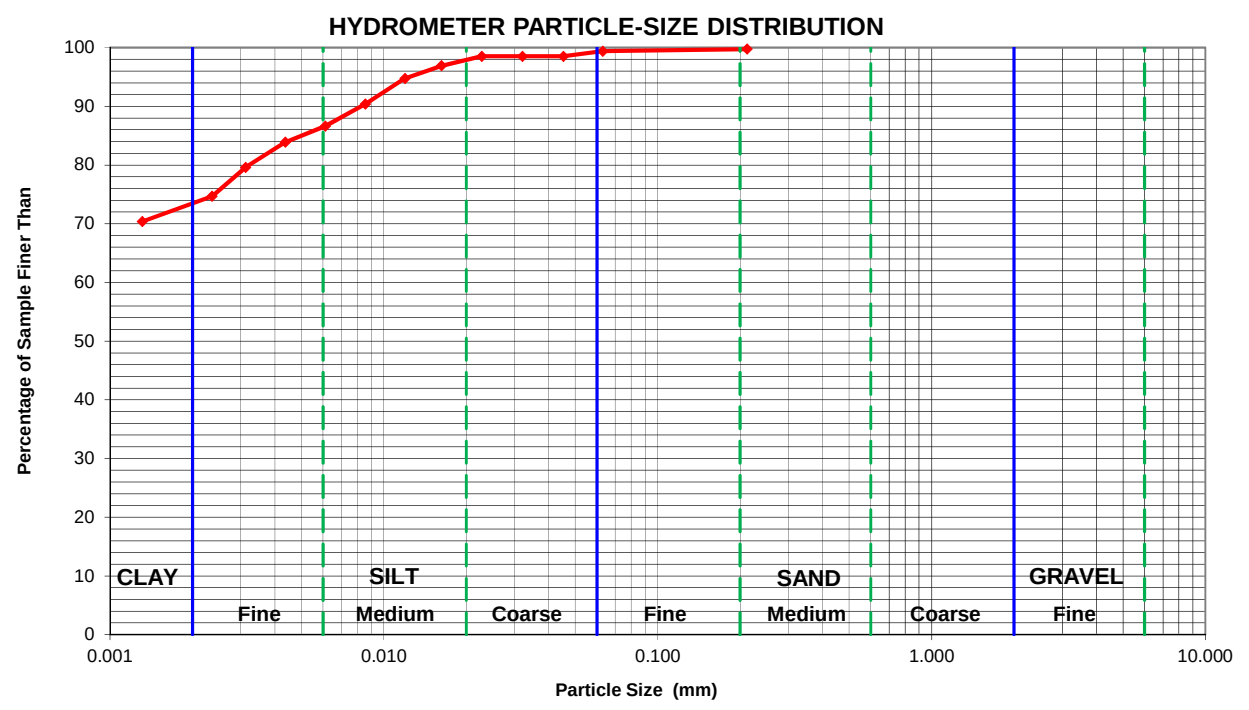
pH of sedimentation suspension: 8.5

| Particle Size (mm) | % Finer Than |
|---|---|
| 0.212 | 100 |
| 0.063 | 99 |
| 0.045 | 99 |
| 0.032 | 99 |
| 0.023 | 99 |
| 0.016 | 97 |
| 0.012 | 95 |
| 0.0086 | 90 |
| 0.0061 | 87 |
| 0.0044 | 84 |
| 0.0031 | 80 |
| 0.0024 | 75 |
| 0.0013 | 70 |

**HYDROMETER ANALYSIS (% of dry mass)**

| | | | | TOTAL | |
|---|---|---|---|---|---|
| GRAVEL: | (Medium) | *< 9.5 - 6mm* | 0 | 0 | % |
| | (Fine) | *6 - 2mm* | 0 | | |
| SAND: | (Coarse) | *2.0 - 0.6mm* | 0 | | |
| | (Medium) | *0.6 - 0.2mm* | 0 | 1 | % |
| | (Fine) | *0.2 - 0.06mm* | 1 | | |
| SILT FRACTION: | (Coarse) | *0.06 - 0.02mm* | 1 | | |
| | (Medium) | *0.02 - 0.006mm* | 12 | 25 | % |
| | (Fine) | *0.006 - 0.002mm* | 12 | | |
| CLAY FRACTION: | *< 0.002mm* | | | 74 | % |
| | | | | 100% | |

**HYDROMETER TEST WAS CARRIED OUT ON THE WHOLE SOIL**



| | | | | |
|---|---|---|---|---|
| Babbage Geotechnical Laboratory | Job Number: | 64746#L | Sheet 1 of 1 | Page 4 of 6 |
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| | Report No: | 64746#L/HYD Spark DC | Issue Date: | July 2022 |
| | Project: | SPARK DC | | |

# PARTICLE-SIZE DISTRIBUTION BY HYDROMETER

Test Methods: NZS4402: 1986: Test 2.1, Test 2.8.1, Test 2.8.4

| | | |
|---|---|---|
| Tested By: | WEC | 22-May-23 |
| Compiled By: | WEC | 23-May-23 |
| Checked By: | JF | 23-May-23 |

**BH:** AU23-BH06 **Sample No:** BS1 **Depth:** 1.00 - 1.20m

***Water Content (%):*** **86.4**

Sample History: Natural / ~~Air Dried / Oven Dried / Unknown~~

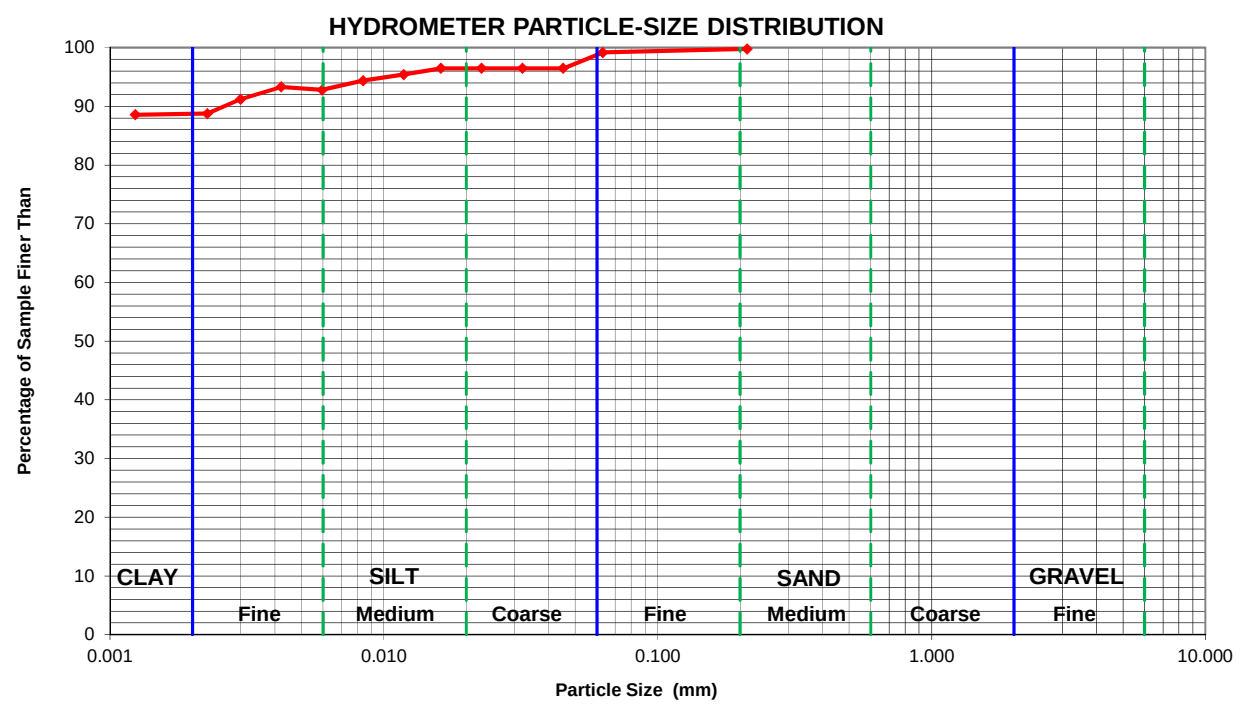
pH of sedimentation suspension: 8.5

| Particle Size (mm) | % Finer Than |
|---|---|
| 0.212 | 100 |
| 0.063 | 99 |
| 0.045 | 96 |
| 0.032 | 96 |
| 0.023 | 96 |
| 0.016 | 96 |
| 0.012 | 95 |
| 0.0084 | 94 |
| 0.0060 | 93 |
| 0.0042 | 93 |
| 0.0030 | 91 |
| 0.0023 | 89 |
| 0.0012 | 89 |

**HYDROMETER ANALYSIS (% of dry mass)**

| | | | | TOTAL | |
|---|---|---|---|---|---|
| GRAVEL: | (Medium) | *< 9.5 - 6mm* | 0 | 0 | % |
| | (Fine) | *6 - 2mm* | 0 | | |
| SAND: | (Coarse) | *2.0 - 0.6mm* | 0 | | |
| | (Medium) | *0.6 - 0.2mm* | 0 | 1 | % |
| | (Fine) | *0.2 - 0.06mm* | 1 | | |
| SILT FRACTION: | (Coarse) | *0.06 - 0.02mm* | 3 | | |
| | (Medium) | *0.02 - 0.006mm* | 3 | 10 | % |
| | (Fine) | *0.006 - 0.002mm* | 4 | | |
| CLAY FRACTION: | *< 0.002mm* | | | 89 | % |
| | | | | 100% | |

**HYDROMETER TEST WAS CARRIED OUT ON THE WHOLE SOIL**



| | | | | |
|---|---|---|---|---|
| Babbage Geotechnical Laboratory | Job Number: | 64746#L | Sheet 1 of 1 | Page 5 of 6 |
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| | Report No: | 64746#L/HYD Spark DC | Issue Date: | July 2022 |
| | Project: | SPARK DC | | |

# PARTICLE-SIZE DISTRIBUTION BY HYDROMETER

Test Methods: NZS4402: 1986: Test 2.1, Test 2.8.1, Test 2.8.4

| | | |
|---|---|---|
| Tested By: | WEC | 22-May-23 |
| Compiled By: | WEC | 23-May-23 |
| Checked By: | JF | 23-May-23 |

**BH:** AU23-BH06 **Sample No:** BS2 **Depth:** 7.95 - 8.20m

***Water Content (%):*** **69.8**

Sample History: Natural / ~~Air Dried / Oven Dried / Unknown~~

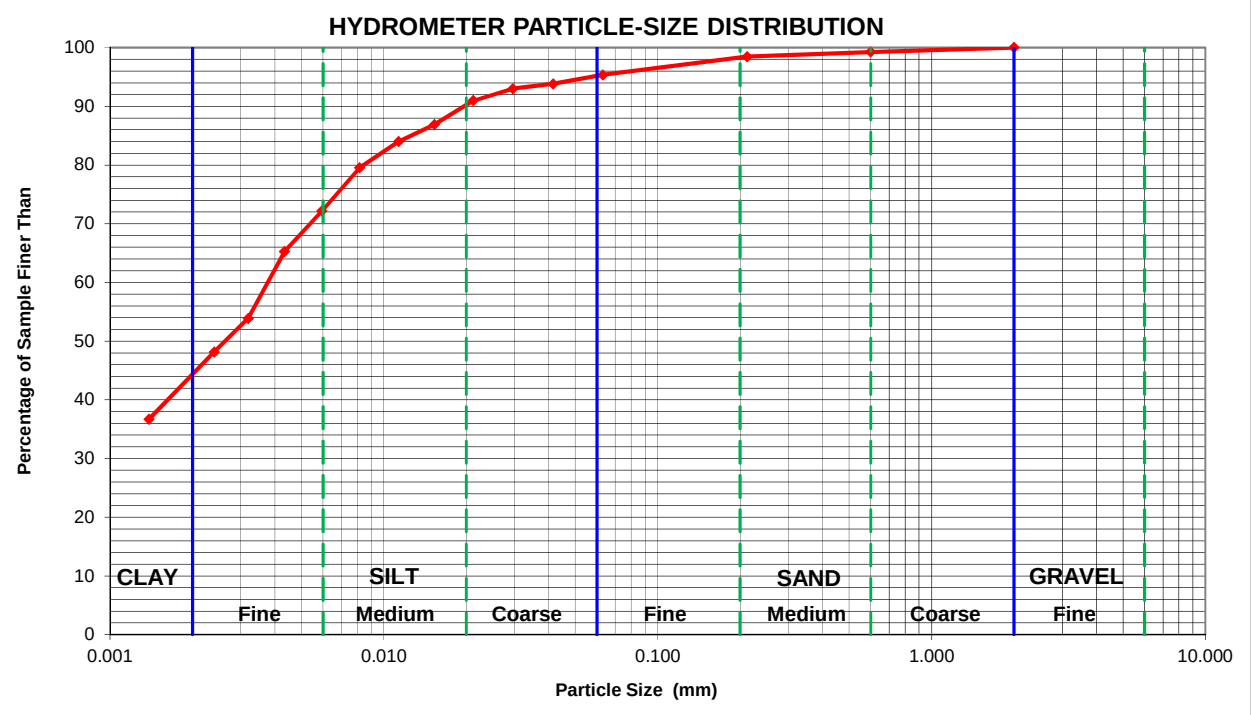
pH of sedimentation suspension: 9.0

| Particle Size (mm) | % Finer Than |
|---|---|
| 2.00 | 100 |
| 0.600 | 99 |
| 0.212 | 98 |
| 0.063 | 95 |
| 0.042 | 94 |
| 0.030 | 93 |
| 0.021 | 91 |
| 0.015 | 87 |
| 0.011 | 84 |
| 0.0082 | 80 |
| 0.0059 | 72 |
| 0.0043 | 65 |
| 0.0032 | 54 |
| 0.0024 | 48 |
| 0.0014 | 37 |

**HYDROMETER ANALYSIS (% of dry mass)**

| | | | | TOTAL | |
|---|---|---|---|---|---|
| **GRAVEL:** | (Medium) | ***< 9.5 - 6mm*** | 0 | **0** | % |
| | (Fine) | ***6 - 2mm*** | 0 | | |
| **SAND:** | (Coarse) | ***2.0 - 0.6mm*** | 1 | **5** | % |
| | (Medium) | ***0.6 - 0.2mm*** | 1 | | |
| | (Fine) | ***0.2 - 0.06mm*** | 3 | | |
| **SILT FRACTION:** | (Coarse) | ***0.06 - 0.02mm*** | 5 | **51** | % |
| | (Medium) | ***0.02 - 0.006mm*** | 18 | | |
| | (Fine) | ***0.006 - 0.002mm*** | 28 | | |
| **CLAY FRACTION:** | | ***< 0.002mm*** | | **44** | % |
| | | | | **100%** | |

**HYDROMETER TEST WAS CARRIED OUT ON THE WHOLE SOIL**



| | | | | |
|---|---|---|---|---|
| Babbage Geotechnical Laboratory | Job Number: | 64746#L | Sheet 1 of 1 | Page 6 of 6 |
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| | Report No: | 64746#L/HYD Spark DC | Issue Date: | July 2022 |
| | Project: | SPARK DC | | |

# PARTICLE-SIZE DISTRIBUTION BY HYDROMETER

Test Methods: NZS4402: 1986: Test 2.1, Test 2.8.1, Test 2.8.4

| | | |
|---|---|---|
| Tested By: | WEC | 22-May-23 |
| Compiled By: | WEC | 23-May-23 |
| Checked By: | JF | 23-May-23 |

**BH:** AU23-BH07 **Sample No:** PT1 **Depth:** 4.50 - 5.00m

***Water Content (%):*** **34.9**

Sample History: Natural / ~~Air Dried / Oven Dried / Unknown~~

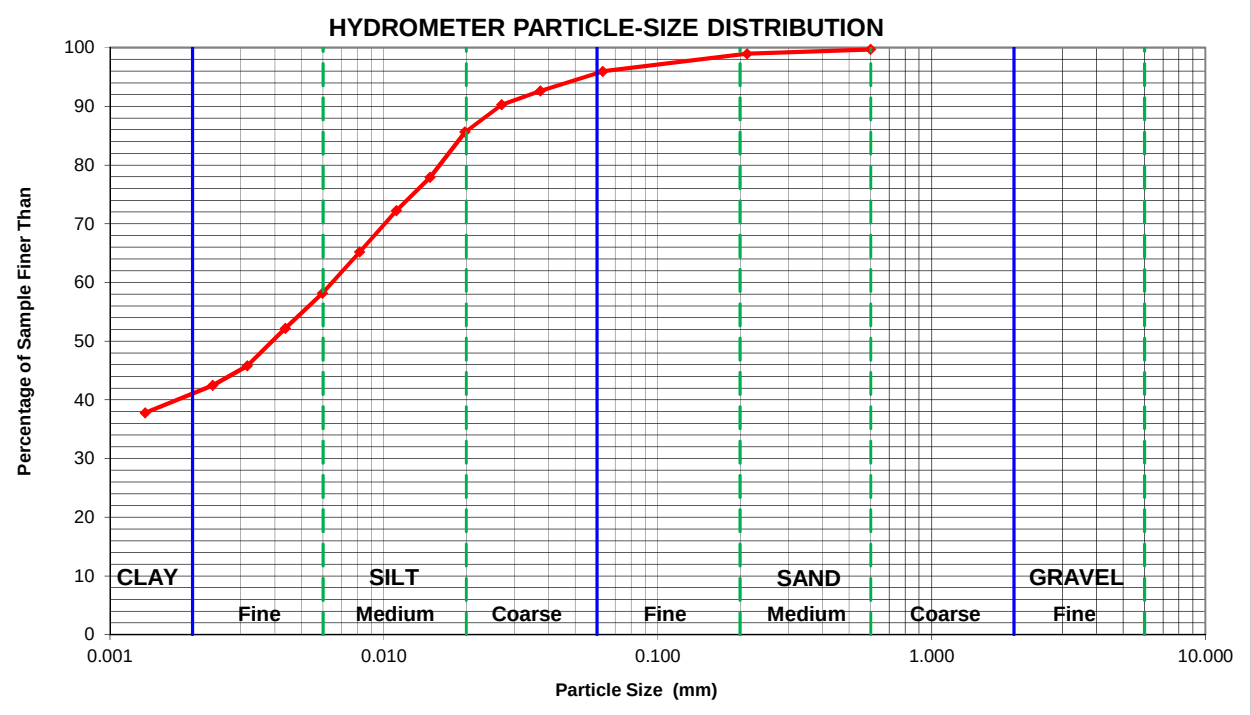
pH of sedimentation suspension: 9.0

| Particle Size (mm) | % Finer Than |
|---|---|
| 0.600 | 100 |
| 0.212 | 99 |
| 0.063 | 96 |
| 0.037 | 93 |
| 0.027 | 90 |
| 0.020 | 86 |
| 0.015 | 78 |
| 0.011 | 72 |
| 0.0082 | 65 |
| 0.0060 | 58 |
| 0.0044 | 52 |
| 0.0032 | 46 |
| 0.0024 | 42 |
| 0.0013 | 38 |

