WINSTONE AGGREGATES

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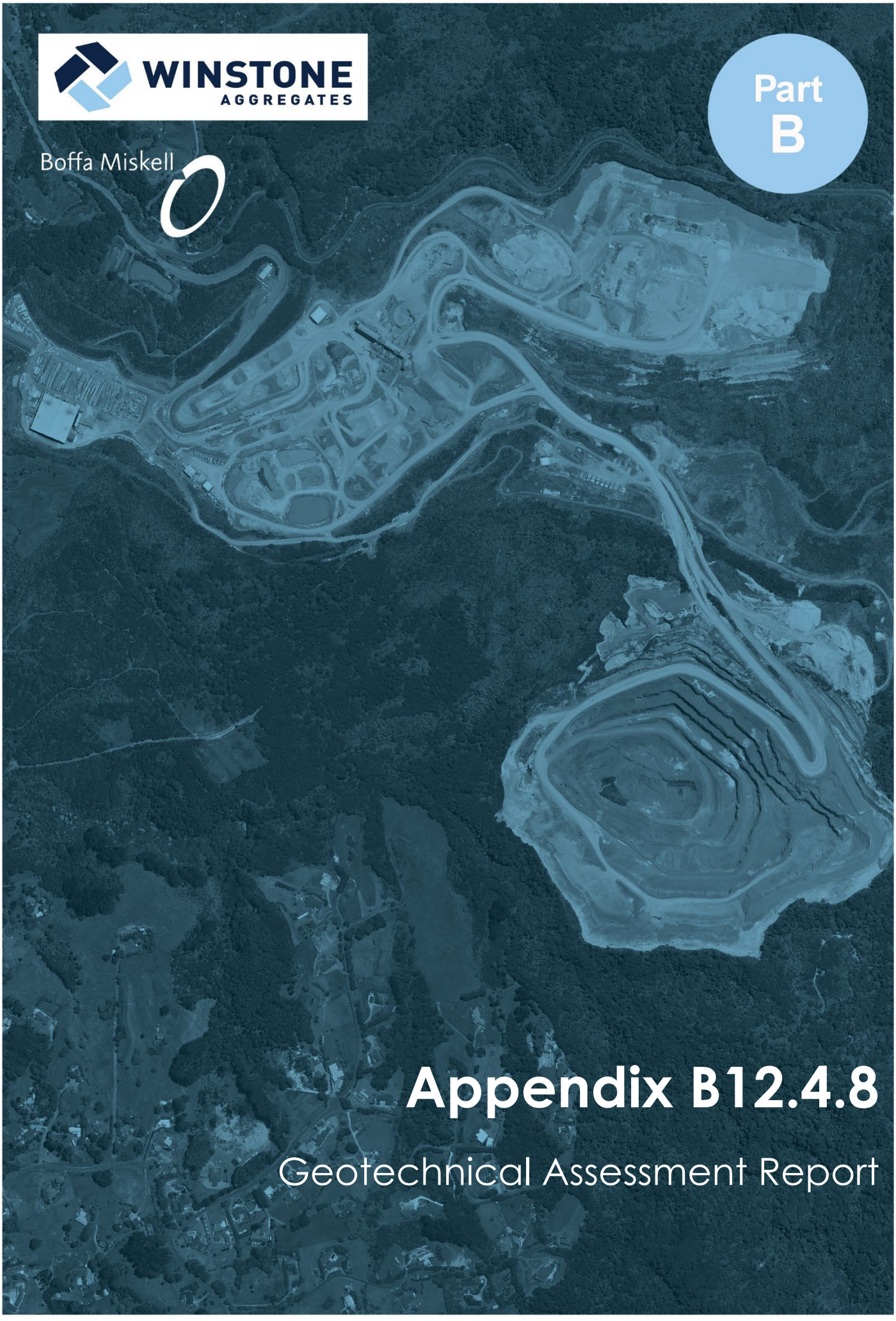
Part B



Appendix B12.4.8

Geotechnical Assessment Report

REPORT

Tonkin+Taylor

Resource Consent Technical Report - Geotechnical Assessment

Hunua Quarry

Prepared for
Fletcher Concrete and Infrastructure Limited
Prepared by
Tonkin & Taylor Ltd
Date
March 2026
Job Number
1099889.1000 v5

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Document control

Title: Resource Consent Technical Report - Geotechnical Assessment					
Date	**Version**	**Description**	**Prepared by:**	**Reviewed by:**	**Authorised by:**
19/01/2026	1	Draft Geotechnical Assessment – 50% completed	T. Kinley and P. Mathewson	D. Johnson	M. Thomas
2/02/2026	2	Draft Geotechnical Assessment – 90% completed	P. Mathewson	D. Johnson	M. Thomas
23/02/2026	3	Final issue	P. Mathewson	D. Johnson	M. Thomas
19/03/2026	4	Final issue	P. Mathewson	D. Johnson	M. Thomas
27/03/2026	5	Final issue	P. Mathewson	D. Johnson	M. Thomas

Distribution:

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1 Executive Summary

Tonkin and Taylor (T+T) have been commissioned by Fletcher Concrete and Infrastructure Limited (FCIL), trading as Winstone Aggregates (Winstone), to assess the effects of the proposed Hunua Quarry Development and Mangapū Tributary diversion from a geotechnical perspective. The proposed development is to the north and south of the Symonds Hill pit, within land currently owned by FCIL, and is projected to provide at least a further fifty years of resource and enabling up to 80 years' supply, as designed by FCIL.

This report demonstrates that the quarry development is feasible from a geotechnical perspective, and offsite effects such as slope stability, groundwater and rock mass dilation will not impact current nor future land use adjacent to the quarry operations. Geotechnical risks can be managed through conventional design methods. Ground movement impacts beyond FCIL owned land are likely to be negligible (less than 10 mm) and pose very low levels of risk ("R1", defined in Appendix H). Off-site effects are expected to be less than minor. Continued monitoring and adaptive management through the excavation phases will ensure that any emerging geological or hydrogeological risks are effectively identified and mitigated to acceptable levels (R1 to R2). The final pit slopes will be reviewed and certified by a suitability qualified geotechnical professional to confirm the final as-built cut meets closure stability criteria.

A summary of our assessment is as follows:

Ground Conditions

The geology of the site has been defined by surface mapping and subsurface borehole investigations. The geology of the quarry expansion will be dominated by moderately strong to strong Waipapa Group Greywacke rock in various weathering states, overlain in the north and northeast of the quarry site by Waitemata Group, and Waikato Coal Measures (WCM). The surface of the greywacke rock is highly weathered, with the rock becoming less weathered with depth, with locally deeper weathering profiles along faults.

The moderately, slightly and unweathered greywacke rock is suitable for aggregate. The overburden materials (Waitemata Group, WCM, and the residual to highly weathered greywacke) will be cut to waste, with the overburden to be used to complete the backfilling of the now closed Hunua Pit, and progressively within the Symonds Hill Pit from Stage 7 onwards.

The quarry site is located within a fault bounded by greywacke block with SW-NE and SE-NW regional faults (cutting across all geological units) which are related to the Hunua and Drury Faults. Within the site, the Hunua Pit is traversed by a sequence of faults that are present only within the greywacke rock. The greywacke rock mass is highly jointed.

The regional groundwater inflow to the quarry(as modelled by others[1]) is controlled by the dewatering level and greywacke aquifer properties. The current regional groundwater level in the greywacke is at approximately RL 60 m within Symonds Hill Pit and will be drawn down to RL -50 m to enable mining to the end of Stage 8. The regional groundwater has a flat gradient with flow to the west on a regional scale. Pre-quarry regional groundwater levels at the Symonds Hill Pit were approximately RL 75 m. The jointed rock mass has high transmissivity, and it has been shown that dewatering to support the excavation of the quarry to full depth will draw the regional groundwater down to the quarry floor, with a flat gradient maintained within the faulted block. The drawdown zone of influence is modelled to extend beyond the quarry footprint. On completion of dewatering at the pit (and take from the current water supply bore (HUN14/8)), groundwater is likely to rebound to pre-pumping levels (RL 75 m).

[1] PDP (2026), Hunua Quarry Development: Groundwater Effects Assessment. Prepared for Winstone Aggregates. Dated 2 February 2026.

The overlying Waitemata Group, WCM and weathered greywacke have lower/variable permeability, and contain localised perched water tables. Perched groundwater levels are not directly connected to the regional system and typically discharge to local streams.

Landslide risk and slope stability assessment

An assessment of short-term and long-term slope stability of the proposed slopes (both within the quarry extension shell designs and the Mangapū Stream diversion) has been completed. The assessment uses ground models based on historic and recent site investigations and has been calibrated against the observed performance of the Hunua and Symonds Hill pit faces. Our assessment concludes:

- The design approach is proven and practical, validated by successful application at the Hunua Quarry Pit and consistent stable performance at Symonds Hill over the past ten years.
- The current design parameters achieve satisfactory stability levels, with calculated Factors of Safety exceeding 2.0 for slopes extending beyond FCIL property boundaries, and greater than 1.5 for slopes within FCIL property.
- Interbench and mid-slope designs are appropriate and supported by empirical data and field performance observations from comparable quarry operations.

No significant off-site geotechnical impacts are expected.

An assessment of the proposed activities within Table E36.4.1B and C indicates a Low (acceptable) landslide hazard risk classification, in accordance with Chapter M, Appendix 24 of the AUP, for the existing Symonds Hill Pit and the proposed development of Symonds Hill Pit. Refer to Section 13 for further details on the PC120 assessment.

Stability assessment – Overburden Disposal Area (OBDA)

The overburden disposal at Hunua Pit is already consented and subject to conditions and does not form part of the current consent application.

The existing Hunua Pit OBDA will be used for early stripping (Stages 1–3 and 6) until capacity is reached, after which overburden disposal will transition to in-pit placement within Symonds Hill Pit. Existing geotechnical assessments remain applicable for the Hunua Pit OBDA. The Hunua backfill has been designed to support filling to RL 190 m, with the required levels of stability at completion. Regular inspection and monitoring of the backfill construction is being undertaken by FCIL and is reported on (by others). The backfill is being constructed to the design.

Offsite effects beyond FCIL owned land

The quarry slopes have been designed based on set criteria to provide high levels of stability (Factor of Safety (FoS) > 2.0) for all land beyond the site boundaries. Accordingly, the risk of the project causing slope instability affecting land, buildings and infrastructure beyond the site boundary is R1.

An assessment of potential settlement effects beyond the site boundaries due to dewatering of the quarry pit to its deepest extent (Stage 8) indicates settlements of less than 10 mm. Furthermore, the flat nature of the groundwater surface means that no significant differential settlements are anticipated (R1 risk). Groundwater-induced settlement is not expected to cause any adverse impacts upon land use or structures.

Excavation of the quarry will allow the underlying rock to relax, causing up to approximately 10 mm of movement at the cut faces. Our analyses show that this relaxation reduces quickly behind the cut faces, and little to no rock mass dilation is expected below the Mangapū Stream and Stream diversion.

Mangapū Stream diversion

The Mangapū Stream diversion will be constructed within slightly weathered fractured greywacke rock over much of its length. An engineered clay liner will be constructed beneath the naturalised stream diversion[2], to minimise leakage of the stream flow into the underlying rock.

Management of unexpected ground conditions

The primary residual risk relates to the potential encounter of previously unexposed geological structures during ongoing excavation. To manage this, a monitoring and staged investigation programme is recommended. This should include continuous slope performance monitoring, detailed geological mapping of newly exposed faces, and groundwater level monitoring to identify any deviations from modelled conditions. A Trigger Action Response Plan (TARP) should guide appropriate responses if conditions differ from those anticipated. Staged targeted investigations within the Mangapū Stream diversion area and the northwestern and eastern areas should also be undertaken as the quarry advances with timing of the investigations staged to match the pit development stages. Conditions of consent are recommended (see Section 17) to manage this risk.

A careful approach will be required when reaching the final face positions in Stage 8 to minimise the risk of back-break. Pre-splitting is recommended to minimise structural damage to the final batter profiles. At the end of pit development, the final faces should be subject to inspection by a geotechnical professional familiar with the contents of this report.

2 Report Release and Reliance

This report has been prepared by Tonkin & Taylor Limited on the instructions of our client, in accordance with the agreed scope of work. If it is intended to support an application under the Fast-track Approvals Act 2024, it may be relied upon by the Expert Panel and relevant administering agencies for the purposes of assessing the application.

While Tonkin & Taylor Ltd has exercised due care in preparing this report, it does not accept liability for any use of the report beyond its intended purpose. Where information has been supplied by the Client or obtained from external sources, it has been assumed to be accurate unless otherwise stated.

This report should be read together with the other technical assessments prepared in support of the application for substantive approvals.

[2] PDP (2026), Mangapū Tributary Realignment – Preliminary Design and Effects Technical Report. Prepared for Winstone Aggregates a division of Fletcher Concrete and Infrastructure Limited. Issue date February 2026. Job ref: A035680017.

3 Introduction

Winstone Aggregates (Winstone), a division of Fletcher Concrete and Infrastructure Limited, has engaged Tonkin & Taylor Limited (T+T) to review the feasibility of the proposed quarry development at Hunua Quarry, 489 Hunua Road, Hunua, Auckland from a geotechnical perspective and to assess the potential for off-site impacts, i.e., slope stability, groundwater and rock mass dilation impacts beyond FCIL land.

Winstone is seeking approval to the project under the Fast-Track Approvals Act 2024 (FTAA). The Hunua Quarry Development is a Listed Project in Schedule 2 of the FTAA, reflecting its regional and national significance. The proposal is to expand the existing quarry to increase annual quarry production to a peak of approximately 5.4 million tonnes of aggregate, and to enable the continued extraction of aggregate for up to 80 years (**"the Proposal"**) or also referred to as the "quarry development area". Through this approval process, Winstone propose to update the consent conditions and quarry management plans applying to the site to incorporate the changes and enable greater operational efficiency.

4 The Site

The Hunua Quarry is in South Auckland, approximately 5 kilometres (km) southeast of Papakura and 35 km southeast of the Auckland Central Business District. The Hunua Quarry has been operating on the site since the 1920's and produces greywacke rock and supplies a significant part of the Auckland region's aggregate requirements, primarily for use in civil infrastructure such as roading and concrete. The Quarry is recognised as one of Auckland's three most strategically important sources of aggregate.

Currently, material is extracted from the Symonds Hill Pit and processed on-site, with material with no value (referred to as overburden) being deposited on-site in the overburden disposal area (the previous Hunua Pit).

To extend the site's operational life, Winstone proposes to undertake a 50ha expansion and deepen the existing Symonds Hill Pit to access additional high quality greywacke resource. Initial investigations confirm that the site contains a substantial greywacke resource, sufficient to meet projected demand for up to 80 years, based on current rates of extraction and known site constraints. The project is proposed to be undertaken in 8 stages, as shown in Figures 1 to 8 in Appendix B.

Under the provisions of the Auckland Unitary Plan (Operative in Part) the existing quarry is zoned Special Purpose – Quarry Zone (SPQZ) but the proposed pit extent will extend the quarry into the adjoining Rural - Mixed Rural Zone. The quarry development area is also subject to the following overlays:

- Quarry Buffer Area (Chapter D27)
- Outstanding Natural Landscape (ONL) (Area 60 Ponga Road),
- Significant Ecological Areas (SEA) (SEA_T_5323 and SEA_T_7032),
- High Use Stream Management Area (HUSMA) and
- Natural Stream Management Area (NSMA).

The site is also subject to the Council's Proposed Plan Change 120 Housing Intensification and Resilience (PC 120). This proposed plan change includes provisions to better manage development for natural hazards across the region. In the case of the Hunua Quarry, the site and wider area is identified as susceptible to land instability (refer to Section 13). These provisions have immediate legal effect.

5 Basis of Assessment

5.1 Scope

To inform the geotechnical assessment of the proposed quarry extension, including the Mangapū Tributary diversion, T+T has undertaken the following work:

- Review of supplied geological and geotechnical information for the existing quarry and published geology of the surrounding areas. This includes a review of relevant literature and drawings, specific to the quarry, and information relevant to materials expected to be encountered in the proposed development of the Symonds Hill Pit. These are listed below:
  - T+T report, 2004, Hunua Quarry Proposed Friedman Block Waste Dump. Prepared for Winstone Aggregates. Ref 21436.04, October 2004.
  - GF Industrial Geology Report, Exploration Report for Hunua Quarry, 2004. Prepared for Winstone Aggregates. April 2004
  - T+T report, 2006, Hunua Quarry Highwall Stability Review. Prepared for Winstone Aggregates. Ref 21436.02, Jan 2006.
  - Mine Design Systems Ltd report, 2007, Hunua Pit Closure, Symonds Hill Startup, Symonds Hill 20 year plan. Prepared for Winstone Aggregates, Ref 4340, February 2007.
  - GF Industrial Geology Report, Drilling Investigations at Symonds Hill (Stage 1), Hunua Quarry 2014, 2014. Prepared for Winstone Aggregates.
  - GF Industrial Geology Report, Additional Investigations at Symonds Hill (Stage 2), Hunua Quarry (2015), 2015. Prepared for Winstone Aggregates.
  - T+T report, 2015, Hunua Quarry In Pit OBDA Geotechnical Assessment. Prepared for Winstone Aggregates. Ref 21435.2010, August 2015.
  - Baseline Geotechnical Limited report, Geotechnical Design Report - Hunua Quarry In Pit Overburden Disposal Area, 2019. Prepared for Winstone Aggregates. Ref BGL000044-v1.0, Dec 2019
  - T+T report, 2018, Hunua Quarry Ground Instability – Geotechnical Appraisal Report. Prepared for Winstone Aggregates. Ref 1006794, October 2018.
  - T+T report, 2023, Hunua Quarry – Quarry Geotechnical Appraisal. Prepared for Winstone Aggregates. Ref 1091496v2, November 2023.
  - New Zealand Geotechnical Society Report, Earthquake and Geotechnical Engineering Practice – Module 1. Overview of the guidelines (Appendix A1), 2021. Prepared for Ministry of Business Innovation and Employment ISBN (online) 978-0-947497-51-4, Nov 2021
- Geotechnical investigations undertaken during December 2025, to the south of the Symonds Hill pit within the vicinity of the proposed Mangapū Tributary diversion. This comprised two cored machine boreholes and four test pits to complement the existing subsurface information.
- Geological and geotechnical mapping of the soil and rock exposures within the Symonds Hill pit and to the south and northwest of the proposed quarry development (November – December 2025).
- Measurement of groundwater levels in the new machine boreholes, and review of groundwater levels for other monitoring bores within the quarry.
- The site investigations and mapping are discussed in further detail in Section 10.

5.2 Risk assessment

This report includes assessments of geotechnical hazards. The risk relating to geotechnical hazards is defined as the *likelihood* of a particular geotechnical hazard, multiplied by its *consequence*. Low likelihood and low consequence risks are more acceptable, and high likelihood or high consequence risks are less acceptable. As detailed in Appendix H, risks can therefore be defined on a scale from R1 (low risk) up to R5 (high risk). In relation to PC120, see the specific comments below in Section 14.

6 Author and code of conduct statement

The author of this report, **Philip Mathewson** is a Senior Engineering Geologist at Tonkin & Taylor Limited (T+T). T+T is an environmental and engineering consulting, with expertise in geotechnical engineering. Philip holds a Master of Science Degree in Engineering Geology and Geography from the University of Canterbury which I completed in 2011. Philip is also a member of the New Zealand Geotechnical Society (NZGS). Philip has 14 years of professional experience in the geotechnical engineering consultancy. Philip's experience includes working on a wide range of cross-discipline projects, mine and quarry sites in Auckland, Waikato and Northland, landslide assessments throughout New Zealand, and multiple commercial and residential developments in the greater Auckland area.

The report has been reviewed by **Doug Johnson.** Doug has over 40 years' experience in Engineering Geology including 16 years of experience in executive management and governance roles. From 2010 to 2021 Doug was Managing Director of Tonkin and Taylor. Doug is currently employed as a Principal Consultant and Technical Director. Doug has a Master's degree in Engineering Geology from the University of Canterbury which Doug completed in 1984. Doug is also a member of the New Zealand Geotechnical Society (NZGS). Doug has experience in engineering geological assessments, site investigation, soil and rock mechanics, slope stability, groundwater, and natural hazards assessment. Doug has worked on many mining, quarrying and civil engineering projects as well support civil infrastructure projects including building foundations, roads, tunnelling, land subdivision and landfill projects. Doug has worked across a range of complex geological terrains, geographies, green and brown field site developments.

The respective curriculum vitae are included in Appendix A.

This report has been prepared and reviewed in accordance with the Environment Court's Code of Conduct for Expert Witnesses, contained in the Environment Court Practice Note 2023. Other than where it is stated that reliance is placed on the advice of another person, the author(s) confirm that the issues addressed in this report are within their area of expertise. The author(s) have not omitted consideration of any material facts known to them that might alter or detract from the opinions expressed.

T+T have had long-standing geotechnical involvement at Hunua Quarry, providing continuous support to Winstone Aggregates since at least the late 1990s. Their work has spanned overburden and dump design, slope stability, pit development, and geotechnical monitoring.

7 Project Description

The Hunua Quarry development seeks to expand and deepen the existing Symonds Hill Pit, enabling sustainable extraction of additional greywacke resource, and the continuation of quarrying within Winstone's existing for up to80 years. The proposed development initially focuses on the southern and northwestern ends of the quarry complex. The new extraction footprint will initially expand the existing Symonds Hill Pit to the south and east, followed by areas to the north and west. These development works will occur entirely within Winstone-owned land and integrate with existing quarry infrastructure.

The quarry will utilise the existing access from Hunua Road, although a right turning lane is proposed to improve the safe operation of the access for turning trucks and other road users. This also reflects the increase in truck volumes accessing the Site as production on the Site increases.

The proposed Symonds Hill Pit expansion will cover an area of approximately 108 hectares, with a depth of – (minus) 50 metres RL at Stage 8, and enabling quarrying beyond that in later years to access further resource. (Any development of the pit below -50 m RL would be subject to further investigations, assessment of effects and local authority consent). Quarry development will use benches ranging from 10m – 15m in height and 9 – 20 m in width. The resource comprises Waipapa Group greywacke, with an estimated total volume exceeding 225 million tonnes. Over the life of the quarry, anticipated to be around 80 years, approximately 24 million m^3 of overburden will be removed, supporting a peak production rate of 5.4 million tonnes per annum.

This expansion will necessitate the realignment of a tributary of Mangapū Stream to allow for the pit expansion. This will include clearance of indigenous and exotic vegetation, overburden stripping and earthworks, stream realignment, followed by revegetation within the new stream corridor. Ecological offset planting will also occur within other parts of the landholding, and this will also achieve landscape mitigation and compensation for the removal of an area of the ONL. Additional ecological offset planting and compensation works will also be undertaken in locations beyond the Site.

The proposal will also utilise the current site access, along with the existing processing facilities, staff facilities and bores.

In summary, the key aspects of the proposed quarry development include:

- Diversion and reclamation of approximately 941 m length of a tributary to Mangapū Stream to enable the expansion of the extraction footprint. This includes construction of a temporary 7m wide bridge to enable access for construction of the stream realignment channel.
- Draining and modification of up to 21 identified natural inland wetlands.
- Providing additional overburden capacity within the Site (from Stage 7), primarily by backfilling the Symonds Hill Pit.
- Construction of new sediment retention ponds, haul road, drainage networks, and Mangapū Stream Tributary diversion integrated with the existing quarry systems.
- Increasing average daily traffic movements during both the AM and PM peak hours when the quarry is operating at peak capacity:
  - AM peak hour – 161 truck movements corresponding to approximately 80 entry and 80 exit truck movements; and
  - PM peak hour – 135 truck movements corresponding to approximately 68 entry and 68 exit truck movements.
- Removal of 44.46ha of indigenous vegetation, associated with the stripping of overburden including within an SEA and ONL.

- Constructing the western haul road, including two culverts, to provide a more efficient connection between the pit and the processing yard as part Stage 2. The haul road will then be removed during Stage 7 and a new haul road constructed.
- Amending the consented groundwater takes and discharges to Mangapū Stream.
- Providing for some in-pit crushing to enable a greater volume, and more efficient, processing of aggregate.
- Providing for the placement of a greater volume of overburden within the Site.
- Implementing progressive rehabilitation (where practicable), ecological offsetting, landscape mitigation, compensation and stream enhancement measures throughout quarry development. The expansion necessitating the stream tributary diversion is the first stage of the project, and the ecological offsetting needed for this will occur in the early phases.
- Enable quarry development below RL -50 m as part of the long-term development of the Symonds Hill Pit, recognising that this deeper resource would only be accessed once the earlier stages of the pit have been quarried. The final Life of Quarry Strategy will be confirmed prior to any excavation below RL -50 m, and will detail further investigations necessary to ensure that adverse environmental effects associated with later-stage extraction and/or rehabilitation are appropriately identified, assessed, and managed (including obtaining any regional consents required).

Winstone is seeking resource consent under the FTAA for both district and regional activities to enable the development of the Symonds Hill Pit. The land use consents (earthworks, vegetation clearance and the disposal of overburden) are being sought in perpetuity (unlimited duration), and a 35-year duration on all water take and use and all discharge permits. Winstone are also seeking a Wildlife Act Authority, an Archaeological Authority and a Complex Freshwater Fisheries Activity Authority.

8 Proposed Quarry Development

The proposed quarry development will be undertaken in stages in general accordance with indicative staging and timeframes, based on information developed by FCIL, as described in the following sections. Plans for Stages 1 to 8 are included in Appendix B (Figures 1 to 8).

The stage designs were developed based on slope design recommendations developed for Hunua Quarry as part of the Symonds Hill Expansion in 2008 by T+T and Mine Design Systems Ltd[3,4].

8.1 Stage 1 - Approximate duration: 4 years

- A new alignment of the Mangapū Tributary will be established along the south-eastern boundary to accommodate the pit expansion. The realignment will create a naturalised channel with riparian vegetation, in-stream habitat features, sediment control devices (if required) and separation from operational surface water controls. The new stream channel will be fully commissioned before any diversion of water from the existing tributary occurs.
- A stripping campaign will commence in the main pit to the northwest with overburden disposal to the Hunua Pit OBDA (currently in use).
- Ongoing extraction from current faces.

8.2 Stage 2 - Approximate duration: 1 year

- Realignment of the Mangapū Tributary will be completed.
- The development of the western haul road will allow for connecting extraction zones, creating a more efficient route from the north-western extension of Symonds Hill Pit to the processing yard. The construction of this haul road will require extensive earthworks, including the design of batter cuts, cut-to-waste zones, and cut-to-fill operations. There will be two culverts installed to prevent the realignment of existing streams through the gully, alongside subsoil drains.
- Overburden removal continuing in the Northwest area (to be cut down to RL 50 m.), with overburden disposal to the Hunua backfill
- Ongoing extraction from current faces.

8.3 Stage 3 - Approximate duration: 1 year

- Minor stripping and expansion to the south of the current Symonds Pit crest, towards the Mangapū Tributary diversion
- Ongoing extraction from current faces.

8.4 Stages 4 to 8 - Approximate duration: 41-72 years

8.4.1 Stage 4

- Expansion through the existing Mangapū Tributary.
- Minor stripping in the south of Symonds Pit, and production from the southern expansion.

[3] T+T report, 2006, Hunua Quarry Highwall Stability Review. Prepared for Winstone Aggregates. Ref 21436.02, Jan 2006.

[4] Mine Design Systems Ltd report, 2007, Hunua Pit Closure, Symonds Hill Startup, Symonds Hill 20 year plan. Prepared for Winstone Aggregates, Ref 4340, February 2007.

8.4.2 Stage 5

- Further production expansion to the south.
- Incremental stripping campaigns from the southern boundary towards the current pit.

8.4.3 Stage 6

- Stripping campaigns in an anticlockwise direction, extending the pit to the south and northwest.
- Deepening the pit to depth 0 m RL.

8.4.4 Stage 7

- Completion of stripping campaigns in the east and northern areas.
- Expansion of the existing pit extends to a depth of -50 m RL.
- The western haul road will be realigned so that, for a limited section, it runs adjacent to the western boundary of the existing pit. This adjustment will facilitate continued development and enable the pit to be extended in a north-westerly direction.
- Incremental stripping campaigns: in an anticlockwise direction, extending the pit to the southwest and northwest and deepening the pit.
- In pit overburden disposal will commence as the existing Hunua Pit OBDA will reach capacity.

8.4.5 Stage 8

- Development of pit shell and depth to -50 m RL.
- Incremental stripping campaigns in an anticlockwise direction, extending the pit to the northwest and north.
- Final cut face management
- At closure - Cessation of pumping and flooding of the pit.

Any development of the pit below -50 m RL would be subject to further investigations, assessment of effects and regional earthworks, groundwater and other consents.

9 Regional Geology

The regional geology, based on the GNS Science Ltd (GNS) 1:250,000 geological map (refer to Figure 9-1), indicates the site is underlain by Waipapa Group greywacke rock, comprising different weathering profiles. The Waipapa Group basement greywacke forms the resource in the Symonds Hill pit, comprising Triassic and Jurassic age faulted sequence of indurated weakly metamorphosed sandstone, siltstones and argillite's commonly referred to as greywacke (227 to 142 Mya). The top of the Waipapa Group is defined by a weathered regional unconformity. To the north and east of Symonds Hill pit the Waipapa Group is uncomfortably overlain by Te Kuiti Group Waikato Coal Measures (WCM) and Waitemata Group (East Coast Bays Formation).

The site is located within an uplifted block bound by the faults related to the southeast to northwest trending Drury Fault and southwest to northeast trending Hunua Fault.

The current (and proposed) quarry operation will extract commercial rock aggregates from the uplifted greywacke rock with the weathered greywacke, WCM and Waitemata Group to be disposed of as overburden in the OBDAs.