**HYDROMETER ANALYSIS (% of dry mass)**

| | | | | TOTAL | |
|---|---|---|---|---|---|
| **GRAVEL:** | (Medium) | ***< 9.5 - 6mm*** | 0 | **0** | % |
| | (Fine) | ***6 - 2mm*** | 0 | | |
| **SAND:** | (Coarse) | ***2.0 - 0.6mm*** | 0 | **5** | % |
| | (Medium) | ***0.6 - 0.2mm*** | 1 | | |
| | (Fine) | ***0.2 - 0.06mm*** | 4 | | |
| **SILT FRACTION:** | (Coarse) | ***0.06 - 0.02mm*** | 9 | **54** | % |
| | (Medium) | ***0.02 - 0.006mm*** | 28 | | |
| | (Fine) | ***0.006 - 0.002mm*** | 17 | | |
| **CLAY FRACTION:** | | ***< 0.002mm*** | | **41** | % |
| | | | | **100%** | |

**HYDROMETER TEST WAS CARRIED OUT ON THE WHOLE SOIL**



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Please reply to: W.E. Campton



Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Attention: **DAVID BOSSE**

Job Number: 64746#L
BGL Registration Number: 2931
Checked by: WEC

19th May 2023

# SHRINK-SWELL INDEX TESTING

Dear Sir,

***Re: SPARK DC***
***Your Reference: P523578***
***Report Number: 64746#L/SS Spark DC***

The following report presents the results of Shrink-swell Index testing at BGL of 60mm diameter undisturbed push-tube soil samples delivered to this laboratory on the 2nd May 2023. The test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **Shrink-swell Index:** | AS1289:Test 7.1.1 - 2003 |

**Sample Descriptions** (*not part of BGL IANZ Accreditation*)

**AU23-BH01 / PT1 / 1.00 – 1.50m:**

PEAT, fibrous, black, very moist, low density.

**AU23-BH06 / PT1 / 0.50 – 1.00m:**

ORGANIC CLAY, firm, highly plastic, light grey & dark brown, rootlets & organic fibres, very moist.

As per the reporting requirements of AS1289: Test 7.1.1 – 2003: the shrink-swell index value has been reported to the nearest 0.1, and water content is reported to the nearest 0.1%. As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. Density & air voids results have been calculated based on the dimensions of the extruded samples. Density results are reported to the nearest 0.01t/m$^3$, and air voids are reported to the nearest whole number.

For calculating the air voids percentages a solid density of 1.50t/m$^3$ was assumed for sample AU23-BH01 / PT1 / 1.00 – 1.50m and a solid density of 2.65t/m$^3$ was assumed for sample AU23-BH06 / PT1 / 0.50 – 1.00m. Note that these assumed values are not part of the IANZ endorsement for this report.

Please note that the test results relate only to the samples as-received, and relate only to the samples under test. Any crumbling of the shrinkage samples did not affect final water content readings.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

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№ 126

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# SHRINK-SWELL TEST RESULTS

| Site Location | | SPARK DC | |
|---|---|---|---|
| Borehole Number / Sample Number | | AU23-BH01 / PT1 | AU23-BH06 / PT1 |
| Depth (m) | | 1.00 – 1.50m | 0.50 – 1.00m |
| **SWELL TEST** | | | |
| Initial Water Content | % | 271 | 36.2 |
| Initial Bulk Density* | t/m³ | 1.11 | 1.83 |
| Initial Dry Density* | t/m³ | 0.28 | 1.40 |
| Initial Air Voids* | % | 0 | 4 |
| Total Swell* | mm | 0.0 | 0.0 |
| Swelling Strain* | % | 0.0 | 0.0 |
| **SHRINKAGE TEST** | | | |
| Water Content* | % | 263 | 35.4 |
| Initial Bulk Density* | t/m³ | 1.16 | 1.85 |
| Initial Dry Density* | t/m³ | 0.32 | 1.37 |
| Initial Air Voids* | % | 0 | 0 |
| Total Shrinkage* | mm | 41.7 | 8.0 |
| Shrinkage Strain* | % | 35.3 | 6.7 |
| Cracking over the drying period | | ~~none / slight / moderate~~ / extreme | ~~none / slight / moderate~~ / extreme |
| **SHRINK-SWELL INDEX** | | | |
| Estimated Inert Inclusions (%) | | 0 | 0 |
| SHRINK-SWELL INDEX | | 19.6 | 3.7 |

**These results are not part of AS1289: Test 7.1.1 – 2003 reporting requirements, and are provided for your information only.*

**Aurecon New Zealand Ltd**
**Unit 1, 150 Cavendish Rd**
**Casebrook**
**Christchurch 8051**

ACCREDITED TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

**Attention:** **David Bosse**

**Report** **985507-S**
Project name SPARK DC
Project ID P523578
Received Date May 02, 2023

| **Client Sample ID** | | | **AU23-BH01-3.5M** | **AU23-BH01-8.5M** | **AU23-BH02-2.0M** | **AU23-BH02-8.5M** |
|---|---|---|---|---|---|---|
| **Sample Matrix** | | | **Soil** | **Soil** | **Soil** | **Soil** |
| **Eurofins Sample No.** | | | **K23-My0003643** | **K23-My0003644** | **K23-My0003645** | **K23-My0003646** |
| **Date Sampled** | | | **May 02, 2023** | **May 02, 2023** | **May 02, 2023** | **May 02, 2023** |
| Test/Reference | LOR | Unit | | | | |
| | | | | | | |
| Chloride[N16] | 5 | mg/kg | 130 | 19 | 79 | 21 |
| Conductivity (1:5 aqueous extract at 25 °C as rec.)[N16] | 10 | uS/cm | 86 | 120 | 410 | 120 |
| pH (1:5 Aqueous extract at 25 °C as rec.)[N16] | 0.1 | pH Units | 7.8 | 8.9 | 5.7 | 9.2 |
| Resistivity*[N16] | 0.5 | ohm.m | 120 | 80 | 25 | 84 |
| Sulphate (as SO4)[N16] | 30 | mg/kg | 1200 | 37 | 2500 | < 30 |
| **Sample Properties** | | | | | | |
| % Moisture[N16] | 1 | % | 59 | 49 | 73 | 42 |

| **Client Sample ID** | | | **AU23-BH03-2.0M** | **AU23-BH03-6.5M** | **AU23-BH03-12.0M** | **AU23-BH04-8.9M** |
|---|---|---|---|---|---|---|
| **Sample Matrix** | | | **Soil** | **Soil** | **Soil** | **Soil** |
| **Eurofins Sample No.** | | | **K23-My0003647** | **K23-My0003648** | **K23-My0003649** | **K23-My0003650** |
| **Date Sampled** | | | **May 02, 2023** | **May 02, 2023** | **May 02, 2023** | **May 02, 2023** |
| Test/Reference | LOR | Unit | | | | |
| | | | | | | |
| Chloride[N16] | 5 | mg/kg | 53 | 50 | 9.1 | 26 |
| Conductivity (1:5 aqueous extract at 25 °C as rec.)[N16] | 10 | uS/cm | 66 | 120 | 140 | 120 |
| pH (1:5 Aqueous extract at 25 °C as rec.)[N16] | 0.1 | pH Units | 6.1 | 7.9 | 8.7 | 8.8 |
| Resistivity*[N16] | 0.5 | ohm.m | 150 | 83 | 72 | 84 |
| Sulphate (as SO4)[N16] | 30 | mg/kg | 99 | 180 | < 30 | 39 |
| **Sample Properties** | | | | | | |
| % Moisture[N16] | 1 | % | 79 | 74 | 18 | 54 |

| Client Sample ID | | | AU23-BH04-1.0M | AU23-BH05-4.1M | AU23-BH05-7.2M | AU23-BH06-2.5M |
|---|---|---|---|---|---|---|
| Sample Matrix | | | Soil | Soil | Soil | Soil |
| Eurofins Sample No. | | | K23-My0003651 | K23-My0003652 | K23-My0003653 | K23-My0003654 |
| Date Sampled | | | May 02, 2023 | May 02, 2023 | May 02, 2023 | May 02, 2023 |
| Test/Reference | LOR | Unit | | | | |
| | | | | | | |
| Chloride[N16] | 5 | mg/kg | 86 | 11 | 5.7 | 160 |
| Conductivity (1:5 aqueous extract at 25 °C as rec.)[N16] | 10 | uS/cm | 84 | 120 | 140 | 230 |
| pH (1:5 Aqueous extract at 25 °C as rec.)[N16] | 0.1 | pH Units | 6.9 | 8.0 | 8.2 | 6.7 |
| Resistivity*[N16] | 0.5 | ohm.m | 120 | 86 | 71 | 43 |
| Sulphate (as SO4)[N16] | 30 | mg/kg | 1100 | 46 | < 30 | 800 |
| **Sample Properties** | | | | | | |
| % Moisture[N16] | 1 | % | 48 | 61 | 53 | 79 |

| Client Sample ID | | | AU23-BH06-5.2M | AU23-BH07-0.75M | AU23-BH07-5.8M | AU23-BH08-0.5M |
|---|---|---|---|---|---|---|
| Sample Matrix | | | Soil | Soil | Soil | Soil |
| Eurofins Sample No. | | | K23-My0003655 | K23-My0003656 | K23-My0003657 | K23-My0003658 |
| Date Sampled | | | May 02, 2023 | May 02, 2023 | May 02, 2023 | May 02, 2023 |
| Test/Reference | LOR | Unit | | | | |
| | | | | | | |
| Chloride[N16] | 5 | mg/kg | 53 | 5.8 | 29 | 64 |
| Conductivity (1:5 aqueous extract at 25 °C as rec.)[N16] | 10 | uS/cm | 110 | 89 | 120 | 210 |
| pH (1:5 Aqueous extract at 25 °C as rec.)[N16] | 0.1 | pH Units | 7.9 | 6.6 | 8.8 | 7.4 |
| Resistivity*[N16] | 0.5 | ohm.m | 94 | 110 | 86 | 47 |
| Sulphate (as SO4)[N16] | 30 | mg/kg | 59 | 71 | 78 | 340 |
| **Sample Properties** | | | | | | |
| % Moisture[N16] | 1 | % | 58 | 32 | 30 | 23 |

| Client Sample ID | | | AU23-BH08-8.9M |
|---|---|---|---|
| Sample Matrix | | | Soil |
| Eurofins Sample No. | | | K23-My0003659 |
| Date Sampled | | | May 02, 2023 |
| Test/Reference | LOR | Unit | |
| | | | |
| Chloride[N16] | 5 | mg/kg | 63 |
| Conductivity (1:5 aqueous extract at 25 °C as rec.)[N16] | 10 | uS/cm | 130 |
| pH (1:5 Aqueous extract at 25 °C as rec.)[N16] | 0.1 | pH Units | 9.3 |
| Resistivity*[N16] | 0.5 | ohm.m | 77 |
| Sulphate (as SO4)[N16] | 30 | mg/kg | 50 |
| **Sample Properties** | | | |
| % Moisture[N16] | 1 | % | 47 |

## Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

| Description | Testing Site | Extracted | Holding Time |
|---|---|---|---|
| Chloride | Melbourne | May 12, 2023 | 28 Days |
| - Method: LTM-INO-4090 Chloride by Discrete Analyser | | | |
| Conductivity (1:5 aqueous extract at 25 °C as rec.) | Melbourne | May 12, 2023 | 7 Days |
| - Method: LTM-INO-4030 Conductivity | | | |
| pH (1:5 Aqueous extract at 25 °C as rec.) | Melbourne | May 12, 2023 | 7 Days |
| - Method: LTM-GEN-7090 pH in soil by ISE | | | |
| Sulphate (as SO4) | Melbourne | May 12, 2023 | 28 Days |
| - Method: LTM-INO-4110 Sulfate by Discrete Analyser | | | |
| % Moisture | Melbourne | May 02, 2023 | 14 Days |
| - Method: LTM-GEN-7080 Moisture | | | |

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IANZ# 1290

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Tel: +61 2 9900 8400
NATA# 1261 Site# 18217

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NATA# 1261 Site# 25466

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**Eurofins ARL Pty Ltd**
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NATA# 2377 Site# 2370

**Company Name:** Aurecon New Zealand Ltd - NI
**Address:** Unit 1, 150 Cavendish Rd
Casebrook
Christchurch 8051

**Project Name:** SPARK DC
**Project ID:** P523578

**Order No.:** P523578 - David Bosse
**Report #:** 985507
**Phone:** 0011 64 3 375 1381
**Fax:** 0011 64 3 379 6955

**Received:** May 2, 2023 2:15 PM
**Due:** May 11, 2023
**Priority:** 7 Day
**Contact Name:** David Bosse

**Eurofins Analytical Services Manager : Karishma Patel**

| Sample Detail | | | | | | Aggressivity Soil Set | Moisture Set |
|---|---|---|---|---|---|---|---|
| **Auckland Laboratory - IANZ# 1327** | | | | | | | |
| **Christchurch Laboratory - IANZ# 1290** | | | | | | | |
| **Melbourne Laboratory - NATA # 1261 Site # 1254** | | | | | | X | X |
| **External Laboratory** | | | | | | | |
| **No** | **Sample ID** | **Sample Date** | **Sampling Time** | **Matrix** | **LAB ID** | | |
| 1 | AU23-BH01-3.5M | May 02, 2023 | | Soil | K23-My0003643 | X | X |
| 2 | AU23-BH01-8.5M | May 02, 2023 | | Soil | K23-My0003644 | X | X |
| 3 | AU23-BH02-2.0M | May 02, 2023 | | Soil | K23-My0003645 | X | X |
| 4 | AU23-BH02-8.5M | May 02, 2023 | | Soil | K23-My0003646 | X | X |
| 5 | AU23-BH03-2.0M | May 02, 2023 | | Soil | K23-My0003647 | X | X |
| 6 | AU23-BH03-6.5M | May 02, 2023 | | Soil | K23-My0003648 | X | X |
| 7 | AU23-BH03- | May 02, 2023 | | Soil | K23-My0003649 | X | X |

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|---|---|---|---|---|---|---|---|
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| **Christchurch Laboratory - IANZ# 1290** | | | | | | | |
| **Melbourne Laboratory - NATA # 1261 Site # 1254** | | | | | | X | X |
| **External Laboratory** | | | | | | | |
| | 12.0M | | | | | | |
| 8 | AU23-BH04-8.9M | May 02, 2023 | | Soil | K23-My0003650 | X | X |
| 9 | AU23-BH04-1.0M | May 02, 2023 | | Soil | K23-My0003651 | X | X |
| 10 | AU23-BH05-4.1M | May 02, 2023 | | Soil | K23-My0003652 | X | X |
| 11 | AU23-BH05-7.2M | May 02, 2023 | | Soil | K23-My0003653 | X | X |
| 12 | AU23-BH06-2.5M | May 02, 2023 | | Soil | K23-My0003654 | X | X |
| 13 | AU23-BH06-5.2M | May 02, 2023 | | Soil | K23-My0003655 | X | X |
| 14 | AU23-BH07-0.75M | May 02, 2023 | | Soil | K23-My0003656 | X | X |

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|---|---|---|---|---|---|---|---|
| **Auckland Laboratory - IANZ# 1327** | | | | | | | |
| **Christchurch Laboratory - IANZ# 1290** | | | | | | | |
| **Melbourne Laboratory - NATA # 1261 Site # 1254** | | | | | | X | X |
| **External Laboratory** | | | | | | | |
| 15 | AU23-BH07-5.8M | May 02, 2023 | | Soil | K23-My0003657 | X | X |
| 16 | AU23-BH08-0.5M | May 02, 2023 | | Soil | K23-My0003658 | X | X |
| 17 | AU23-BH08-8.9M | May 02, 2023 | | Soil | K23-My0003659 | X | X |
| **Test Counts** | | | | | | 17 | 17 |

## Internal Quality Control Review and Glossary

### General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

### Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

### Units

**mg/kg:** milligrams per kilogram
**mg/L:** milligrams per litre
**µg/L:** micrograms per litre
**ppm:** parts per million
**ppb:** parts per billion
**%:** Percentage
**org/100 mL:** Organisms per 100 millilitres
**NTU:** Nephelometric Turbidity Units
**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
**CFU:** Colony forming unit

### Terms

| | |
|---|---|
| **APHA** | American Public Health Association |
| **COC** | Chain of Custody |
| **CP** | Client Parent - QC was performed on samples pertaining to this report |
| **CRM** | Certified Reference Material (ISO17034) - reported as percent recovery. |
| **Dry** | Where a moisture has been determined on a solid sample the result is expressed on a dry basis. |
| **Duplicate** | A second piece of analysis from the same sample and reported in the same units as the result to show comparison. |
| **LOR** | Limit of Reporting. |
| **LCS** | Laboratory Control Sample - reported as percent recovery. |
| **Method Blank** | In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water. |
| **NCP** | Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within. |
| **RPD** | Relative Percent Difference between two Duplicate pieces of analysis. |
| **SPIKE** | Addition of the analyte to the sample and reported as percentage recovery. |
| **SRA** | Sample Receipt Advice |
| **Surr - Surrogate** | The addition of a like compound to the analyte target and reported as percentage recovery. |
| **TBTO** | Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits. |
| **TCLP** | Toxicity Characteristic Leaching Procedure |
| **TEQ** | Toxic Equivalency Quotient or Total Equivalence |
| **QSM** | US Department of Defense Quality Systems Manual Version 5.4 |
| **US EPA** | United States Environmental Protection Agency |
| **WA DWER** | Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA |

### QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

### QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

**Quality Control Results**

| Test | | | Units | Result 1 | | | Acceptance Limits | Pass Limits | Qualifying Code |
|---|---|---|---|---|---|---|---|---|---|
| **Method Blank** | | | | | | | | | |
| Chloride | | | mg/kg | < 5 | | | 5 | Pass | |
| Sulphate (as SO4) | | | mg/kg | < 30 | | | 30 | Pass | |
| **LCS - % Recovery** | | | | | | | | | |
| Chloride | | | % | 101 | | | 70-130 | Pass | |
| **Test** | **Lab Sample ID** | **QA Source** | **Units** | **Result 1** | | | **Acceptance Limits** | **Pass Limits** | **Qualifying Code** |
| **Duplicate** | | | | | | | | | |
| | | | | Result 1 | Result 2 | RPD | | | |
| Conductivity (1:5 aqueous extract at 25 °C as rec.) | K23-My0003643 | CP | uS/cm | 86 | 89 | 2.7 | 30% | Pass | |
| pH (1:5 Aqueous extract at 25 °C as rec.) | K23-My0003643 | CP | pH Units | 7.8 | 7.8 | pass | 30% | Pass | |
| Resistivity* | K23-My0003643 | CP | ohm.m | 120 | 110 | 2.7 | 30% | Pass | |
| **Duplicate** | | | | | | | | | |
| | | | | Result 1 | Result 2 | RPD | | | |
| Chloride | K23-My0003644 | CP | mg/kg | 19 | 20 | 3.9 | 30% | Pass | |
| pH (1:5 Aqueous extract at 25 °C as rec.) | K23-My0003644 | CP | pH Units | 8.9 | 9.1 | pass | 30% | Pass | |
| Sulphate (as SO4) | K23-My0003644 | CP | mg/kg | 37 | 34 | 7.6 | 30% | Pass | |
| **Duplicate** | | | | | | | | | |
| **Sample Properties** | | | | Result 1 | Result 2 | RPD | | | |
| % Moisture | K23-My0003649 | CP | % | 18 | 17 | 8.7 | 30% | Pass | |
| **Duplicate** | | | | | | | | | |
| | | | | Result 1 | Result 2 | RPD | | | |
| Chloride | K23-My0003653 | CP | mg/kg | 5.7 | 5.9 | 4.4 | 30% | Pass | |
| Sulphate (as SO4) | K23-My0003653 | CP | mg/kg | < 30 | < 30 | <1 | 30% | Pass | |
| **Duplicate** | | | | | | | | | |
| **Sample Properties** | | | | Result 1 | Result 2 | RPD | | | |
| % Moisture | K23-My0003659 | CP | % | 47 | 48 | 3.2 | 30% | Pass | |

## Comments

### Sample Integrity

| | |
|---|---|
| Custody Seals Intact (if used) | N/A |
| Attempt to Chill was evident | No |
| Sample correctly preserved | Yes |
| Appropriate sample containers have been used | Yes |
| Sample containers for volatile analysis received with minimal headspace | Yes |
| Samples received within HoldingTime | Yes |
| Some samples have been subcontracted | Yes |

### Qualifier Codes/Comments

| Code | Description |
|---|---|
| N16 | Analysis performed by Eurofins Environment Testing Australia |

### Authorised by:

| | |
|---|---|
| Katyana Gausel | Analytical Services Manager |
| Mary Makarios | Senior Analyst-Inorganic |
| Mary Makarios | Senior Analyst-Sample Properties |



**Michael Ritchie**
**Head of Semi Volatiles (Key Technical Personnel)**

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates IANZ accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Please reply to: W.E. Campton



Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Attention: **DAVID BOSSE**

Job Number: 64746#L
BGL Registration Number: 2931
Checked by: WEC

19th May 2023

# SOAKED CALIFORNIA BEARING RATIO (CBR) TESTING

Dear Sir,

## *Re: SPARK DC*

***Your Reference: P523578***
***Report Number: 64746#L/CBR Spark DC***

The following report presents the results of unsoaked California Bearing Ratio testing at BGL of a bulk soil sample delivered to this laboratory on the 2nd of May 2023. Test results are summarised below, with page 3 showing a graph and detailed results. Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **NZ Standard Compaction:** | NZS4402:1986:Test 4.1.1 |
| **California Bearing Ratio (CBR) – Remoulded:** | NZS4402:1986:Test 6.1.1 (soaked) |

The bulk sample was sieved through a 4.75mm aperture sieve to break up the soil. As the soil was far too wet to compact at the natural water content, with your agreement, it was dried-back to a value judged to be close to the optimum water content. The sample was then compacted into a CBR mould using the NZ Standard Compaction method. The compacted sample was then soaked for four days. The CBR value was next measured using a plunger penetration rate of 1mm per minute.

| Sample Number / % Stabiliser | Water Content (%) | | | Dry Density (t/m$^3$) | CBR (soaked) | Swell (%) |
|---|---|---|---|---|---|---|
| | Natural | After Adjustment to Near Optimum | After Test (under plunger) | | | |
| **AU23-TP01 / BS1 / 0.40 – 0.60m** | **52.8** | **31.8** | **43.0** | **1.16** | **1.0** | **3.6** |
| | ORGANIC CLAY, highly plastic, brown & grey, very wet. | | | | | |

*Note that sample descriptions are not part of BGL IANZ Accreditation.*

Note that a solid density value of 2.00t/m$^3$ was used in the calculation of the air voids for this compacted sample. This value is assumed, and is not part of the IANZ endorsement for this report.

As per the reporting requirements of NZS4402: 1986: Test 6.1.1, dry density is reported to the nearest 0.02t/m$^3$, swell to the nearest 0.2%, CBR's > 20 to the nearest 5, CBR's between 5 and 20 to the nearest 1, and for CBR's < 5 to the nearest 0.5. As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater.

Please note that the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

ACCREDITED
IANZ
TESTING LABORATORY
№ 126

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

| | | | | |
|---|---|---|---|---|
| BGL Babbage Geotechnical Laboratory | JOB NUMBER: | 64746#L | REPORT NUMBER: | Page 3 of 3 |
| | REG. NUMBER: | 2931 | 64746#L/CBR Spark DC | Version 4, Sept 2022 |
| | PROJECT: | SPARK DC | | |

## CALIFORNIA BEARING RATIO TEST:
## REMOULDED SAMPLE, SOAKED

**Test Method: NZS4402:1986:Test 6.1.1**
**NZS4402:1986:Test 2.1 Moisture Content**

| | Initials | Date |
|---|---|---|
| Tested By: | WEC | 16-May-23 |
| Compiled By: | WEC | 17-May-23 |
| Checked By: | JF | 19-May-23 |

**Sample Number:** AU23-TP01 / BS1

**Sample Depth (m):** 0.40 - 0.60m

**Sample History:** ~~dried / wetted / lime added / cement added / unknown /~~ natural

**Compaction Used:** NZ Standard / ~~NZ Heavy~~

| | |
|---|---|
| Proving Ring No: | 1155-10-13232 |
| Calibration Factor: | 337.81 |

(dial divisions / kN: from calibration worksheet)

## SOAKED CBR

| | | |
|---|---|---|
| Soil Sieved Over: | 4.75 | mm sieves |
| Surcharge Used: | 4.00 | kg |
| Mould Number: | B14 | |

***BULK DENSITY***

| | | |
|---|---|---|
| Mass Mould + Base + Soil | 10,317.20 | (g) |
| Mass Mould + Base | 6,803.60 | (g) |
| Volume Mould (from calibration) | 2,299.00 | (ml) |
| **Bulk Density** | **1.53** | ($t/m^3$) |

***WATER CONTENT***

| | Before (trimmings) | After (under plunger) |
|---|---|---|
| Mass Wet Soil + Tin (g) | 348.472 | 279.984 |
| Mass Dry Soil + Tin (g) | 284.348 | 227.370 |
| Mass Tin (g) | 82.418 | 104.905 |
| **Water Content (%)** | **31.8** | **43.0** |
| **Dry Density ($t/m^3$)** | **1.16** | |

***DETERMINATION OF SWELL***

| | |
|---|---|
| Initial Reading (mm) | 12.43 |
| Final Reading (mm) | 16.94 |
| Change in Height (mm) | 4.51 |
| Initial Height (mm) | 127.10 |
| **Swell (%)** | **3.6** |

| | | |
|---|---|---|
| Air Voids: | 5.2 | % |
| Time of Soaking: | 4 | days |
| Plunger Penetration Rate: | 1.0 | mm / minute |

***DETERMINATION OF BEARING VALUE***

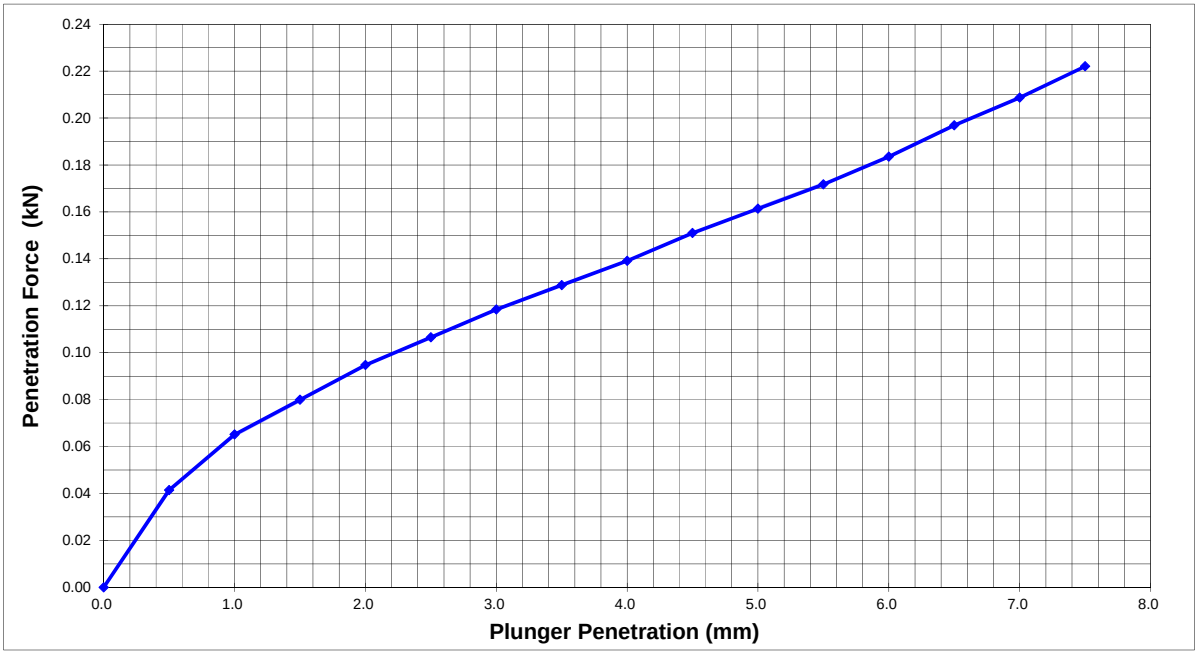
| Plunger Penetration (mm) | Proving Ring Dial (divisions) | Force (kN) |
|---|---|---|
| 0.0 | 0.0 | 0.00 |
| 0.5 | 14.0 | 0.04 |
| 1.0 | 22.0 | 0.07 |
| 1.5 | 27.0 | 0.08 |
| 2.0 | 32.0 | 0.09 |
| **2.5** | **36.0** | **0.11** |
| 3.0 | 40.0 | 0.12 |
| 3.5 | 43.5 | 0.13 |
| 4.0 | 47.0 | 0.14 |
| 4.5 | 51.0 | 0.15 |
| **5.0** | **54.5** | **0.16** |
| 5.5 | 58.0 | 0.17 |
| 6.0 | 62.0 | 0.18 |
| 6.5 | 66.5 | 0.20 |
| 7.0 | 70.5 | 0.21 |
| 7.5 | 75.0 | 0.22 |

| | |
|---|---|
| **2.5mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **0.8** |
| ***with curve shape correction (if needed)*** | **0.8** |
| **5.0mm PENETRATION BEARING VALUE** | |
| ***uncorrected*** | **0.8** |
| ***with curve shape correction (if needed)*** | **0.8** |

**FINAL CBR VALUE: 1.0**

| | | |
|---|---|---|
| Lime Added: | 0.0 | % |
| Cement Added: | 0.0 | % |

## CBR FORCE-PENETRATION CURVE



Babbage Geotechnical Laboratory
Level 4
68 Beach Road
Auckland 1010
Telephone
E-mail

P O Box 2027
New Zealand
64-9-367 4954
wec@babbage.co.nz

Please reply to: W.E. Campton



Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Attention: **DAVID BOSSE**

Job Number: 64746#L
BGL Registration Number: 2931
Checked by: WEC

25th May 2023

# ISOTROPICALLY CONSOLIDATED, UNDRAINED (CIU), MULTI-STAGE TRIAXIAL COMPRESSIVE STRENGTH TESTING

Dear Sir,

***Re: SPARK DC***
***Your Reference: P523578***
***Report Number: 64746#L/CIU Triaxial Spark DC AU23-BH07 4.50 – 5.00m***

## Borehole No: AU23-BH07 Sample No: PT1 Depth: 4.50 – 5.00m

The following report presents the results of triaxial compressive strength testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 2nd of May 2023.

The client request was to measure the isotropically consolidated, undrained compression of the sample in a triaxial apparatus under known conditions of effective stress, with measurement of porewater pressure. We were instructed to test a single sample at effective stresses of 50kPa, 100kPa, and 200kPa by carrying out a 3-point multi-stage test, where sample compression was terminated just before failure on cycles 1 & 2, and the sample was completely failed on cycle 3.

Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402: 1986: Test 2.1 |
| **Part 9: Consolidated triaxial compression tests on water saturated soils:** | BS EN ISO 17892-9:2018 |

Please note that the multi-stage method described below is a special procedure that is not fully covered by BS EN ISO 17892-9:2018, however, is the most common type of triaxial soil test carried out by soils testing laboratories. The method described below refers to the general procedures described in BS EN ISO 17892-9:2018, and also to the methods described in "Manual of Soil Laboratory Testing Volume 3: Effective Stress Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2014, Section 20.2 – Multistage triaxial test.

**ISOTROPICALLY CONSOLIDATED, UNDRAINED (CIU), MULTI-STAGE TRIAXIAL COMPRESSIVE STRENGTH TESTING**

**Borehole No: AU23-BH07** **Sample No: PT1** **Depth: 4.50 – 5.00m**

## Test Procedure

The sample was extruded from the push-tube and trimmed to length. The sample was then set up in a triaxial cell with vertical filter paper side drains and a single covering latex membrane. Saturation was achieved in distinct stages using 50kPa increments of cell pressure and back pressure, with a differential pressure of 10kPa (***the cell pressure was 10kPa greater than the back pressure***) in order to maintain a small positive effective stress. Saturation occurred through both the top and bottom ends of the sample.

The final saturation stage used a cell pressure of 400kPa and a back pressure of 390kPa. The bottom (base drainage) line was then closed & the sample was left overnight, allowing the porewater pressure to equalise throughout the sample. Saturation was then confirmed by closing the top (back pressure) line & increasing the cell pressure to 440kPa, observing the resulting increase in porewater pressure. A porewater pressure coefficient (***B***) of 1.00 was achieved, confirming saturation of the sample (ie. ***B*** ≥ 0.95).

Excess porewater pressure was then dissipated during the first consolidation cycle by opening the top (back pressure) line, resulting in an effective stress of 50kPa. The sample was then compressed at a set rate of 0.012mm per minute (actual rate of 0.011mm per minute). The compression was stopped when the deviator stress & stress ratio appeared to be close to maximum, and the load was taken off the sample. A final axial reading was then taken in order to calculate the rebound of the sample. The compression occurred under undrained conditions – ie. both the top (back pressure) and bottom (base drainage) lines were closed.

For cycle 2 the cell pressure was increased to 490kPa while the back pressure remained at 390kPa. The resulting increased porewater pressure was then dissipated by opening the top (back pressure) line, resulting in an effective stress of 100kPa acting on the same sample. Once consolidated, the 2nd compression cycle was compressed at a set rate of 0.012mm per minute (actual rate of 0.011mm per minute). The compression was stopped when the deviator stress & stress ratio appeared to be close to maximum, and the load was taken off the sample. A final axial reading was then taken in order to calculate the rebound of the sample. The compression occurred under undrained conditions – ie. both the top (back pressure) and bottom (base drainage) lines were closed.

For cycle 3 the cell pressure was increased to 590kPa while the back pressure remained at 390kPa. The resulting increased porewater pressure was dissipated by opening the top (back pressure) line, resulting in an effective stress of 200kPa acting on the same sample. Once consolidated, the 3rd compression cycle was compressed at a set rate of 0.012mm per minute (actual rate of 0.012mm per minute) until complete failure of the sample had occurred. The load was then taken off the sample and a final axial reading was taken in order to calculate the rebound of the sample at the end of the test. Like the previous cycles, the compression occurred under undrained conditions – ie. both the top (back pressure) and bottom (base drainage) lines were closed.