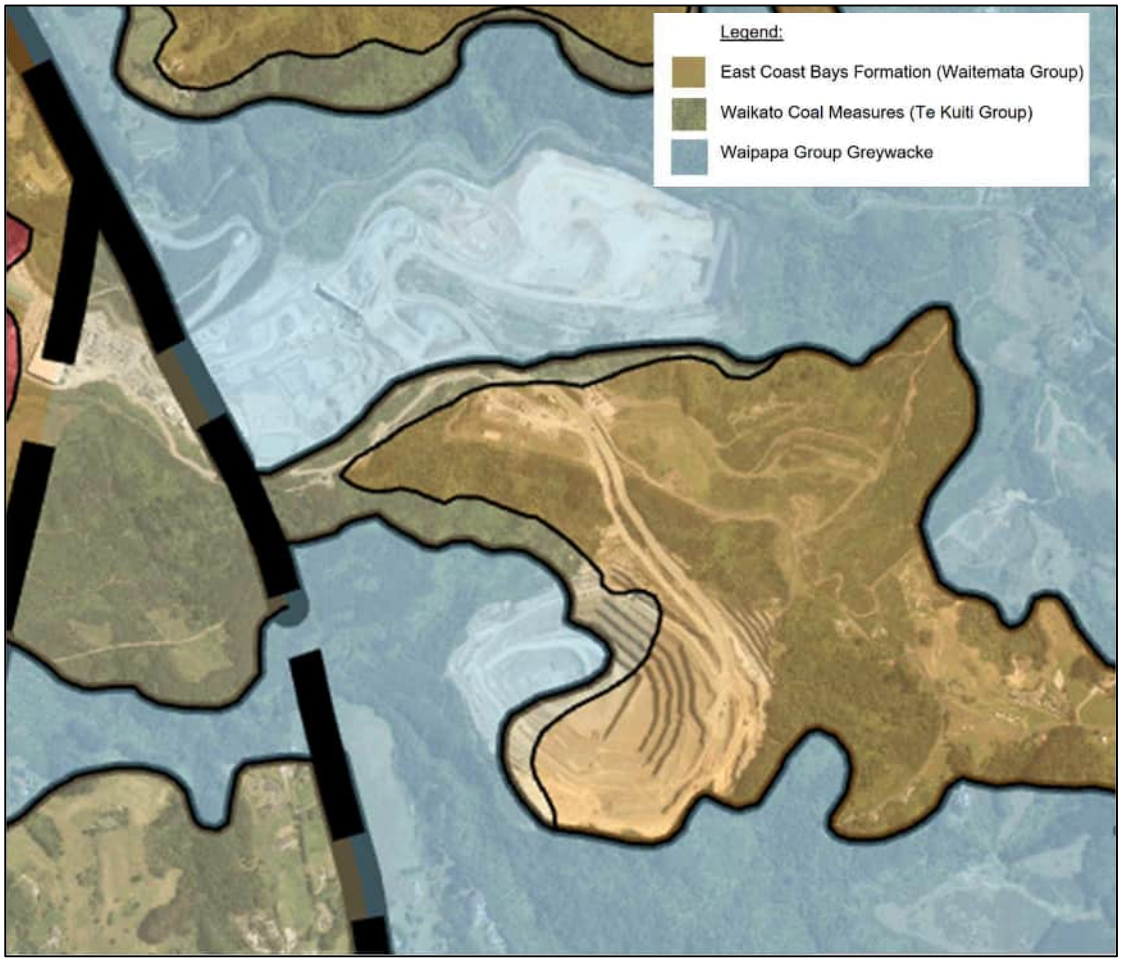

Figure 9-1: *GNS 1:250,000 geological map for the Hunua Quarry. Bold dashed lines are part of the Drury Fault system to the west of Hunua Quarry.*

10 Site Investigations

10.1 Previous Investigations

There have been several stages of investigations that have occurred within Hunua Quarry since the opening of the Symonds Hill Pit, including:

- Four machine boreholes in 2004 throughout Symonds Hill pit (HUN04/9 –12)
- Seven machine boreholes in 2014 throughout Symonds Hill pit (HUN14/1 –7)
- Eleven machine boreholes in 2015 throughout Symonds Hill pit (HUN15/1 –11)
- One machine borehole in 2018 to the southeast of the Symonds Hill pit (HUN18/2)
- One machine borehole in 2025 to the southwest of the Symonds Hill pit (HUN25/1)

The locations of the previous borehole investigations are shown on the geotechnical investigation plan, Figure 9, in Appendix B. The borehole logs are included in Appendix C.

The drilling investigation undertaken between 2004 and 2025 in association with mapping undertaken by Grant Fisher[5] provide a robust geological model of the site, which alongside current pit exposures provide sufficient detail to support geotechnical feasibility and preliminary design of the main pit cut slopes.

10.2 T+T 2025 Site Investigations

10.2.1 General

Geotechnical investigations were undertaken in December 2025 to the south of the Symonds Hill pit, within the vicinity of the proposed Mangapū Tributary diversion. The purpose of these investigations was to investigate subsurface geology in the proposed diversion area, to confirm geotechnical feasibility design for the diversion cut and alignment.

This comprised two cored machine boreholes and four test pits, which are described in the following sections. The locations of the investigations are shown on the geotechnical site investigation plan, Figure 9, in Appendix B.

10.2.2 Machine Borehole Investigations (HUN25/2-3)

The two machine borehole investigations were undertaken by Drillforce Ltd, under the supervision of T+T. The boreholes were strategically located at the high and mid-slope elevations where the Mangapū Tributary diversion is proposed, and where access for the tracked drill rig was achievable.

HUN25/2 was completed near the crest of the Mangapū Tributary diversion cut (191 m RL) to a depth of 80 m below ground level (bgl). HUN25/3 is located midway up the slope (150 m RL) to a depth of 35 m bgl.

The core samples were photographed and geologically logged in accordance with previous studies at Hunua Quarry and standard guidelines. Standpipe piezometers were installed in both boreholes for groundwater monitoring. The borehole logs and core photographs are included in Appendix D.

10.2.3 Test Pits (HUN25/TP1-4)

Four test pits (HUN25/TP1-4) were carried out using an excavator supplied and operated by FCIL, under the supervision of T+T. The test pits were located at the northern (upstream) end of the

[5] Grant Fisher, Industrial Geology (2015), DWG 1, Geological Map of Symonds Hill, Hunua Quarry. Prepared for Winstone Aggregates. Job ref: WAL14/5. Modified November 2015.

proposed Mangapū Tributary diversion, adjacent to the existing tributary stream, between RL 141 m and RL 145 m.

The excavated material from the test pits was photographed and geologically logged in accordance with previous studies at Hunua Quarry and standard guidelines. The test pit logs and excavation photographs are included in Appendix D.

10.3 T+T 2025 Site Walkovers and Field Mapping

Site walkovers were undertaken in November and December 2025 by T+T Engineering Geologists to identify and map soil or rock outcrops beyond the current pit shell. This included a site walkover of the densely vegetated areas to the northwest, south and southwest of the current Symonds Hills Pit. Outcrops within sections of the Mangapū Tributary were also mapped where accessible. Defect mapping was undertaken within the current Symonds Hill Pit to record persistent joint sets and faults.

Specific features from the site walkovers are shown on the geomorphological plan, Figure 10, in Appendix B.

11 Ground Model

11.1 Overview

The geology of the site is illustrated on Figure 9-1. The geological units and structure exposed in the current pit and found in investigations to define the quarry expansion are described below.

Geological cross sections (Sketches 1 to 8) are included in Appendix B. The location of the geological cross sections are shown on Figure 9 in Appendix B. The cross sections have been produced at locations specific to various stages of the proposed quarry extension, with the focus being on Stage 1 (tributary diversion) and Stage 8. The focus on Stage 1 and Stage 8 is because these stages represent the most critical final permanent slope profiles, which have been assessed for overall slope stability (see Section 13.4). The stability of slopes formed progressively will be managed as part of current quarry operations, with stability reviews built into quarry management processes to ensure staged works maintain risk for offsite effects to R1.

11.2 Geological Units

11.2.1 General

Three geological units are exposed in the current Symonds Hill Pit and have also been observed within the Hunua Quarry extent. The geological units are summarised in the following sections, with the greywacke subdivided into weathering grades aligned with rock suitability for use as aggregate.

11.2.2 Waitemata Group

Waitemata Group is present in the upper northwest to northeast benches of the highwall above RL 150 m and forms a large part of the overburden for the Symonds Hill Pit. It comprises extremely weak to weak interbedded sandstone and siltstone overlain by residually weathered soils. The base of the Waitemata Group is irregular in the Symonds Hill Pit. Where Waikato Coal Measures are absent, the Waitemata Group non-conformably overlies the Waipapa Group greywacke (i.e., the younger sedimentary Waitemata Group has been deposited over the older, eroded and weathered Waipapa Group), as shown in Photo 11-1 .

Photo 11-1: *Non-conformity contact of Waitemata Group overlying the Waipapa Group greywacke in the Symonds Hill Pit (denoted by the yellow dashed line).*

11.2.3 Waikato Coal Measures (WCM / Te Kuiti Group)

The Waikato Coal Measures (WCM) are dark brown, highly weathered, weak interbedded siltstones and carbonaceous mudstones. WCM are exposed below the Waitemata Group in an area on the northeastern wall of the Symonds Hill Pit, where it is approximately 5 to 10 m thick and approximately 50 m wide in the face.

The WCM are not currently exposed anywhere else in Symonds Hill Pit, but are shown to be present towards the southwest (about Coal Mine Road), and are present in investigation boreholes in the area referred to as the Friedman Block immediately west of Symonds Hill pit, shown on Figure 9 in Appendix B.

The WCM mudstones in the Friedman block were proven to be more than 13.1 m thick, and have been observed to dip towards the southwest. Weakened bedding shear surfaces were encountered, which are known to have contributed to localised slope instability in this area, where those shear surfaces are at or near the interface with the overlying Waitemata Group.

11.2.4 Waipapa Group Greywacke

The Waipapa Group greywacke comprises lightly metamorphosed, moderately strong to very strong sandstone, siltstone and rare mudstones. The Waipapa Group rocks are typically closely jointed and locally heavily faulted or sheared, with variable weathering. In general, weathering reduces with depth below the unconformity. However, the greywacke rock is typically more deeply weathered where faulting is present.

The argillite (siltstone and mudstone) content of the greywacke is variable with the frequency of siltstone beds increasing across the western section of the Symonds Hill Pit (northwest of Fault B) and further beyond the current pit shell. The deeply weathered and altered argillite has been previously mapped west of the main Symonds Hill Pit, in boreholes and within Mangapū Stream. However, the black tectonically sheared argillite (sheared mudstone), which is common in other

greywacke sequences exposed in greywacke quarries about the region, have not been identified in Symonds Hill Pit.

The Waipapa Group greywacke units are summarised below in Table 11-1.

Table 11-1: Waipapa Group definitions standardised for Hunua Quarry

Geological Term	Quarry Term	Definition	Potential Quarry Use
Residual Soil to Highly Weathered	Rotten	More than half changed to geotechnical soils [RS, CW & HW]	Overburden (Clay & Clean Fill)
		Weak discoloured rock [HW-MW]	Hard Overburden (Fill & Race Rock)
Moderately Weathered [MW]	Brown	More than 50% rock discoloured but retains significant strength	Hard Fill and High PSV Aggregates (Strong Sandstone Only)
Slightly Weathered [SW]	Blue-brown	25-5% discoloured or weakened [MW-SW]	Low-Grade Aggregates: GAP & Asphalt Aggregates
		25-5% discoloured or weakened [SW-FW]	Moderate-Grade Aggregates: Basecourses & Concrete Aggregates
Fresh or Unweathered [FW or UW]	Blue	Less than 5% rock discoloured or weakened	High-Grade Aggregates: Standard Sealing Chips

* Standardised definitions prepared by Grant Fisher, Industrial Geology[6]

11.3 Geological Structure

The geological structures mapped within the project area have been classified into a hierarchy of decreasing significance. Each category is discussed in the report as follows:

- Regional faults
- Major faults
- Joint sets
- Bedding

11.3.1 Regional faults

The main Drury Fault is a regionally significant fault located west of the site and has associated with its many related north to south trending faults. One of which is inferred to the west of Hunua Quarry (shown on the regional geological map Figure 9-1 and on the geomorphology plan Figure 10 in Appendix B). This fault is shown on regional geological maps but has not been mapped nor confirmed in the immediate proximity of the quarry, as it has not been observed in ground surface exposures or within ground investigations.

The Hunua Fault is a regional east–west striking fault (visible at the top of Figure 10, Appendix B) that traverses the site and separates the Hunua Pit and Symonds Hill Pit excavations. The fault trace has been mapped on the 160 m RL bench within the Hunua Pit face, dipping approximately 45° to the south. The fault is downthrown to the south, with Waitemata Group rocks exposed at ground

[6] GF Industrial Geology Report, Drilling Investigations at Symonds Hill (Stage 1), Hunua Quarry 2014, 2014. Prepared for Winstone Aggregates.

surface south of the fault. While the total throw on the Hunua Fault is not proven at the site, it is estimated to be at least 90 m.

Although the location of the Hunua Fault has been mapped and surveyed, information on rock mass conditions on either side of the fault is limited. This is due to the fault largely coinciding with haul roads within the current quarry wall, resulting in few suitable exposures. Data collected to date indicates a 1 to 2 m wide zone of crushed and shattered rock within a broader, heavily fractured zone approximately 10 m wide.

11.3.2 Major Faults

11.3.2.1 Mapped Faults

Major faults have been mapped in the area of the site and identified traversing the site. Major faults are defined as discrete faults or associated crush zones that are persistent across the quarry site. These can be mapped over single or multiple benches and displace or cross-cut the majority of other geological structures within the quarry faces, and that form boundaries between distinct structural domains. These faults are confined to the greywacke rock and do not project into the overburden rock. These faults typically have soft (clay and rock fragment gouge) infill more than 5 mm thick, are planar or undulating with smooth defect surfaces.

Two major faults (Fault A and Fault B), striking sub parallel to the Hunua Fault, have been identified in the Symonds Hill Pit (refer to Figure 11-1, Figure 11-2 and Figure 11-3), and in plan view shown on Figure 10 in Appendix B. These are summarised in Table 11-2 below. It is likely that the northeast/southwest trending gully to the northwest of Symonds Hill pit is structurally controlled by Fault B. There is a large waterfall in Mangapū Stream previously identified by Grant Fisher (2016) southwest of the Symonds Hill Pit that directly coincides with Fault B. These faults in Symonds Hill Pit result in infrequent localised face toppling failures and interbench wedge failures, where the cut face orientation allows unfavourable oriented orthogonal joint sets to intersect these faults.

Table 11-2: Symonds Hill Major Faults

Fault ID	Dip	Dip Direction	Location
Fault A	55° (45 – 65)	330° (320 – 340)	Southeast face of Symonds Hill pit
Fault B	55° (45 – 65)	135° (125 – 145)	Northwest face of Symonds Hill pit

***Figure 11-1**: Fault A seen in Symonds Hill (2023) looking southwest, delineated by yellow dashed lines.*

***Figure 11-2:** Fault A seen in Symonds Hill (2023) looking northeast, delineated by yellow dashed lines. Localised wedge failure highlighted.*

Figure 11-3: *Fault B seen in Symonds Hill (2023) looking northeast, delineated by yellow dashed lines.*

There are no known major faults within the Mangapū Tributary realignment route. However, this will need to be monitored as the quarry extends into this area and the geology is exposed.

Beyond the current Symonds Hill pits three major north–south striking faults were mapped within the Hunua Quarry[7]. The locations of these structures are shown on Figure 10 in Appendix B and are summarised below in Table 11-3. We have not observed the major faults mapped in the Hunua Pit projecting into the Symonds Hill Pit. It is likely that the east-west trending Hunua fault acts as a structural domain between the Hunua Pit and Symonds Hill Pit and these faults terminate at the Hunua Fault. There is the potential of related defects (joints) to be locally present.

Table 11-3: Hunua Pit Major Faults – South Highwall

Fault ID	Dip	Dip Direction
Fault A	74 - 80°	041° - 082°
Fault B	60°	060°
Fault C	60°	300°

[7] T+T report, 2006, Hunua Quarry Highwall Stability Review. Prepared for Winstone Aggregates. Ref 21436.02, Jan 2006.

11.3.2.2 Potential for other faults within the site

The greywacke rock mass in particular has been subjected to several phases of subsidence, mountain building, and erosion. The site is characterised by the structural block bounded by the Hunua and Drury faults, which formed within the regional extensional stress regime. It is common within these blocks for parallel conjugate faults sets to form, and potentially for multiple sets to be found within a structural block. Faults A and B mapped in the Symonds Hill pit are interpreted to be conjugate joint sets (sub parallel to the Hunua Fault) and there is the potential for similar features to existing to the south of the current pit.

There is also the potential for faults sub parallel to the Drury Fault to also exist beyond the current pit exposure. No evidence from mapping or borehole data has been collected to suggest that such a feature exists, but the potential for a fault related to Faults A and B in proximity of the stream diversion to the south cannot be discounted. Similarly, faults sub parallel to the Drury fault (or faults related to Faults A, B and C from the Hunua Pit) may be present behind the current pit wall. Detailed mapping and assessment of the Stage 1 excavations will be required to ensure this risk is managed, and the stream diversion design will need to anticipate potential mitigation measures if such faulting is encountered. Conditions of consent are proposed to appropriately manage those risks (refer to Section 17).

11.3.3 Joint sets

Jointing is the most common rock mass defect in the existing Symonds Hill and Hunua Pits. A selective sample of defect measurements was taken from the existing Symonds Hill Pit and supplemented with joint orientation data collected from the Hunua Pit. There was emphasis on taking only persistent joint defects in Symonds Hill that were able to be widely identified throughout the pit as persistent joints can influence cut face stability. Minor or less persistent joints do not influence stability to the same extent and have not been assessed in detail at this stage of design, as these may only result in localised drop outs within individual benches and are expected, and managed under current quarry operations.

The greywacke rock mass in the Hunua and Symonds Hill pits is highly jointed, however, the jointing does vary between weathering grades. In the unweathered to slightly weathered greywacke rock mass, the joints typically have either no infill or hard infill less than 5 mm thick. In some cases, joints show dilation, mostly due to blasting. Joints may be planar through to stepped and typically have rough joint surfaces. As the rock mass becomes more weathered the joints become less obvious (weathered out and become part of the weathered rock mass) and while still present, no longer define a major strength contrast within weaker weathered rock and resulting soil mass.

Overall, many joint sets are present; and joint spacing, persistence, orientation and joint wall condition are highly variable across the quarry and between weathering grades. Most of the joint defects have limited persistence and do not influence the kinematic stability of the cut faces.

The general blocky jointed nature of the joint rock mass is accommodated within the rock strength assessments developed using generalised Hoek-Brown parameters. However, there are multiple persistent joint sets within the Hunua Pit and Symonds Hill cut faces which have the potential to affect kinematic cut face design parameters (i.e., they may influence face wedge, planner or toppling stability). Stereo nets illustrating dominant joint orientations are shown in Appendix E.

In the current Symonds Hill cut faces only one persistent joint set extending through multiple benches, has been identified (Joint Set A). Joint Set A was observed on the eastern wall of the Symonds Hill Pit with a dip direction of 245 to 265° and a dip of 50 to 70°. Where Joint Set A is intersected by non-persistent orthogonal joints locally this has led to minor wedge and toppling failures on individual benches, with the only significant face instability notes where Joint Set A intersects with Faults A and B (refer to Figure 11-1, Figure 11-2 and Figure 11-3).

The joint sets that influence current batter stability have been assessed and are discussed for different face orientations in Section 12.2 below. As noted, the focus here is on persistent defect sets. We recommend that orientation and persistence of defects are mapped and analysed as the quarry is excavated, so that any unfavourable defects can be identified and assessed to allow for effective management. Conditions of consent are proposed in this regard (refer to Section 17).

11.3.4 Bedding

Bedding within the Waitemata Group and WCM in the Symonds Hill northern pit wall has been observed to dip into the slope. This orientation is favourable from a stability perspective, as it reduces the likelihood of planar sliding or daylighting of bedding planes towards the pit excavation. No evidence of instability associated with these bedding orientations has been observed to date.

Previous investigations and assessment of the Friedman Block area in 2004[8] interpreted the Waitemata Group and WCM to dip out of the slope (in a southwest direction). Bedding in the gully northwest of the Symonds Hill Pit also appears to dip out of the slope, based primarily on geomorphological assessment due to the presence of historical slope instability in this area (refer to Figure 10 in Appendix B), which has been interpreted from historical aerial photography. Site investigations and/or field mapping to confirm bedding orientation will be carried out to inform design for the haul road and quarry pit in this Northern area, and as detailed in section 12.5.5.3 of this report can be managed by standard quarry operational procedures and any instability within this area will only effect quarry operations.

Metamorphic processes have disrupted bedding in greywacke (sandstone and siltstone) sequences such that bedding is not a prominent defect. Bedding shears can develop where argillite (siltstone and mudstone) exists within the sedimentary sequence due to its lower strength; and these have been detected in other greywacke quarries. Such bedding related defects have not been observed in either the Hunua or Symonds Hill excavations to date, nor in borehole investigations undertaken to date. However, as quarry development progresses and deeper or newly exposed materials are encountered, continued monitoring and detailed geological mapping are recommended to identify any emergence of weak zones or structurally adverse bedding. Conditions of consent are proposed in this regard (refer to Section 17).

11.4 Geotechnical Parameters

The geotechnical parameters for Hunua Quarry for the different soil and rock units discussed above are summarised below in Table 11-4 to Table 11-7, and are based on previous studies, experience of these materials in the Auckland region and on site (in particular from the performance of current Symonds Hill Pit slopes and from the Hunua Pit).

The Hoek Brown parameters are based on field observations and quantified descriptions. For the current assessment there is an absence of reliable testing data that represents the Symonds Hill rock mass. Therefore, we have based our assumptions on qualitative description assessment as per Hoek Brown methodology, which is within the Rocscience software, and is shown for the slightly to unweathered Waipapa Group in Appendix F.

[8] T+T report, 2004, Hunua Quarry Proposed Friedman Block Waste Dump. Prepared for Winstone Aggregates. Ref 21436.04, October 2004.

Table 11-4: Waitemata Group Mohr-Coulomb Parameters

Material Type	Description	Unit Weight (kN/m³)	Cohesion (kPa)	Friction Angle (°)
Residually to completely weathered Waitemata Group	Residually to completely weathered silts and clays. Stiff to very stiff.	18	7	32
Highly to moderately weathered Waitemata Group	Highly to moderately weathered silts and clays. Very stiff to hard.	19	7 to 12 (10)	32 to 36 (34)
Slightly to weathered Waitemata Group	Slightly to unweathered interbedded sandstone and siltstone. Extremely to very weak.	20	35 to 50 (40)	35
Landslide Debris (Waitemata Group)	Disturbed residual to moderately weathered ECBF materials. Considered to have largely moved as intact block, however mass has still been disturbed below insitu strength and may include discrete shear surfaces. Note that basal shear surfaces may govern landslide stability (Table 11-5)	18	3-7 (5)	28-35 (30)

Table 11-5: Waikato Coal Measures Mohr Coulomb Parameters

Material Type	Description	Unit Weight (kN/m³)	Cohesion (kPa)	Friction Angle (°)
Basal Shear Surface (ECBF/Coal Measures Contact)	Inferred historic/relic movement surface between ECBF and underlying Coal Measures. Considered at residual strength. Groundwater typically perched above this zone.	18	0	12 to 14
Intact Coal Measures	Carbonaceous mudstone. Extremely weak.	22	100	25

Table 11-6: Waipapa Group (Greywacke) Soil Mohr Coulomb Parameters

Material Type	Description	Unit Weight (kN/m³)	Cohesion (kPa)	Friction Angle (°)
Residually to completely weathered greywacke (Overburden)	Largely weathered to a soil with some relic rock fabric present within the completely weathered rock. Stiff to very stiff.	22	7	30
Heavily sheared Rock Mass	Areas of heavily sheared rock mass. Hoek-Brown model to be used for rock mass which is not heavily sheared (Table 11-7)	22	70	35
Defect Surface (hard or no infill)	Typical of most defect surfaces.	22	30	35
Defect Surface (soft infill)	Potential faults or past movement.	22	15	20

Table 11-7: Waipapa Group Rock Generalised Hoek-Brown Parameters

Material	Description	UCS (MPa)	GSI	mi	D
Highly Weathered GW (Weathered Brown to Brown Rock)	Highly weathered, brown greywacke. Extremely weak. Highly fractured and variable. Partially turned to soil in sections.	3	25	18	0
Moderately Weathered GW (Blue-Brown Rock)	Moderately weathered, brownish grey greywacke. Weak. Highly fractured, closely spaced defects. Zones of infrequent slightly weathered blue rock.	35	50	18	0
SW to UW GW (Blue Rock)	Slightly to unweathered, blueish grey greywacke. Moderately strong to strong. Highly fractured, closely to moderately spaced defects. Discolouration present along prominent defects within slightly weathered rock. Unweathered, shows no signs of discolouration.	75	60	18	0

11.5 Groundwater

Groundwater effects of the proposed project are detailed in the PDP groundwater assessment report[1]. As detailed in the report, the regional groundwater prior to quarry development (i.e., pre-pumping) was at approximately RL +75 m, as shown on the geological cross sections in Appendix B. This regional groundwater table is below invert level of both the proposed tributary stream diversion, and Mangapū Streams within the project area. Hunua Pit encountered regional groundwater at approximately RL+60 m and had to be actively pumped to avoid filling the base. Groundwater levels in piezometers north of the Hunua Fault within greywacke appear largely controlled by the fault. Records extend back as far as 1998, and the overall groundwater model has been previously modelled as having a shallow south to north gradient. The base of Symonds Pit is at approximately RL+69 m and is now being actively pumped. Pumping will continue to be required as the pit is deepened to a depth of RL-50m at Stage 8 of the proposed extension.

The overlying Waitemata Group, WCM and weathered greywacke have lower/variable permeability, and contain localised perched water tables. The analysis undertaken by PDP demonstrates that perched (or shallow) groundwater levels are not directly connected to the regional system and typically discharge to local streams. The current streams in the area are perched, and the Mangapū Tributary diversion works will not affect regional groundwater surface.

Interactions between localised groundwater and the proposed excavations are discussed below in sections 12.5.2 to 12.5.6.

12 Geotechnical Assessment

12.1 Observation of existing slope performance

Site walkovers were carried out by T+T Engineering Geologists in November and December 2025 to observe the current slope stability of the Symonds Hill Pit. Geotechnical appraisals of the existing Symonds Hill Pit to assess the risk of slope stability were also completed by T+T in 2018[9] and 2023[10]. Minimal failures were observed throughout; and when these were seen, they were limited to individual batter faces and localised drop-outs, with limited loss of bench width above and with debris contained on adjacent benches below.

The geotechnical appraisals completed by T+T in 2018 and 2023 indicated a low risk of slope failure within the Symonds Hill Pit, which aligns with what is seen at present. Large scale, interbench or multi bench failures have not been observed at the Symonds Hill Pit, due to a favourable combination of defect orientations, rock mass strength and overall slope angles. Existing slope failure types have been limited to planar, wedge, and topple style failures, which are illustrated in Figure 12-1. In accordance with standard quarry development and for operational safety, the advancing pit excavations will need to be monitored by mapping and analysis of defects and consequent slope stability factored into operational designs as the quarry develops. This programme for works will be directed by a Trigger Action Response Plan (TARP) as discussed in Section 17.

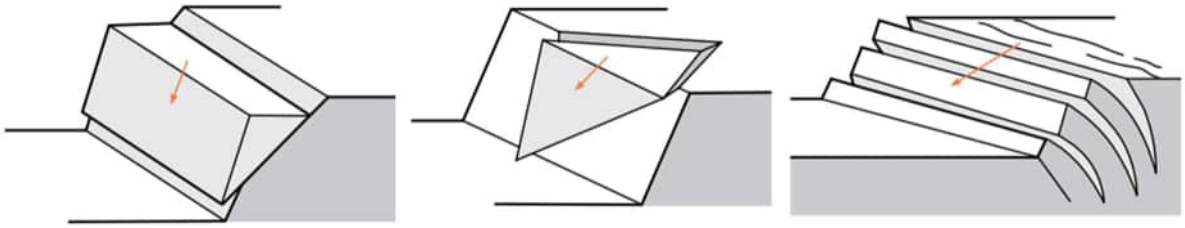

Figure 12-1: *Typical rock slope failures, from left to right, planar failure, wedge failure and toppling failure (Worksafe, 2025[14])*

12.2 Design risk terminology

Geotechnical design risk tables and definitions of risk terms adopted for this assessment are set out in Appendix H. When referring to risk elements the terms for likelihood, consequence and risk definitions are as set out in Appendix H. These are applied at all stages in quarry development .

12.3 Specific rock defect stability

12.3.1 General

Stability of rock slopes is largely a function of the orientation and persistence of defects, relative to the slope face orientation. A given combinations of joints may be stable in one face orientation, but unstable in another.

A kinematic analysis was carried out for individual defects within the proposed greywacke rock for a range of cut faces orientations. The stability of specific rock defects was assessed for potential

[9] T+T (2018), Hunua Quarry Ground Instability – Geotechnical Appraisal Report. Prepared for Winstone Aggregates. Ref 1006794, October 2018.
[10] T+T (2023), Hunua Quarry – Quarry Geotechnical Appraisal. Prepared for Winstone Aggregates. Ref 1091496v2, November 2023.

planar, toppling and wedge failures using stereographic projection methods within Rocscience DIPs software.

These analyses have conservatively assumed (worst case) that joints are persistent enough to form wedges and planes in the rock mass. It is noted from field observations that the joints in the Symonds Hill greywacke rock mass are generally not very persistent (i.e., less than 5 m), hence the kinematic stability analyses presented below are likely to be conservative. It will be important to calibrate the results of the kinematic analyses with field observations as part of ongoing operations and operational cut design (refer to TARP as discussed in Section 17).

Further, where defects or defect intersections persist some distance behind the face but do not daylight, additional modelling was undertaken using SLIDE2 slip circle modelling software. This allowed potential breakout through the rock mass to be assessed.

The design parameters for the different analysis cases are shown below in Table 12-1. We have determined the friction angles for each rock unit based on previous studies undertaken by T+T[7,8] at Hunua Quarry.

Table 12-1: Kinematic analysis parameters

Material	Analysis Case	Slope Angle (°)	Friction Angle (°)
Slightly to unweathered	15 m batter	70	45
Slightly to unweathered	Full slope	43	45
Moderately weathered	15 m batter	60	40
Moderately weathered	Full slope	38	40
Highly weathered	15 m batter	50	35

Jointing has less influence upon the behaviour of the weaker Waitemata Group and Waikato Coal Measures rock masses. These units are not significant in the final quarry cut faces, because they have typically been excavated already; and where present they are dominated by global stability considerations (see Section 12.4), typically resulting in shallower face profiles than in the stronger Waipapa greywacke rock mass.

12.3.2 Summary

A suite of kinematic analyses has been undertaken using the parameters in Table 12-1 for a range of face orientations and batter slope angles. The results of the kinematic analysis using DIPs software is summarised in the table in Appendix E and is discussed below:

a Wedge and Planar Failures

- The likelihood of wedge and planar failure affecting the whole slope (less than 50°) is unlikely to rare, due to the steep joint dips. Although the consequences of these failures might be moderate, the resultant risk is R1 (therefore acceptable).
- Overall the likelihood of wedge and planar failures affecting the 15 m high interbench cut faces is demonstrated to increase where persistent defects are found, and for slopes above 60 degrees is almost certain and above 70 degrees are certain to occur. The consequences of these failures will be the accumulation of small debris at the base of the slope and will not pose an operational hazard to standard quarry operations. The consequence is assessed as low. The resultant risk is R1 to R2.
- It is noted the likelihood of wedge and or planar failure does vary slightly with face orientation. On south facing slopes (dip directions between 150° and 240°) these are almost certain. However, the likelihood of occurrence diminishes on southeast facing

slopes (120°–150°) and are likely, and further again on southwest to west facing slopes (240°–270°) with likelihood reducing to possible. The lowest likelihood for these potential failure modes is associated with north to northeast facing slopes (330°–90°) assessed as unlikely.

- The above analyses are consistent with existing field observations of planar and wedge failure mechanisms, where the likelihood was observed to be almost certain on cut faces dipping to the south within the slightly to unweathered greywacke units. However, for cut faces at 70° or less, the volume of any failure is small collected on individual benches below, and does not impact on safe quarry pit operations as designed. The likelihood of failure mechanisms were observed to be reduced to possible in the moderately weathered material, and unlikely in the highly weathered greywacke where joints have less influence on face stability. In the more weathered material instability is only noted where major persistent defects are present (Joint Set A).
- Blasting can weaken rock behind the temporary slope face. The likelihood of wedge and planar failure of permanent slopes should be reduced and managed by ensuring the rock is not blast damaged during final excavation. For example, by adopting presplitting for the final cut faces or standing off the final run of blast holes and manually excavating the final batter cut. Either of these approaches (and others) on excavation of the final cut will produce a face that will have low rock fall risk and is suitable for sign off at the end of construction.

b Toppling Failures

- The analysis overall indicates the likelihood of toppling failures is unlikely.
- Occurrences of toppling failures were uncommon within the assessment for all face orientations, which is consistent with site observations.