Mohr circle plots for each cycle are presented on page 5 of this report. We leave the determination of the effective angle of shearing resistance / effective angle of internal friction (Ø') and the effective cohesion (c') to our clients, but as a guide to this we tabulate each tangent to sets of circles on the graph.

Babbage Geotechnical Laboratory

## ISOTROPICALLY CONSOLIDATED, UNDRAINED (CIU), MULTI-STAGE TRIAXIAL COMPRESSIVE STRENGTH TESTING

**Borehole No: AU23-BH07** **Sample No: PT1** **Depth: 4.50 – 5.00m**

This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard. Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing. Please note that the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

ACCREDITED
IANZ
TESTING LABORATORY
№ 126

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| Babbage Geotechnical Laboratory | Job Number: | Registration No: | Page 4 of 8 | Version No: | 7 |
|---|---|---|---|---|---|
| | 64746#L | 2931 | | Issue Date: | July 2022 |
| | Report No: | 64746#L/CIU Triaxial Spark DC AU23-BH07 4.50 - 5.00m | | Auth. By: | WEC |

# SPARK DC

## CIU MULTI-STAGE TRIAXIAL COMPRESSION TEST

| | | | |
|---|---|---|---|
| **BS EN ISO 17892-9:2018: Part 9: Consolidated triaxial compression tests on water saturated soils** | **Tested By:** | JF | May 2023 |
| | **Compiled By:** | JF | 23-May-23 |
| **NZS4402:1986: Test 2.1 - Water Content** | **Checked By:** | WEC | 25-May-23 |

**Borehole:** AU23-BH07 **Sample No:** PT1 **Depth:** 4.50 - 5.00m

**Sample History:** undisturbed ~~/ remoulded / compacted / other~~

**Sample Description** (not part of BGL IANZ accreditation):

**CLAY, firm to stiff, highly plastic, light grey with black organic mottles, moist.**

## SAMPLE DETAILS

| | | | |
|---|---|---|---|
| Initial Diameter: | 54.1 mm | Initial Water Content: | 50.9 % |
| Initial Length: | 108.4 mm | Final Water Content: | 42.4 % |
| Initial Mass: | 428.83 g | Initial Dry Density: | 1.14 t/m$^3$ |
| Initial Bulk Density: | 1.72 t/m$^3$ | Final Dry Density: | 1.29 t/m$^3$ |

## SATURATION CYCLE

| **At End of Saturation:** | | | | |
|---|---|---|---|---|
| | Cell Pressure Increase: | 40.0 kPa | Final Cell Pressure: | 440 kPa |
| | Resulting Increase in Pore Pressure: | 39.9 kPa | Final Pore Pressure: | 429.8 kPa |
| | Pore Pressure Coefficient *B*: | 1.00 | | |

## CONSOLIDATION CYCLES

| Cycle Number: | | 1 | 2 | 3 |
|---|---|---|---|---|
| Cell Pressure | kPa | **440** | **490** | **590** |
| Back Pressure | kPa | **390** | **390** | **390** |
| **Effective Pressure** | **kPa** | **50** | **100** | **200** |
| Pore Pressure at Start of Consolidation | kPa | 427.8 | 449.9 | 514.6 |
| Pore Pressure to Dissipate | kPa | 37.8 | 59.9 | 124.6 |
| Dissipation | % | 96.0 | 99.0 | 100.0 |
| Pore Pressure at End of Consolidation | kPa | 391.5 | 390.6 | 390.0 |
| Vertical Strain after Consol. (*cumulative) | % | 0.94 | * 3.09 | * 6.83 |
| Volumetric Strain after Consol. (*cumulative) | % | 2.81 | * 5.63 | * 11.39 |

## COMPRESSION CYCLES

| | | | | |
|---|---|---|---|---|
| Rate of Strain (set) | mm/min | 0.012 | 0.012 | 0.012 |
| Average Rate of Strain (actual) | mm/min | 0.011 | 0.011 | 0.012 |
| Average Rate of Strain (actual) | % per hour | 0.62 | 0.48 | 0.58 |
| Pore Pressure at Start of Compression | kPa | 391.5 | 390.6 | 390.0 |
| Vertical Effective Stress at Start of Compression | kPa | 48.5 | 99.4 | 200.0 |

## FAILURE CONDITIONS

| Criteria Used to Determine Failure: | | **maximum deviator stress / ~~maximum effective stress ratio~~** | | |
|---|---|---|---|---|
| Axial Strain at Failure (*cumulative) | % | 1.90 | * 3.93 | * 8.55 |
| Axial Strain at Failure (*cumulative) | mm | 2.04 | * 4.89 | * 10.43 |
| Axial Strain after rebound (*cumulative) | % | 1.21 | * 3.07 | * 14.79 |
| Axial Strain after rebound (*cumulative) | mm | 1.30 | * 3.25 | * 15.09 |
| Deviator Stress at Failure | kPa | 56.4 | 89.8 | 146.5 |
| Pore Pressure at Failure | kPa | 414.1 | 444.0 | 493.0 |
| Vertical Effective Stress at Failure | kPa | 82.3 | 135.8 | 243.5 |
| Horizontal Effective Stress at Failure | kPa | 25.9 | 46.0 | 97.0 |
| Effective Stress Ratio at Failure | | 3.178 | 2.951 | 2.511 |
| | | | **Failure Type:** | **PLASTIC** |

## CORRECTIONS APPLIED TO MEASURED DEVIATOR STRESS AT FAILURE

| | | | | |
|---|---|---|---|---|
| Elastic Membrane Restraining Effect Correction | kPa | 0.39 | 0.81 | 1.77 |
| Vertical Filter Paper Side Drain Correction | kPa | 0.01 | 0.01 | 0.01 |

| Babbage Geotechnical Laboratory | 3-POINT CIU MULTI-STAGE TRIAXIAL COMPRESSION TEST | | | | | Page 5 of 8 | Version No: | 7 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Issue Date: | July 2022 |
| | BS EN ISO 17892-9:2018: Part 9: Consolidated triaxial compression tests on water saturated soils | | | | | | Auth. By: | WEC |
| | PROJECT: | SPARK DC | | | | | Initials | Date |
| | | | | | | Tested By: | JF | May 2023 |
| | Job No: | 64746#L | Borehole Number: | AU23-BH07 | Depth: 4.50 - 5.00m | Plotted By: | JF | 23-May-23 |
| | Reg. No: | 2931 | Sample Number: | PT1 | | Checked By: | WEC | 25-May-23 |

**Mohr Circle Plot:**

| cycle | Vertical Effective Stress $\sigma_v'$ kPa | Horizontal Effective Stress $\sigma_h'$ kPa | Effective Stress Path Parameters $(\sigma_v' + \sigma_h') / 2$ kPa | $(\sigma_v' - \sigma_h') / 2$ kPa |
|---|---|---|---|---|
| 1 | 82 | 26 | 54 | 28 |
| 2 | 136 | 46 | 91 | 45 |
| 3 | 244 | 97 | 170 | 73 |

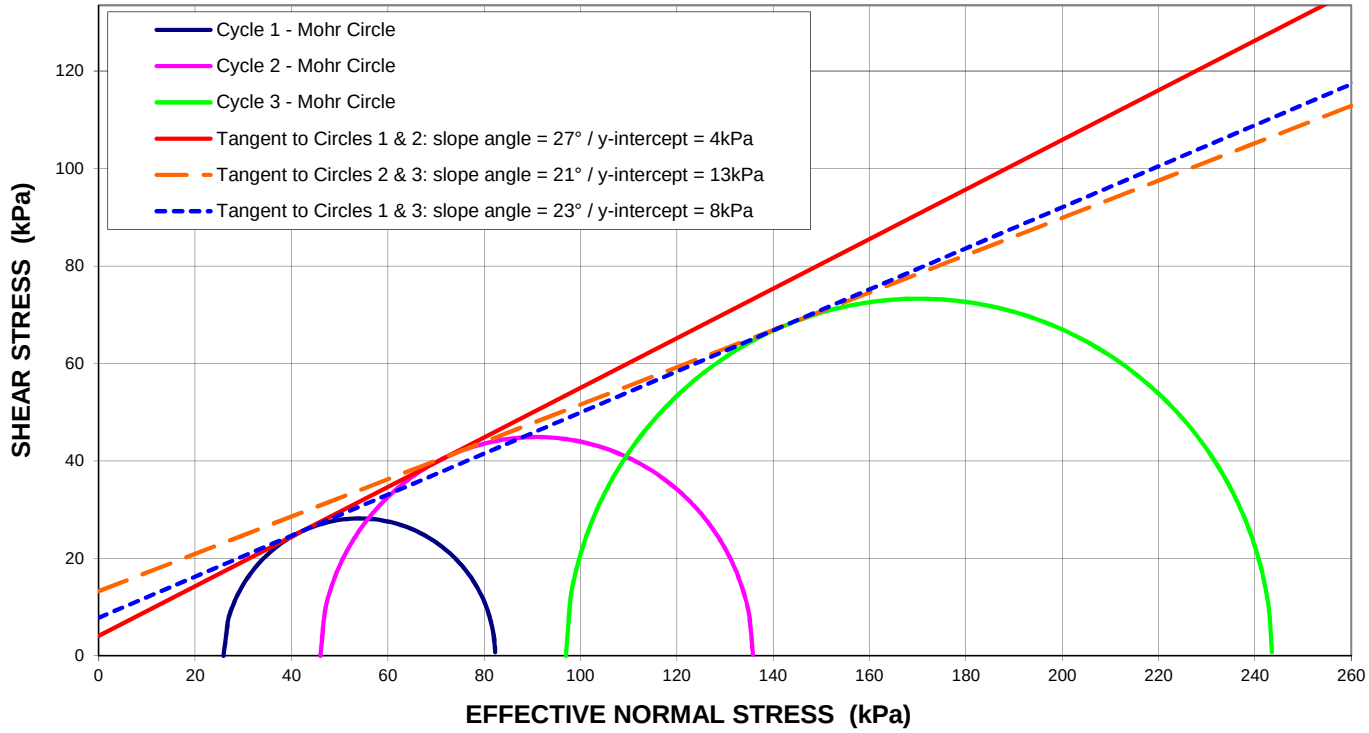
***From Graph Below:***

**Angle of Shear Resistance** $\phi'=$ _____ **degrees**

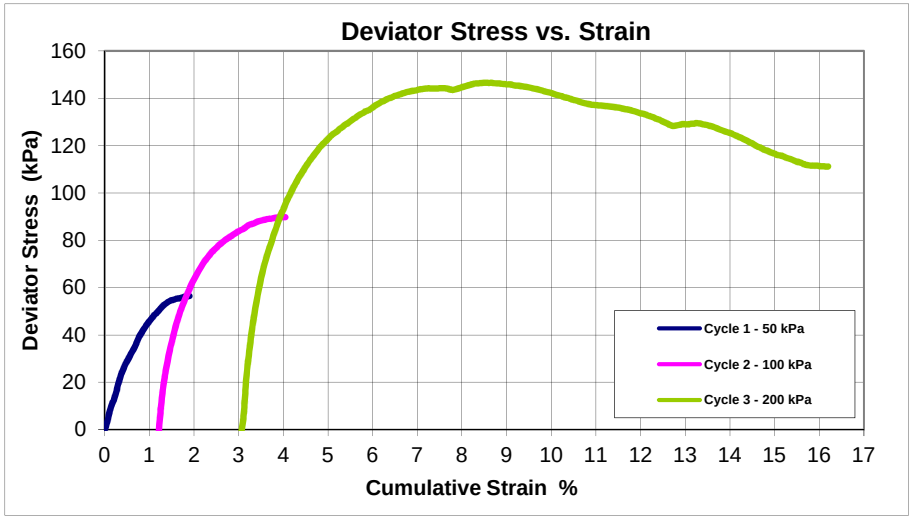
**Cohesion** $c'=$ _____ **kPa**

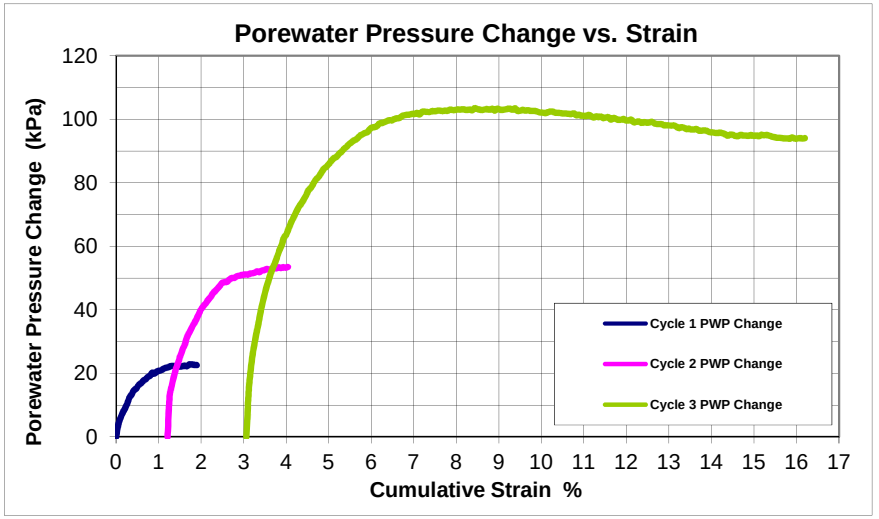
(Values to be decided upon by Geotechnical Engineer)

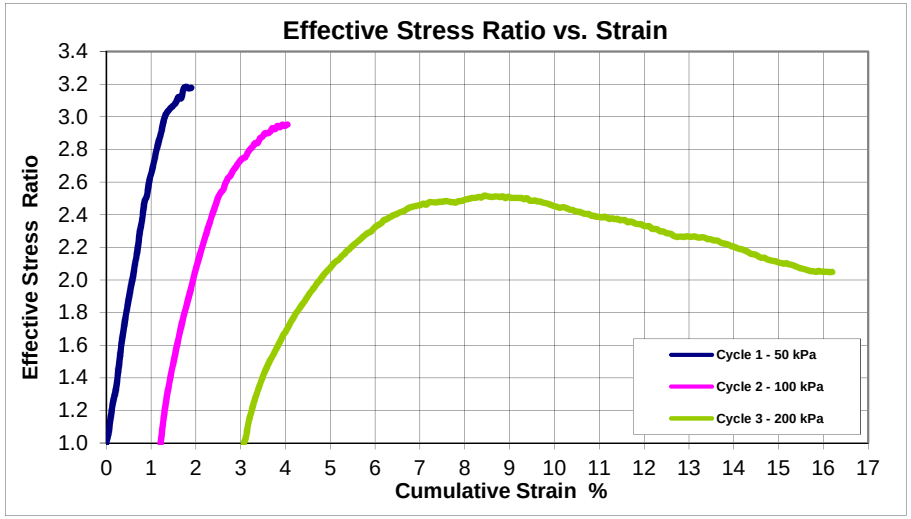
## MOHR CIRCLE PLOT

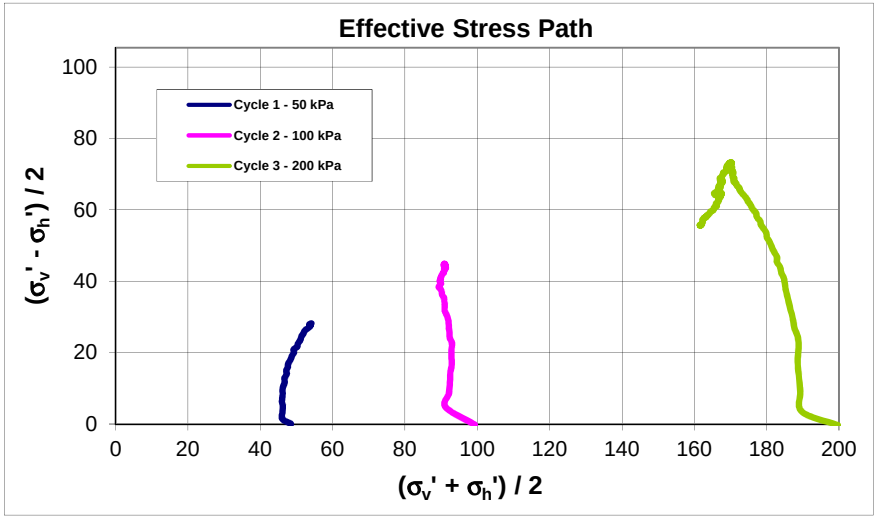


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| | PROJECT: | SPARK DC | | | | | Initials | Date |
| | | | | | | Tested By: | JF | May 2023 |
| | Job No: | 64746#L | Borehole Number: | AU23-BH07 | Depth: | 4.50 - 5.00m | Plotted By: | JF | 23-May-23 |
| | Reg. No: | 2931 | Sample Number: | PT1 | | | Checked By: | WEC | 25-May-23 |