Structural defect measurements were primarily obtained from exposures within the slightly to unweathered greywacke, except where regionally persistent discontinuities (e.g., Fault A, Fault B, and Joint Set A) were present and measurable across greywacke weathering grades.

Kinematic analyses for the slightly and moderately weathered greywacke units did not identify any critical defect intersections capable of producing full-slope instabilities. This outcome remained consistent when the datasets were combined, including data from the Hunua Pit[11], confirming the absence of critical intersections associated with potential large-scale slope instability for the full slope cases assessed.

A batter cut face design at 70° for the slightly to unweathered greywacke(See Table 12-3) provides acceptable risk outcomes for safe quarry operations. As a sensitivity check, a steeper batter angle of 80° was assessed for the slightly to unweathered greywacke at 15 m high batters. However, increasing the batter angle from 70° to 80° resulted in a rise in the number of critical intersections across all face orientations, by approximately 80% for planar failures, 50% for wedge failures, and 200% for toppling failures. The size of landslide blocks would also increase, potentially compromising safe bench access and reducing capacity to manage debris accumulation at the base of the face.

This would pose a significant rock fall safety risk and would have the potential impact overall face stability, with a consequence of failure increasing to high to very high, leading to a resultant risk of R4 to R5 (unacceptable). Therefore, it is recommended that the face design slope as per Table 12-1 (70° batter angle), should continue to be used for future cuts (and care must be taken to avoid over steepening of cut faces).

[11] The defects sets measured in the Hunua Pit appear to be within different structural block with slightly different frequency and orientation. However, as a check this data can be used to as part of a sensitivity / what if check for Symonds Hill Pit cuts where the structural geology has yet to be exposed and confirmed.

The results of the kinematic analysis for each geotechnical assessment area (refer to Figure 11 in Appendix B) and corresponding face orientations is also discussed in Section 13.4. While some information in these sections may repeat details outlined above, this has been intentionally included to ensure clarity and completeness when these sections of the report are read independently.

12.4 Soil and rock mass stability

12.4.1 General

General soil and rock mass stability analyses were undertaken on critical and representative sections using Rocscience SLIDE2 software. The analyses were carried out using limit equilibrium methods (Morgenstern–Price), with a half-sine inter-slice force function to satisfy both force and moment equilibrium.

The minimum factor of safety (FoS) was determined by automatically searching for potential circular failure surfaces and by manually assessing a range of fully defined failure surfaces[12]. In all cases, optimisation was undertaken to identify the most critical failure surface.

12.4.2 Design Criteria

The following table (Table 12-2) summarises the design criteria adopted for the Hunua Quarry site. The criteria were developed in accordance with current standards[13,14], with additional guidance from Winstone to reflect the site-specific risk profile given the nature of quarrying and the buildability of the proposed slopes. Factors of Safety (FoS) have been selected to ensure design slopes provide:

1 For safe quarry operations within the quarry development area.

2 The likelihood of slope instability beyond Winstone's land will not affect land use.

3 The design is R1 or R2 as per the risk assessment set out in Appendix H.

[12] FoS is the theoretical ratio of resisting forces (strength) to driving (destabilising) forces. A slope with a FOS above 1 indicating the slope has sufficient strength to remain stable. The higher the modelled stability FOS is the more likely the slope is to be stable given the model assumptions made.

[13] Auckland Council (May 2023), The Auckland Code of Practice for Land Development and Subdivision – Chapter 2: Earthworks and Geotechnical. Version 2.0.

[14] WorkSafe (June 2025), Health and safety at opencast mines, alluvial mines and quarries – Guidance for Operators.

Table 12-2: Minimum factor of safety for soil and rock mass stability

Location	Minimum Factor of Safety (FoS) for Design Cases		
	Long term static	Elevated Groundwater	Seismic[1]
Full wall – For land behind cut face beyond FCIL Property	2.0	1.3	1.0
Full wall – For land behind the cut face within FCIL Property **OR** Upper slopes (i.e., overburden) - For land beyond FCIL Property	1.5	1.3	1.0
Mid slope (multi bench within overall cut)	1.3	1.1	1.0
Inter-bench batter face	1.2	1.1	n/a

Note 1: Factor of safety under the influence of a static peak ground acceleration (described in section 12.4.5 below) acting in an unfavourable direction.

Note 2: The likelihood of slope failure for factors of safety in excess of 3 are assessed as rare as defined in Appendix H, given we have high confidence we have high confidence in the geological model. The likelihood of slope failure for factors of safety less than 1 are assessed as certain. The likelihood of slope failures for factors of safety between 1 and 3 are scaled between rare and certain.

12.4.3 Cut Slope Design Geometry

Cut slope design geometries for the Mangapū Stream diversion and the Symonds Hill Pit are presented in Table 12-3 below. The proposed rock cuts are the same as were adopted and used for the recently closed Hunua Quarry pit and the Symonds Hill Pit operations to date. Based on current face mapping, the rock mass at Symonds Hill Pit is less fractured and has a lower frequency of persistent joint sets than at the Hunua Pit. As a result, the pit slope design for Symonds Hill is potentially slightly more conservative than that used in the Hunua Pit. Over its approximately 10 years of operation, the Symonds Hill Pit has only experienced minor, localised slope failures confined to individual benches.

The design geometry shown in Table 12-3 is based on full height slope stability assessment using SLIDE2 (limit equilibrium slope stability software), while individual rock cut bench faces are based on kinematic design using measured rock mass defects (see Section 13.2).

The proposed cut slopes in overburden soils are based on SLIDE2 analysis and previous experience within the wider Hunua Quarry site.

Table 12-3: Cut slope design

Material	Batter Angle	Batter Height	Bench Width	Overall Slope Angle
Residual soil and completely weathered Waitemata Group and Waipapa Group (Overburden)	n/a	n/a	n/a	27° (1V:2H slope)
Waitemata Group weathered rock and highly weathered Waipapa Group greywacke	50°	15 m	9 m	35°
Moderately weathered Waipapa Group greywacke	60°	15 m	10 m	38°
Slightly to unweathered Waipapa Group greywacke	70°	15 m	10 m	43°

12.4.4 Groundwater Assumptions

Groundwater level assumptions are based on direct advice from PDP. For the purposes of the static analysis cases, groundwater has been assessed as follows:

- Regional groundwater during operations to be controlled by pumping at base of the quarry.
- Regional groundwater at quarry closure is expected to equalise to pre-quarrying levels across the site and fill at RL 75m (once pumping has stopped).
- Perched groundwater levels are typically within the overburden soil (residual soil or completely weathered greywacke) or within the highly weathered greywacke. Determined from nearby groundwater monitoring piezometers. If there were no nearby groundwater measurements then a perched level has been assumed, based on soil and rock weathering profiles. The perched groundwater levels are shown on the geological sections in Appendix B (Sketches 1 to 8).

12.4.5 Seismic Assumptions

For the purposes of slope stability pseudo-seismic analysis, a Peak Ground Acceleration (PGA) was determined for two design cases in accordance with NZGS and MBIE guidelines[15] and TS1170.5:2025[16], and the details for each are shown below in Table 12-4.

Table 12-4: Design seismic coefficient

Design Case	Design Working Life	Importance Level	Annual Probability of Exceedance (ULS)	Magnitude	PGA
For land behind cut face within FCIL Property	50 years	1	1/100	5.9	0.09 g
For land behind the cut face beyond FCIL Property	50 years	2	1/500	6.5	0.19 g

[15] New Zealand Geotechnical Society (NZGS) and Ministry of Business Innovation & Employment (MBIE) Earthquake Geotechnical Engineering Practice in New Zealand, Rev 1, Issue Date: November 2021.
[16] TS 1170.5:2025, Structural design actions Part 5: Earthquake actions – New Zealand. Date published: 28/11/25

12.5 Stability Assessment

12.5.1 Overview

Because slope stability is governed by the slope geology (material type, structure, and defect orientation) relative to the cut face, for the purposes of slope stability assessment and design, the site has been subdivided into five geotechnical areas. Each area is defined by common cut face orientation, geology and structural controls.

These are illustrated on Figure 11 in Appendix B, comprising:

- Area 1 – Mangapū Tributary diversion.
- Area 2 – Southern area (below Mangapū Tributary diversion) with north facing slopes.
- Area 3 – Western area (below Mangapū Stream) with east facing slopes.
- Area 4 – Northern area with south facing slopes.
- Area 5 – Eastern area with west facing slopes.

12.5.2 Mangapū tributary diversion

12.5.2.1 Ground conditions summary

Ground conditions of this area are summarised on Geological Cross Section 4 (Sketch 4) and Geological Long Sections 7 and 8 (Sketches 7 and 8) in Appendix B. Cross section locations are shown on Figure 9, Appendix B.

Additional investigations in this area were undertaken for this study to provided subsurface geology control for assessment and design purposes. This included:

- Borehole HUN25/2 was completed near the crest of the Mangapū Tributary diversion cut (191 m RL) to a depth of 80 m below ground level (bgl). A typical greywacke profile was observed, becoming slightly weathered at 30 m bgl and then into fresh/unweathered greywacke at 37 m bgl.
- Borehole HUN25/3 was located midway up the slope (150 m RL) and was drilled to a depth of 35 m bgl. Residual and completely weathered soils were identified to a depth of 12 m bgl, highly weathered greywacke to 20 m bgl, and then becoming moderately weathered to the end of the hole.
- Four test pits were completed at the northern end of the proposed alignment at lower elevations (141 m to 144 m RL) and encountered completely to highly weathered greywacke at their final depth (4 m to 5 m bgl).

The information gathered indicated moderately to highly weathered greywacke was mapped at the northern (upstream) end of the proposed alignment in the existing Mangapū Tributary. Slightly weathered greywacke was observed at the southern (downstream) end of the proposed realignment of the Mangapū Tributary. Completely and highly weathered greywacke exposures were evident adjacent to walking tracks along the northern slopes, which is consistent with what was observed in the borehole investigations. Highly fractured highly weathered exposures were identified between the crest of the stream diversion section and the southern section of Mangapū stream.

The greywacke in this area is dominated by sandstone sequence with lesser siltstone beds.

There are no known major faults within the proposed Mangapū Tributary realignment route. The subsurface investigations did not identify faulting in the boreholes or test pits. However, this will need to be monitored as excavations are carried out into this area and the geology is exposed. The potential for conjugate faults related to Faults A and B cannot be discounted (the spacing of Faults A and B would imply the potential for a third fault in the vicinity of the tributary gully, and the

presence of the waterfall in the Mangapū stream may align with this hypothesis. However, this is conjecture at this stage, as no physical evidence of a fault has yet to be exposed and if present the consequences of such a fault cannot be assessed until its nature and orientation can be confirmed).

Perched groundwater levels were measured in the piezometers installed in HUN25/2 and HUN25/3 at 172 to 167 m RL and 143 m RL respectively. Perched groundwater levels are also assumed to be controlled by the level of the nearby adjacent streams/tributaries. The investigations holes were terminated well above the regional groundwater table.

12.5.2.2 Specific rock defect stability results and discussion

The Mangapū Tributary diversion will comprise west to northwest facing slopes (270°–330°), and interim east to southeast (90°–120°) facing slopes during Stage 1. The southeast facing slopes are later removed in Stage 4.

Based on the assumption that the defects measured in Symonds Hill Pit remain common for this cut, the assessed risk is R1 (refer to Appendix H) for face instability. Slope performance is expected to be similar to faces of similar orientation in the existing Symonds Hill Pit.

12.5.2.2.1 Permanent slopes

As noted in Section 13.2.2, the likelihood of potential for both planar and wedge failure mechanisms in west facing slopes (270°) is possible. The likelihood is assessed to reduce further as the slopes orientate more towards the northwest. The consequence of these failures is low, as rock fall is small, due to low joint persistence, and should accumulate on the benches below.

Similarly, the likelihood on toppling failures diminishes progressively from west to northwest, with no toppling expected on slopes oriented towards approximately 270°, provided individual cut faces are no steeper than 70°.

12.5.2.2.2 Interim slopes

The cut slopes have been designed so that any potential kinematic failures (wedge, planar, toppling) will be small and of low consequence, and can be managed by standard mining practices. For the interim east to southeast-facing slopes (90°–120°) formed during Stage 1, the assessment indicates that the likelihood of planar and wedge failure are likely to unlikely. The likelihood of toppling failure modes is unlikely for these interim slopes during Stage 1, particularly within the slightly to unweathered greywacke units. However, the east to southeast facing slopes are temporary and will be removed in Stage 4, thereby eliminating any associated short-term instability potential once excavation progresses.

12.5.2.2.3 Possibility of faulting in the stream diversion area

While not mapped, the potential for faults conjugate to Faults A and B in this area has been recognised. A fault sub parallel to Fault A would be locally unfavourable for the temporary southeast facing slope and fault sub parallel to Fault B would potential unfavourable for the permanent slopes above the diversion. As noted above, this risk needs to be managed during site development and excavation about the diversion alignment. We recommend that orientation and persistence of defects are mapped and analysed as the quarry is excavated, so that any unfavourable defects (including faults) can be identified and assessed to allow for effective management. Conditions of consent are proposed to appropriately manage those risks (refer to Section 17). Response measures may include notification to relevant authorities, more frequent monitoring, changes to the design and/or construction or operation methodology.

12.5.2.3 Global soil and rock mass stability results and discussion

The slope stability was assessed in SLIDE2 for Geological Cross Section 4 for the Mangapū Diversion area, and the results for each stability case is summarised in Table 12-5 below. The SLIDE2 outputs are included in Appendix G. In all stability cases the target FoS was achieved. The resultant risk in all cases is R1 to R2.

The potential for Joint Set A to influence face stability in this area has been recognised over and above the impact on general rock strength. As a result, Joint Set A was applied to the SLIDE2 model as a discrete set of rock mass weakness as shown in the Geological Cross Section 4 for the eastern permanent slope.

Table 12-5: Section 4 slope stability analysis results summary

Case	Factor of Safety (FoS)					
	Long term static	Target	Elevated Groundwater	Target	Seismic	Target
Stage 1 – Overburden soils - Mid-slope	1.4	1.3	1.4	1.1	1.2	1.0
Stage 1 – Overburden soils - Within property boundary	1.5	1.5	1.5	1.3	1.2	1.0
Stage 1 – Entire Slope – Beyond property boundary	5.7	2.0	5.4	1.3	1.1	1.0
Stage 8 – Entire Slope – Beyond property boundary	2.4	2.0	2.4	1.3	2.0	1.0

12.5.2.4 Considerations for tributary diversion invert design

Once the quarry is cut down along the western edge of the stream diversion, where the channel crosses over moderately or slightly weather rock, the stream channel may leak to the nearby Symonds Hill Pit. Unmitigated, our assessment is the leakage from the stream channel, especially at low conditions, is likely to result in a R3 or even R4 risk. A low permeability stream liner is proposed to minimise this risk, and to help maintain water in the stream during low flow periods. Erosion protection and naturalised stream features would be built over the top of the liner, as detailed in the PDP tributary preliminary design report[2]. The assessed mitigated design is R1.

The proposed liner will comprise compacted low permeability fill, likely suitable clay rich overburden sourced from within the quarry site.

Hydrological design of the stream is detailed in the PDP tributary preliminary design report[2]. The stream diversion has also been assessed against potential future over-design events, which could cause over-topping of the channel. This will be managed by constructing a bund on the channel bank or the outer edge of the haul road, to ensure that flood flows do not spill into the pit.

12.5.3 Southern area

12.5.3.1 Ground conditions summary

Ground conditions of this area are summarised on Geological Cross Sections 4 and 5 (Sketches 4 and 5) and Geological Long Sections 7 and 8 (Sketches 7 to 8) in Appendix B.

Limited investigations have been undertaken in the southern area, however, based on field mapping within the existing Mangapū Tributary and the recent T+T investigations, anticipated ground conditions are similar to the Mangapū Tributary diversion (see Section 8.4.2.1 above). Fault A was observed in the southeast face of Symonds Hill Pit. This fault with an average dip 55° towards the north/northwest (330°) potentially projects in to the southern extent of the pit extension (Stage 8). However, based on current data, the fault will crop in the east facing slopes below the main stream, but similar oriented fault and or major joint set could be present that may have some impact on stability. This will need to be monitored for and the risk assessed as the excavations are advanced. Conditions of consent are proposed to appropriately manage those risks (refer to Section 17).

12.5.3.2 Specific rock defect stability results and discussion

The southern area will comprise west to northeast facing slopes (270°–60°).

Based on the assumption that the defects measured in Symonds Hill Pit remains common for this cut, the likelihood of significant face instability is considered as possible to unlikely. Design slope performance is expected to be similar to faces in Symonds Hill Pit of similar orientation.

12.5.3.2.1 Wedge and Planar Failures

As noted in Section 13.2.2, the assessment indicates that planar and wedge failure mechanisms are generally infrequent, with possible likelihood on west facing slopes (around 270°) that reduces to unlikely for the northwest to northeast facing orientations.

12.5.3.2.2 Toppling Failures

Toppling failures show limited potential across this range, with no toppling expected on west facing slopes and only a likelihood of unlikely toward the northeast.

12.5.3.3 Soil and rock mass stability results and discussion

The slope stability was assessed in SLIDE2 for Geological Cross Section 5 for the southern area, and the results for each stability case is summarised in Table 12-6 below. The SLIDE2 outputs are included in Appendix G. The target FoS was achieved for the full slope during Stage 8.

Table 12-6: Section 5 slope stability analysis results summary

Case	Factor of Safety (FoS)					
	Long term static	Target	Elevated Groundwater	Target	Seismic	Target
Stage 8 – Entire Slope – Beyond property boundary	5.1	2.0	5.1	1.3	3.7	1.0

12.5.4 Western area

12.5.4.1 Ground conditions summary

Ground conditions of this area are summarised on Geological Cross Section 6 (Sketch 6) and Geological Long Section 7 (Sketch 7) in Appendix B.

Borehole investigations in this area mapping along the Mangapū Stream bed indicate Waipapa Group is encountered from the surface. Increased siltstone and mudstone bedding (argillite) was encountered in borehole investigations at varying depths, noting the argillite was not logged as tectonised black high sheared mudstone nor heavily fractured. The borehole logs suggest that the sandstone is increasingly interbedded with siltstone and mudstone bed (increasing argillite content) to the north and in particular north of Fault B. Fault B was encountered in borehole HUN14/2 and HUN25/1, and in the Mangapū Stream bed dipping 60-70° towards the southeast. The faulting is noted as a highly sheared and argillitic zone with coarse greywacke to argillaceous conglomerate immediately east of the contact.

Perched water tables were identified at varying depths, 66 to 58 m RL (HUN25/1) and 59 m RL (HUN15/1).

12.5.4.2 Specific rock defect stability results and discussion

The western area will comprise northeast facing slopes (30°–60°).

Based on the assumption that the defects measured in Symonds Hill Pit remains common for this cut, slope performance is expected to be similar to faces in Symonds Hill Pit of similar orientation.

12.5.4.2.1 Wedge and Planar Failures

As noted in Section 12.3.2, where slopes will face towards the northeast (30°–60°), the potential for planar and wedge failures is low, as these orientations correspond to the range where such failure mechanisms are least common. These failures are expected to be infrequent across all greywacke weathering grades.

12.5.4.2.2 Toppling Failures

Toppling failures may occur sporadically within this aspect range, as northeast facing slopes coincide with the east facing orientations (60°–120°) where toppling is most prevalent. However, the likelihood remains low overall.

12.5.4.3 Soil and rock mass stability results and discussion

The slope stability was assessed in SLIDE2 for Geological Cross Section 6 for the western area, and the results for each stability case is summarised in Table 12-7 below. The SLIDE2 outputs are included in Appendix G. The target FoS was achieved for the full slope during Stage 8 and the resultant risk in is R1.

Table 12-7: Section 6 slope stability analysis results summary

Case	Factor of Safety (FoS)					
	Long term static	Target	Elevated Groundwater	Target	Seismic	Target
Stage 8 – Entire Slope – Beyond property boundary	5.0	2.0	5.0	1.3	3.8	1.0

The presence of Faults A and B, in combination with the current orientation of the western slopes, indicate that they may intersect with the potential for a wedge development during Stage 7 and 8. However, the resultant wedge, based on current data would be stable with a high factor of safety (>1.5) and be very unlikely to move. However, these faults may interact with other defects and form smaller localised wedges, particularly where fault and joint sets intersect along the final wall. However, at Stage 8, the likelihood of the geometrical conditions required for the formation of a large scale continuous basal wedge plane are unlikely to occur. Kinematic analyses suggest that the known discontinuity sets within the planned slope geometry do not present a slope stability risk (R1 and R2 acceptable design).

Furthermore, no laterally persistent northeast-dipping structures have been identified that could result in a through-going basal failure surface. This assessment aligns with the interpretation presented in Geological Cross Section 7 (Sketch 7) in Appendix B, which illustrates the spatial relationships between the key faults, joint sets, and the pit configuration.

Notwithstanding the above comments, as the pit is developed the western faces will be subject to several iterations of excavation as operational cut faces are advanced. This will allow the performance of the slope about these fault planes to be observed and calibrated against design. This means any unfavourable slope performance about the faults will be identified well before the final walls are cut and wall design can be manged if required. Conditions of consent are proposed to appropriately manage those risks (refer to Section 17).

12.5.5 Northern area

12.5.5.1 Ground conditions summary

Ground conditions of this area are summarised on Geological Cross Sections 1 and 2 (Sketches 1 and 2) and Geological Long Section 7 (Sketch 7) in Appendix B.

Waitemata Group is exposed in the existing north to northeastern highwall in the current pit above 150 m RL. The Waitemata Group sandstone and siltstone bedding dips 10 to 20° towards the north to northeast (i.e., dipping into the slope), which is favourable for slope stability. The Waipapa Group directly underlies the Waitemata Group in the exposed highwall.

Limited investigations have been carried out in the gully area northwest of the current Symonds Hill Pit. Subsurface investigations (BH3 to BH6) were completed in 2004 by T+T in the lower Friedman Block area[17], approximately 500 m west of the Stage 8 pit shell extent. Slope debris and colluvium were encountered in the 2004 boreholes to varying depths. The hummocky terrain in the lower area is typically related to these colluvium materials, which were wet to saturated sands and clays. Signs of historical slope instability are evident from the geomorphology in the northwest gully, as identified by the headscarps and hummocky ground, as shown on Figure 10, Appendix B.

[17] T+T (2004), Hunua Quarry Proposed Friedman Block Waste Dump. Prepared for Winstone Aggregates. Ref 21436.04, October 2004.

Based on the 2004 investigations, we anticipate the geology in the northwest gully to comprise Waitemata Group, potentially overlying the Waikato Coal Measures, then underlain by the Waipapa Group. Waitemata Group residual soils were observed within tributary channels within the northwest area during a T+T site walkover.

The northern area is structurally complex with the Hunua regional east-west trending fault located to the north and a north-south regional fault, associated with the Drury Fault to the west of Mangapū Stream. Faulting noted within the Waikato Coal Measures indicates that faults likely predate the deposition of the Waitemata Group, and the significance of these faults are generally unknown. These likely faults constrain the location of the Waikato Coal Measures to the west (i.e., Friedman Block area) but that has not been confirmed. Fault B was observed in the northwest face of Symonds Hill Pit on average dipping 55° towards the southeast (135°). However, no significant faulting or shear zones were identified in boreholes (HUN04/3-6) carried out in this area.

There is no perched groundwater levels recorded in this area; however, we anticipate a perched groundwater level to reside within the Waitemata Group.

12.5.5.2 Specific rock defect stability results and discussion

The northern area will comprise east to southwest-facing slopes (90°–240°).

Based on the assumption that the defects measured in Symonds Hill Pit remains common for this cut, slope performance is expected to be similar to faces in Symonds Hill Pit of similar orientation.

a Wedge and Planar Failures

As noted in Section 13.2.2, for southwest-facing slopes (90°–240°), planar and wedge failure mechanisms are expected to range from almost certain to unlikely in likelihood. The likelihood is unlikely on the east facing slopes (around 90°), increases slightly toward the southeast (120°–150°), and reaches its highest likelihood on south to southwest-facing slopes as almost certain (150°–240°). However, provide the cut faces are 70° or less the scale of instability will be small and able to be easily managed safely by quarry operations.

b Toppling Failures

The likelihood of toppling failures are unlikely on the east facing slopes (60°–120°) but decrease toward the south and southwest.

12.5.5.3 Soil and rock mass stability results and discussion

The slope stability was assessed in SLIDE2 for Geological Cross Section 2 for the northern area, and the results for each stability case is summarised in Table 12-8 below. The SLIDE2 outputs are included in Appendix G.

Due to the presence of pre-existing slope instability within the overburden (Waitemata Group) of the northern area, the sequence of slope excavation will have a significant influence on stability. If the slope is undercut, there is the potential for further slope instability as Stage 2 stripping occurs in the gully area to the northwest of the existing pit, leading to a resultant risk of R3. A top-down earthworks approach would be required to remove overburden slope to reduce the risk of slope failure to occur. Further investigations and design would also need to be undertaken to determine the proposed slope profile to achieve a stable slope. The SLIDE2 analyses indicate that the target FoS for the Stage 2 overburden slope can be achieved by forming a wider catch bench at the crest of the slope for any potential failure and battering the overburden back to a 1(V):3(H) to 1(V):4(H) slope profile. Conditions of consent are proposed to appropriately manage the risks associated with pre-existing slope instability in this area (see Section 17.0).

As the pit shell extends in the northwestern area, these historical landslides will need to be continuously laid back and monitored for movement, which is also proposed to be controlled through conditions.

Table 12-8: Section 2 slope stability analysis results summary

Case	Factor of Safety (FoS)					
	Long term static	Target	Elevated Groundwater	Target	Seismic	Target
Stage 2 – Entire slope - Within property boundary (landslide debris reshaped)	3.4	1.5	3.4	1.3	2.6	1.0
Stage 7 - Upper slope - Within property boundary	1.6	1.3	1.6	1.1	1.3	1.0
Stage 7 - Entire slope - Within property boundary	4.2	1.5	4.3	1.3	3.6	1.0
Stage 8 - Upper slope - Within property boundary	1.8	1.3	2.0	1.1	1.5	1.0
Stage 8 - Entire slope - Within property boundary	4.1	1.5	4.1	1.3	3.6	1.0

The haul road (including two culverts), which is constructed during Stage 2, intersects the toe of several mapped landslides in the northwestern area. While geometric designs have been considered for the development of this haul road, no geotechnical nor surface water designs have yet been undertaken. Additional investigation and design will be undertaken in order to design the haul road and any remedial work required to provide acceptable stability in this area. This will be managed by the proposed TARP, discussed in Section 17.

It is important to note the works in Stage 2 are to be excavated and removed at a later stage of the quarry development and are temporary. Furthermore, the northern area is not located near any neighbouring properties. Therefore, no impacts are expected beyond the site boundaries. All earthworks and any potential slope instability remain entirely within FCIL-owned land and any risk to on-site activities will be managed through the application of the TARP.

12.5.6 Eastern area

12.5.6.1 Ground conditions summary

Ground conditions of this area are summarised on Geological Cross Section 3 (Sketch 3) in Appendix B.

Boreholes in the eastern area encountered Waitemata Group to 150 m RL, where it is underlain by Waipapa Group. A 50 m long and approximately 5 to 10 m in thickness outcrop of Waikato Coal Measures was exposed in the eastern area, at the base of the Waitemata Group.

Joint Set A was observed on the eastern wall of the Symonds Hill Pit with a dip direction of 245° to 265° and a dip of 50 to 70°.

Evidence of historical instability has been identified at the eastern extent of Stage 8, where headscarps have formed along the ridgeline, on the western side of Middleton Road, and hummocky terrain is evident downslope. This is shown on the geomorphological map (Figure 10) in Appendix B. Historical instability in this area is likely confined within the Waitemata Group soils, as the

Waitemata Group sandstone and siltstone bedding exposed in the current pit dips 10 to 20° towards the north to northeast (i.e., dipping into the slope), which is favourable for slope stability.

There is no perched groundwater levels recorded in this area; however, we anticipate a perched groundwater level within the Waitemata Group towards the east.

12.5.6.2 Specific rock defect stability results and discussion

The eastern area will comprise southwest to northwest facing slopes (210°–330°).

Based on the assumption that the defects measured in Symonds Hill Pit remains common for this cut, slope performance is expected to be similar to faces in Symonds Hill Pit of similar orientation.

a Wedge and Planar Failures

As noted in Section 13.2.2, the likelihood for planar and wedge failures is almost certain from the southwest (around 210°–240°), and possible for west facing slopes (240°–270°) and unlikely toward the northwest (270°–330°).

b Toppling Failures

Toppling failures are also limited across these slope aspects, with no toppling potential identified for west facing slopes (approximately 270°) and only an unlikely likelihood towards the northwest (300°–330°).

12.5.6.3 Soil and rock mass stability results and discussion

The slope stability was assessed in SLIDE2 for Geological Cross Section 2 for the northern area, and the results for each stability case is summarised in Table 12-9 below. The SLIDE2 outputs are included in Appendix G.

Due to the presence of pre-existing slope instability within the overburden (Waitemata Group) of the eastern area, the sequence of slope excavation will have significant influence on stability. If the slope is undercut, there is the potential for further slope instability as Stage 7 stripping occurs in the gully area to the east of the existing pit, leading to a resultant risk of R3. A top-down earthworks approach is recommended to reduce the risk of slope failure. Further investigations and design would need to be undertaken to determine stable slope profiles. The SLIDE2 analyses indicate that the target FoS for the Stage 7 overburden slope can be achieved by forming a wider catch bench at the crest of the slope for any potential failure and battering the overburden back to a 1(V):3(H) to 1(V):4(H) slope profile.

As the pit shell extends in the eastern area, these historical landslides will need to be continuously laid back and monitored for movement. Again, this (and the slope design for Stage 7) will be addressed through conditions of consent.

Table 12-9: Section 3 slope stability analysis results summary

Case	Factor of Safety (FoS)					
	Long term static	Target	Elevated Groundwater	Target	Seismic	Target
Stage 2 – Entire slope - Within property boundary	8.6	1.5	8.6	1.3	6.8	1.0
Stage 7 – Upper slope – Within property boundary (historical landslide, no remediation undertaken)	1.1	1.5	1.0	1.3	0.7	1.0
Stage 7 – Entire slope - Within property boundary (landslide debris reshaped)	4.4	2.0	4.4	1.3	3.3	1.0

12.5.7 Sensitivity Check

The quarry excavation represented by Geological Cross Section 5 in the southwest wall of the Symonds Hill Pit (southern geotechnical assessment area) represents a critical slope below the Mangapū Stream. Therefore, this section with the full height within slightly to unweathered greywacke was considered for review and for a sensitivity check. The following sensitivity check scenarios were undertaken:

- The Hoek-Brown UCS and GSI values for the slightly to unweathered greywacke were gradually reduced to determine the minimum values to the capacity of the design to incorporate different ground conditions to those assumed.
- An alternative (more conservative) groundwater response was assumed. A higher groundwater response was also assessed on Section 4 under the Mangapū Tributary diversion.
- Quarry closure case whereby the regional groundwater equalises across the site, due to pumping having stopped, leading to the formation of a lake at 75 m RL. We have also assessed the slope stability during filling of the lake at 1/3 of the height, to check for any partial pooling impacts.