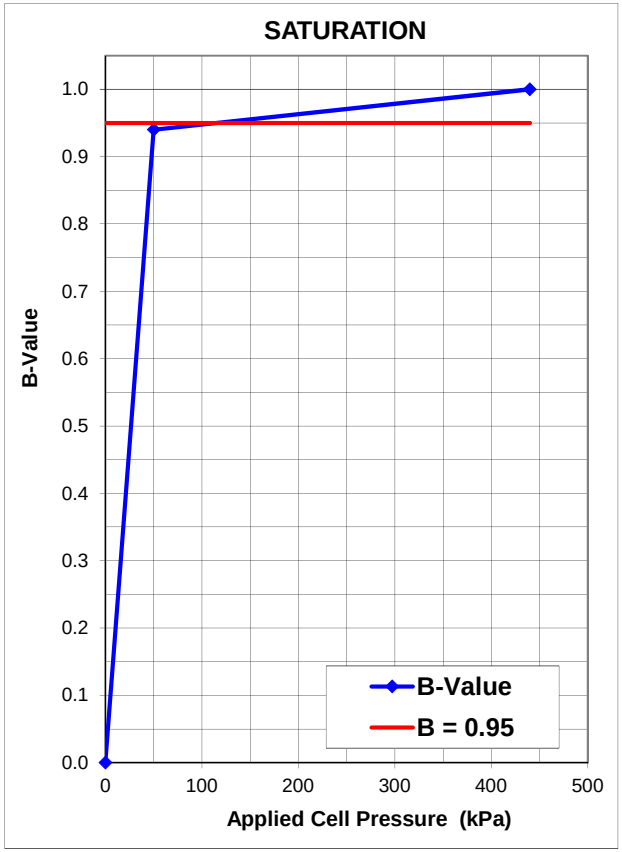


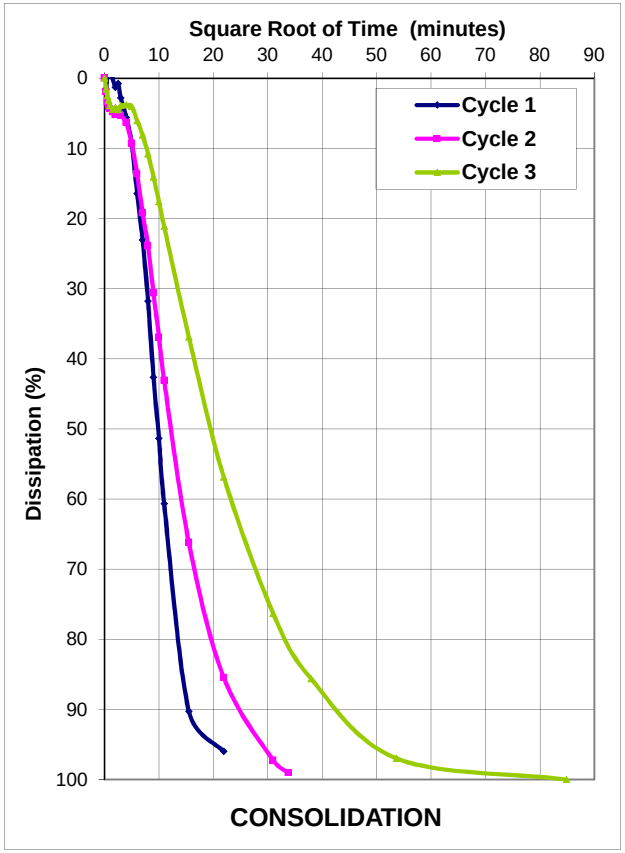



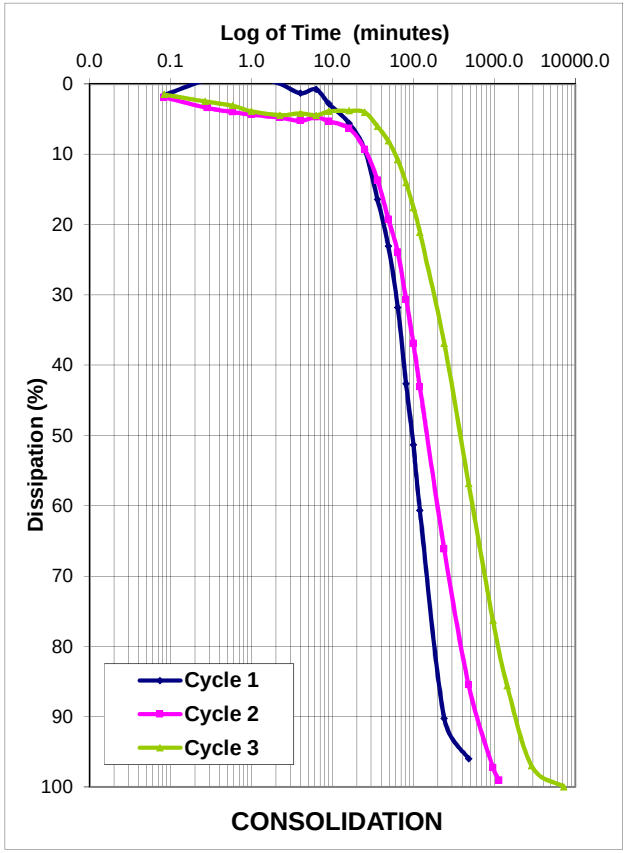



| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BGL Babbage Geotechnical Laboratory | 3-POINT CIU MULTI-STAGE TRIAXIAL COMPRESSION TEST | | | | Page 7 of 8 | Version No: | 7 |
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| | BS EN ISO 17892-9:2018: Part 9: Consolidated triaxial compression tests on water saturated soils | | | | | Auth. By: | WEC |
| | PROJECT: | SPARK DC | | | | Initials | Date |
| | | | | | Tested By: | JF | May 2023 |
| | Job No: 64746#L | Borehole Number: AU23-BH07 | | Depth: 4.50 - 5.00m | Plotted By: | JF | 23-May-23 |
| | Reg. No: 2931 | Sample Number: PT1 | | | Checked By: | WEC | 25-May-23 |



| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
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| | Reg. No: | 2931 | Sample Number: | PT1 | | Checked By: | WEC | 25-May-23 |

SAMPLE BEFORE TEST



SAMPLE AFTER TEST



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64-9-367 4954
wec@babbage.co.nz

Please reply to: W.E. Campton



Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Attention: **DAVID BOSSE**

Job Number: 64746#L
BGL Registration Number: 2931
Checked by: WEC

25th May 2023

# ISOTROPICALLY CONSOLIDATED, UNDRAINED (CIU), MULTI-STAGE TRIAXIAL COMPRESSIVE STRENGTH TESTING

Dear Sir,

***Re: SPARK DC***
***Your Reference: P523578***
***Report Number: 64746#L/CIU Triaxial Spark DC AU23-BH08 3.00 – 3.45m***

## Borehole No: AU23-BH08 Sample No: PT1 Depth: 3.00 – 3.45m

The following report presents the results of triaxial compressive strength testing at BGL of a 60mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 2nd of May 2023.

The client request was to measure the isotropically consolidated, undrained compression of the sample in a triaxial apparatus under known conditions of effective stress, with measurement of porewater pressure. We were instructed to test a single sample at effective stresses of 50kPa, 100kPa, and 200kPa by carrying out a 3-point multi-stage test, where sample compression was terminated just before failure on cycles 1 & 2, and the sample was completely failed on cycle 3.

Test standards used were:

| | |
|---|---|
| **Water Content:** | NZS4402: 1986: Test 2.1 |
| **Part 9: Consolidated triaxial compression tests on water saturated soils:** | BS EN ISO 17892-9:2018 |

Please note that the multi-stage method described below is a special procedure that is not fully covered by BS EN ISO 17892-9:2018, however, is the most common type of triaxial soil test carried out by soils testing laboratories. The method described below refers to the general procedures described in BS EN ISO 17892-9:2018, and also to the methods described in "Manual of Soil Laboratory Testing Volume 3: Effective Stress Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2014, Section 20.2 – Multistage triaxial test.

**ISOTROPICALLY CONSOLIDATED, UNDRAINED (CIU), MULTI-STAGE TRIAXIAL COMPRESSIVE STRENGTH TESTING**

**Borehole No: AU23-BH08** **Sample No: PT1** **Depth: 3.00 – 3.45m**

## Test Procedure

The sample was extruded from the push-tube and trimmed to length. The sample was then set up in a triaxial cell with vertical filter paper side drains and a single covering latex membrane. Saturation was achieved in distinct stages using 50kPa increments of cell pressure and back pressure, with a differential pressure of 10kPa (***the cell pressure was 10kPa greater than the back pressure***) in order to maintain a small positive effective stress. Saturation occurred through both the top and bottom ends of the sample.

The final saturation stage used a cell pressure of 400kPa and a back pressure of 390kPa. The bottom (base drainage) line was then closed & the sample was left overnight, allowing the porewater pressure to equalise throughout the sample. Saturation was then confirmed by closing the top (back pressure) line & increasing the cell pressure to 440kPa, observing the resulting increase in porewater pressure. A porewater pressure coefficient (***B***) of 1.00 was achieved, confirming saturation of the sample (ie. ***B*** ≥ 0.95).

Excess porewater pressure was then dissipated during the first consolidation cycle by opening the top (back pressure) line, resulting in an effective stress of 50kPa. The sample was then compressed at a set rate of 0.012mm per minute (actual rate of 0.014mm per minute). The compression was stopped when the deviator stress & stress ratio appeared to be close to maximum, and the load was taken off the sample. A final axial reading was then taken in order to calculate the rebound of the sample. The compression occurred under undrained conditions – ie. both the top (back pressure) and bottom (base drainage) lines were closed.

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For cycle 3 the cell pressure was increased to 590kPa while the back pressure remained at 390kPa. The resulting increased porewater pressure was dissipated by opening the top (back pressure) line, resulting in an effective stress of 200kPa acting on the same sample. Once consolidated, the 3rd compression cycle was compressed at a set rate of 0.012mm per minute (actual rate of 0.014mm per minute) until complete failure of the sample had occurred. The load was then taken off the sample and a final axial reading was taken in order to calculate the rebound of the sample at the end of the test. Like the previous cycles, the compression occurred under undrained conditions – ie. both the top (back pressure) and bottom (base drainage) lines were closed.

Mohr circle plots for each cycle are presented on page 5 of this report. We leave the determination of the effective angle of shearing resistance / effective angle of internal friction (Ø') and the effective cohesion (c') to our clients, but as a guide to this we tabulate each tangent to sets of circles on the graph.

Babbage Geotechnical Laboratory

## ISOTROPICALLY CONSOLIDATED, UNDRAINED (CIU), MULTI-STAGE TRIAXIAL COMPRESSIVE STRENGTH TESTING

**Borehole No: AU23-BH08** **Sample No: PT1** **Depth: 3.00 – 3.45m**

This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard. Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing. Please note that the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Justin Franklin
**Key Technical Person**
**Assistant Laboratory Manager**
**Babbage Geotechnical Laboratory**

ACCREDITED
TESTING LABORATORY
№ 126

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| Babbage Geotechnical Laboratory | Job Number: | Registration No: | Page 4 of 8 | Version No: | 7 |
|---|---|---|---|---|---|
| | 64746#L | 2931 | | Issue Date: | July 2022 |
| | Report No: | 64746#L/CIU Triaxial Spark DC AU23-BH08 3.00 - 3.45m | | Auth. By: | WEC |

# SPARK DC

## CIU MULTI-STAGE TRIAXIAL COMPRESSION TEST

| | | | |
|---|---|---|---|
| **BS EN ISO 17892-9:2018: Part 9: Consolidated triaxial compression tests on water saturated soils** | **Tested By:** | JF | May 2023 |
| | **Compiled By:** | JF | 23-May-23 |
| **NZS4402:1986: Test 2.1 - Water Content** | **Checked By:** | WEC | 25-May-23 |

**Borehole:** AU23-BH08 **Sample No:** PT1 **Depth:** 3.00 - 3.45m

**Sample History:** undisturbed ~~/ remoulded / compacted / other~~

**Sample Description** (not part of BGL IANZ accreditation):

**CLAY, soft to firm, highly plastic, light grey with black organic mottles, very moist.**

## SAMPLE DETAILS

| | | | |
|---|---|---|---|
| Initial Diameter: | 60.0 mm | Initial Water Content: | 62.0 % |
| Initial Length: | 120.0 mm | Final Water Content: | 47.2 % |
| Initial Mass: | 557.46 g | Initial Dry Density: | 1.01 t/m$^3$ |
| Initial Bulk Density: | 1.64 t/m$^3$ | Final Dry Density: | 1.18 t/m$^3$ |

## SATURATION CYCLE

| | | | | |
|---|---|---|---|---|
| **At End of Saturation:** | Cell Pressure Increase: | 40.0 kPa | Final Cell Pressure: | 440 kPa |
| | Resulting Increase in Pore Pressure: | 39.8 kPa | Final Pore Pressure: | 429.1 kPa |
| | Pore Pressure Coefficient *B*: | 1.00 | | |

## CONSOLIDATION CYCLES

| Cycle Number: | | 1 | 2 | 3 |
|---|---|---|---|---|
| Cell Pressure | kPa | **440** | **490** | **590** |
| Back Pressure | kPa | **390** | **390** | **390** |
| **Effective Pressure** | **kPa** | **50** | **100** | **200** |
| Pore Pressure at Start of Consolidation | kPa | 430.4 | 454.6 | 515.3 |
| Pore Pressure to Dissipate | kPa | 40.4 | 64.6 | 125.3 |
| Dissipation | % | 99.8 | 102.9 | 100.0 |
| Pore Pressure at End of Consolidation | kPa | 390.1 | 388.1 | 390.0 |
| Vertical Strain after Consol. (*cumulative) | % | 1.65 | * 4.54 | * 8.01 |
| Volumetric Strain after Consol. (*cumulative) | % | 4.96 | * 8.36 | * 14.23 |

## COMPRESSION CYCLES

| | | | | |
|---|---|---|---|---|
| Rate of Strain (set) | mm/min | 0.012 | 0.012 | 0.012 |
| Average Rate of Strain (actual) | mm/min | 0.014 | 0.014 | 0.014 |
| Average Rate of Strain (actual) | % per hour | 0.71 | 0.47 | 0.57 |
| Pore Pressure at Start of Compression | kPa | 390.1 | 388.1 | 390.0 |
| Vertical Effective Stress at Start of Compression | kPa | 49.9 | 101.9 | 200.0 |

## FAILURE CONDITIONS

| Criteria Used to Determine Failure: | | **maximum deviator stress /** ~~**maximum effective stress ratio**~~ | | |
|---|---|---|---|---|
| Axial Strain at Failure (*cumulative) | % | 2.55 | * 4.14 | * 6.85 |
| Axial Strain at Failure (*cumulative) | mm | 3.01 | * 5.76 | * 9.70 |
| Axial Strain after rebound (*cumulative) | % | 1.74 | * 3.27 | * 16.68 |
| Axial Strain after rebound (*cumulative) | mm | 2.06 | * 3.81 | * 18.61 |
| Deviator Stress at Failure | kPa | 44.5 | 69.6 | 107.9 |
| Pore Pressure at Failure | kPa | 419.2 | 443.1 | 491.0 |
| Vertical Effective Stress at Failure | kPa | 65.3 | 116.5 | 206.9 |
| Horizontal Effective Stress at Failure | kPa | 20.8 | 46.9 | 99.0 |
| Effective Stress Ratio at Failure | | 3.138 | 2.485 | 2.089 |
| | | | **Failure Type:** | **PLANAR / PLASTIC** |

## CORRECTIONS APPLIED TO MEASURED DEVIATOR STRESS AT FAILURE

| | | | | |
|---|---|---|---|---|
| Elastic Membrane Restraining Effect Correction | kPa | 0.48 | 0.77 | 1.28 |
| Vertical Filter Paper Side Drain Correction | kPa | 0.01 | 0.01 | 0.01 |

| Babbage Geotechnical Laboratory | 3-POINT CIU MULTI-STAGE TRIAXIAL COMPRESSION TEST | | | | | Page 5 of 8 | Version No: | 7 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Issue Date: | July 2022 |
| | BS EN ISO 17892-9:2018: Part 9: Consolidated triaxial compression tests on water saturated soils | | | | | | Auth. By: | WEC |
| | PROJECT: | SPARK DC | | | | | Initials | Date |
| | | | | | | Tested By: | JF | May 2023 |
| | Job No: | 64746#L | Borehole Number: | AU23-BH08 | Depth: 3.00 - 3.45m | Plotted By: | JF | 23-May-23 |
| | Reg. No: | 2931 | Sample Number: | PT1 | | Checked By: | WEC | 25-May-23 |

**Mohr Circle Plot:**

| cycle | Vertical Effective Stress $\sigma_v'$ kPa | Horizontal Effective Stress $\sigma_h'$ kPa | Effective Stress Path Parameters $(\sigma_v' + \sigma_h') / 2$ kPa | $(\sigma_v' - \sigma_h') / 2$ kPa |
|---|---|---|---|---|
| 1 | 65 | 21 | 43 | 22 |
| 2 | 117 | 47 | 82 | 35 |
| 3 | 207 | 99 | 153 | 54 |

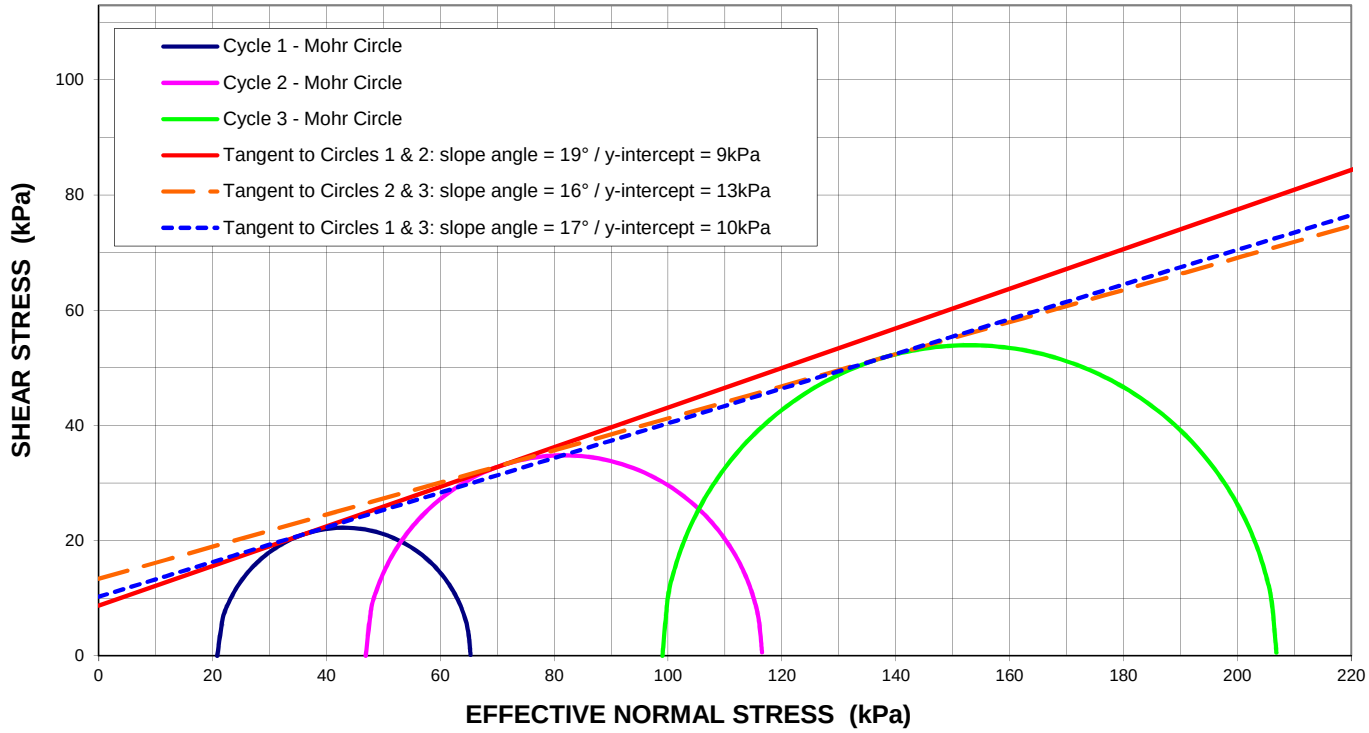
***From Graph Below:***

**Angle of Shear Resistance** $\phi'=$ _____ **degrees**

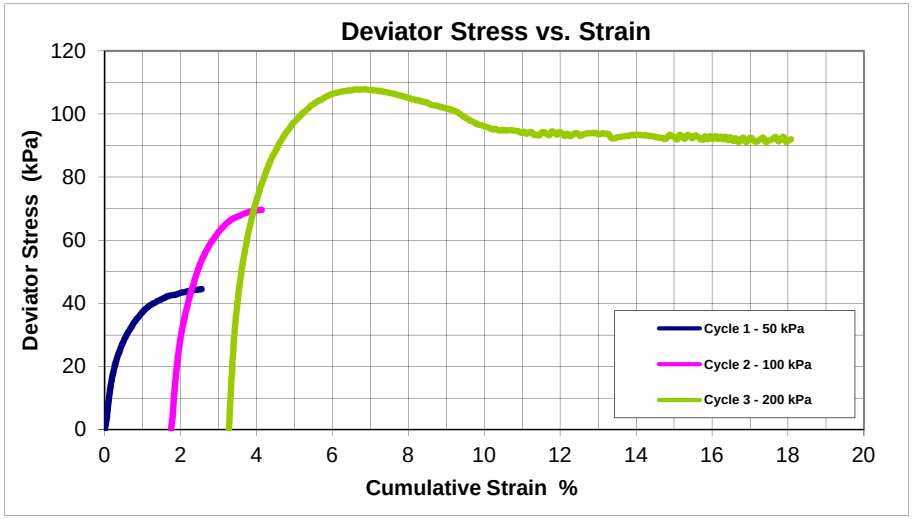
**Cohesion** $c'=$ _____ **kPa**

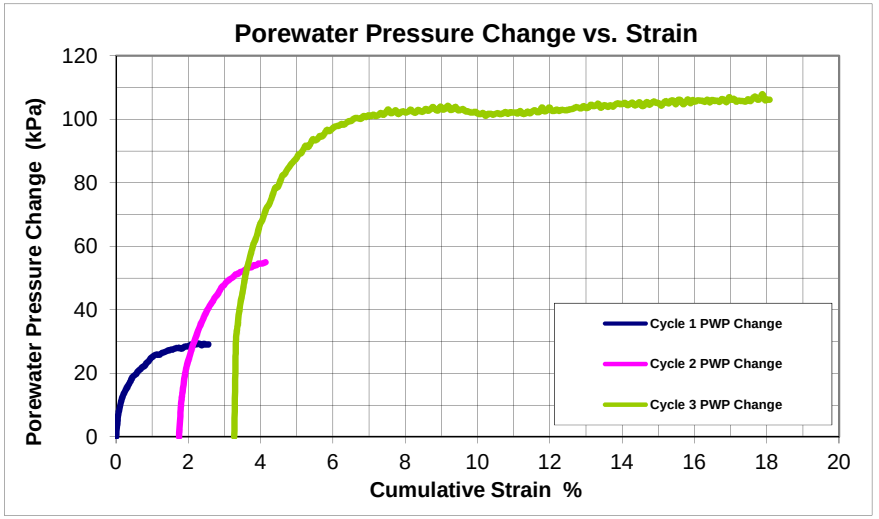
(Values to be decided upon by Geotechnical Engineer)

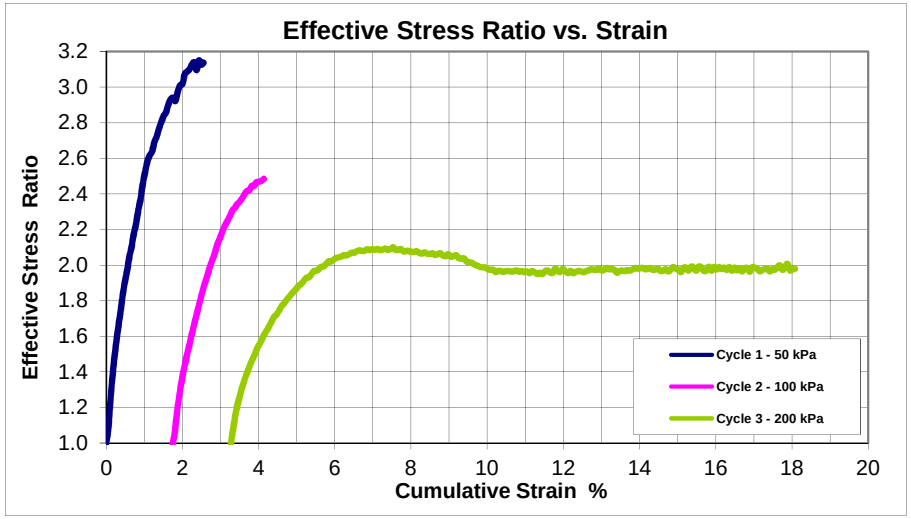
## MOHR CIRCLE PLOT

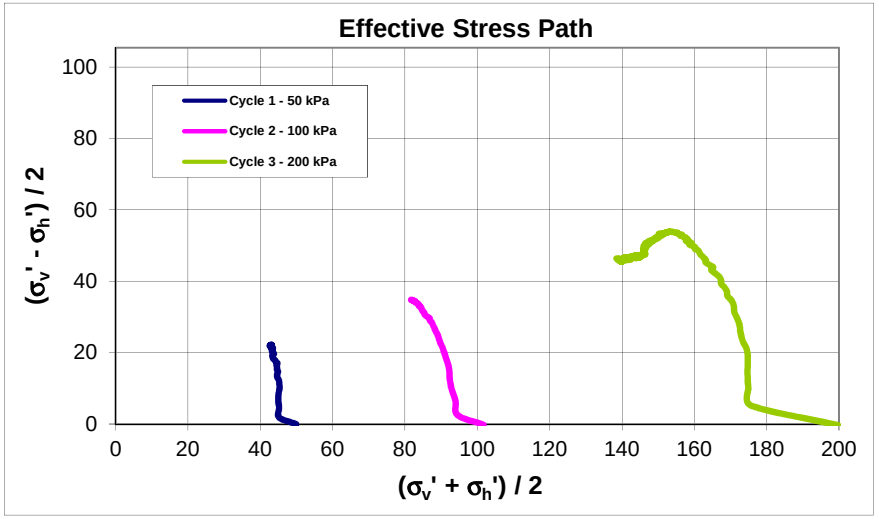


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| | PROJECT: | SPARK DC | | | | | Initials | Date |
| | | | | | | Tested By: | JF | May 2023 |
| | Job No: | 64746#L | Borehole Number: | AU23-BH08 | Depth: | 3.00 - 3.45m | Plotted By: | JF | 23-May-23 |
| | Reg. No: | 2931 | Sample Number: | PT1 | | | Checked By: | WEC | 25-May-23 |

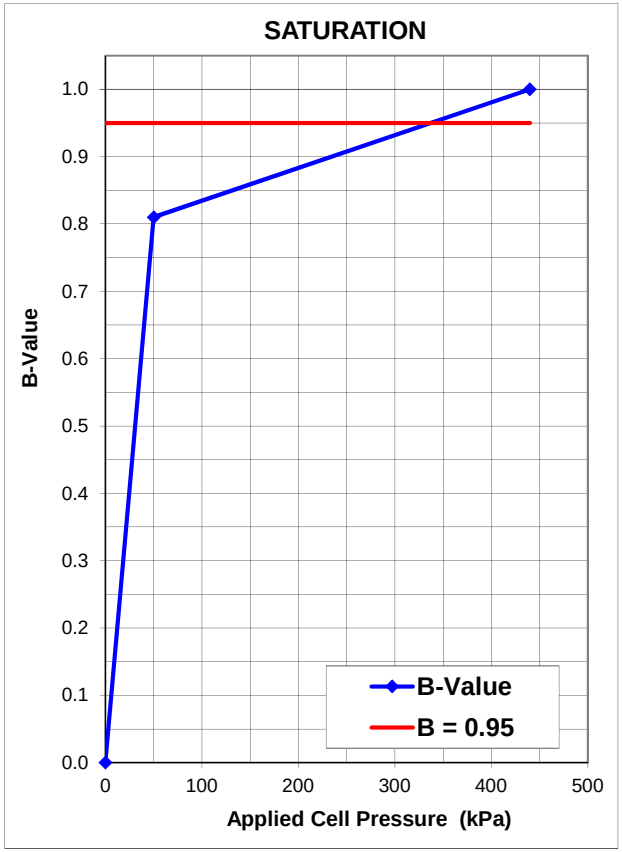


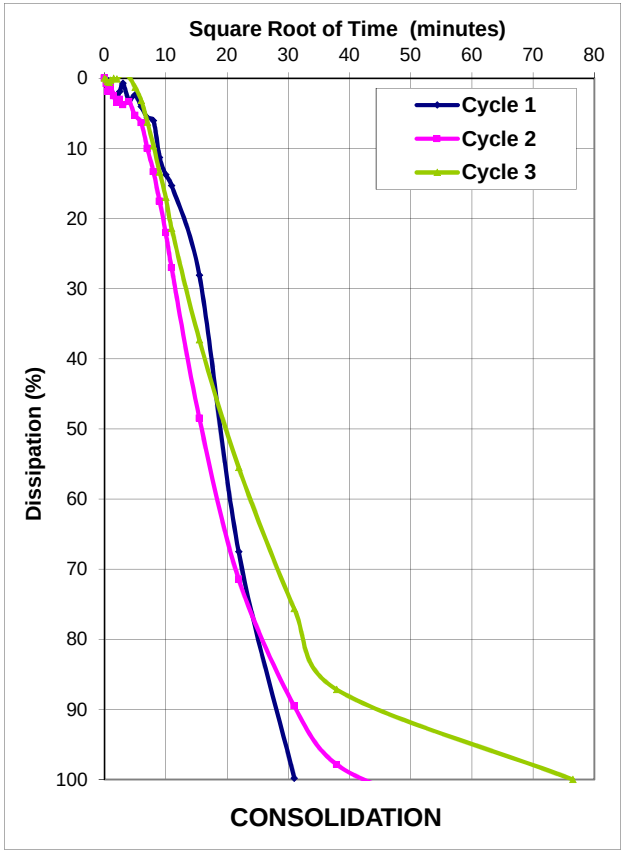



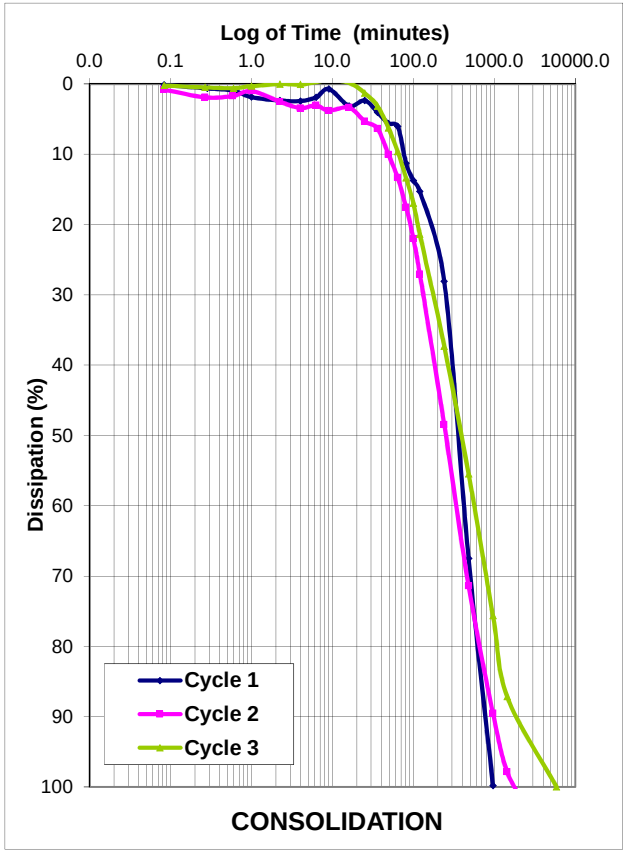



| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
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| | PROJECT: | SPARK DC | | | | | Initials | Date |
| | | | | | | Tested By: | JF | May 2023 |
| | Job No: | 64746#L | Borehole Number: | AU23-BH08 | Depth: 3.00 - 3.45m | Plotted By: | JF | 23-May-23 |
| | Reg. No: | 2931 | Sample Number: | PT1 | | Checked By: | WEC | 25-May-23 |



| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
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| | Reg. No: | 2931 | Sample Number: | PT1 | | Checked By: | WEC | 25-May-23 |

SAMPLE BEFORE TEST



SAMPLE AFTER TEST



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Please reply to: W.E. Campton



Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Attention: **DAVID BOSSE**

Job Number: 64746#L
BGL Registration Number: 2931
Checked by: JF

22nd May 2023

# ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

***Re: SPARK DC***
***Your Reference: P523578***
***Report Number: 64746#L/Consol Spark DC AU23-BH07 4.50 – 5.00m***

## Borehole No: AU23-BH07 Sample No: PT1 Depth: 4.50 – 5.00m

The following report presents the results of one dimensional consolidation testing at BGL of a 54mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 2nd of May 2023. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give both the $\sqrt{T_{90}}$ and $T_{50}$ values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **One Dimensional Consolidation:** | NZS4402:1986:Test 7.1 |

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube in small increments & trimmed into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of $m_v$ shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m$^3$ was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation ($c_v$'s), and coefficients of volume compressibility ($m_v$'s) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

Note that the Coefficient of Secondary Compression ($C_{sec}$) and the Coefficient of Permeability (k) values reported on page 5 have been calculated based on the methods described in "Manual of Soil Laboratory Testing Volume 2: Permeability, Shear Strength & Compressibility Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2011. The Coefficient of Permeability values were calculated using the $c_v$(log) values determined in the test. The reporting of these figures is not part of NZS4402:1986:Test 7.1, therefore these figures are not part of the IANZ endorsement for this report.