The results for the sensitivity check for Section 5 are shown in Table 12-10 below. In summary, to still achieve the required FoS, the slightly to unweathered greywacke Hoek-Brown parameters would need to be reduced to UCS = 35 MPa and GSI = 30, which is less than the parameters currently adopted for the moderately weathered greywacke. The higher groundwater response scenarios for Section 4 (Mangapū Tributary) and Section 5 (Mangapū Stream) also achieved the required FoS for their reduced strength assumptions. Two quarry closure cases have been considered (full lake and 1/3 full) and these show the slope stability increases compared to the groundwater conditions modelled to exist and full extent of mining, due to the buttressing effect of the lake. Therefore, flooding the pit is not identified as a risk to slope stability.

In summary, the sensitivity analysis suggests that even if moderately weathered rock were to be encountered over the full-face height due localised weathering down nearby faults the design would still achieve the required FoS (refer to Table 12-10) and correlated to a R1 risk (given high FoS corelate to unlikely/rare likelihood). This reinforcing the cut design is governed by the kinematic slope design parameters of the individual 15 m bench faces cuts rather than the overall rock mass. The slope stability would only become critical if either the groundwater response to drawdown was limited in its extent, or there is a significant thickness of faulted rock mass behind the face, or there is a discrete unfavourably oriented fault surface behind the face. We have no evidence for weak faulted rock nor a fault zone behind this wall, however this cannot be ruled out (refer to Section 12.5.3). Given the importance of this wall stability as the pit is advanced, we recommend

consideration be given to a staged drill programme to confirm the rock mass quality behind this cut. This will close out this potential risk and give confirm the wall capacity to stand at required levels of stability, or conversely allow for design changes should unfavourable ground conditions be encountered. A condition of consent is proposed to address this.

Table 12-10: Section 5 slope stability sensitivity check results summary

Scenario		Factor of Safety against slope instability					
		Static		Elevated Groundwater		Seismic (PGA=0.19)	
		Calculated	Required	Calculated	Required	Calculated	Required
Sensitivity Check 1	*UCS=65MPa; GSI=50*	4.0	>2.0	4.0	>1.3	3.0	>1.0
Sensitivity Check 2	*UCS=55MPa; GSI=40*	3.2		3.2		2.4	
Sensitivity Check 3	*UCS=45MPa; GSI=30*	2.6		2.6		1.9	
Sensitivity Check 4	*UCS=35MPa; GSI=30*	2.4		2.4		1.8	
Sensitivity Check 5	*UCS=20MPa; GSI=25*	1.9		1.9		1.4	
Sensitivity Check 6	*Alternate GWT*	3.7		n/a		n/a	
Sensitivity Check 7	*Quarry closure, with lake*	5.7		n/a		n/a	
Sensitivity Check 8	*Quarry closure, 1/3 full lake*	5.0		n/a		n/a	

12.6 Off-site Impacts

12.6.1 General

Aside from the assessment of slope stability that can affect properties beyond FCIL owned land, consideration is also required for other factors that could potentially lead to off-site impacts. This includes rock mass dilation and groundwater drawdown induced settlement, which are discussed in the following sections.

12.6.2 Rock mass dilation

As rock is removed during quarrying, the stresses on the surrounding remaining rock mass change because of reduced overburden mass and removal side support to a slope. This leads to the opening of existing defects and can lead to the creation of new defects (spalling), causing the rock mass to dilate towards the free face and lead to greater rock mass permeability in the areas of rock dilation.

Progression of quarrying to Stage 8 introduces a potential risk of rock mass dilation at the quarry face, which could induce vertical and/or horizontal displacement in proximity to adjacent property boundaries and the Mangapū Stream, along the southern, western and eastern boundaries. Rock mass dilation will occur at all stages of the development, however, Stage 8 is considered the critical case as it is within closer proximity to site boundaries. A high-level assessment has been undertaken to evaluate the potential implications of such dilation on the Mangapū Stream channel, including the possible drainage of the stream. In pit backfilling within Symonds Hill Pit will occur from Stage 7 onwards. However, conservatively, for this assessment it is assumed that no backfilling has occurred, which would only reduce the amount of rock mass dilation due to the buttressing effect of the backfill in the pit. The outcomes of this assessment are presented in the subsequent sections.

12.6.2.1 Methodology

Geological Section 5 (Sketch 5 in Appendix B), on the southwestern face, was used as the critical section to assess the effects of rock mass dilation due to the proximity of Mangapū Stream in this location. Noting Section 5 is where the stream is closest to the excavation. The geotechnical finite element software PLAXIS was used, which can be utilised for the analysis of deformation and stability in soil and rock. The Hoek-Brown parameters for the Waipapa Group rock were applied for the analysis, found in Table 11-7. The geology in this location, Section 5, is predominantly slightly to unweathered greywacke. As a sensitivity check we have also applied a thicker highly weathered greywacke layer (approximately 20 m thick) underlying Mangapū stream.

12.6.2.2 Results and Discussion

The results indicate that, following excavation for Stage 8, up to 10 mm of dilation may be expected at the quarry face and this estimated to quickly decrease back into the rock mass. Given the damage to the face during blasting and face excavation this level of deformation is not likely to be easily observed in face even with pre splitting of the final faces.

Below Mangapū Stream, our modelling suggests the rock mass dilation will be less than 5 mm and would is unlikely to result in a measurable increase in leakage of the stream. It is therefore assessed as an R1 to R2 risk (acceptable) of affecting the Mangapū Stream and adjacent properties. The likelihood of the excavation to lead to increase leakage from the stream by this mechanism is unlikely.

The current assessment is high level and considers only the intact rock mass parameters. For a detailed assessment, persistent defect sets would be modelled. It maybe that leakage could occur along specific open defects of fault zone independent of the dilation caused by excavation. However, no persistent defects have been observed within the southwest wall (southern geotechnical assessment area) of the quarry face. Further mapping will be required as quarrying advances. Monitoring of the slope face is also suggested to manage this risk as the excavation progresses. This may involve face mapping as well survey surface monitoring at points of interest (i.e., property boundaries or adjacent to the Mangapū Stream). Conditions of consent are proposed to address this (see Section 17.0).

12.6.3 Groundwater drawdown induced settlement

Groundwater drawdown induced settlement may occur when lowering the water table, during pumping at the base of the operational pit, increases the effective stress on soil, leading to consolidation and surface deformation. This condition is especially significant in soft, compressible soils like peat or clay.

The regional groundwater (pre-quarrying) was at 75 m RL and pumping will continue at the base of Symonds Hill Pit as it deepens. The pit depth at Stage 8 will be -50 m RL and therefore the total amount of groundwater drawdown of the regional groundwater level will be 125 m. As noted in the

PDP groundwater assessment report[1], the greywacke rock has a high hydraulic conductivity, and any drawdown of the regional groundwater level will create a relatively flat drawdown curve within the greywacke. The regional groundwater drawdown is confined to be within the unweathered greywacke and the lateral extents are bounded by regional faults in all direction around Hunua Quarry (i.e., groundwater drawdown does not extend to the alluvial plains in Papakura westwards). Pumping in the Symonds Hill Pit is also not anticipated to influence perched levels. Only the regional groundwater is expected to be affected, which is based on previous groundwater monitoring from the Hunua Pit, when that pit was operational.

Assuming the maximum amount of groundwater drawdown being 125 m in the unweathered greywacke, we have estimated <1 mm of settlement may occur. This in primarily due to the high strength of the greywacke and that it has been subject to several stages of tectonic subsidence burial and uplift over the geological past. Therefore, we consider that the risk of groundwater induced settlement in the greywacke rock beyond the site boundaries is R1.

13 PC120 Assessment

The existing Symonds Hill Pit and the extent of the proposed Symonds Hill Pit development has been mapped as being high to very highly susceptible to both shallow and large-scale landslides in Auckland Council Geomaps and therefore the amendments in Proposed Plan Change 120 (PPC120) to Chapter E36 of the Auckland Unitary Plan – Operative in Part (AUP) apply. However, as noted on the Geomaps website, the maps are intended as a regional overview and do not replace site-specific assessments.

As assessed and discussed in previous sections of this report, the landslide (slope instability) risk for the existing Symonds Hill Pit and the design extent of the proposed Symonds Hill Pit development is R1 or R2 (acceptable). For the haul road (including two culverts) construction in the northern area during Stage 2, further investigations are required to determine the depth and geometry of historical landslides and any landslide risk. These investigations will determine the design and extent of any remedial work required to provide stability in the northwest gully to support final design and will ensure an R1/R2 outcome for the final design. This will be managed by the proposed TARP, discussed in Section 17.

As with the landslide risk classification presented in Appendix H, the landslide risk classification under Chapter M, Appendix 24 of the AUP is determined by combining consequence and likelihood. The consequence and likelihood definitions adopted for this assessment (Appendix H) differ slightly from those in Chapter M, Appendix 24, as they are more applicable to the current quarry operations and the proposed development. Notwithstanding these minor differences, we consider the resulting landslide risk classification to be equivalent. **Accordingly, the equivalent risk rating for the proposed Symonds Hill Pit development (once all elements are investigated and designed) is Low (acceptable).** Therefore, a separate assessment in accordance with Chapter M, Appendix 24 of the AUP has not been undertaken.

Based on the above, an assessment of the proposed activities within Table E36.4.1B and C indicates a Low (acceptable) landslide hazard risk classification for the existing Symonds Hill Pit and the proposed development of Symonds Hill Pit. In summary, the mapped landslide risks are not considered to represent the actual conditions on site. The areas classified as being highly and very highly susceptible to landslides do not reflect the actual level of risk on site when taking into account the historic and current site modifications, existing operations, and the engineering measures in place.

14 Overburden Disposal Area

The existing overburden disposal area (OBDA) within the Hunua Pit will continue to be utilised for the stripping campaigns during Stages 1, 2, 3 and 6. The design and monitoring of the existing OBDA area are covered in previous reports by T+T[18] and Baseline Geotechnical[19]. To date the backfill has been monitored consistently with existing conditions of consent and is being built to specification.

For Stages 7 and 8 overburden disposal is proposed to be directed back into the Symonds Hill Pit, concurrently with on-going resource extraction.

[18] T+T report, 2015, In Pit OBDA Geotechnical Assessment. Prepared for Winstone Aggregates. Ref 21436.2010, August 2015.

[19] Baseline Geotechnical Limited report, Geotechnical Design Report - Hunua Quarry In Pit Overburden Disposal Area, 2019. Prepared for Winstone Aggregates. Ref BGL000044-v1.0, Dec 2019

15 Residual Geotechnical Risks

During ongoing quarry development, there remains the potential for encountering unforeseen geological structures such as previously unmapped faults, shear zones, or persistent orthogonal joint sets. This is the main geotechnical risk to the site. These features can locally alter rock mass strength, slope instability, and groundwater conditions and may locally increase the likelihood and scale (hence consequence) of any resultant instability. This has the potential to elevate the assessed risk rating from R1 or R2 to R3 or above and would, if encountered, necessitate a design change. As excavation progresses to greater depths, continuous geological mapping and geotechnical inspections should be implemented to identify any such structures early. Conditions of consent are proposed to appropriately manage those risks (refer to Section 17).

If a new fault or other significant structural feature is encountered, the associated geotechnical risk can be assessed at that stage, consistent with the proposed conditions of consent. This would typically include an evaluation of its orientation relative to the excavation faces, continuity, potential to form release or wedge planes, and any influence on local groundwater flow or pressure conditions. Depending on findings, slope designs or drainage provisions may require refinement to maintain long-term stability and operational safety.

Additionally, monitoring of groundwater inflows and piezometric responses during excavation should continue, as newly exposed pathways or fault zones may locally increase permeability and lead to changes in water pressure. If elevated inflows are detected, targeted dewatering or slope drainage measures can be implemented to mitigate any adverse effects on slope stability or working conditions, such as horizonal directionally drilled drainage.

A Trigger Action Response Plan (TARP) should guide appropriate responses if conditions differ from those anticipated. Targeted investigations within the Mangapū Stream diversion area and the northwestern and eastern areas (i.e., where previous slope instability has been mapped) should also be undertaken as the quarry advances.

A careful approach will be required when reaching the final face positions in Stage 8 to minimise the risk of back-break, leading to unnecessarily broken rock in the final face and any temporary faces. Pre-splitting is recommended to minimise structural damage to the final batter profiles, which involves drilling a single row of closely spaced, lightly charged holes along the designed perimeter, which are detonated simultaneously or in close succession to shear the rock between them. At the end of the 50-80-year cycle, the final faces should be subject to inspection by a geotechnical professional familiar with the contents of this report.

16 Conclusion

Overall, the quarry development is feasible from a geotechnical perspective, and offsite effects such as slope stability, groundwater drawdown induced settlement and rock mass dilation can be managed through conventional design methods and conditions of consent. Ground movement impacts beyond FCIL owned land are likely to be negligible (less than 10 mm) and pose an R1 level of risk (refer to Appendix H). Off-site effects are expected to be less than minor. On-site effects will be managed by the site operator under the proposed TARP, as discussed in Section 17. This will ensure the safe and commercial operations of the quarry. Continued monitoring and ongoing management through the excavation phases, secured through conditions of consent and management plans, including the TARP, will ensure that any emerging geological or hydrogeological risks are effectively identified and mitigated to acceptable levels (R1 to R2).

17 Recommended Geotechnical Consent Conditions

17.1 Geotechnical

1 The Site shall be operated in a manner which ensures the geotechnical risk does not exceed the following limits in accordance with the Risk Assessment Matrix in Appendix H of the Geotechnical Report, prepared by Tonkin + Taylor:

(a) R1 for land and land use beyond the Site boundary not in FCIL ownership;

(b) R1 or R2 for land owned by FCIL within the Site boundary (but outside the consented Quarry Development Area); and,

(c) R3 within the Site boundary where achieving R1 or R2 is not practicable.

2 Upon permanent closure of the Hunua Quarry, the Consent Holder shall ensure that access to the site remains restricted.

17.2 Trigger Action Response Plan

3 The objective of the Trigger Action Response Plan (TARP) is to set out the measures to manage geotechnical risk to achieve the limits in Condition 1. The TARP shall be reviewed every 5-years and re-certified in accordance with Condition 4.

4 The TARP must include:

(a) guidance to operational staff on what may constitute unexpected ground conditions, what to do if unexpected ground conditions are encountered, levels of escalation required for different observations, and management reporting requirements.

(b) the requirement to review quarry geotechnical conditions against observed geology, slope performance, and groundwater conditions:

(i) following material lateral advance of quarry faces, benches or batters that exposes new geological conditions;

(ii) prior to, and during, excavation works undertaken:

- within 50 m of the Site boundary;
- associated with the stream diversion works (Stage 2); and
- within 50 m of the final cut below stream channels invert, where the final cut is below.

(c) response options where there is significant deviation from expected conditions, including:

(i) further investigations;

(ii) design review and risk assessment to ensure activities do not exacerbate geotechnical risk in accordance with the Risk Assessment Matrix in Appendix H of the Geotechnical Report, prepared by Tonkin + Taylor, dated March 2026

(iii) changes to operational methodology and/or design;

(iv) more frequent assessment and additional monitoring;

(d) the following response pathways in accordance with the Risk Assessment Matrix in Appendix H of the Geotechnical Report prepared by Tonkin + Taylor, dated March 2026:

(i) where an increase of geotechnical risk over and above R2 is identified, design review shall be undertaken to reduce the risk hazard to R1 beyond the Site boundary (not owned by FCIL), or R1 or R2 within the Site boundary and outside the Quarry Development Area, and where practicable reduce the risk hazard to R1 or R2 within the Quarry Development Area;

(ii) where it is not practicable to reduce geotechnical risks to R1 or R2 within the Quarry Development Area, mitigation measures and a contingency plan must be adopted to ensure geotechnical risks do not exceed R3; and,

(iii) Council may review the consent in accordance with the Review Condition XX, where mitigation measures and contingency planning cannot reduce geotechnical risk within the Quarry Development Area to R3 or less, or cannot reduce geotechnical risk outside the Quarry Development Area to R2 or less or R1 for land outside the Quarry Development Area (not owned by FCIL).

17.3 Annual monitoring report

5 As a minimum the Annual Monitoring Report must include:

(a) details of any response taken to achieve the geotechnical limits in Condition 1 in accordance with the TARP required by Condition 4 over the preceding 12 months.

18 Applicability

This report has been prepared for the exclusive use of our client Fletcher Concrete and Infrastructure Limited , with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report as part of an application for resource consent and that Auckland Council as the consenting authority will use this report for the purpose of assessing that application.

Recommendations and opinions in this report are based on data from discrete investigation locations. The nature and continuity of subsoil away from these locations are inferred but it must be appreciated that actual conditions could vary from the assumed model.

Tonkin & Taylor Ltd
Environmental and Engineering Consultants

Report prepared by:

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Philip Mathewson
Senior Engineering Geologist

Report reviewed by:

.....

Doug Johnson
Senior Principal Engineering Geologist

Authorised for Tonkin & Taylor Ltd by:

.....

Mark Thomas
Project Director / Senior Principal Geotechnical Engineer

27-Mar-26
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Appendix A CV's

- Philip Mathewson
- Doug Johnson

Doug Johnson

Technical Director + Senior Principal Engineering Geologist, Auckland

Key technical skills

- Engineering geology
- Opencast mining and quarrying
- Landslides
- Cut slope design
- Ground investigation
- Slope stability
- Ground modelling
- Risk assessment
- Seismic hazard
- Geotechnical site assessment
- Project governance and management

Qualifications

MSc (Hon), Engineering Geology 1984, University of Canterbury

BSc, Geology,1982, University of Canterbury

Professional Engineering Geologist (PEngGeol)

Board member – Construction Health and Safety New Zealand (CHASNZ)

Member International Association for Engineering Geology and the Environment

Immediate past Vice President (Australasia) IAEG

Member - Engineering New Zealand

Member – New Zealand Geotechnical Society

About Doug

Doug has 40 years' experience expertise in Engineering Geology including 16 years of experience in executive management and governance roles. He has specialist skills in engineering geological assessments, site investigation, soil and rock mechanics, slope stability, groundwater, and natural hazards (including seismic) assessment. He has worked on many mining, quarrying and civil engineering projects including building foundations, roads, tunnelling, land subdivision and landfill projects. He has worked across a range of complex geological terrains, geographies, green and brown field site developments. Doug currently sits on several Review Panels and Project Boards for road infrastructure and Quarry/Mining projects.

Work experience

Winstone Aggregates
Doug provided engineering and geotechnical engineering investigation and design services to Winstone Aggregates operations supporting several quarry operations across the upper North Island of New Zealand. Services included engineering geological and geotechnical assessments, groundwater, resource assessment, cut slope design, overburden disposal, and risk management. In addition to quarry development design support, has also included site closure and redevelopment for commercial uses. Projects include: • Hunua Quarry (Auckland) • Whitehall/ Karapiro Quarry (Waikato) • Symonds Hill expansion (Auckland) • Pokeno Quarry (Waikato) • 3 Kings Quarry (Auckland) • Stevenson Huntly Quarry (Waikato) • Lun Ave Quarry (Auckland) • Belmont Quarry Wellington • Wiri Quarry (Auckland) • Wilsonville Limestone Quarry (Whangarei) • Flat Top Quarry (Rodney) • Portland Limestone Quarry (Whangarei).

BT Mining Stockton, West Coast Regional Council and Buller District Council
Doug provides geological and geotechnical review for Bathurst Resources opencast mining operations at Stockton and Cypress. He is part of 3-person expert panel providing review on geotechnical, geochemical, and environmental design and practice and advises on site preparedness to meet environmental consent compliance at closure. He is on a team supporting Bathurst Mining and the NZ Government on the long-term management of historic mining induced acid water discharge from the Stockton Plateau.

Solid Energy NZ Opencast Operations
Doug provided engineering geological investigation, modelling, and designer services to support NZ largest opencast coal mining operations at Huntly and Stockton. The Huntly and Maramarua Opencast operations are situated in complex, highly faulted, weak rock geological settings. Doug also supported South Island operations at Stockton and Ohai. Services included ground investigations, geological and engineering geological modelling, groundwater assessment, highwall slope design, overburden disposal and backfill dump design, risk management, assessment of mining through old underground workings, operational support, and project management. Projects include: • Awaroa 4 Opencast • Township Opencast • Mangakotukutuku Stream Diversion • Waipuna Opencast Wall Failure • Waipuna Opencast Redesign • Smith's Opencast • K1 Lake Dewatering and Mine Expansion • K4 Opencast Coal Mine Feasibility • Millerton Mine Stockton • Stockton No 2 Extension • Pit 17 Ohai Wall failure • Cypress Mine Geotechnical Peer Review • Cypress Mine Peer Review Panel.

Philip Mathewson

Project Manager + Senior Engineering Geologist, Auckland

Key managerial skills

- Project management
- Leading multi-disciplinary teams

Key technical skills

- Engineering geological mapping interpretation
- Geotechnical investigation and co-ordination
- Landslip assessments and remedial design
- Slope stability analysis

Qualifications

BSc, Geology, 2008, University of Auckland

PGradDip, Engineering Geology, 2009, University of Canterbury

MSc, Geography, 2011, University of Canterbury

New Zealand Geotechnical Society (NZGS) Member

About Phil

Phil is an Engineering Geologist with over 10 years of experience. He has worked on a wide range of cross-discipline projects including the LEAD Alliance, NZTA Waterview Connection, mine/quarry sites in Auckland, Waikato and Northland, landslide assessments throughout New Zealand, and multiple commercial and residential developments in the greater Auckland area.

Work experience

Strata Control, Principal Hazard Management Plans, North Island | GBC Winstone | May 2018 - Oct 2018

Engineering Geologist, Project Manager

Geotechnical appraisals for 10 Winstone quarry sites across the north island. Involves assessing principal hazards on cut slopes and overburden disposal sites. To support the development of Principal Hazard Management Plans.

Hunua Quarry, Stability Assessment, Auckland | Winstone Aggregates | Feb 2015 - 2016

Engineering Geologist

Stability assessment of proposed in-pit overburden disposal area (OBDA) slope. Ongoing inspections and monitoring.

Tetley Quarry, Steen Road, Maramarua, Overburden Slope, Waikato | Hauraki District Council | Jan 2014 - Current

Project Manager, Engineering Geologist

Geotechnical assessment of two large landslides within the overburden slopes of Tetley Quarry, Maramarua to support the closure of the quarry. Site investigation, engineering geological mapping, slope stability and reporting.

McLaughlins Mountain Rock Fall, Wiri, Auckland | Department of Conservation | Jun 2016 - Jul 2016

Shadow Project Manager, Engineering Geologist

Rock fall risk assessment for properties adjacent to McLaughlin's Mountain. Site inspection and reporting.

Otaua, Waikato North Head Iron Sands Mine, Waikato | NZ Steel Limited | Apr 2015 - Aug 2017

Engineering Geologist

Geotechnical logging, site supervision and slope stability analysis of tipping platforms and proposed tailings storage areas at NZ Steel iron sands mine.

Taharoa, Iron Sands Mine, Waikato | NZ Steel Limited | Dec 2016 - Feb 2017

Engineering Geologist

Review of current operational bunds and ponds together with other geotechnical related aspects of the tailings systems at Taharoa Iron Sands Mine. Site inspection and reporting.

LEAD Alliance, Auckland | Kainga Ora | Dec 2019 - Mar 2022

Geotechnical Lead for Tamaki Precinct

Coordination of geotechnical investigations, reporting, review and project management. To support the delivery of residential superlots for the Auckland Housing Programme and shovel ready infrastructure projects.

Waterview Connection, SH20 Motorway Link to SH16, Auckland | NZTA | Jan 2012 - Sep 2013

Engineering Geologist

Organisation of site investigations, geotechnical logging and site supervision for a range of ground investigations during the design and construction phase.

Appendix B Figures

- **Figure 1– Stage 1 Development Plan**
- **Figure 2 – Stage 2 Development Plan**
- **Figure 3 – Stage 3 Development Plan**
- **Figure 4 – Stage 4 Development Plan**
- **Figure 5 – Stage 5 Development Plan**
- **Figure 6 – Stage 6 Development Plan**
- **Figure 7 – Stage 7 Development Plan**
- **Figure 8 – Stage 8 Development Plan**
- **Figure 9 – Geotechnical Investigation Plan**
- **Figure 10 – Geomorphological Plan**
- **Figure 11 - Geotechnical Assessment Areas**
- **Sketch 1 – Geological Cross Section 1**
- **Sketch 2 – Geological Cross Section 2**
- **Sketch 3 – Geological Cross Section 3**
- **Sketch 4 – Geological Cross Section 4**
- **Sketch 5 – Geological Cross Section 5**
- **Sketch 6 – Geological Cross Section 6**
- **Sketch 7 – Geological Cross Section 7**
- **Sketch 8 – Geological Cross Section 8**

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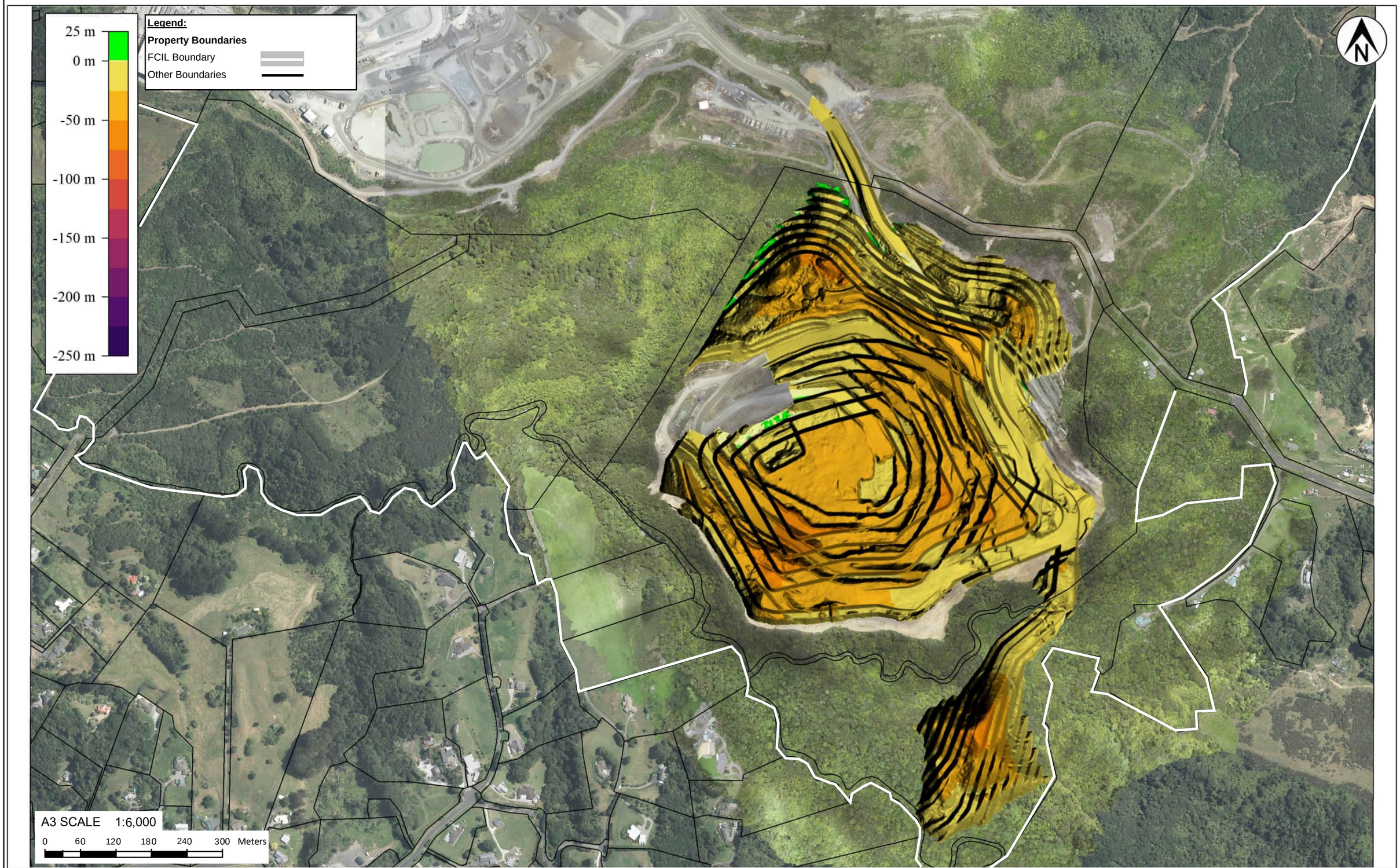

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NOTES:
1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) AERIAL PHOTOS SOURCED FROM AUCKLAND COUNCIL 2024 AND DRONE AERIAL SURVEY PROVIDED BY WINSTONES XXX.
3) HORIZONTAL COORDINATE SYSTEM: NZGD2000, MOUNT EDEN CIRCUIT.
4) PROPERTY BOUNDARIES SOURCED FROM LINZ
5) DESIGN SURFACE OUTLINES PROVIDED BY WINSTONES
6) STAGES SHADER DEPTHS BASED ON AUCKLAND COUNCIL 2024 SURFACE COMPARED AGAINST PROVIDED WINSTONES STAGE DESIGN SURFACES