**Sample Description** (***not part of BGL IANZ Accreditation***)

**AU23-BH07 / PT1 / 4.50 – 5.00m:**

CLAY, stiff, highly plastic, light greenish grey with black speckles (roots), moist.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
**Key Technical Person**
**Laboratory Manager**
**Babbage Geotechnical Laboratory**

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TESTING LABORATORY
№ 126

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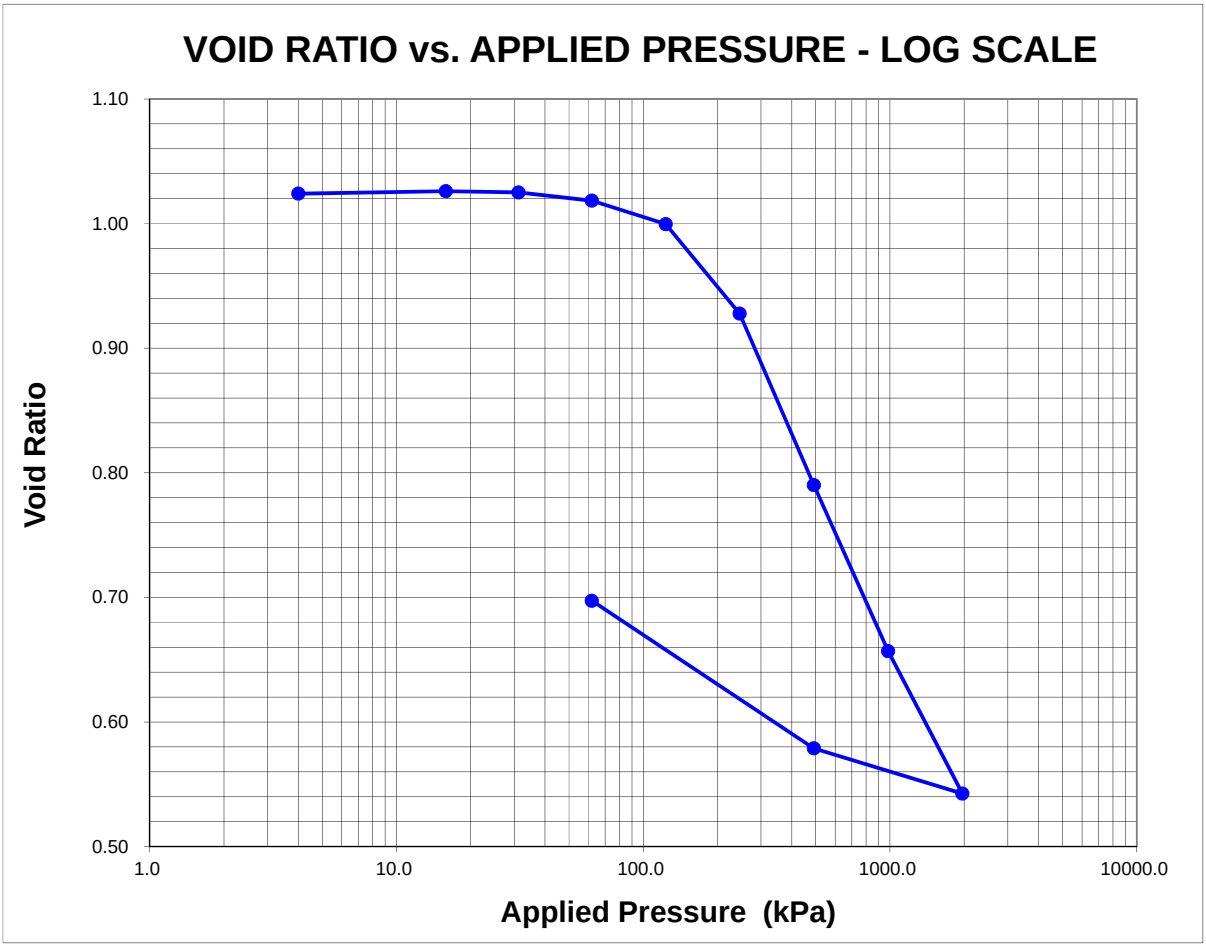
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| | 64746#L | 2931 | 3 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |

# SPARK DC

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 22-May-23 |
| | Checked By: | JF | 22-May-23 |

**Borehole No:** AU23-BH07 **Sample No:** PT1 **Depth:** 4.50 - 5.00m




### *SAMPLE HISTORY & PREPARATION*

undisturbed / ~~disturbed~~

Sample from 54mm diameter push-tube

Extruded from 54mm diameter tube in small increments & trimmed into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

### *TEST DETAILS*

| | | | | | |
|---|---|---|---|---|---|
| Consol machine number: | 3 | | Surface area of sample top: | 1997 | $mm^2$ |
| Consol ring number: | 3b | | Sample mass: | 72.543 | g |
| Sample diameter: | 50.43 | mm | Initial bulk density: | 1.82 | $t/m^3$ |
| Sample height: | 19.97 | mm | Assumed solid density of soil particles: | 2.65 | $t/m^3$ |

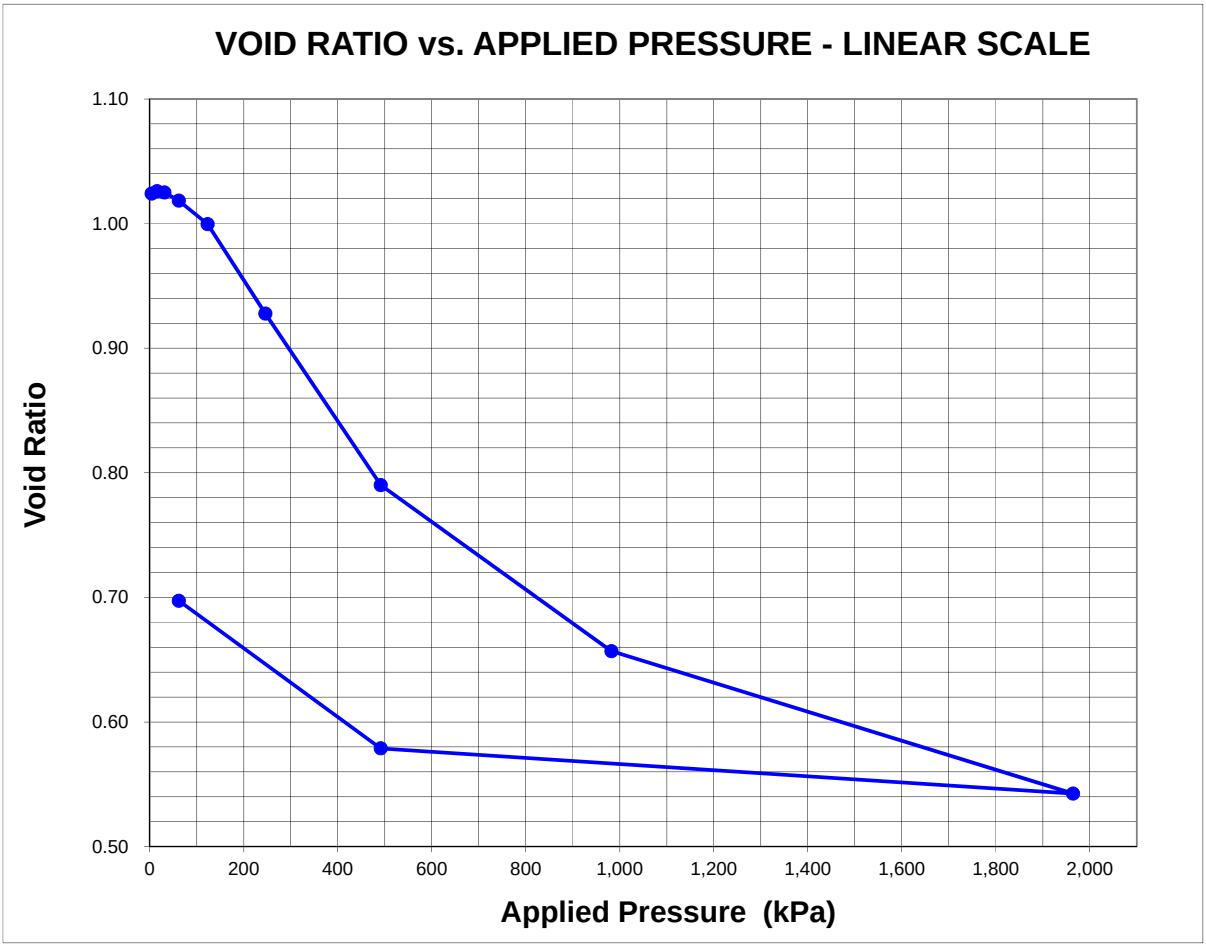
| Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 13 |
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| | 64746#L | 2931 | 4 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |

# SPARK DC

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 22-May-23 |
| | Checked By: | JF | 22-May-23 |

**Borehole No:** AU23-BH07 **Sample No:** PT1 **Depth:** 4.50 - 5.00m




***PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING***



| BGL Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 13 |
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| | 64746#L | 2931 | 5 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |

# SPARK DC

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 22-May-23 |
| | Checked By: | JF | 22-May-23 |

**Borehole No:** AU23-BH07 **Sample No:** PT1 **Depth:** 4.50 - 5.00m

| Applied Pressure | Incremental Deflection | Sample Height | Compression Ratio | Height of Voids | Void Ratio | Coefficient of Volume Compressibility $m_v$ | Coefficient of Consolidation - $c_v$ (log time) | Coefficient of Consolidation - $c_v$ (sqrt time) |
|---|---|---|---|---|---|---|---|---|
| kPa | mm | mm | | mm | e | $m^2$/MN | $m^2$/year | $m^2$/year |
| 4.0 | 0.000 | 19.970 | 1.000 | 10.104 | 1.024 | | | |
| 15.9 | -0.020 | 19.990 | 1.001 | 10.123 | 1.026 | sample swelled | | |
| 31.2 | 0.010 | 19.980 | 1.000 | 10.113 | 1.025 | 0.032 | 30 | 28 |
| 61.9 | 0.066 | 19.914 | 0.997 | 10.048 | 1.018 | 0.11 | 14 | 15 |
| 123.3 | 0.186 | 19.729 | 0.988 | 9.862 | 1.000 | 0.15 | 3.7 | 12 |
| 246.0 | 0.708 | 19.020 | 0.952 | 9.154 | 0.928 | 0.29 | 0.83 | 2.0 |
| 491.5 | 1.359 | 17.662 | 0.884 | 7.795 | 0.790 | 0.29 | 0.39 | 0.64 |
| 982.5 | 1.315 | 16.347 | 0.819 | 6.481 | 0.657 | 0.15 | 0.25 | 0.31 |
| 1964.4 | 1.128 | 15.219 | 0.762 | 5.353 | 0.543 | 0.070 | 0.18 | 0.21 |
| 491.5 | -0.358 | 15.577 | 0.780 | 5.711 | 0.579 | BACKLOAD 1 | | |
| 61.9 | -1.169 | 16.746 | 0.839 | 6.880 | 0.697 | BACKLOAD 2 | | |

| Coefficient of Secondary Compression - $C_{sec}$ | |
|---|---|
| Applied Pressure | $C_{sec}$ |
| 15.9 | - |
| 31.2 | 0.0004 |
| 61.9 | 0.001 |
| 123.3 | 0.001 |
| 246.0 | 0.005 |
| 491.5 | 0.007 |
| 982.5 | 0.007 |
| 1964.4 | 0.007 |

| Coefficient of Permeability - k | |
|---|---|
| Applied Pressure | k (m/s) |
| 15.9 | - |
| 31.2 | 3.0E-10 |
| 61.9 | 4.6E-10 |
| 123.3 | 1.7E-10 |
| 246.0 | 7.5E-11 |
| 491.5 | 3.5E-11 |
| 982.5 | 1.2E-11 |
| 1964.4 | 4.0E-12 |

| | INITIAL | FINAL |
|---|---|---|
| Mass of dry sample (g) | 52.22 | 52.22 |
| Height of sample (mm) | 19.970 | 15.219 (after consolidation)<br>16.746 (after rebound) |
| Water Content (%) | 38.9 | 28.4 |
| Dry Density (t/$m^3$) | 1.31 | 1.72 |
| Height of soil particles (mm) | 9.866 | 9.866 |
| Void Ratio | 1.024 | 0.543 (after consolidation)<br>0.697 (after rebound) |
| Degree of saturation (%) | - | - |

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New Zealand
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wec@babbage.co.nz

Please reply to: W.E. Campton



Aurecon New Zealand Limited
PO Box 9762
Newmarket
Auckland 1149

Attention: **DAVID BOSSE**

Job Number: 64746#L
BGL Registration Number: 2931
Checked by: JF

26th May 2023

# ONE DIMENSIONAL CONSOLIDATION TESTING

Dear Sir,

***Re: SPARK DC***
***Your Reference: P523578***
***Report Number: 64746#L/Consol Spark DC AU23-BH08 3.00 – 3.45m***

## Borehole No: AU23-BH08 Sample No: PT1 Depth: 3.00 – 3.45m

The following report presents the results of one dimensional consolidation testing at BGL of a 60mm diameter undisturbed push-tube soil sample delivered to this laboratory on the 2nd of May 2023. Our instructions were to carry out a one dimensional consolidation test using cycle times that would give both the $\sqrt{T_{90}}$ and $T_{50}$ values, and using a standard pressure sequence.

The push-tube sample was tested in accordance with the following standards:

| | |
|---|---|
| **Water Content:** | NZS4402:1986:Test 2.1 |
| **One Dimensional Consolidation:** | NZS4402:1986:Test 7.1 |

Please note that consolidation cycles were of a variable time duration, and hence is a departure from the test standard which states that the cycle time period for the consolidation loads after the initial cycle should be of approximately the same length. Subsequent load cycles were taken to at least the time of the previous cycle.

The sample was extruded from the tube straight into the consolidation ring, until the sample protruded from both sides of the ring. A wire was then used to cut the sample from the soil remaining in the tube, and a scalpel and straight edge were used to trim the sample flat in the ring.

These test results only relate to the sample tested. The values of $m_v$ shown on the table have been calculated for each pressure increment, using void ratio difference for that increment. Note that a solid density value of 2.65t/m$^3$ was assumed for this test, and is not part of the IANZ endorsement for this report. This test was carried out in a laboratory in which the temperature is controlled to be kept within the specification of the test standard.

As per the reporting requirements of NZS4402: 1986: Test 2.1: water content is reported to two significant figures for values below 10%, and to three significant figures for values of 10% or greater. As per the reporting requirements of NZS4402: 1986: Test 7.1: one dimensional consolidation, the coefficients of consolidation ($c_v$'s), and coefficients of volume compressibility ($m_v$'s) are reported to two significant figures.

The "Void Ratio vs. Applied Pressure – Linear Scale" plot presented on page 4 is included for your information, and is based on the paper "Soil stiffness measured in oedometer tests" by L. Wesley & M. Pender, Proc. 18th NZGS Geotechnical Symposium on Soil-Structure Interaction, 2008. Please note that the presentation of the data on a linear scale is not part of the test standard, hence page 4 does not form part of the IANZ endorsement for this report.

Note that the Coefficient of Secondary Compression ($C_{sec}$) and the Coefficient of Permeability (k) values reported on page 5 have been calculated based on the methods described in "Manual of Soil Laboratory Testing Volume 2: Permeability, Shear Strength & Compressibility Tests" by K.H. Head & R.J. Epps, 3rd Edition, 2011. The Coefficient of Permeability values were calculated using the $c_v$(log) values determined in the test. The reporting of these figures is not part of NZS4402:1986:Test 7.1, therefore these figures are not part of the IANZ endorsement for this report.

**Sample Description** (***not part of BGL IANZ Accreditation***)

**AU23-BH08 / PT1 / 3.00 – 3.45m:**

ORGANIC CLAY, soft, highly plastic, dark grey, brown & black, very moist.

Each test result is data obtained at a specific test location. The nature and continuity of subsoil conditions away from the test area could vary from the data recovered during this testing, therefore the test results relate only to the sample as-received, and relate only to the sample under test.

Thank you for the opportunity to carry out this testing. If you have any queries regarding the content of this report please contact the person authorising this report below at your convenience.

Yours faithfully,

Wayne Campton
**Key Technical Person**
**Laboratory Manager**
**Babbage Geotechnical Laboratory**

ACCREDITED
IANZ
TESTING LABORATORY
№ 126

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation. This report may not be reproduced except in full & with written approval from BGL.

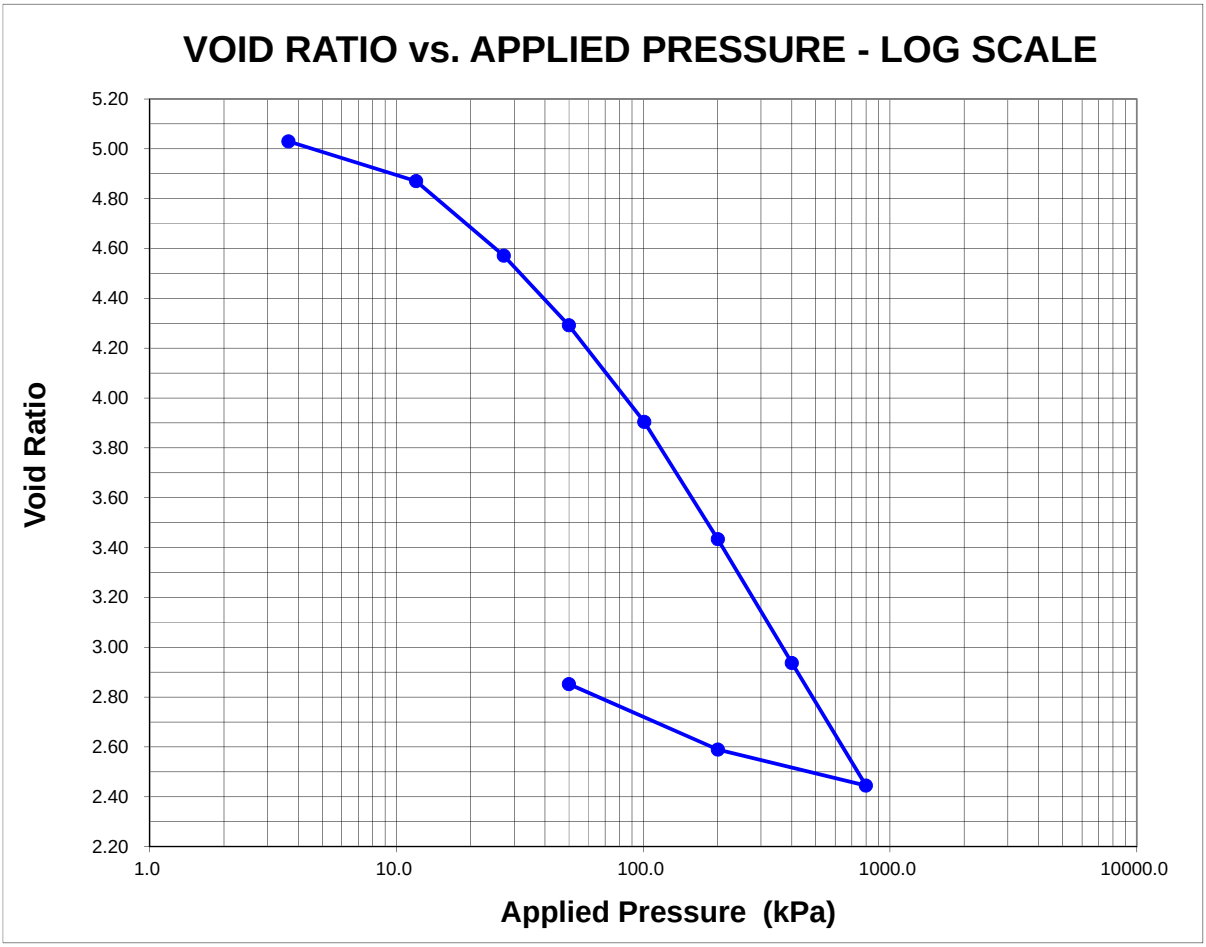
| BGL Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 13 |
|---|---|---|---|---|---|---|
| | 64746#L | 2931 | 3 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |

# SPARK DC

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 25-May-23 |
| | Checked By: | JF | 26-May-23 |

**Borehole No:** AU23-BH08 **Sample No:** PT1 **Depth:** 3.00 - 3.45m




### *SAMPLE HISTORY & PREPARATION*

undisturbed / ~~disturbed~~

Sample from 60mm diameter push-tube

Extruded from 60mm diameter tube straight into consol ring. Both sides of ring then trimmed flat with a scalpel & straight edge.