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

PROJECT No.	1099889	
DESIGNED	JOWI	23/1/26
DRAWN	JOWI	23/1/26
CHECKED	PRMM	23/1/26
APPROVED		DATE

CLIENT FLETCHER CONCRETE AND INFRASTRUCTURE LTD

PROJECT PROJECT MAHITAHI

TITLE STAGE 1 DEVELOPMENT PLAN

SCALE (A3) 1:6000 FIG No. 1 REV 1

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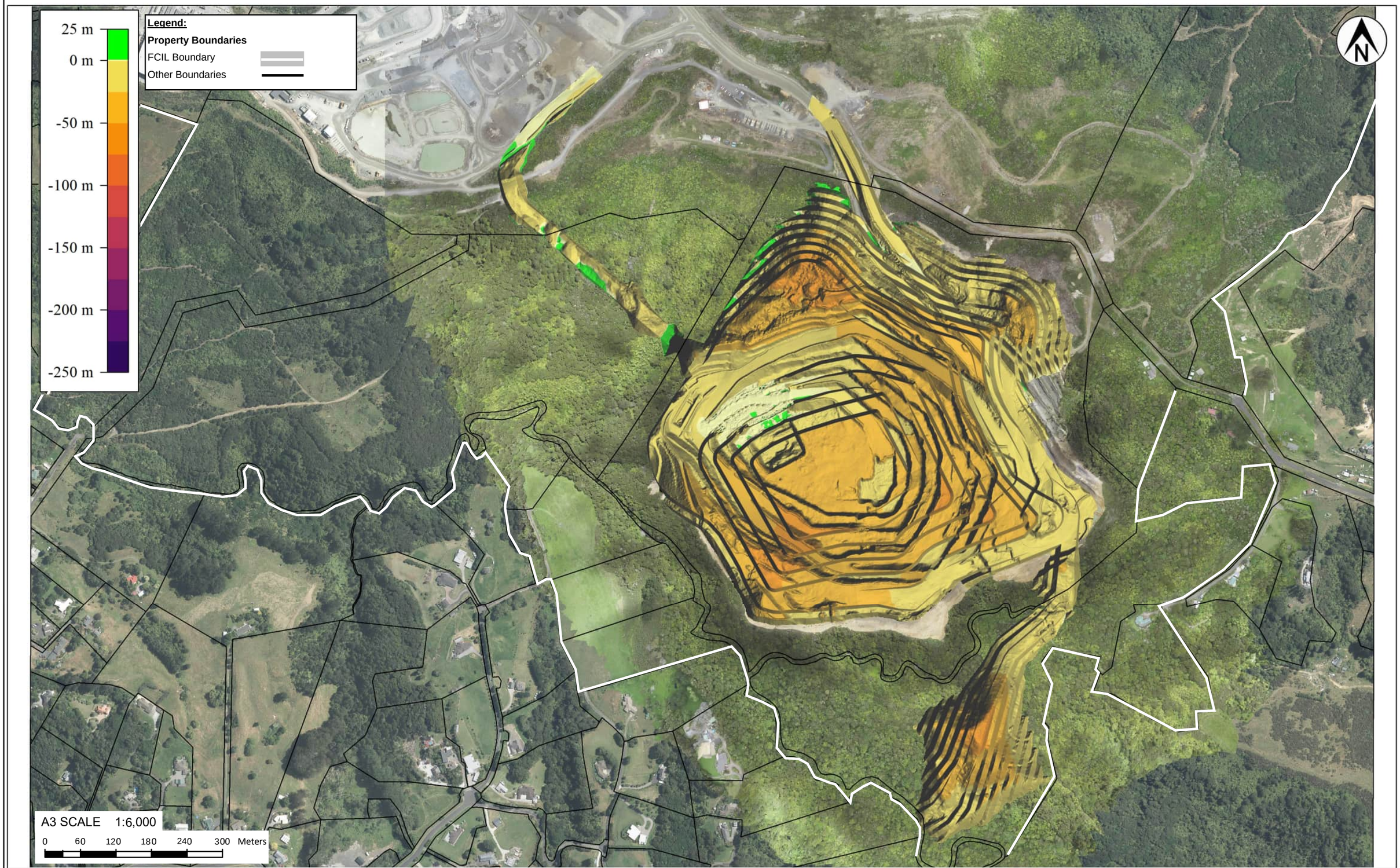

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NOTES:

1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) AERIAL PHOTOS SOURCED FROM AUCKLAND COUNCIL 2024 AND DRONE AERIAL SURVEY PROVIDED BY WINSTONES XXX.
3) HORIZONTAL COORDINATE SYSTEM: NZGD2000, MOUNT EDEN CIRCUIT.
4) PROPERTY BOUNDARIES SOURCED FROM LINZ
5) DESIGN SURFACE OUTLINES PROVIDED BY WINSTONES
6) STAGES SHADER DEPTHS BASED ON AUCKLAND COUNCIL 2024 SURFACE COMPARED AGAINST PROVIDED WINSTONES STAGE DESIGN SURFACES

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

PROJECT No.	1099889		
DESIGNED	JOWI	23/1/26	
DRAWN	JOWI	23/1/26	
CHECKED	PRMM	23/1/26	
APPROVED		DATE	

CLIENT	FLETCHER CONCRETE AND INFRASTRUCTURE LTD
PROJECT	PROJECT MAHITAHI
TITLE	STAGE 2 DEVELOPMENT PLAN
SCALE (A3)	1:6000
FIG No.	2
REV	1

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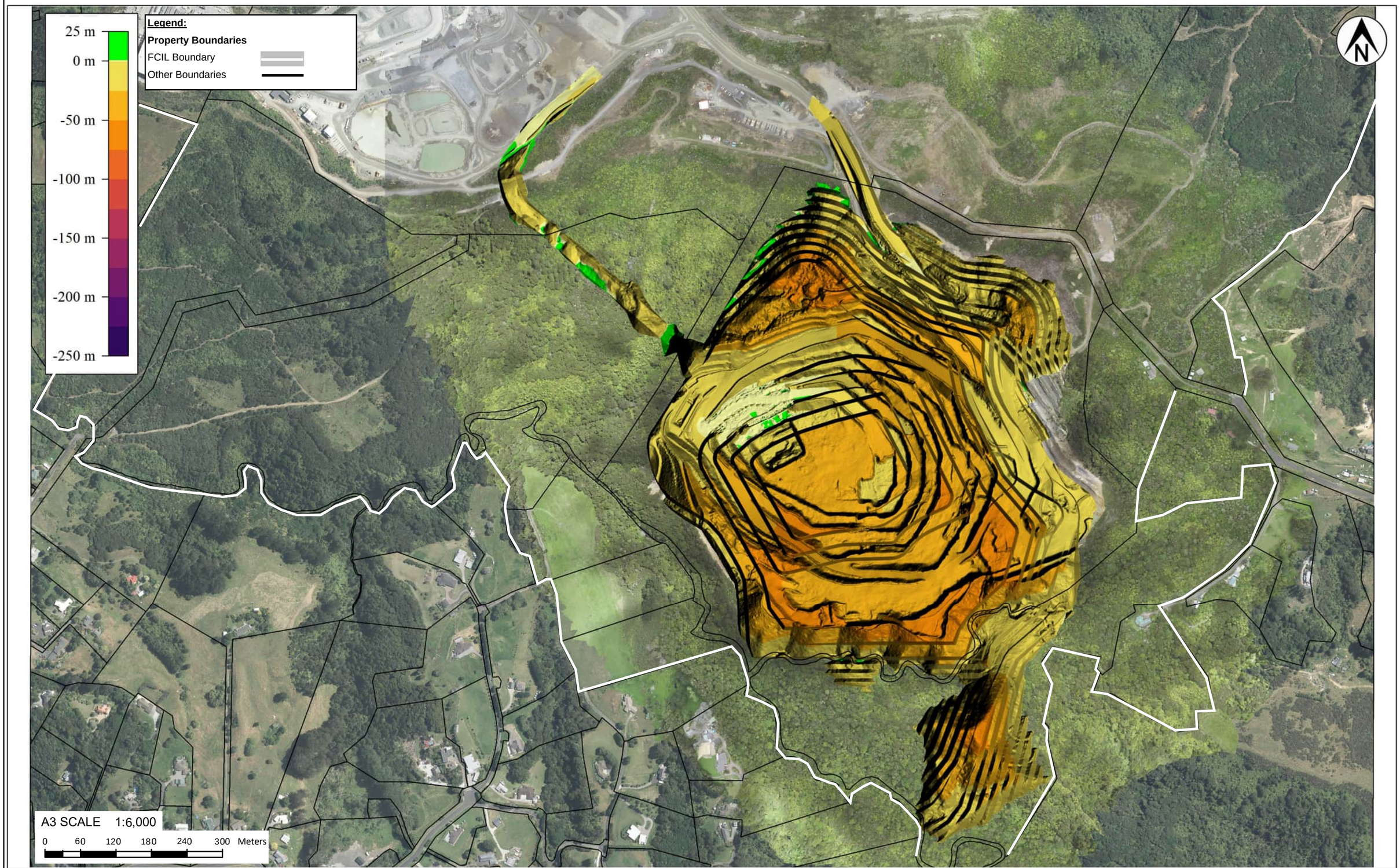

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NOTES:

1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) AERIAL PHOTOS SOURCED FROM AUCKLAND COUNCIL 2024 AND DRONE AERIAL SURVEY PROVIDED BY WINSTONES XXX.
3) HORIZONTAL COORDINATE SYSTEM: NZGD2000, MOUNT EDEN CIRCUIT.
4) PROPERTY BOUNDARIES SOURCED FROM LINZ
5) DESIGN SURFACE OUTLINES PROVIDED BY WINSTONES
6) STAGES SHADER DEPTHS BASED ON AUCKLAND COUNCIL 2024 SURFACE COMPARED AGAINST PROVIDED WINSTONES STAGE DESIGN SURFACES

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

PROJECT No.	1099889		
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DRAWN	JOWI	23/1/26	
CHECKED	PRMM	23/1/26	
APPROVED		DATE	

CLIENT	FLETCHER CONCRETE AND INFRASTRUCTURE LTD
PROJECT	PROJECT MAHITAHI
TITLE	STAGE 3 DEVELOPMENT PLAN
SCALE (A3)	1:6000
FIG No.	3
REV	1

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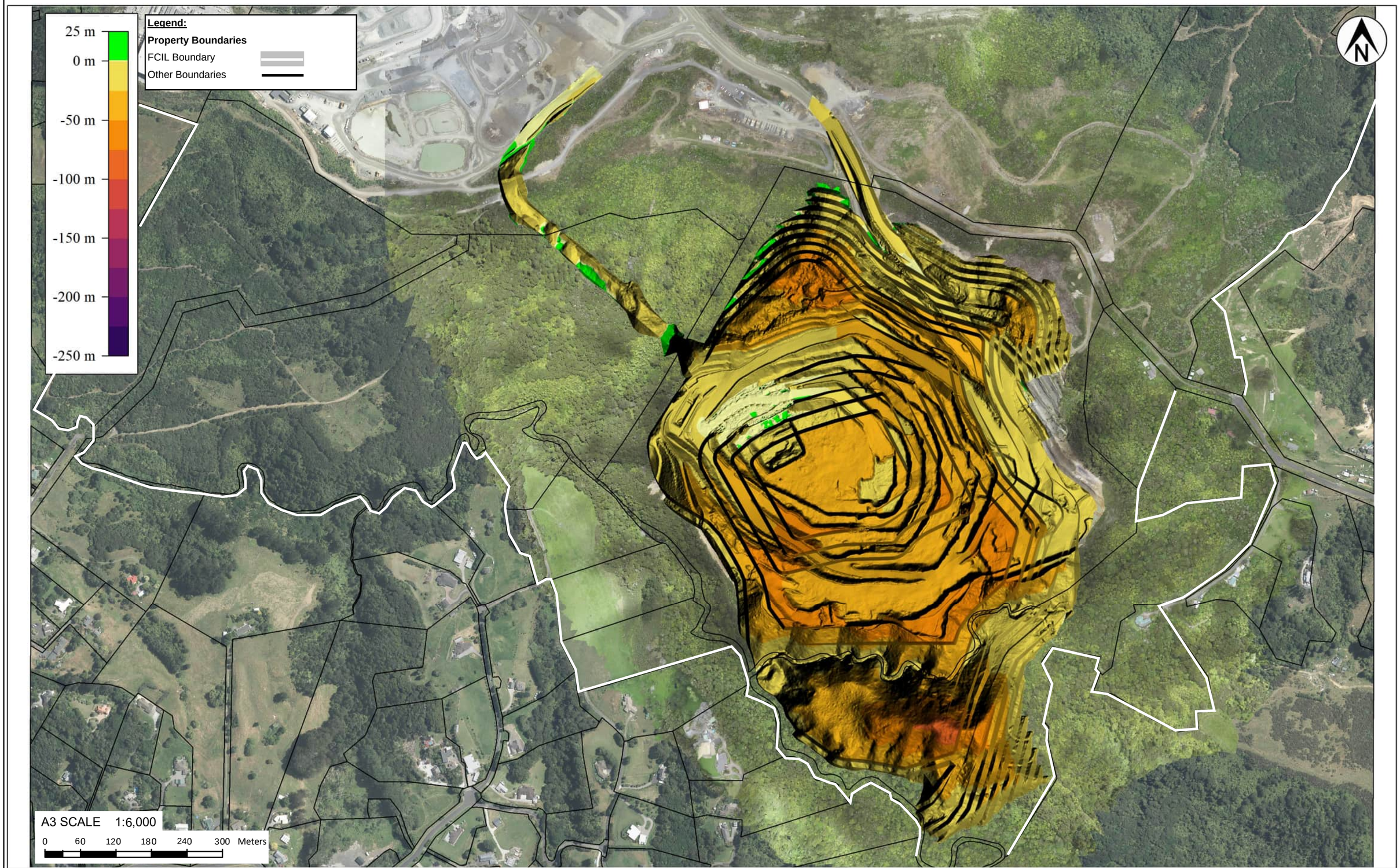

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1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) AERIAL PHOTOS SOURCED FROM AUCKLAND COUNCIL 2024 AND DRONE AERIAL SURVEY PROVIDED BY WINSTONES XXX.
3) HORIZONTAL COORDINATE SYSTEM: NZGD2000, MOUNT EDEN CIRCUIT.
4) PROPERTY BOUNDARIES SOURCED FROM LINZ
5) DESIGN SURFACE OUTLINES PROVIDED BY WINSTONES
6) STAGES SHADER DEPTHS BASED ON AUCKLAND COUNCIL 2024 SURFACE COMPARED AGAINST PROVIDED WINSTONES STAGE DESIGN SURFACES

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

PROJECT No.	1099889	
DESIGNED	JOWI	23/1/26
DRAWN	JOWI	23/1/26
CHECKED	PRMM	23/1/26
APPROVED		DATE

CLIENT FLETCHER CONCRETE AND INFRASTRUCTURE LTD

PROJECT PROJECT MAHITAHI

TITLE STAGE 4 DEVELOPMENT PLAN

SCALE (A3) 1:6000 FIG No. 4 REV 1

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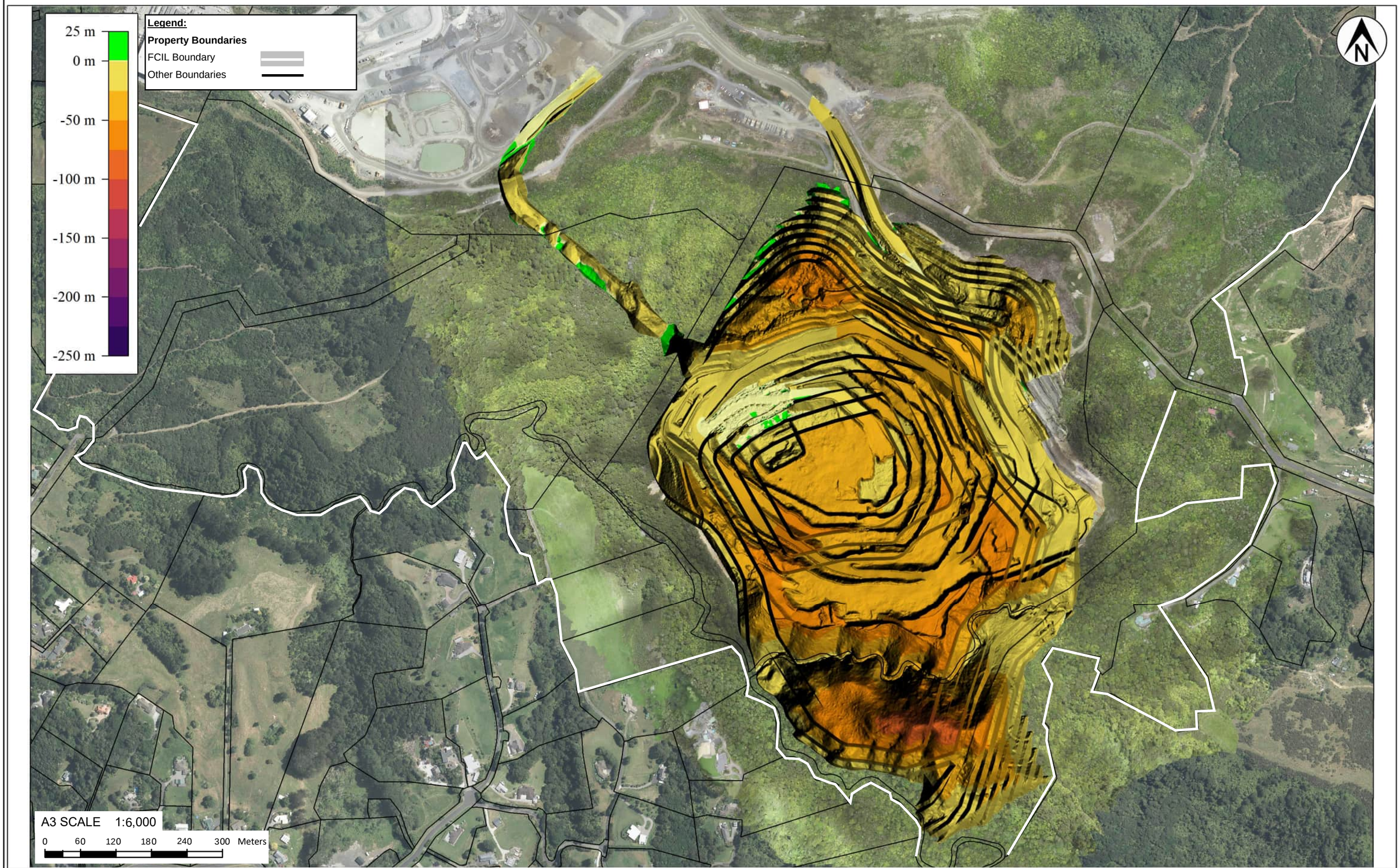

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NOTES:

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2) AERIAL PHOTOS SOURCED FROM AUCKLAND COUNCIL 2024 AND DRONE AERIAL SURVEY PROVIDED BY WINSTONES XXX.
3) HORIZONTAL COORDINATE SYSTEM: NZGD2000, MOUNT EDEN CIRCUIT.
4) PROPERTY BOUNDARIES SOURCED FROM LINZ
5) DESIGN SURFACE OUTLINES PROVIDED BY WINSTONES
6) STAGES SHADER DEPTHS BASED ON AUCKLAND COUNCIL 2024 SURFACE COMPARED AGAINST PROVIDED WINSTONES STAGE DESIGN SURFACES

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

PROJECT No.	1099889		
DESIGNED	JOWI	23/1/26	
DRAWN	JOWI	23/1/26	
CHECKED	PRMM	23/1/26	
APPROVED		DATE	

CLIENT	FLETCHER CONCRETE AND INFRASTRUCTURE LTD
PROJECT	PROJECT MAHITAHI
TITLE	STAGE 5 DEVELOPMENT PLAN
SCALE (A3)	1:6000
FIG No.	5
REV	1

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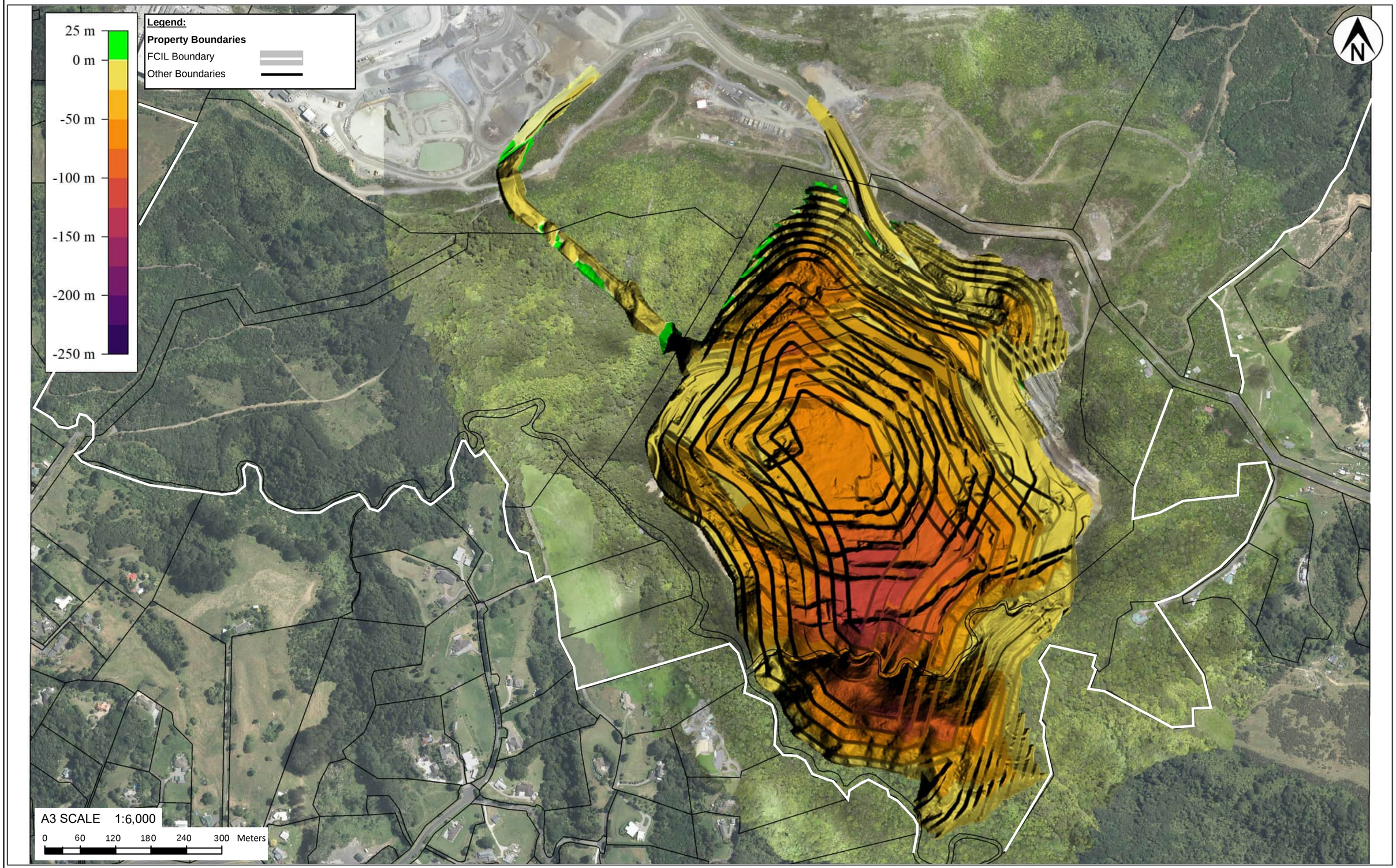

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NOTES:
1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) AERIAL PHOTOS SOURCED FROM AUCKLAND COUNCIL 2024 AND DRONE AERIAL SURVEY PROVIDED BY WINSTONES XXX.
3) HORIZONTAL COORDINATE SYSTEM: NZGD2000, MOUNT EDEN CIRCUIT.
4) PROPERTY BOUNDARIES SOURCED FROM LINZ
5) DESIGN SURFACE OUTLINES PROVIDED BY WINSTONES
6) STAGES SHADER DEPTHS BASED ON AUCKLAND COUNCIL 2024 SURFACE COMPARED AGAINST PROVIDED WINSTONES STAGE DESIGN SURFACES

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

PROJECT No.	1099889	
DESIGNED	JOWI	23/1/26
DRAWN	JOWI	23/1/26
CHECKED	PRMM	23/1/26
APPROVED		DATE

CLIENT FLETCHER CONCRETE AND INFRASTRUCTURE LTD

PROJECT PROJECT MAHITAHI

TITLE STAGE 6 DEVELOPMENT PLAN

SCALE (A3) 1:6000 FIG No. 6 REV 1

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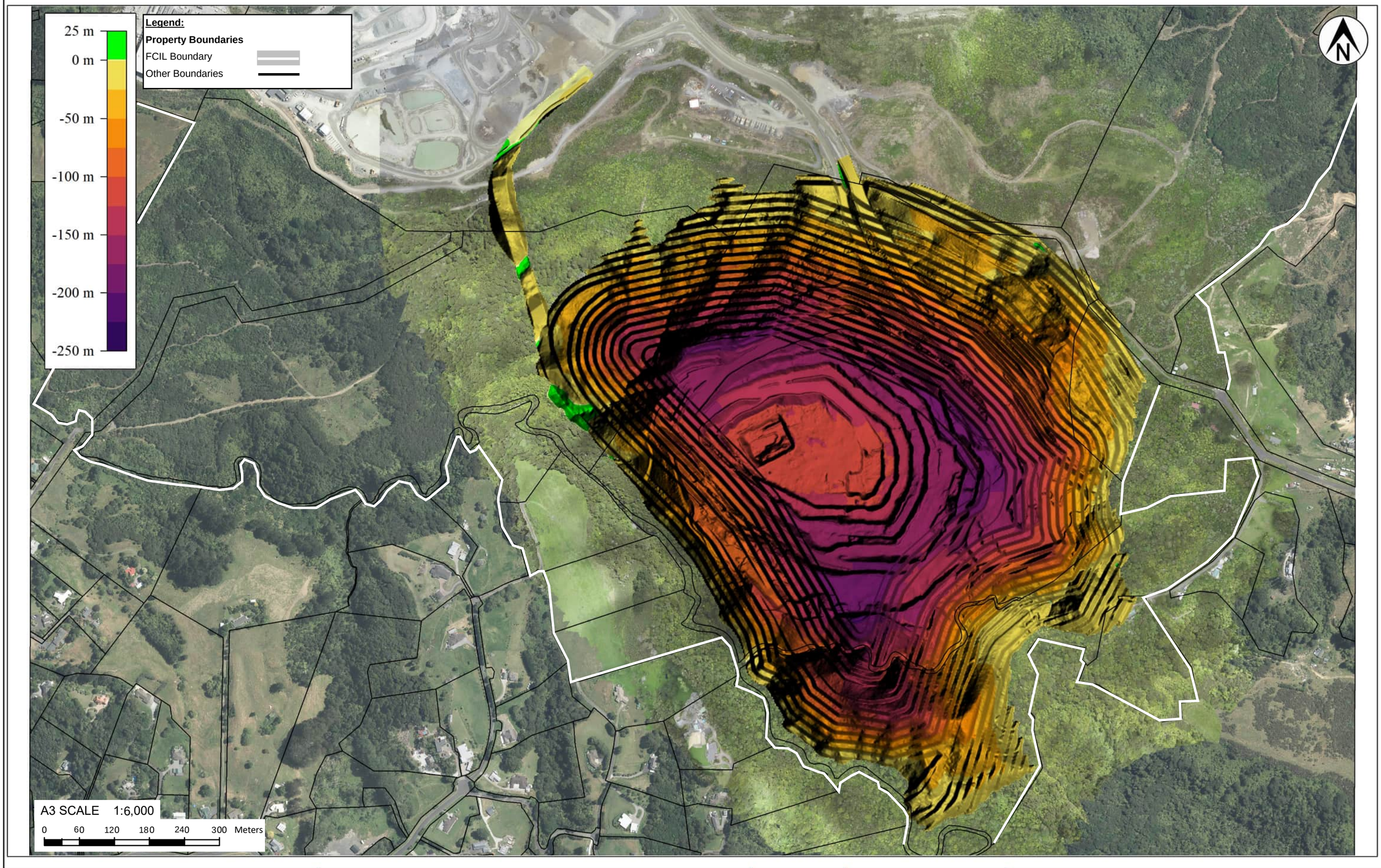

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NOTES:
1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) AERIAL PHOTOS SOURCED FROM AUCKLAND COUNCIL 2024 AND DRONE AERIAL SURVEY PROVIDED BY WINSTONES XXX.
3) HORIZONTAL COORDINATE SYSTEM: NZGD2000, MOUNT EDEN CIRCUIT.
4) PROPERTY BOUNDARIES SOURCED FROM LINZ.
5) DESIGN SURFACE OUTLINES PROVIDED BY WINSTONES
6) STAGES SHADER DEPTHS BASED ON AUCKLAND COUNCIL 2024 SURFACE COMPARED AGAINST PROVIDED WINSTONES STAGE DESIGN SURFACES

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

PROJECT No.	1099889	
DESIGNED	JOWI	23/1/26
DRAWN	JOWI	23/1/26
CHECKED	PRMM	23/1/26
APPROVED		DATE

CLIENT	FLETCHER CONCRETE AND INFRASTRUCTURE LTD
PROJECT	PROJECT MAHITAHI
TITLE	STAGE 7 DEVELOPMENT PLAN
SCALE (A3)	1:6000
FIG No.	7
REV	1

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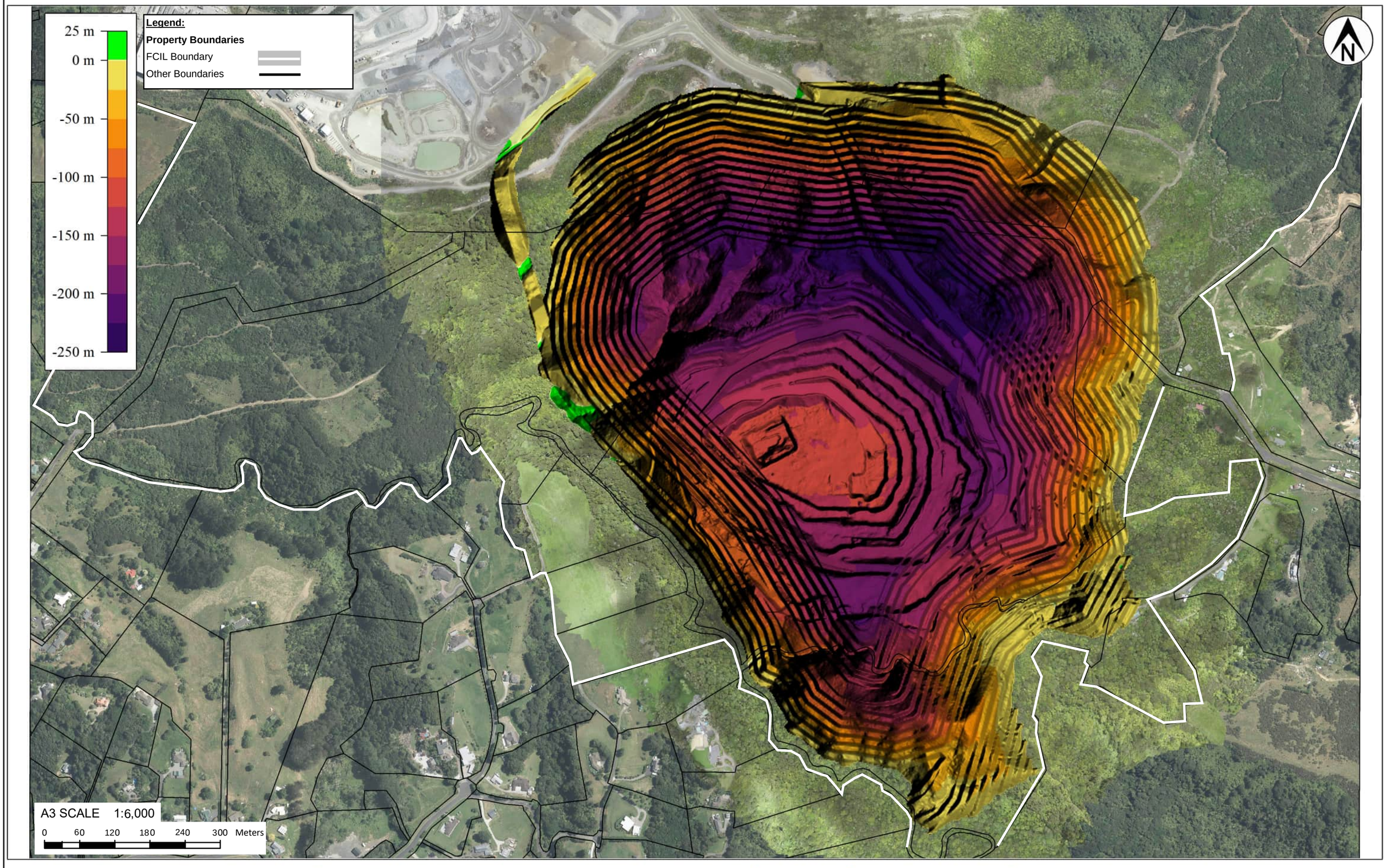

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NOTES:
1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) AERIAL PHOTOS SOURCED FROM AUCKLAND COUNCIL 2024 AND DRONE AERIAL SURVEY PROVIDED BY WINSTONES XXX.
3) HORIZONTAL COORDINATE SYSTEM: NZGD2000, MOUNT EDEN CIRCUIT.
4) PROPERTY BOUNDARIES SOURCED FROM LINZ.
5) DESIGN SURFACE OUTLINES PROVIDED BY WINSTONES
6) STAGES SHADER DEPTHS BASED ON AUCKLAND COUNCIL 2024 SURFACE COMPARED AGAINST PROVIDED WINSTONES STAGE DESIGN SURFACES

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

PROJECT No.	1099889	
DESIGNED	JOWI	23/1/26
DRAWN	JOWI	23/1/26
CHECKED	PRMM	23/1/26
APPROVED		DATE

CLIENT	FLETCHER CONCRETE AND INFRASTRUCTURE LTD
PROJECT	PROJECT MAHITAHI
TITLE	STAGE 8 DEVELOPMENT PLAN
SCALE (A3)	1:6000
FIG No.	8
REV	1

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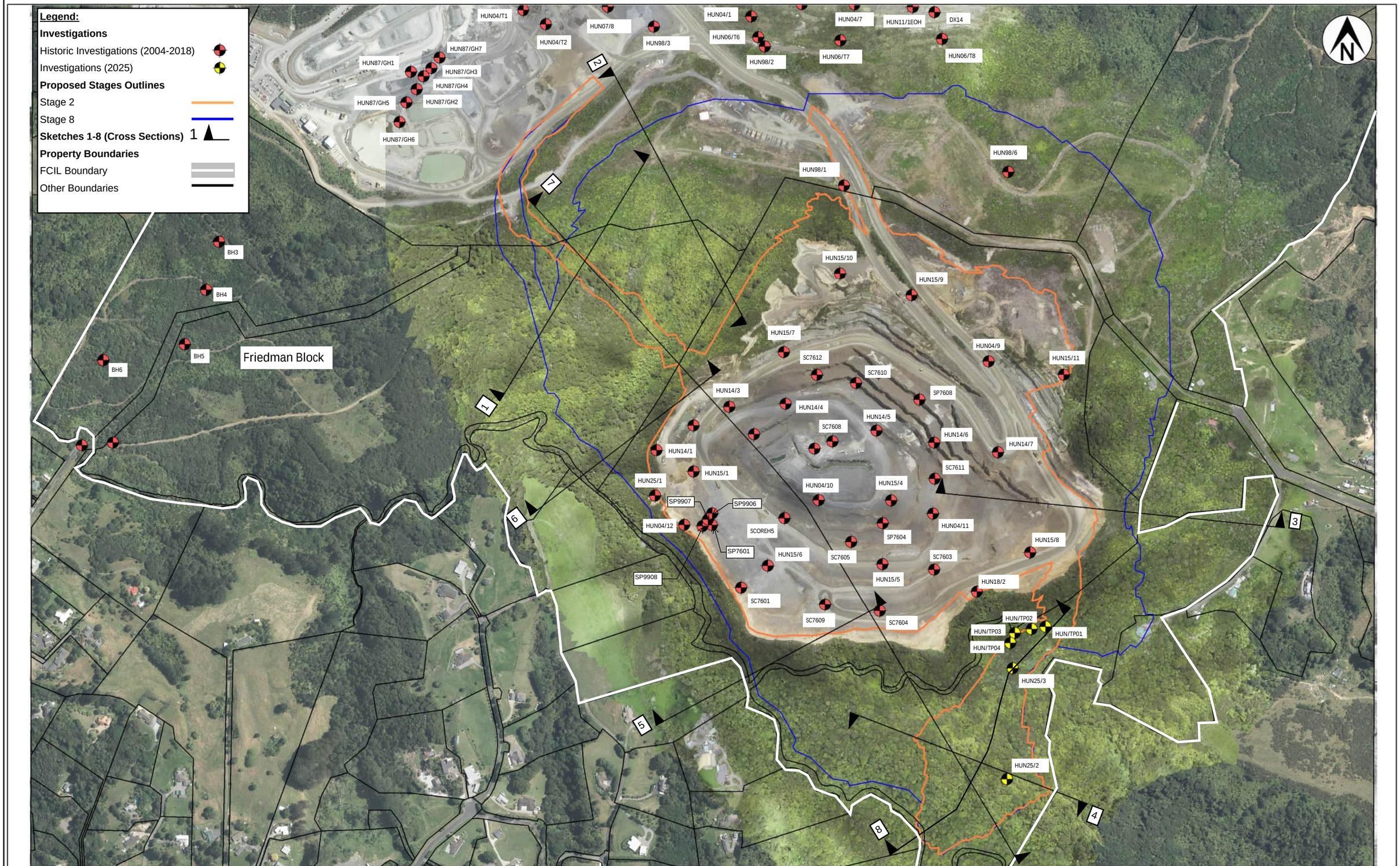

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NOTES:
1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) AERIAL PHOTOS SOURCED FROM AUCKLAND COUNCIL 2024 AND DRONE AERIAL SURVEY PROVIDED BY WINSTONES XXX.
3) HORIZONTAL COORDINATE SYSTEM: NZGD2000, MOUNT EDEN CIRCUIT.
4) PROPERTY BOUNDARIES SOURCED FROM LINZ
5) DESIGN SURFACE OUTLINES PROVIDED BY WINSTONES
6) HISTORIC INVESTIGATION LOCATIONS BASED ON PROVIDED CAD FILE BY WINSTONES
7) 2025 T+T INVESTIGATIONS, BASED ON SURVEY DATA

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

APPROVED DATE

PROJECT No.	1099889	
DESIGNED	JOWI	23/1/26
DRAWN	JOWI	23/1/26
CHECKED	PRMM	23/1/26

CLIENT **FLETCHER CONCRETE AND INFRASTRUCTURE LTD**

PROJECT **PROJECT MAHITAHI**

TITLE INVESTIGATION LOCATION PLAN

SCALE (A3) 1:6000 FIG No. 9 REV 1

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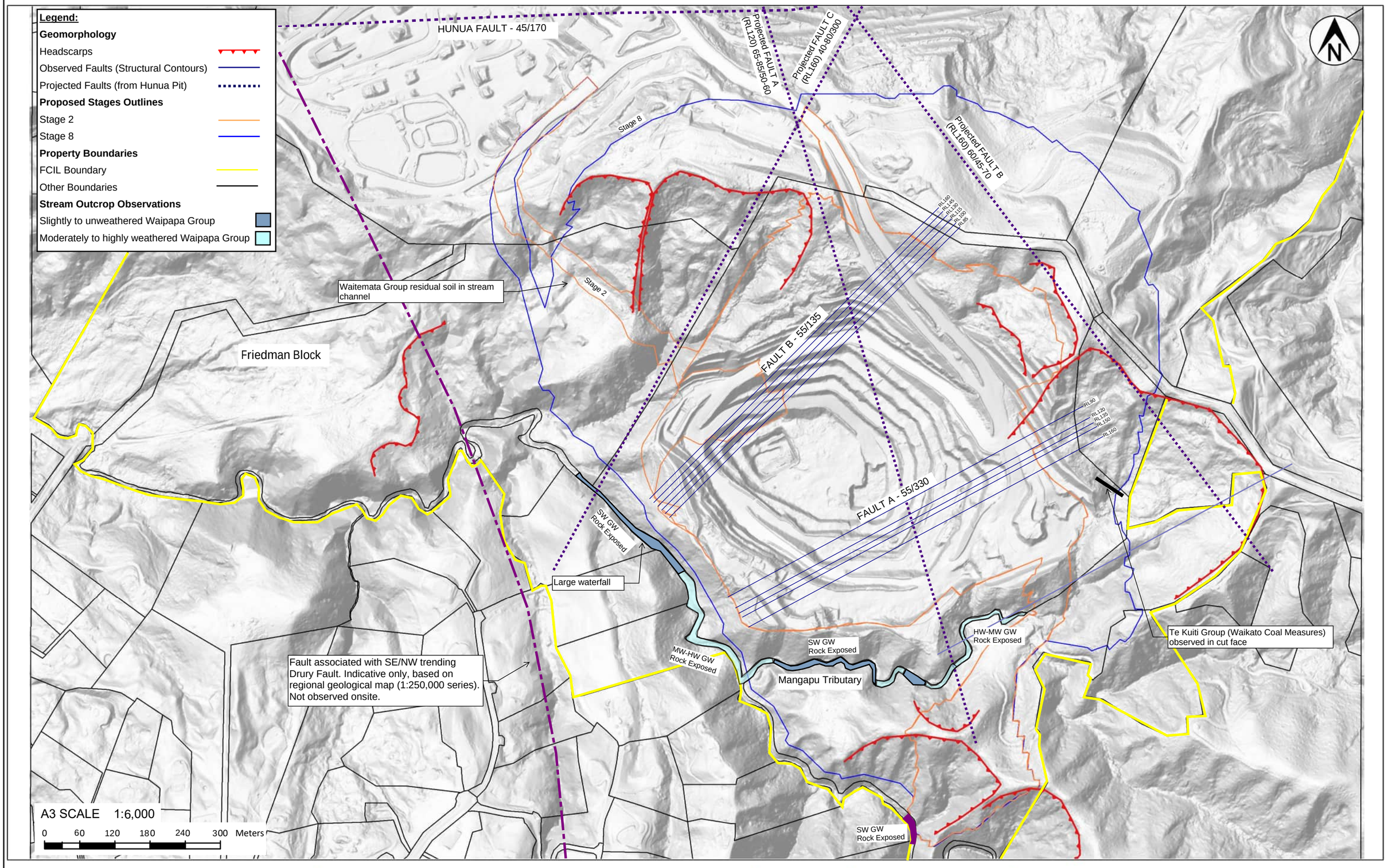

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NOTES:
1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) DEM SOURCED FROM LINZ 2024 SURFACE.
3) HORIZONTAL COORDINATE SYSTEM: NZGD2000, MOUNT EDEN CIRCUIT.
4) PROPERTY BOUNDARIES SOURCED FROM LINZ
5) DESIGN SURFACE OUTLINES PROVIDED BY WINSTONES XXXX
6) STRUCTURAL OBSERVATIONS BASED ON SITE OBSERVATIONS AND REVIEW OF HILLSHADE SURFACE
7) FAULT PROJECTIONS BASED ON EXISTING MAPPING IN HANUA PIT.

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

PROJECT No.	1099889	
DESIGNED	JOWI	23/1/26
DRAWN	JOWI	23/1/26
CHECKED	PRMM	23/1/26
APPROVED		DATE

CLIENT	FLETCHER CONCRETE AND INFRASTRUCTURE LTD
PROJECT	PROJECT MAHITAHI
TITLE	GEOMORPHOLOGY PLAN
SCALE (A3)	1:6000
FIG No.	10
REV	1

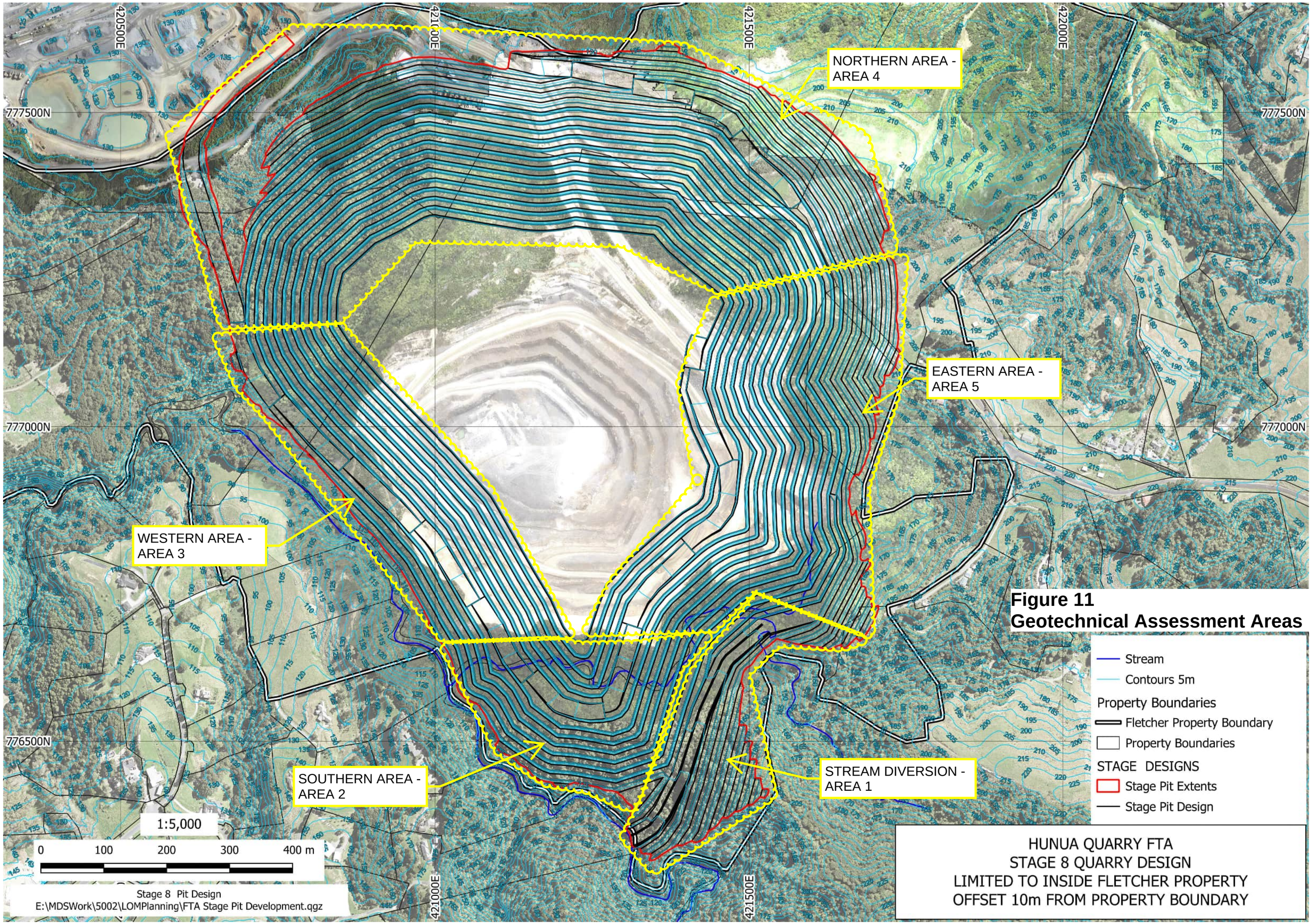

Figure 11
Geotechnical Assessment Areas

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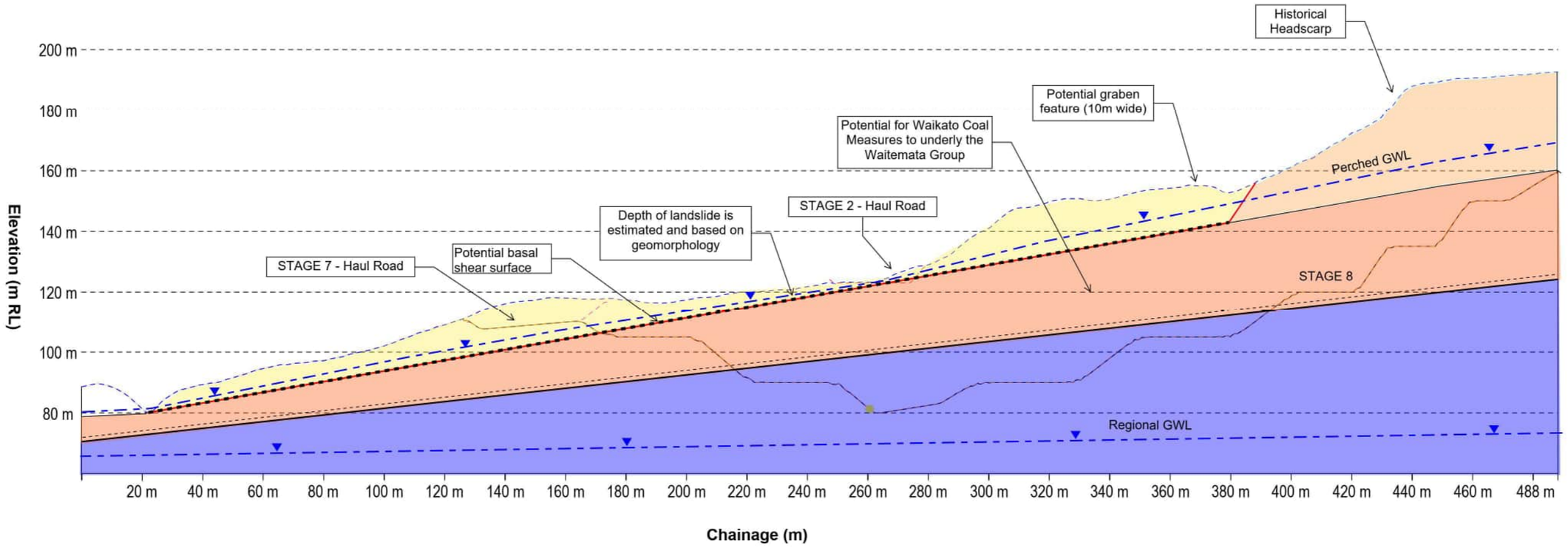
Legend:

- **Landslide Debris**
- **Waitemata Group (Siltstone/Sandstone)**
  - Residual-Completely Weathered
  - Highly-Moderately Weathered
  - Slightly-Unweathered
- **Te Kuiti Group**
  - Waikato Coal Measures
- **Waipapa Group (Greywacke)**
  - Residual-Completely Weathered
  - Highly Weathered
  - Moderately Weathered
  - Slightly-Unweathered
- **Geological Structures**
  - Fault/joint set
- **Groundwater Level**
- **Borehole (*projected distance*)** HUN14/7 (*10m*)



A3 SCALE 1:1,500

0 20 40 60 80 100 Meters

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1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) STAGING DESIGN SURFACE PROVIDED BY WINSTONES AND BASED ON EXISTING DESIGN SLOPE CRITERIA.
3) MINIMAL INVESTIGATION HAS BEEN UNDERTAKEN IN THE LOCATION OF THIS SECTION AND GROUND CONDITIONS HAVE BEEN INFERED BETWEEN BOREHOLES AND FROM SITE OBSERVATIONS AND GEOMORPHOLOGICAL MAPPING AND MAY VARY FROM WHAT IS SHOWN.
4) THE LOCATION AND ORIENTATION OF FAULT STRUCTURES ARE INDICATIVE ONLY AND ARE BASED ON SITE OBSERVATIONS AND GEOMORPHOLOGICAL MAPPING AND MAY VARY FROM WHAT IS SHOWN..

REV	DESCRIPTION	CAD	CHK	DATE

DESIGNED	JOWI	27/1/26	DRAWING STATUS: RESOURCE CONSENT
DRAWN	JOWI	27/1/26	
DESIGN CHECKED	PRMM	27/1/26	PROJECT PHASE
DRAWING CHECKED	JDJ	27/1/26	

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APPROVED DATE

CLIENT **FLETCHER CONCRETE AND INFRASTRUCTURE LTD**

PROJECT **PROJECT MAHITAHI**

TITLE SECTION 1 - NORTHERN GEOTECHNICAL ASSESSMENT AREA GEOLOGICAL CROSS SECTION

SCALE (A3) 1:1500 SKETCH-1 REV

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Legend:

- **Landslide Debris**
- **Waitemata Group (Siltstone/Sandstone)**
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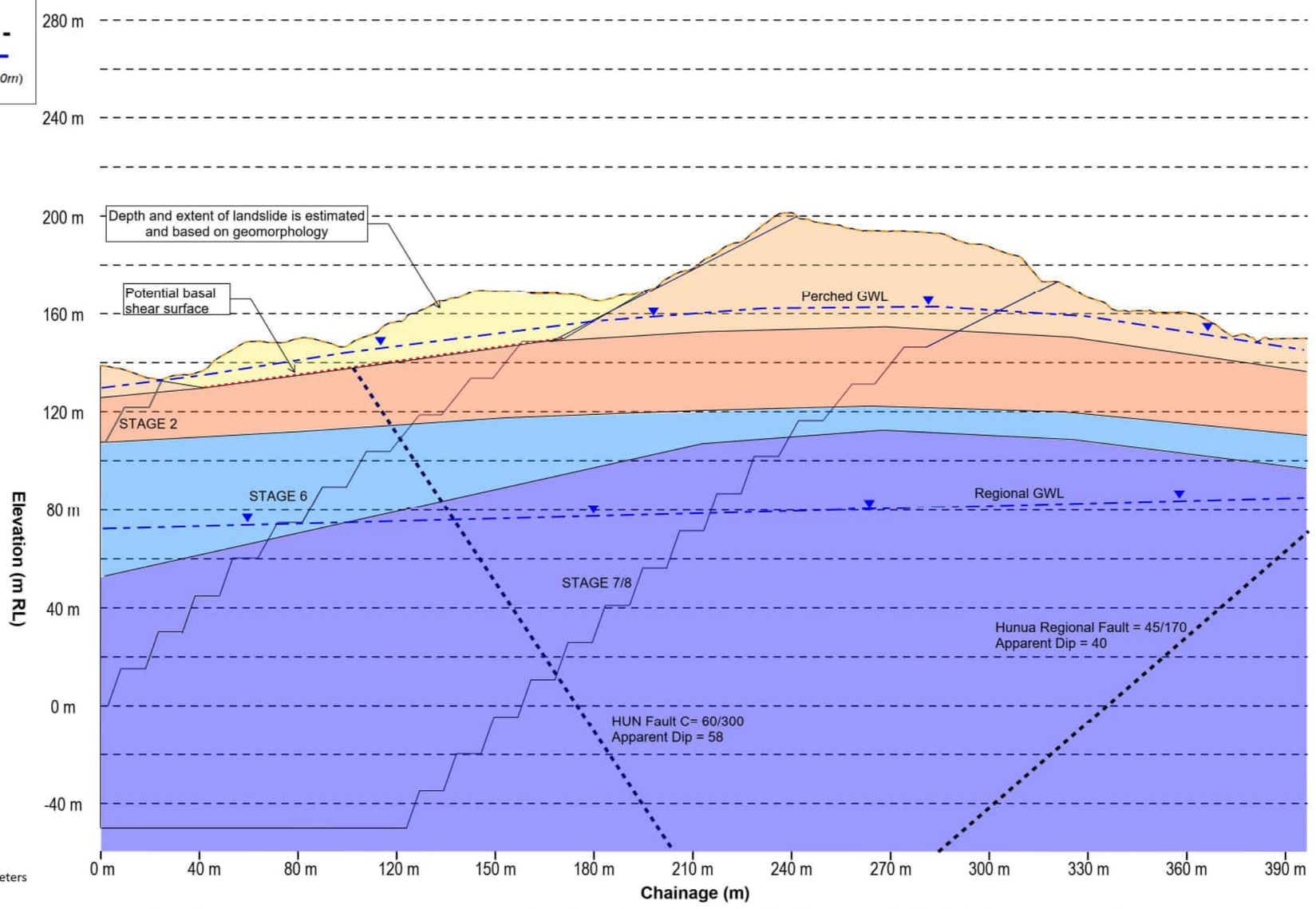
  - Slightly-Unweathered
- **Geological Structures**
  - Fault/joint set
  - **Groundwater Level**
  - **Borehole (*projected distance*)** HUN14/7 (*10m*)



A3 SCALE 1:2,000

0 20 40 60 80 100 Meters

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1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
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3) MINIMAL INVESTIGATION HAS BEEN UNDERTAKEN IN THE LOCATION OF THIS SECTION AND GROUND CONDITIONS HAVE BEEN INFERED BETWEEN BOREHOLES AND FROM SITE OBSERVATIONS AND GEOMORPHOLOGICAL MAPPING AND MAY VARY FROM WHAT IS SHOWN.
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DRAWN	JOWI	23/1/26
DESIGN CHECKED	PRMM	23/1/26
DRAWING CHECKED	JDJ	23/1/26

DRAWING STATUS: RESOURCE CONSENT

PROJECT PHASE

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CLIENT **FLETCHER CONCRETE AND INFRASTRUCTURE LTD**

PROJECT **PROJECT MAHITAHI**

TITLE SECTION 2 - NORTHERN GEOTECHNICAL ASSESSMENT AREA GEOLOGICAL CROSS SECTION

SCALE (A3) 1:2000 SKETCH-2 REV 1

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Legend:

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- **Waitemata Group (Siltstone/Sandstone)**
  - Residual-Completely Weathered
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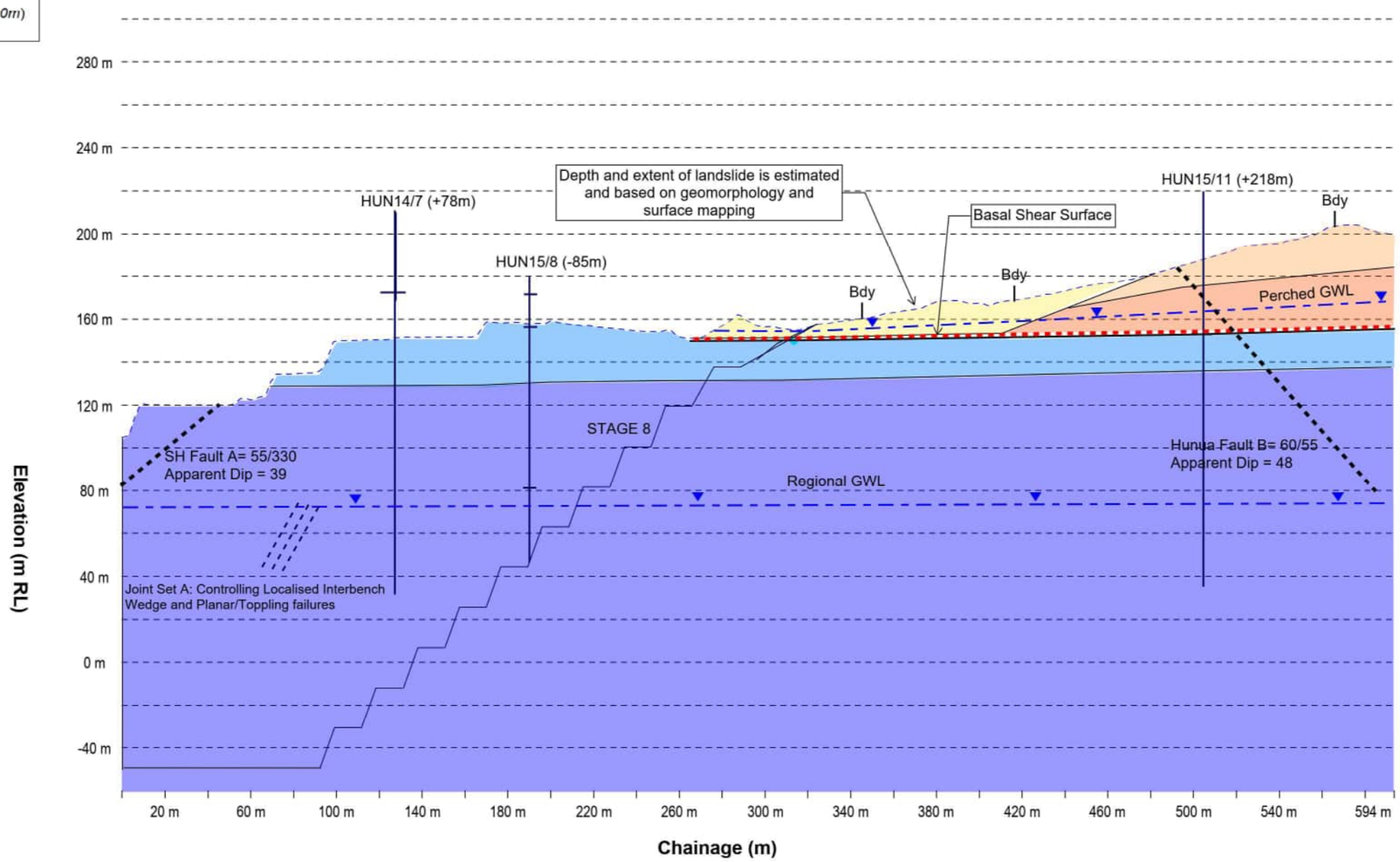
  - Moderately Weathered
  - Slightly-Unweathered
- **Geological Structures**
  - Fault/joint set
  - **Groundwater Level**
  - **Borehole (*projected distance*)** HUN14/7 (*10m*)



A3 SCALE 1:2,000

0 20 40 60 80 100 Meters

1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) STAGING DESIGN SURFACE PROVIDED BY WINSTONES AND BASED ON EXISTING DESIGN SLOPE CRITERIA.
3) MINIMAL INVESTIGATION HAS BEEN UNDERTAKEN IN THE LOCATION OF THIS SECTION AND GROUND CONDITIONS HAVE BEEN INFERED BETWEEN BOREHOLES AND FROM SITE OBSERVATIONS AND GEOMORPHOLOGICAL MAPPING AND MAY VARY FROM WHAT IS SHOWN.
4) THE LOCATION AND ORIENTATION OF FAULT STRUCTURES ARE INDICATIVE ONLY AND ARE BASED ON SITE OBSERVATIONS AND GEOMORPHOLOGICAL MAPPING AND MAY VARY FROM WHAT IS SHOWN..