### *TEST DETAILS*

| | | | | | |
|---|---|---|---|---|---|
| Consol machine number: | 2 | | Surface area of sample top: | 2827 | $mm^2$ |
| Consol ring number: | 60B | | Sample mass: | 71.409 | g |
| Sample diameter: | 60.00 | mm | Initial bulk density: | 1.23 | $t/m^3$ |
| Sample height: | 20.60 | mm | Assumed solid density of soil particles: | 2.65 | $t/m^3$ |

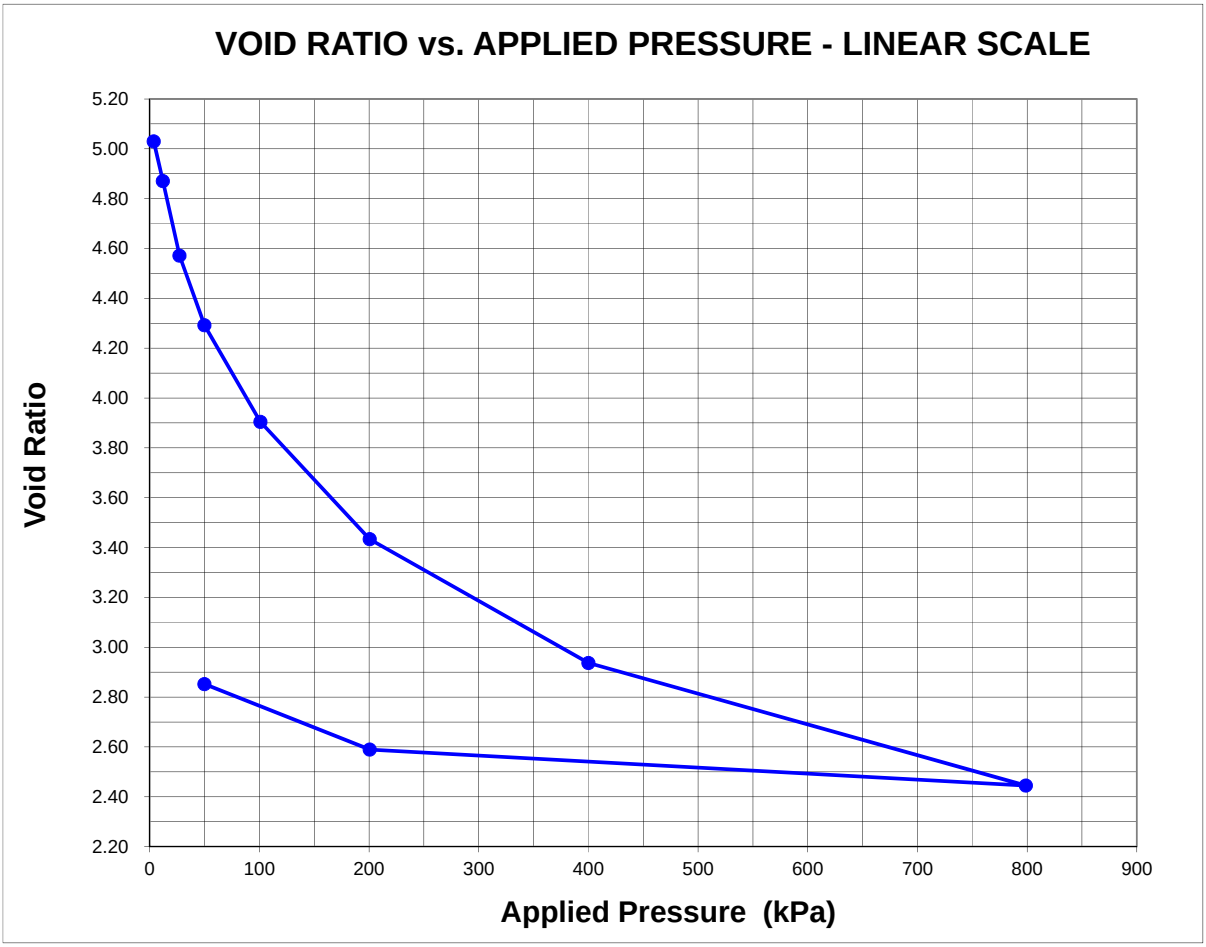
| Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 13 |
|---|---|---|---|---|---|---|
| | 64746#L | 2931 | 4 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |

# SPARK DC

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
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| | Checked By: | JF | 26-May-23 |

**Borehole No:** AU23-BH08 **Sample No:** PT1 **Depth:** 3.00 - 3.45m




***PHOTOGRAPH OF THE SAMPLE PRIOR TO TESTING***



| BGL Babbage Geotechnical Laboratory | Job No: | Reg. No: | Page | of | Version No: | 13 |
|---|---|---|---|---|---|---|
| | 64746#L | 2931 | 5 | 5 | Issue Date: | July 2022 |
| | PROJECT: | | | | Auth. By: | WEC |

# SPARK DC

## ONE DIMENSIONAL CONSOLIDATION

| | | | |
|---|---|---|---|
| Test Method: NZS4402:1986:Test 2.1 - Water Content | Tested By: | WEC | May 2023 |
| Test Method: NZS4402:1986:Test 7.1 - Consolidation | Compiled By: | WEC | 25-May-23 |
| | Checked By: | JF | 26-May-23 |

**Borehole No:** AU23-BH08 **Sample No:** PT1 **Depth:** 3.00 - 3.45m

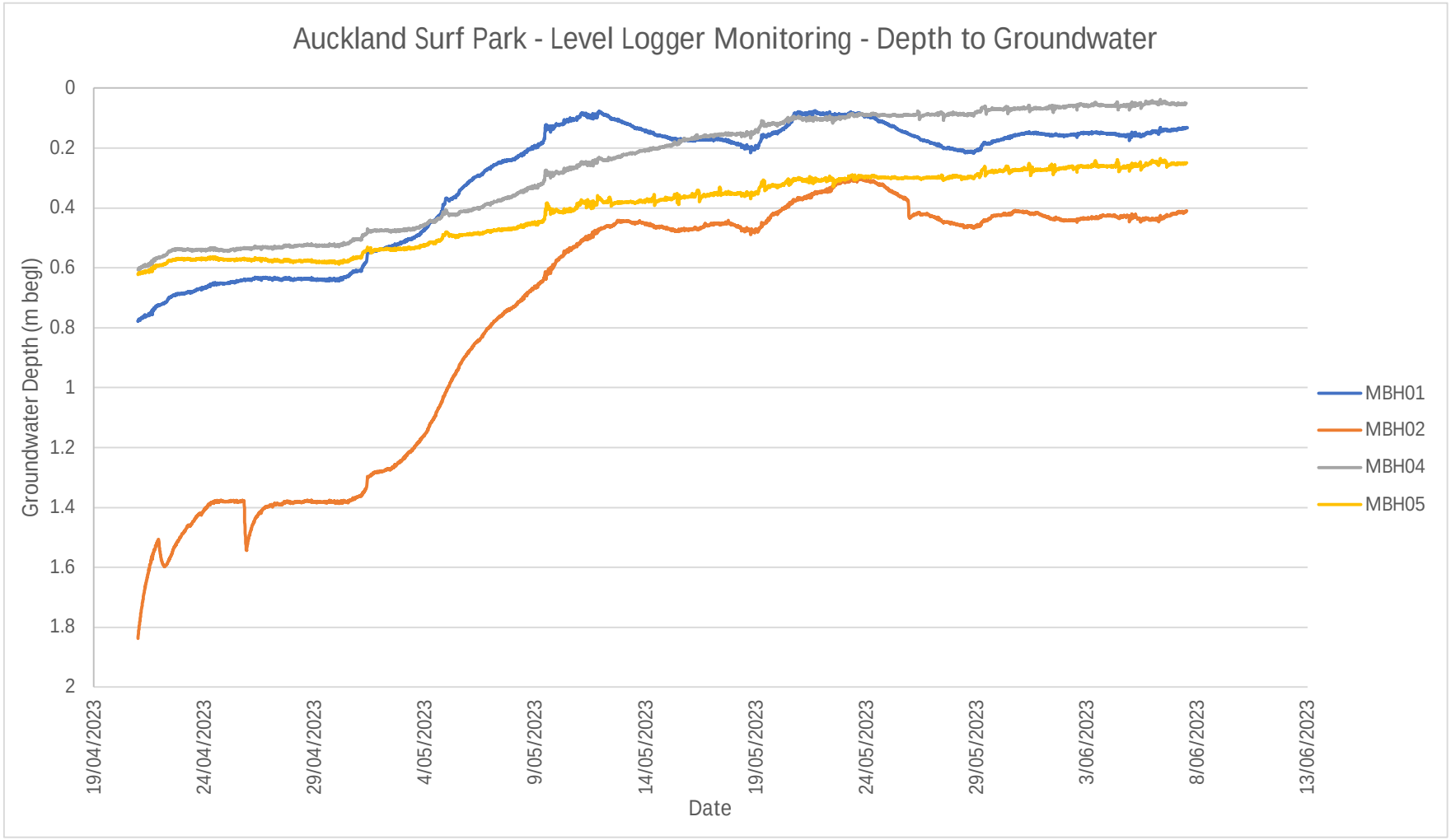
| Applied Pressure | Incremental Deflection | Sample Height | Compression Ratio | Height of Voids | Void Ratio | Coefficient of Volume Compressibility $m_v$ | Coefficient of Consolidation - $c_v$ (log time) | Coefficient of Consolidation - $c_v$ (sqrt time) |
|---|---|---|---|---|---|---|---|---|
| kPa | mm | mm | | mm | e | $m^2$/MN | $m^2$/year | $m^2$/year |
| 3.7 | 0.000 | 20.600 | 1.000 | 17.184 | 5.030 | | | |
| 12.0 | 0.546 | 20.054 | 0.974 | 16.638 | 4.870 | 3.2 | 0.37 | 0.48 |
| 27.2 | 1.020 | 19.034 | 0.924 | 15.618 | 4.572 | 3.3 | 0.48 | 0.60 |
| 50.0 | 0.956 | 18.078 | 0.878 | 14.662 | 4.292 | 2.2 | 0.45 | 0.73 |
| 100.9 | 1.325 | 16.753 | 0.813 | 13.337 | 3.904 | 1.4 | 0.57 | 0.94 |
| 200.6 | 1.607 | 15.146 | 0.735 | 11.730 | 3.434 | 0.96 | 0.43 | 0.70 |
| 400.1 | 1.697 | 13.449 | 0.653 | 10.033 | 2.937 | 0.56 | 0.33 | 0.52 |
| 798.9 | 1.681 | 11.768 | 0.571 | 8.352 | 2.445 | 0.31 | 0.26 | 0.36 |
| 200.6 | -0.494 | 12.262 | 0.595 | 8.845 | 2.589 | | BACKLOAD 1 | |
| 50.0 | -0.897 | 13.159 | 0.639 | 9.743 | 2.852 | | BACKLOAD 2 | |

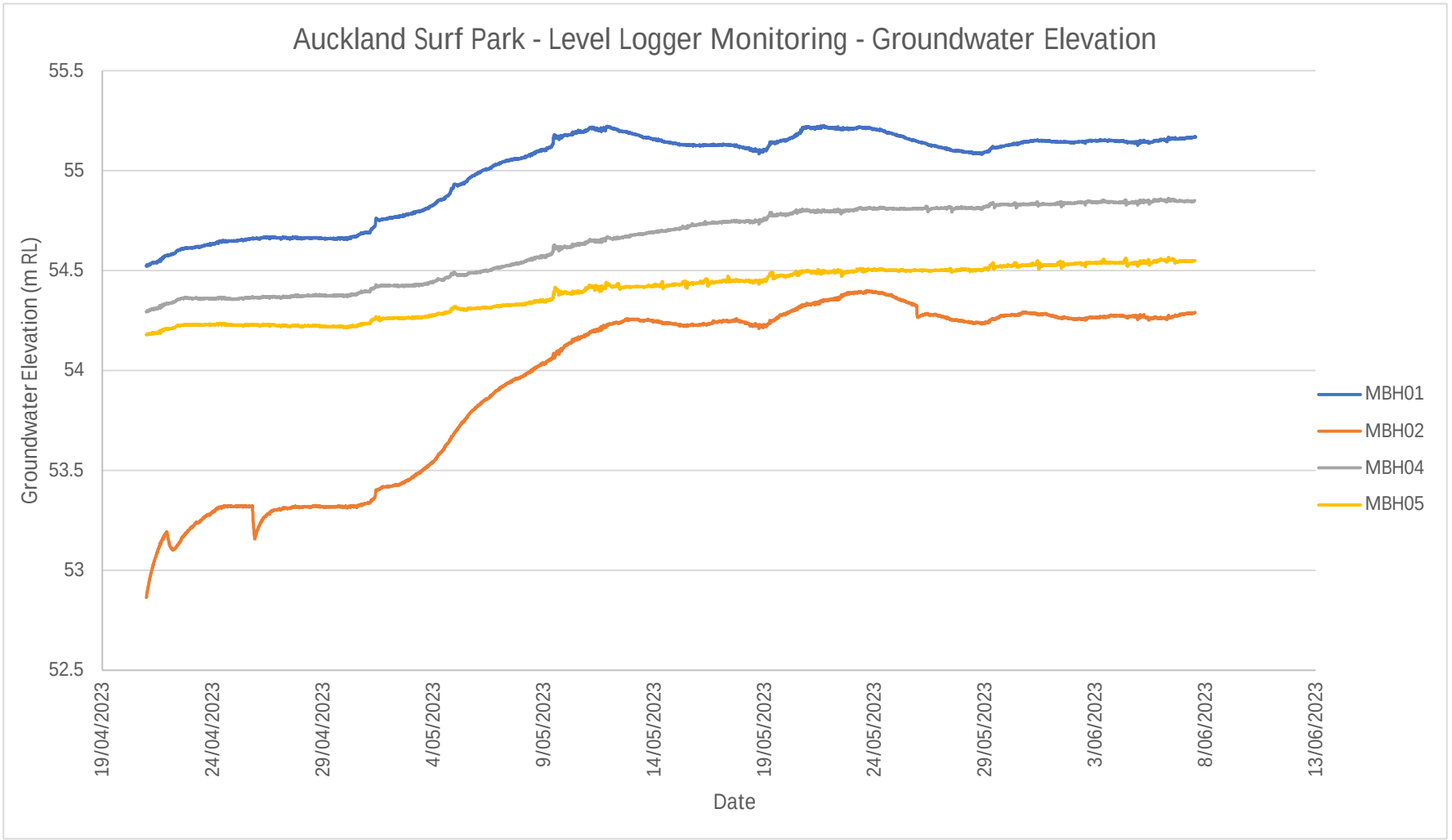
| Coefficient of Secondary Compression - $C_{sec}$ | |
|---|---|
| Applied Pressure | $C_{sec}$ |
| 12.0 | 0.005 |
| 27.2 | 0.007 |
| 50.0 | 0.007 |
| 100.9 | 0.009 |
| 200.6 | 0.009 |
| 400.1 | 0.010 |
| 798.9 | 0.009 |

| Coefficient of Permeability - k | |
|---|---|
| Applied Pressure | k (m/s) |
| 12.0 | 3.6E-10 |
| 27.2 | 4.9E-10 |
| 50.0 | 3.1E-10 |
| 100.9 | 2.5E-10 |
| 200.6 | 1.3E-10 |
| 400.1 | 5.8E-11 |
| 798.9 | 2.5E-11 |

| | INITIAL | FINAL |
|---|---|---|
| Mass of dry sample (g) | 25.60 | 25.60 |
| Height of sample (mm) | 20.600 | 11.768 (after consolidation)<br>13.159 (after rebound) |
| Water Content (%) | 179 | 99.8 |
| Dry Density ($t/m^3$) | 0.44 | 0.77 |
| Height of soil particles (mm) | 3.416 | 3.416 |
| Void Ratio | 5.030 | 2.445 (after consolidation)<br>2.852 (after rebound) |
| Degree of saturation (%) | 94.3 | 92.7 |

# Appendix F Initia Groundwater Monitoring Plots


Auckland Surf Park - Level Logger Monitoring - Depth to Groundwater
Groundwater Depth (m begl)
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
19/04/2023
24/04/2023
29/04/2023
4/05/2023
9/05/2023
14/05/2023
19/05/2023
24/05/2023
29/05/2023
3/06/2023
8/06/2023
13/06/2023
Date
MBH01
MBH02
MBH04
MBH05


Auckland Surf Park - Level Logger Monitoring - Groundwater Elevation
Groundwater Elevation (m RL)
55.5
55
54.5
54
53.5
53
52.5
19/04/2023
24/04/2023
29/04/2023
4/05/2023
9/05/2023
14/05/2023
19/05/2023
24/05/2023
29/05/2023
3/06/2023
8/06/2023
13/06/2023
Date
MBH01
MBH02
MBH04
MBH05