REV	DESCRIPTION	CAD	CHK	DATE

DESIGNED	JOWI	27/1/26
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DESIGN CHECKED	PRMM	27/1/26
DRAWING CHECKED	JDJ	27/1/26

DRAWING STATUS: RESOURCE CONSENT
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APPROVED DATE

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0 m 25 m 75 m 125 m

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PROJECT **PROJECT MAHITAHI**

TITLE SECTION 3 - EASTERN GEOTECHNICAL ASSESSMENT AREA GEOLOGICAL CROSS SECTION

SCALE (A3) 1:2000 SKETCH-3 REV

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Legend:

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- **Waitemata Group (Siltstone/Sandstone)**
  - Residual-Completely Weathered
  - Highly-Moderately Weathered
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- **Waipapa Group (Greywacke)**
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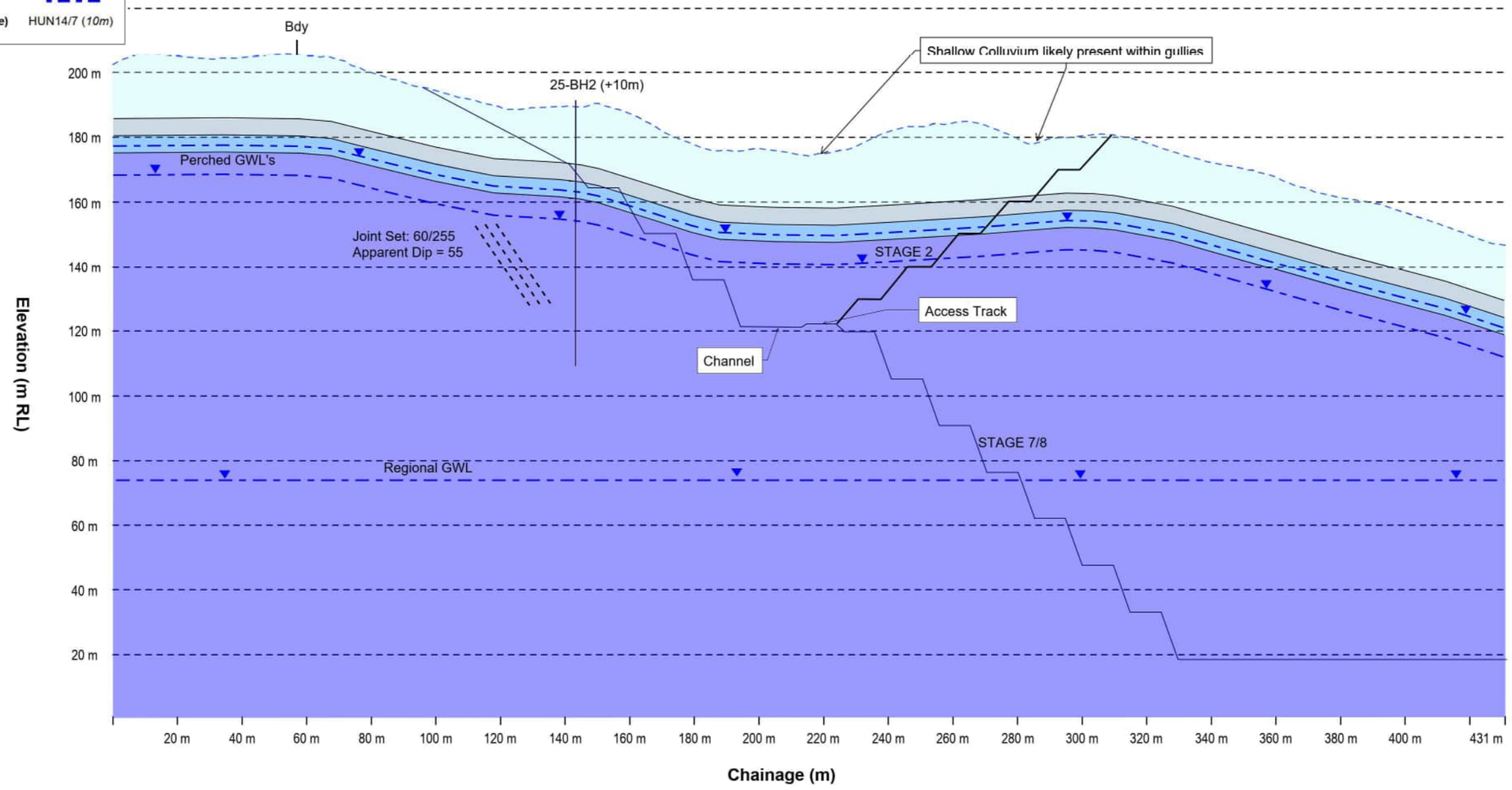
  - Moderately Weathered
  - Slightly-Unweathered
- **Geological Structures**
  - Fault/joint set
- **Groundwater Level**
- **Borehole (*projected distance*)** HUN14/7 (*10m*)



A3 SCALE 1:1,500

0 20 40 60 80 100 Meters

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1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) STAGING DESIGN SURFACE PROVIDED BY WINSTONES AND BASED ON EXISTING DESIGN SLOPE CRITERIA.
3) MINIMAL INVESTIGATION HAS BEEN UNDERTAKEN IN THE LOCATION OF THIS SECTION AND GROUND CONDITIONS HAVE BEEN INFERED BETWEEN BOREHOLES AND FROM SITE OBSERVATIONS AND GEOMORPHOLOGICAL MAPPING AND MAY VARY FROM WHAT IS SHOWN.
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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE

DESIGNED	JOWI	27/1/26
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DESIGN CHECKED	PRMM	27/1/26
DRAWING CHECKED	JDJ	27/1/26

DRAWING STATUS: RESOURCE CONSENT
PROJECT PHASE

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PROJECT **PROJECT MAHITAHI**
TITLE SECTION 4 - TRIBUTARY GEOTECHNICAL ASSESSMENT AREA GEOLOGICAL CROSS SECTION

SCALE (A3) 1:1500 SKETCH-4 REV

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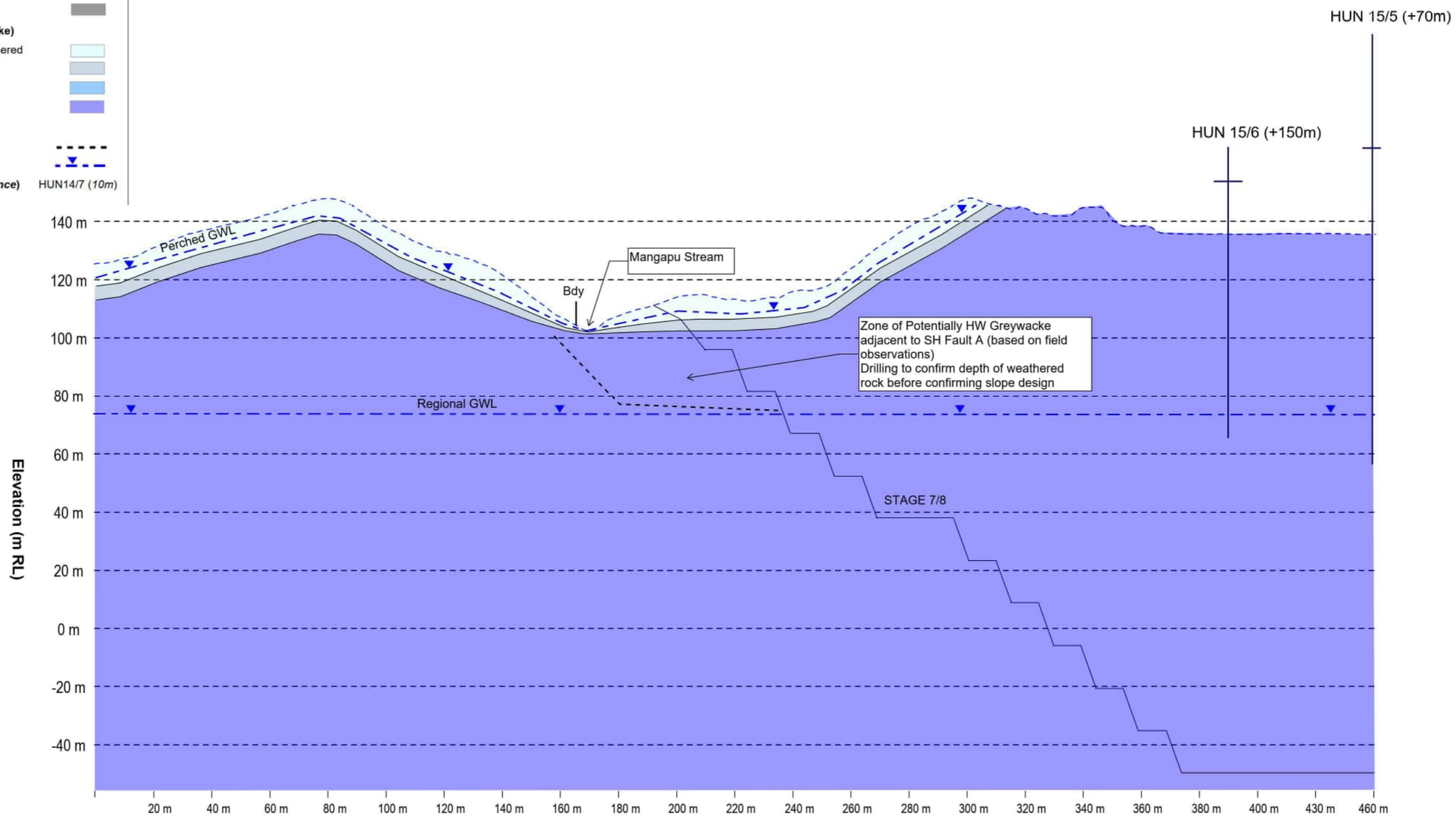
Legend:

- **Landslide Debris**
- **Waitemata Group (Siltstone/Sandstone)**
  - Residual-Completely Weathered
  - Highly-Moderately Weathered
  - Slightly-Unweathered
- **Te Kuiti Group**
  - Waikato Coal Measures
- **Waipapa Group (Greywacke)**
  - Residual-Completely Weathered
  - Highly Weathered
  - Moderately Weathered
  - Slightly-Unweathered
- **Geological Structures**
  - Fault/joint set
- **Groundwater Level**
- **Borehole (*projected distance*)** HUN14/7 (*10m*)



A3 SCALE 1:1,500

0 20 40 60 80 100 Meters

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1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) STAGING DESIGN SURFACE PROVIDED BY WINSTONES AND BASED ON EXISTING DESIGN SLOPE CRITERIA.
3) MINIMAL INVESTIGATION HAS BEEN UNDERTAKEN IN THE LOCATION OF THIS SECTION AND GROUND CONDITIONS HAVE BEEN INFERED BETWEEN BOREHOLES AND FROM SITE OBSERVATIONS AND GEOMORPHOLOGICAL MAPPING AND MAY VARY FROM WHAT IS SHOWN.
4) THE LOCATION AND ORIENTATION OF FAULT STRUCTURES ARE INDICATIVE ONLY AND ARE BASED ON SITE OBSERVATIONS AND GEOMORPHOLOGICAL MAPPING AND MAY VARY FROM WHAT IS SHOWN..

REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE

DESIGNED	JOWI	27/1/26
DRAWN	JOWI	27/1/26
DESIGN CHECKED	PRMM	27/1/26
DRAWING CHECKED	JDJ	27/1/26

DRAWING STATUS: RESOURCE CONSENT
PROJECT PHASE

NOT FOR CONSTRUCTION

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PROJECT **PROJECT MAHITAHI**
TITLE SECTION 5 - EASTERN GEOTECHNICAL ASSESSMENT AREA GEOLOGICAL CROSS SECTION

SCALE (A3) 1:1500 SKETCH-5 REV

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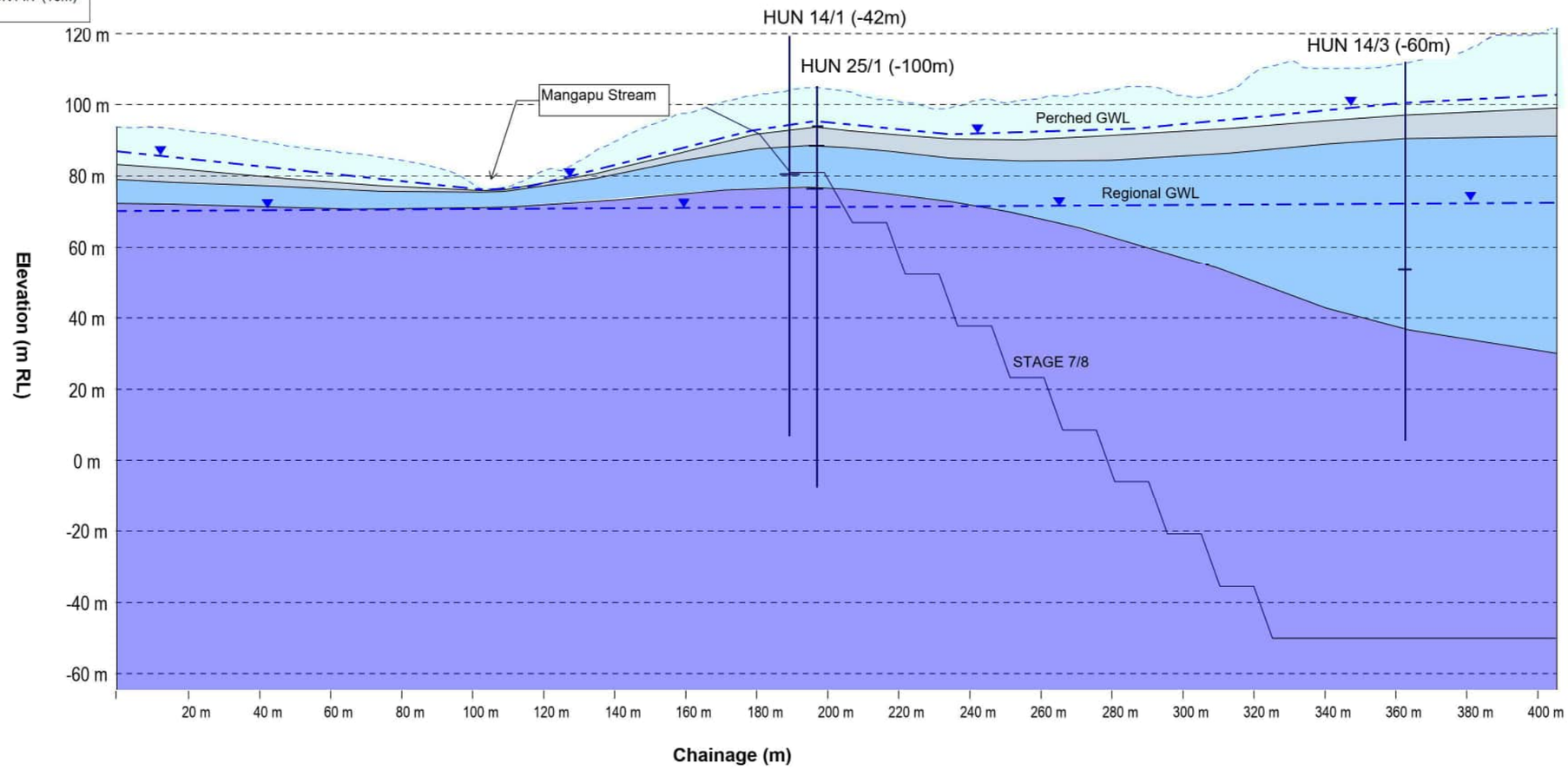
Legend:

- **Landslide Debris**
- **Waitemata Group (Siltstone/Sandstone)**
  - Residual-Completely Weathered
  - Highly-Moderately Weathered
  - Slightly-Unweathered
- **Te Kuiti Group**
  - Waikato Coal Measures
- **Waipapa Group (Greywacke)**
  - Residual-Completely Weathered
  - Highly Weathered
  - Moderately Weathered
  - Slightly-Unweathered
- **Geological Structures**
  - Fault/joint set
- **Groundwater Level**
- **Borehole (*projected distance*)** HUN14/7 (*10m*)



A3 SCALE 1:1,500

0 20 40 60 80 100 Meters

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2) STAGING DESIGN SURFACE PROVIDED BY WINSTONES AND BASED ON EXISTING DESIGN SLOPE CRITERIA.
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REV	DESCRIPTION	CAD	CHK	DATE

DESIGNED	JOWI	27/1/26	DRAWING STATUS: RESOURCE CONSENT
DRAWN	JOWI	27/1/26	
DESIGN CHECKED	PRMM	27/1/26	PROJECT PHASE
DRAWING CHECKED	JDJ	27/1/26	

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APPROVED DATE

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PROJECT **PROJECT MAHITAHI**

TITLE SECTION 6 - EASTERN GEOTECHNICAL ASSESSMENT AREA GEOLOGICAL CROSS SECTION

SCALE (A3) 1:1500 SKETCH-6 REV

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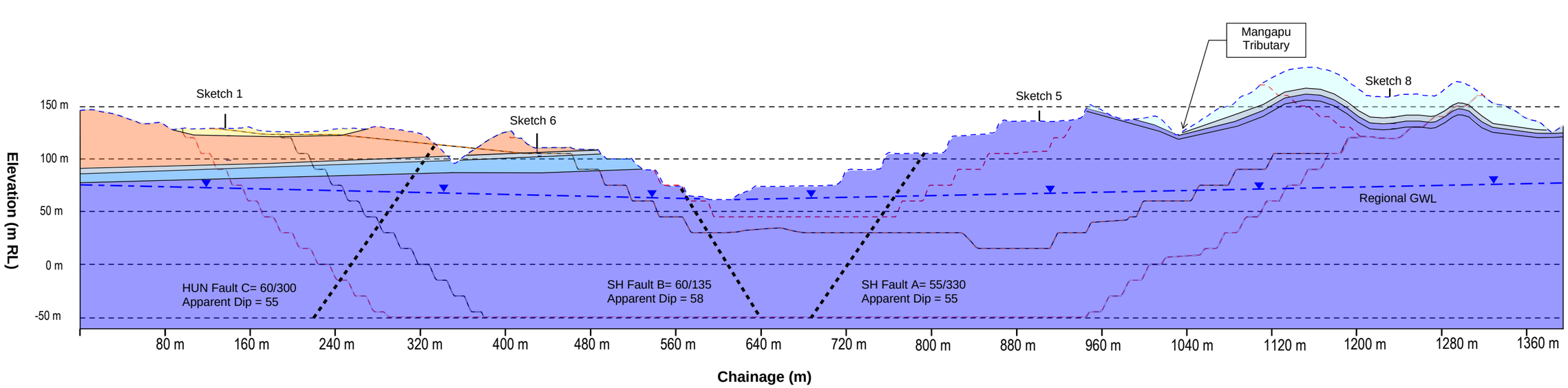
Legend:

- **Landslide Debris**
- **Waitemata Group (Siltstone/Sandstone)**
  - Residual-Completely Weathered
  - Highly-Moderately Weathered
  - Slightly-Unweathered
- **Te Kuiti Group**
  - Waikato Coal Measures
- **Waipapa Group (Greywacke)**
  - Residual-Completely Weathered
  - Highly Weathered
  - Moderately Weathered
  - Slightly-Unweathered
- **Geological Structures**
  - Fault/joint set
  - **Groundwater Level**
  - **Borehole (*projected distance*)** HUN14/7 (*10m*)

2024_DEM
Stage1
Stage6
Stage7
Stage8



A3 SCALE 1:4,000

0 50 100 150 200 250 Meters

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1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE

DESIGNED	JOWI	27/1/26	DRAWING STATUS	RESOURCE CONSENT
DRAWN	JOWI	27/1/26		
DESIGN CHECKED	PRMM	27/1/26	PROJECT PHASE	
DRAWING CHECKED	JDJ	27/1/26		

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CLIENT **FLETCHER CONCRETE AND INFRASTRUCTURE LTD**
PROJECT **PROJECT MAHITAHI**
TITLE SECTION 7 - THROUGH MIDDLE OF THE PIT GEOLOGICAL LONG SECTION
SCALE (A3) 1:4000 SKETCH-7 REV

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Legend:

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- **Waitemata Group (Siltstone/Sandstone)**
  - Residual-Completely Weathered
  - Highly-Moderately Weathered
  - Slightly-Unweathered
- **Te Kuiti Group**
  - Waikato Coal Measures
- **Waipapa Group (Greywacke)**
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  - Highly Weathered
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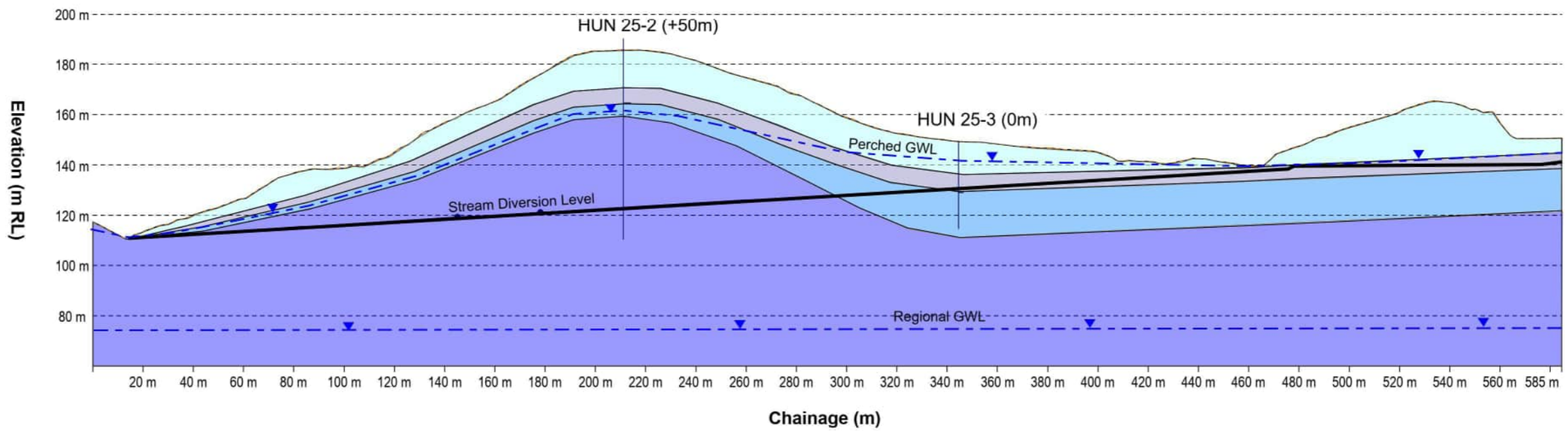
- **Geological Structures**
  - Fault/joint set
- **Groundwater Level**
- **Borehole (*projected distance*)** HUN14/7 (*10m*)



A3 SCALE 1:2,000

0 20 40 60 80 100 Meters

1) EXISTING GROUND CONTOURS BASED ON AUCKLAND COUNCIL LIDAR (2024).
2) STAGING DESIGN SURFACE PROVIDED BY WINSTONES AND BASED ON EXISTING DESIGN SLOPE CRITERIA.
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REV	DESCRIPTION	CAD	CHK	DATE	APPROVED	DATE

DESIGNED	JOWI	27/1/26	DRAWING STATUS: RESOURCE CONSENT
DRAWN	JOWI	27/1/26	
DESIGN CHECKED	PRMM	27/1/26	PROJECT PHASE
DRAWING CHECKED	JDJ	27/1/26	

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PROJECT **PROJECT MAHITAHI**

TITLE SECTION 8 - TRIBUTARY GEOTECHNICAL ASSESSMENT AREA GEOLOGICAL LONG SECTION

SCALE (A3) 1:2000 SKETCH-8 REV

Appendix C Historical ground investigation results

- HUN04/9
- HUN04/10
- HUN04/11
- HUN04/12
- HUN14/1
- HUN14/2
- HUN14/3
- HUN14/4
- HUN14/5
- HUN14/6
- HUN14/7
- HUN15/1
- HUN15/2
- HUN15/3
- HUN15/4
- HUN15/5
- HUN15/6
- HUN15/7
- HUN15/8
- HUN15/9
- HUN15/10
- HUN15/11
- HUN18/2
- HUN25/1

BOREHOLE No. HUN04/3

LOCATION: HUNUA QUARRY
GRID REF: 321452.63E 677691.10N

CLIENT: Winstone Aggregates LTD
COLLAR ALTITUDE: 172.60m
SHEET 1 **OF** 5

JOB No. WAL04/1
DATUM: Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04
DATE FINISHED: 19-2-04
LOGGED BY: GDF/MN
DRILLER: Brown Bros (NZ) LTD
TYPE OF DRILLING RIG: Rig 7 Ingersoll Rand TH60
STAND PIPE: G.L.
ORIENTATION: 137.25° **PLUNGE:** 60°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		172	1		Weathered GREYWACKE (siltstone) [HW-MW]; light to dark orangish brown, EWK to MS, weathered to partly weathered (<25%), intact cuttings. Common remnant joint surfaces. Trace less weathered greywacke cuttings. Variable content of light brown (orange-tint) drilling fines (sand-silt).		Damp samples with possible uphole contamination to 18m.
		171	2		- some pale brown to discoloured grey, greywacke cuttings (above 5m) and more light brown (orange-tint), slightly plastic, drilling fines (sandy mud) by 2m.		
		170	3				
		169	4				
		168	5		- harder cuttings (VWK-S) and less light brown drilling fines (silty sand) below 5m.		
		167	6				Moist sample 6-8m.
			7			ORH	
		166	8				
		165	9				
		164	10		- more partly weathered (<50%) cuttings by 9.3m.		Poor sample recovery 10-12m. Dry samples from 10m.
		163	11				
		162	12				
		161	13				
			14		14m GREYWACKE SILTSTONE [MW]; light orangish brown to dark brown with some discoloured grey (interiors), VWK-S, weathered to partly weathered (>50%) cuttings. Common limonite-stained joint surfaces. Some light brown drilling fines (silty sand).		- maximum depth of contact. Damp sample 14-16m.
		160	15				
		159	16				
		158	17			ORM	
		157	18				No sample (bit blocked?) 18-22.5m.
		156	19				

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/3

LOCATION: HUNUA QUARRY **GRID REF:** 321452.63E 677691.10N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 172.60m **SHEET** 2 **OF** 5

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** 137.25° **PLUNGE:** 60°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		155	21				18/2/04.
		154	22				
		153	23		- dark orangish brown to discoloured grey (interiors), MS-S, partly weathered cuttings (FW <5%) by 22.5m. Minor weathered greywacke cuttings.		
		152	24		- more weathered greywacke (<30%) cuttings 24-27m.		Damp sample 24-26m.
		151	25				
		150	26				
		149	27		- more drilling fines and no fresh greywacke cuttings below 27m.		Small cuttings 27-30m.
		148	28				
		147	29				
		146	30			ORM	Larger cuttings by 30.3m.
		145	31				
		144	32				
		143	33		- less weathered (FW <40%) between 33.4-36m.		
		142	34				Large cuttings near 34.8m & below 35.2m.
		141	35				
		140	36		- minor fresh greywacke cuttings by 36m.		Moist sample 36-38m.
		139	37				
			38				
			39				

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/3

LOCATION: HUNUA QUARRY **GRID REF:** 321452.63E 677691.10N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 172.60m **SHEET** 3 **OF** 5

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** 137.25° **PLUNGE:** 60°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Comments
		137	41		- dark brown to dark grey, MS-VS, partly weathered to fresh (<50%) cuttings and less drilling fines below 40m. Trace more weathered greywacke cuttings (uphole material?). Trace weathered veins (<1mm) by 42m.		Sample collected using spade after cyclone blocked near 40.5m. No sample 41-43m (Drillers comment).
		136	42				Wet sample 42-44m.
		135	43			ORM	19/2/04.
		134	44				
		133	45				
		132	46		46m GREYWACKE SILTSTONE [MW-SW]; dark brown to dark grey, MS-VS, partly weathered to fresh (<75%) cuttings. Common limonite-stained joint surfaces. Trace weathered veins (<1mm). Some light brown (grey tint) drilling fines (silty sand).		- maximum depth of contact.
		131	47				
		130	48			RSWb	Bit blocked by cuttings near 47.8m. Moist samples 48-50 & 52-54m.
		129	49				
		128	50		50.5m GREYWACKE SILTSTONE [SW-FW]; dark grey with some dark brown, MS-VS, partly weathered to fresh (>75%) cuttings. Common limonite-stained joint surfaces. Trace white veins (<1mm, weathered?) above 56m. Some light greyish brown drilling fines (silty sand).		Large cuttings near 50.5m.
		127	51				
		126	52				
		125	53				
		124	54		- less fines below 54m.		Damp sample 54-56m.
		123	55			RSWg	
		122	56				Wet samples with minor more weathered greywacke (uphole material) in samples from 56m.
		121	57				
			58		- less weathered [FW <95%] below 58m. Fewer limonite-stained joint surfaces.		
			59				

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/3**

LOCATION: HUNUA QUARRY **GRID REF:** 321452.63E 677691.10N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 172.60m **SHEET** 4 **OF** 5

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** 137.25° **PLUNGE:** 60°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		120	61				
		119	62		- light brown drilling fines (silty sand) 62-64m.		
		118	63				
		117	64				
		116	65			RSWg	
		115	66		- less weathered near 65.5m. Trace white veins (<1mm, quartz).		
		114	67				
		113	68		- more limonite-stained joint surfaces below 68m.		
		112	69				
		111	70		70.5m GREYWACKE SILTSTONE [FW]; dark grey, S-VS, fresh cuttings with some partly weathered (<2mm) and/or limonite-stained joint surfaces. Trace white veins (<1mm, quartz). Trace light grey-brown drilling fines (silty sand).		
		110	71				
		109	72				
		108	73				
		107	74				
		106	75			RFW	
		105	76		- slightly weathered [FW >75%] between 76-78m.		
		104	77				
			78				
			79				Large cuttings near 79.5m.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BOREHOLE No. HUN04/3

LOCATION: HUNUA QUARRY **GRID REF:** 321452.63E 677691.10N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 172.60m **SHEET** 5 **OF** 5

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (MI Eden Circuit)

DATE STARTED: 17-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** 137.25° **PLUNGE:** 60°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		103	81		- greyer fines and fewer limonite-stained joint surfaces below 80m.		
		102	82				Large cuttings near 81.5 & 83.8m.
		101	83				
		100	84		- trace partly weathered greywacke cuttings (uphole material?) between 83.8-86m.		
		99	85			RFW	
		98	86				
		97	87				
		96	88				
		95	89				
			90		90m		
		94	91		EOH @ 90m		
		93	92				
		92	93				
		91	94				
		90	95				
		89	96				
		88	97				
		87	98				
			99				

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/4

LOCATION: HUNUA QUARRY **GRID REF:** 321429.98E 677659.67N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 172.28m **SHEET** 1 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 6-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		172	0		Weathered GREYWACKE (siltstone) [HW to MW]; light orangish brown, non-plastic drilling fines (sand-silt). Abundant orangish brown to pale brown (interiors), EWK-MS, weathered to partly weathered (<25%) greywacke cuttings with remnant limonite-stained joint surfaces.			Dry samples collected using spade to 18m.
		171	1					
		170	2		- harder cuttings (VWK-MS) and decreasing fines [HW-MW] below 2m. Trace light brown, plastic clayey silt between 2-4m.			
		169	3					
		168	4					
		167	5			ORH		
		166	6		- less light brown (orange-tint) drilling fines (silty sand) below 6m.			
		165	7					
		164	8		- as below with less partly weathered (<50%) cuttings.			
		163	9					
		162	10		10m GREYWACKE SILTSTONE [MW]; light to dark orangish brown with some discoloured grey (interiors), VWK-S, weathered to partly weathered (>50%) cuttings with common limonite-stained joint surfaces. Minor light brown-brown drilling fines (silty sand).			- contact between 8-12.5m.
		161	11					
		160	12					
		159	13					
		158	14		- dark brown to light greyish brown (interiors), MS-S, partly weathered cuttings and more drilling fines by 14m.			
		157	15			ORM		
		156	16					
		155	17					
		154	18					
		153	19		- some weathered greywacke cuttings and light brown (orange-tint) drilling fines (silty sand) below 18.5m. Trace lumps of pale brown, plastic clayey silt between 18-20m.			

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Drilling Methods	Casing Depths	Hole Diameters
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BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/4

LOCATION: HUNUA QUARRY **GRID REF:** 321429.98E 677659.67N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 172.28m **SHEET** 2 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 6-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		152	21					
		151	22		- dark brown, MS-S, partly weathered cuttings below 21.3m. Trace fresh greywacke cuttings.			
		150	23					
		149	24					
		148	25		- some weathered greywacke cuttings between 24-26m. Trace weathered veins (<1mm) by 24m.			Larger cuttings by 24.7m.
		147	26			ORM		
		146	27					
		145	28					Damp cuttings 28-30m.
		144	29					
		143	30		- some clay (no sample) near 29.5m.			Large cuttings by 29.5m.
		142	30.8m					
		141	31		GREYWACKE SILTSTONE [MW-SW]; dark brown to dark grey, MS-VS, partly weathered to fresh (>50%) cuttings. Common limonite-stained joint surfaces. Trace white veins (<1mm, quartz). Some light brown (grey tint) drilling fines (silty sand).			
		140	32					
		139	33		- more weathered between 33.5-35m.	RSWb		
		138	34					
		137	35				S.W.L 35.9m (16/3/04)	
		136	36					
		135	36m		GREYWACKE SILTSTONE [MW]; dark brown to dark grey, MS-VS, partly weathered to fresh (<50%) cuttings with common limonite-stained joint surfaces. Trace weathered veins (<1mm). Minor light brown (grey tint) drilling fines (silty sand).			- maximum depth of contact. Large cuttings near 36m.
		134	37					
		133	38			ORM		Large cuttings near 38.3m.
			39					Small cuttings 38.7-39.3m

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/4

LOCATION: HUNUA QUARRY **GRID REF:** 321429.98E 677659.67N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 172.28m **SHEET** 3 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 6-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		132	41		- slighlly weathered [FW >50%] and fewer limonite-stained joint surfaces between 40-42m.			
		131						
			42		- darker brown and more drilling fines (silty sand) below 42m.			Drillers away to 16/2/04. Smaller cuttings by 42m.
		130						
			43					Producing some water from 43m.
		129				ORM		
			44		- more weathered [FW <25%] below 46m.			
		128						
			45					
		127						
			46					
		126						
			47		47m			
		125			GREYWACKE SILTSTONE [MW-SW]; dark brown to dark grey, MS-VS, partly weathered to fresh (<75%) cuttings. Common limonite-stained joint surfaces. Trace white veins (<1mm, weathered). Some light greyish brown drilling fines (silty sand).			
			48					
		124						
			49					
		123				RSWb		
			50		- some clay (no sample) near 49.5m.			
		122						
			51					
		121			51.5m			
			52		GREYWACKE SILTSTONE [SW-FW]; dark grey with some dark brown, MS-VS, partly weathered to fresh (>75%) cuttings. Common limonite-stained joint surfaces. Trace white veins (<1mm, quartz). Some light greyish brown drilling fines (silty sand).			Larger cuttings below 52m.
		120						
			53					
		119						
			54		- less weathered [FW <95%] and fewer limonite-stained joint surfaces by 54m. More while veins (<1mm, quartz) between 54-56m.			Wet cuttings with minor variably weathered greywacke (uphole material) in samples from 54m.
		118						
			55					Large cuttings near 54.8m.
		117						
			56			RSWg		
		116						Smaller cuttings by 56m.
			57					
		115						
			58					
		114						
			59					
		113						

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/4

LOCATION: HUNUA QUARRY **GRID REF:** 321429.98E 677659.67N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 172.28m **SHEET** 4 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 6-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		112	61		- more fresh cuttings [>95%] between 60-64m.			
		111						
		110	62					
		109	63			RSWg		
		108	64		- minor dark orangish brown, MS-S, partly weathered greywacke cuttings by 64m. More partly weathered (<3mm) and/or limonite-stained joint surfaces.			
		107	65					
		106	66		66m GREYWACKE SILTSTONE [FW]; dark grey, S-VS, fresh cuttings with some partly weathered (<2mm) and/or limonite-stained joint surfaces. Trace white veins (<1mm, quartz). Trace light grey-brown drilling fines (silty sand).			
		105	67					
		104	68		- fewer joint surfaces below 68m.			
		103	69					
		102	70		- trace discoloured grey, MS-S, partly altered greywacke cuttings between 70-72m. Trace semitransparent to white, veins (<3mm, quartz & zeolite?) below 70m.	RFW		
		101	71					
		100	72					
		99	73		- more weathered [FW <95%] by 73.7m. More partly weathered (<3mm) and/or limonite-stained joint surfaces with trace pyrite specks.			Large cuttings by 73.7m. Producing 27 litres/minute of water by EOH.
		98	74		74m EOH @ 74m			
		97	75					
		96	76					
		95	77					
		94	78					
		93	79					

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/5**

LOCATION: HUNUA QUARRY **GRID REF:** 321382.95E 677638.58N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 171.64m **SHEET** 1 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 20-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 23-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** 139.25° **PLUNGE:** 60°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Comments
		171	1		Weathered GREYWACKE (siltstone) [HW to MW]; orangish brown to pale brown, EWK-WK, weathered intact cuttings with remnant limonite-stained joint surfaces. High content of light orangish brown, non-plastic drilling fines (sand-silt).		Dry samples collected using spade to 12m.
		170	2		- harder cuttings (VWK-WK) below 2m.		
		169	3				
		168	4			ORH	
		167	5				
		166	6		- light to dark orangish brown, VWK-MS, weathered to partly weathered (<25%) cuttings with deceasing drilling fines (silty sand) below 6m. [HW-MW].		
		165	7				
		164	8				
			9		9m GREYWACKE SILTSTONE [MW]; dark orangish brown to light brown (grey tint), VWK-S, weathered to partly weathered (>50%) cuttings with common limonite-stained joint surfaces. Some light brown (orange-tint) drilling fines (silty sand).		
		163	10				
		162	11				
		161	12		- trace weathered greywacke cuttings and light brown (grey tint to 16m), drilling fines (silty sand) by 12m.		Slow drilling by 12m.
		160	13				
		159	14		- more drilling fines by 14m.	ORM	
		158	15				
		157	16		- minor dark grey, S-VS, fresh greywacke cuttings between 16-18m. Trace white veins (<1mm, weathered) by 16m.		23/2/04.
		156	17				
		155	18		- light to dark orangish brown, MS-S, partly weathered cuttings below 18m.		
			19				

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 12m. RC Downhole Hammer 12m-EOH.	Temporary 152mm PVC casing to 12m.	222mm to 12m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/5**

LOCATION: HUNUA QUARRY **GRID REF:** 321382.95E 677638.58N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 171.64m **SHEET** 2 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 20-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 23-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** 139.25° **PLUNGE:** 60°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Comments
		154	21				
		153	22		- dark brown to dark grey, MS-VS and less weathered [FW <50%] between 22-23.7m. More white veins (<1mm, weathered).		
		152	23				
		151	24		- trace fresh greywacke cuttings below 23.7m. Minor light brown, slightly plastic silt to sandy silt lumps above 28m.		
		150	25				
		149	26				
		148	27				
			28			ORM	
		147	29				
		146	30		- dark orangish brown to dark grey, MS-VS and less weathered [FW <50%] between 30-34m. High content of light greyish brown drilling fines (silty sand).		
		145	31				
		144	32		- some pale to light brown (orange-tint), plastic to slightly plastic, clayey silt near 31.5m.		
		143	33				
		142	34		- less fresh greywacke cuttings [<25%] and more light brown, drilling fines (sand-silt) below 34m.		
		141	35				
			36		36m		
		140	37		GREYWACKE SILTSTONE [MW-SW]; dark orangish brown to dark grey, MS-VS, partly weathered to fresh (<75%) cuttings. Common limonite-stained joint surfaces. Trace white veins (<1mm, weathered). Some light greyish brown drilling fines (silty sand).		
		139	38		- trace light orangish brown to light grey (near 40.7m), plastic to slightly plastic, clayey silt lumps [Fault Zone] below 38m.	RSWb	
		138	39				Larger cuttings by 39.3m.

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Tricone to 12m. RC Downhole Hammer 12m-EOH.	Temporary 152mm PVC casing to 12m.	222mm to 12m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/5

LOCATION: HUNUA QUARRY **GRID REF:** 321382.95E 677638.58N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 171.64m **SHEET** 3 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 20-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 23-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** 139.25° **PLUNGE:** 60°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Comments
						RSWb	
					40.7m		
		136	41		Veined GREYWACKE SILTSTONE [SW-FW]; grey-dark grey with some dark orangish brown, MS-VS, partly weathered to fresh (>75%) cuttings. Some limonite-stained joint surfaces. Some indistinct while veins (<1mm, zeolite?). Some light grey (brown-tint) drilling fines (silty sand).	RSWg	
		135	42		42.7m		
		134	43		Veined GREYWACKE SILTSTONE [FW]; dark grey, VS, fresh cuttings with common while veins (<2mm, quartz). Some light grey drilling fines (silty sand).		Large cuttings near 42.7m.
		133	44				
		132	45				
		131	46		- trace partly weathered (<2mm) and/or limonite-stained joint surfaces between 46-48m.		
		130	47				
		129	48				
		128	49				
		127	50				
		126	51			RFW	
		125	52				
		124	53				
		123	54		- less drilling fines below 54m.		
		122	55				
		121	56				
		120	57				
			58				
			59				

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 12m. RC Downhole Hammer 12m-EOH.	Temporary 152mm PVC casing to 12m.	222mm to 12m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/5

LOCATION: HUNUA QUARRY **GRID REF:** 321382.95E 677638.58N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 171.64m **SHEET** 4 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 20-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 23-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** 139.25° **PLUNGE:** 60°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Comments
		119	61		- minor partly weathered (<2mm) and/or limonite-stained joint surfaces by 61m. More light grey (brown-tint) drilling fines (silty sand).		
		118	62				
		117	63				
		116	64				
		115	65		- clay lumps (no sample) near 65.3m. Slightly weathered [FW <95%] between 65.3-67m.	RFW	
		114	66				
		113	67		- fewer partly weathered (<2mm) and/or limonite-stained joint surfaces and less light grey drilling fines (sandy sill) by 67m.		
		112	68				
		111	69				
		110	70				Larger cuttings near EOH.
		109	71		71m		
		108	72		EOH @ 71m		
		107	73				
		106	74				
		105	75				
		104	76				
		103	77				
			78				
			79				

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BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/6

LOCATION: HUNUA QUARRY **GRID REF:** 321358.92E 677599.89N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 171.36m **SHEET** 1 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 29-1-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 2-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		171	0		GRAVELLY SILT; light orangish brown, hard, non-plastic. Abundant drilling fines (sandy silt) and intact cuttings (EWK-VWK) with remnant limonite-stained joint surfaces. Minor lumps of clayey silt near top. [Fill (<1m) to HW Greywacke].			Trench exposed Waitemata Group immediately south of hole.
		170	1					
		169	2					
		168	3					
		167	4		- cuttings becoming harder (EWK-WK) and less drilling fines (silty sand).			
		166	5			ORH		
		165	6					More intact cuttings by 6m.
		164	7					Smaller cuttings from 6.5m.
		163	8		- harder cuttings (VWK-WK) below 8m.			
		162	9					
			9.8m					
		161	10		WEATHERED GREYWACKE [HW-MW]; light orangish brown to brown (grey tint), VWK to MS, weathered to partly weathered (<15%) cuttings. Common limonite-stained joint surfaces. Variable content of light brown (orange-tint) drilling fines (silty sand).			Larger cuttings near 9.8m.
		160	11					Some large cuttings between 11.3-11.9m.
		159	12					
		158	13					Slower drilling (harder) below 13m.
		157	14					
		156	15			ORH		
		155	16					
		154	17					Trace lumps of light brown (orange tint) sandy mud between 18-22m [uphole material?].
		153	18		- more partly weathered (25%) cuttings below 18m.			
		152	19					

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Drilling Methods	Casing Depths	Hole Diameters
Blade to 12.2m. Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BHFORM3 HUN GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/6**

LOCATION: HUNUA QUARRY **GRID REF:** 321358.92E 677599.89N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 171.36m **SHEET** 2 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 29-1-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 2-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60 **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF/MN

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		151	21					
		150	22					
		149	23					
		148	24		- more partly weathered (<50%) cuttings between 23.7-26m. Trace pale brown, slightly plastic to plastic mud lumps between 24-30m.			More cuttings from 23.7m.
		147	25					
		146	26		- abundant light orangish brown, drilling fines (sand-silt) 26-30m.			More cuttings near 26m.
		145	27					
		144	28					
		143	29					
		142	30		- more orangish brown to greyish brown, partly weathered (<50%) cuttings below 30m.	ORH	SWL 31.3m (15/3/04)	More cuttings by 30.7m.
		141	31					
		140	32		- trace fresh cuttings between 32-34m.			
		139	33					
		138	34		- some lumps of light brown (orange tint), slightly plastic to plastic, sandy mud between 34-36m. [Minor Fault].			Probably drilling down fault by 34m.
		137	35					
		136	36		- less weathered [verging MW] below 36m. Light orangish brown to light brownish grey, VWK to MS, weathered to partly weathered (<50%) cuttings. Common white veins (<1mm, weathered). Minor off-white to light brown (orange tint), slightly plastic mud lumps.			More cuttings and darker fines by 36m.
		135	37					
		134	38					
		133	39					
		132						

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BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/6**

LOCATION: HUNUA QUARRY **GRID REF:** 321358.92E 677599.89N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 171.36m **SHEET** 3 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 29-1-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 2-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60 **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF/MN

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		131	41					
		130	42		- less veins below 42m.			Rods rattling [fractured] from 42m.
		129	43					
		128	44		- brown to dark greyish brown, MS-S, partly weathered cuttings (<50%) below 44m. Minor white veins.	ORH		
		127	45					
		126	46					
		125	47					
		124	48					
		123	49		48.2m GREYWACKE SILTSTONE [MW]; orangish brown to dark grey, MS-S, partly weathered to fresh (<35%) cuttings. Common limonite-stained joint surfaces. Some white veins (<1mm, weathered). Some light brown drilling fines (silty sand).			Larger cuttings and no hammering [soft material/fractured] 48.2-49.8m. Foam added. Spot sample (wet) at 51m.
		122	50		- pale brown to grey, plastic, sandy mud lumps between 49.8-50.5m. [Major Fault].			
		121	51					
		120	52					Some lumps of light brown, slightly plastic, sandy mud [uphole material?] by 52m.
		119	53		- darker cuttings below 53m. Trace veins.			
		118	54			ORM		Producing water from 54m.
		117	55					
		116	56		- trace fresh cuttings by 56m.			
		115	57					
		114	58					Larger cuttings by 57.7m.
		113	59		- minor light grey mud lumps near 58.25m.			
		112						

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Drilling Methods	Casing Depths	Hole Diameters
Blade to 12.2m. Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/6

LOCATION: HUNUA QUARRY **GRID REF:** 321358.92E 677599.89N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 171.36m **SHEET** 4 **OF** 4

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 29-1-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 2-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								Piezometer Diameters in mm
		111	61		61m	ORM		SWL 21.6m on morning of 2/2/04. Wet samples from 60m. Minor weathered cuttings [uphole material] in sample 60-62m.
		110	62		GREYWACKE SILTSTONE [MW-SW]; orangish brown to dark grey, MS-VS, partly weathered to fresh (>50%) cuttings. Common limonite-stained joint surfaces. Minor white veins (<1mm, zeolite?). Some light brown muddy drilling fines.			
		109	63					
		108	64			RSWb		
		107	65		- less weathered [FW<75%] below 64.5m. Abundant limonite-stained joint surfaces.			
		106	66		66.15m			Hole terminated due to difficult drilling conditions at 66m. SWL >21.6m.
		105	67		EOH @ 66.15m			
		104	68					
		103	69					
		102	70					
		101	71					
		100	72					
		99	73					
		98	74					
		97	75					
		96	76					
		95	77					
		94	78					
		93	79					
		92						

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Drilling Methods	Casing Depths	Hole Diameters
Blade to 12.2m. Tricone to 18m. RC Downhole Hammer 18m-EOH.	Temporary 152mm PVC casing to 18m.	222mm to 18m. 137mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/7

LOCATION: HUNUA QUARRY **GRID REF:** 321166.62E 677566.20N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 162.46m **SHEET** 1 **OF** 3

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 24-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 25-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		162	0		CLAYEY SILT: light orangish brown, plastic. Some greywacke gravel near top. [Fill (<3m) to Residual Soil].			
		161	1					
		160	2			O		
		159	3		- becoming light brown (orange-tint) and less plastic.			
		158	4		4.3m MUD; brownish grey, slightly plastic to plastic. Some intact cuttings.			
		157	5					
		156	6			O		
		155	7					
		154	8					
		153	9		9m Fine SANDSTONE with some siltstone [SW to FW]; grey (brown-tint), EWK-VWK, calcareous. Intact cuttings and drilling fines (sandy silt). [Waitemata Group].			
		152	10					
		151	11					
		150	12				S.W.L. 13.3m (15/3/04)	
		149	13					
		148	14		- harder (VWK) cuttings and sandier drilling fines (muddy sand) by 14m.	OWT		Wet samples with minor uphole material from 14m.
		147	15					Producing water by 15m.
		146	16		- conglomeratic interval near 15.5m. Minor cuttings and clasts (<10mm) of dark greenish grey to black, fresh greywacke-siliceous rock and trace brown mudstone. Trace cuttings of mottled white and black, coarse sandstone from conglomerate matrix.			
		145	17					
		144	18		- less intact cuttings between 18-20m.			
		143	19					

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 22m. RC Downhole Hammer 22m-EOH.	Temporary 152mm PVC casing to 22m.	222mm to 22m. 137mm to EOH.

BHFORM4 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/7

LOCATION: HUNUA QUARRY **GRID REF:** 321166.62E 677566.20N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 162.46m **SHEET** 2 **OF** 3

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 24-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 25-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								Piezometer Diameters in mm
		142	21		- conglomeratic interval near 21.5m. Some cuttings and clasts (<15mm) of greenish grey to black, fresh greywacke-siliceous rock.			
		141	22		- less cuttings and slightly plastic drilling fines (sandy mud) by 22m.			Damp samples from 22m.
		140	23			OWT		
		139	24					
		138	25		25m SANDY MUD (Fault Zone) to WEATHERED GREYWACKE [HW]; light greenish grey, slightly plastic, sandy mud with common intact cuttings of weathered greywacke.			- maximum depth of contact.
		137	26					
		136	27			ORH		
		135	28		28m Fractured GREYWACKE SANDSTONE possibly with muddy intervals [SW]; grey, VS, fresh (<95%) with minor variably weathered cuttings. Common limonite-stained joint surfaces. High content to light grey (green tint), slightly plastic drilling fines (mud-sand) (possibly uphole material).			- minimum depth of contact. Wet samples from 22m.
		134	29					
		133	30			RSW		
		132	31		- joint surfaces coated by dark green, chloritic material (<1mm) and more muddy drilling fines below 30m. Trace semitransparent to white veins (<2mm, quartz).			SWL 12.2m on morning of 25/2/04.
		131	32		31.3m Fractured GREYWACKE SANDSTONE [MW]; light brown-brown, MS-S, partly weathered [FW <5%] cuttings with many limonite-stained joint surfaces. Minor weathered veins (<3mm, some quartz). Some light brown drilling fines (silty sand).			
		130	33			RW		
		129	34		34m Fractured GREYWACKE SANDSTONE [SW/FW]; grey-dark grey, VS, surface weathered (<3mm, indistinct) to fresh (<95%) cuttings with many limonite-stained surfaces. Trace white veins (<5mm, quartz & weathered). Some light brown to grey drilling fines (silty sand).			- maximum depth of contact.
		128	35					
		127	36					
		126	37			RSWg		
		125	38		- dark grey, S-VS, siltstone and minor white veins (<2mm, quartz) between 38-40m.			
		124	39					
		123						

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 22m. RC Downhole Hammer 22m-EOH.	Temporary 152mm PVC casing to 22m.	222mm to 22m. 137mm to EOH.

BHFORM4 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/7

LOCATION: HUNUA QUARRY **GRID REF:** 321166.62E 677566.20N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 162.46m **SHEET** 3 **OF** 3

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 24-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 25-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60 **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF/MN

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		122	41		- light brown clay (no recovery) near 41.5m. Grey (green-tint), MS-VS, variably altered [FW >50%] cuttings with some joint surfaces coated by dark green chloritic material (<1mm) and more drilling fines (sand-silt) between 42-44m.			
		121	42					
		120	43					
		119	44		- more white veins (<5mm, quartz) between 44-46m.	RSWg		Smaller cuttings from 44m.
		118	45					
		117	46		- high content of pale grey-brown drilling fines (silty sand) below 46m.			
		116	47					
		115	48		48m			
		114	49		Fractured GREYWACKE SANDSTONE [MW-SW]; light orangish brown to grey, S-VS, partly weathered to fresh (>50%) cuttings. Common limonite-stained joint surfaces with trace pyrite specks. Trace weathered-white veins (<2mm, some quartz). Some light brown drilling fines (silty sand).			Dry sample 48-50m.
		113	50		- more veins (<3mm, quartz) and drilling fines (sandy mud) below 50m.	RSWb		
		112	51					
		111	52		52m			
		110	53		Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh cuttings. Trace limonite-stained joint surfaces. Common white veins (<2mm, quartz). Minor grey drilling fines (silty sand).			
		109	54					
		108	55					
		107	56			RFW		
		106	57					
		105	58					
		104	59					
		103	60		60m EOH @ 60m			

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 22m. RC Downhole Hammer 22m-EOH.	Temporary 152mm PVC casing to 22m.	222mm to 22m. 137mm to EOH.

BHFORM4 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/8

LOCATION: HUNUA QUARRY **GRID REF:** 321077.57E 677566.74N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 155.21m **SHEET** 1 **OF** 3

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 25-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		155	0		FILL; variably weathered to fresh greywacke cuttings with some light grey (green-tint), slightly plastic drilling fines (sandy mud).	OF		Damp sample 0-2m.
		154	1		1.3m CLAYEY SILT; light orangish brown, plastic. Minor off-white to pale brown, EWK, mudstone cuttings near top. [Residual Soil].			
		153	2					Moist samples from 2m. Minor greywacke cuttings (uphole material) in samples 2-6m.
		152	3					
		151	4					
		150	5		- light brown (orange-tint), less plastic and minor sand below 5m. [CW to HW Waitemata Group?]	O		
		149	6					
		148	7					
		147	8		- becoming more plastic.			
		146	9					
		145	10		10m UNCERTAIN [As above]- no recovery.	UD		No sample 10-12m.
		144	11					
		143	12					SWL 7.6m on 26/2/04. Wet samples from 12m.
		142	13		12.8m MUD (Fault Zone) to WEATHERED GREYWACKE [HW]; pale grey, slightly plastic mud with some intact cuttings of light grey (geen-tint), EWK (hard), weathered greywacke.			
		141	14		- some sand and harder (EWK-S) greywacke cuttings below 14m.			
		140	15					
		139	16		- pale grey, non-plastic drilling fines (sandy mud) below 16m. Increasing cuttings with some remnant white veins (<3mm, weathered). [HW Greywacke].	O		
		138	17					
		137	18					
		136	19		19m WEATHERED GREYWACKE possibly with muddy intervals [HW-MW]; light grey (green-tint) to grey with some limonite-stained seams, VWK-MS, weathered to partly weathered (<50%) cuttings and pale grey	ORH		

S.W.L 16.3m? (15/3/04)

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 12m. RC Tricone 12-30.55m. RC Downhole Hammer 30.55m-EOH.	Temporary 152mm PVC casing to 12m.	222mm to 12m. 137mm to EOH.

BHFORM4 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/8**

LOCATION: HUNUA QUARRY **GRID REF:** 321077.57E 677566.74N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 155.21m **SHEET** 2 **OF** 3

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 25-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		135	21		drilling fines (mud-sand). Trace remnant white veins (<3mm, weathered).			
		134						
		133	22					
		132	23			ORH		
		131	24					
		130	25					
			26		26m			
		129			GREYWACKE SILTSTONE [MW]; light greenish grey to grey with some limonite-stained seams, WK-S, weathered to partly weathered (>50%) cuttings. Minor white veins (<2mm, weathered) by 28m. High content of light grey drilling fines (mud-sand).			
		128	27					
		127	28			ORM		
		126	29					
					29.5m			
		125	30		GREYWACKE SILTSTONE [SW]; dark grey with some limonite-stained seams, MS-VS, partly weathered to fresh (>70%) cuttings. Minor white veins (<2mm, quartz). Some light grey drilling fines (silty sand). Minor variably weathered, greywacke sandstone cuttings (uphole material?).			
		124	31					
		123	32			RSW		
		122	33					Stopped using foam by 33m.
					34m			
		121	34		GREYWACKE SANDSTONE [SW]; grey (orangish brown-tint), S-VS, pervasive slightly weathered cuttings. Common limonite-stained joint surfaces. Minor weathered veins (<2mm). Some greyish brown drilling fines (silty sand).			Dry sample 34-36m.
		120	35					
		119	36		- greenish grey to grey with some limonite-stained seams, MS-VS, partly weathered to fresh (>50%) cuttings below 36m. Some light grey (oxidizes light orangish brown) drilling fines. Minor fresh greywacke siltstone cuttings.	RSW		
		118	37					
		117	38		- slightly plastic drilling fines below 38m.			Larger cuttings by 37.7m.
					39m			
		116	39		Fractured GREYWACKE SANDSTONE [MW]; orangish brown (grey tint), MS-S, partly weathered [FW <10%] cuttings with many limonite-stained joint surfaces. Trace white veins (<2mm, quartz). High	RW		

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 12m. RC Tricone 12-30.55m. RC Downhole Hammer 30.55m-EOH.	Temporary 152mm PVC casing to 12m.	222mm to 12m. 137mm to EOH.

BHFORM4 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/8

LOCATION: HUNUA QUARRY **GRID REF:** 321077.57E 677566.74N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 155.21m **SHEET** 3 **OF** 3

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 25-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-2-04 **TYPE OF DRILLING RIG:** Rig 7 Ingersoll Rand TH60

LOGGED BY: GDF/MN **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Rel Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		115	41		content of light brown drilling fines (silty sand). Some greywacke siltstone cuttings near top.			Dry samples from 40m.
		114						
		113	42					
		112	43			RW		
		111	44					- some lumps of light brown, slightly plastic, sandy mud (uphole material?) between 44-52m.
		110	45					
		109	46		- light grey, plastic clay near 47m.			
		108	47		47m GREYWACKE SANDSTONE [FW]; grey, VS, fresh cuttings with common limonite-stained joint surfaces. Trace white veins (<1mm, quartz). Some light greyish brown drilling fines (silty sand). Trace pyrite specks on joint surfaces by 50m.			- minimum depth of contact.
		107	48					
		106	49					
		105	50					Smaller cuttings by 50m.
		104	51					
		103	52		- minor grey (brown-tint) drilling fines (silty sand) and less cuttings with limonite-stained joint surfaces below 52m.			
		102	53			RFW		
		101	54					Moist sample 54-56m.
		100	55					
		99	56		- some joint surfaces coated by dark green, chloritic material by 56m.			
		98	57					
		97	58		- more veins (<1mm, quartz) below 58m.			
		96	59					
					60m EOH @ 60m			

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Drilling Methods	Casing Depths	Hole Diameters
Tricone to 12m. RC Tricone 12-30.55m. RC Downhole Hammer 30.55m-EOH.	Temporary 152mm PVC casing to 12m.	222mm to 12m. 137mm to EOH.

BHFORM4 HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/9

LOCATION: HUNUA QUARRY **GRID REF:** 321392.59E 676961.43N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 187.77m **SHEET** 1 **OF** 9

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 21-1-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Depth (m)	Description	Ref Code	Comments
0	UNCERTAIN [Topsoil to As Below]; no recovery.	UD	RQD entered into penetration field in database from 29.3m.
1.73m	CLAYEY SILT; mottled light brown and orangish brown, stiff, plastic. Some rootlets. [Residual Soil].	O	Disturbed core from 1.73m. 0.35m uphole material at 1.8m.
2.7m	SILT; pale brown-grey with orangish brown streaks, soft to firm (disturbed), slightly to non-plastic. [HW Waitemata Group].	OWT	- maximum depth of contact.
3.25m	SILT-SAND with some clayey bands; grey (light brown near 30mm), firm (disturbed), non-plastic. [MW Waitemata Group].	OWT	- intact core from 3.3m.
4.7m	- pale brown patch (30mm). - pale brown below 4.6m.		- clayey band (<50mm) dipping 25°.
	Fine SANDSTONE with mudstone bands [SW to FW]; grey-dark grey (brown tint), EWK (very stiff-hard), bioturbated. Mudstone bed near top 4.73-5.03m. [Waitemata Group]. - becoming dark grey.		Undisturbed core broken into 50-200mm lengths 4.95-9.3m. Bedding dips 20-10°.
	- VWK and calcareous below 5.95m. - mudstone bed 6.15-6.43m.		- interval of clayey crushed rock 6.2-6.3m. [Drilling Induced?].
			- thin (25mm) vein network (calcite, <3mm) dipping 10°.
			- several 40-70° discontinuous veins (calcite, <1mm) 8.9-9.1m.
			- 70° discontinuous veins (as above) 9.5-10.2m. - 80° joint (broken core) 10.25-10.5m.
			Losing significant water by 10.8m.
		OWT	- NV slickensided fractured zone 11.15-12.1m. [Minor fault]. - vein (calcite <20mm) within above zone. Shattered zone [Drilling induced?] 11.55-11.6m. - veined (calcite <1mm) 11.9-12.1m. Core broken possibly along indistinct defects 12.3-13.35m.
			- 50° vein (calcite <1mm). Possible 40° joint at 13.625m. - three intersecting 40-70° veins (calcite, <2mm) 13.75-14.9m.
			Geotechnical sample 15.58-15.84m.
			- 65° vein (calcite <1mm).
	- coarser grained 17.25-17.8m. Trace carbonaceous flecks.		- 15° discontinuous calcite-cemented band (<15mm).
18.35m	- medium sandstone 18.03-18.08m.		
	Fine to medium SANDSTONE [FW]; laminated (<5mm) grey to dark grey, VWK, calcareous. Occasional more cemented bands (<30mm).		- contact dips 15°. Dark laminations slightly eroded during drilling.
	- medium to coarse sandstone with some fossil fragments (<3mm) 19.2-19.44m.	OWT	

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 33m.	123mm to 33m. 96mm to EOH.

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/9

LOCATION: HUNUA QUARRY | **GRID REF:** 321392.59E 676961.43N

CLIENT: Winstone Aggregates LTD | **COLLAR ALTITUDE:** 187.77m | **SHEET** 2 **OF** 9

JOB No. WAL04/1 | **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 21-1-04 | **DRILLER:** Brown Bros (NZ) LTD | **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 | **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3 | **ORIENTATION:** | **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100 / 1 5 20	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							32 Piezometer Diameters in mm	
			21		20.25m - becoming conglomeratic sandstone with some fossil fragments (<10mm) and mudstone clasts (<15mm). Fine SANDSTONE with mudstone bands [FW]; grey-dark grey, VWK, calcareous, bioturbated.	OWT		- rough (bioturbated) contact dipping 20°. SWL 3.8m after drilling at 21.3m. SWL 5.2m on morning of 22/1/04. Geotechnical sample 20.43-20.75m.
			22		- laminated coarser sandstone with fossil fragments (<2mm) along base 21.52-21.61m. 22.15m Sandy CONGLOMERATE with some boulders [FW]; patchy dark grey (green-brown tint) and brown, VWK, calcareous. Variably sized (often >65mm) clasts of mudstone and some fresh greywacke (mostly <10mm). Indistinct sandy matrix with pale brown fossil fragments (<20mm).			- two 65° slickensided defects <25mm apart. SWL 3.8m after drilling at 21.3m. SWL 5.2m on morning of 22/1/04. - NV slickensided defect 22.06-22.15m. Broken core (some pieces with slickensided surfaces) from 22.06-24.45m.
			23		- some irregular intervals (<150mm) of fine sandstone between 23.4-24.3m.	OWT		
			24					
			25		25.2m Fine SANDSTONE [FW]; grey, VWK, calcareous.			- slickensided defect. - 40° slickensided defect. - 45° slickensided defect. - 40° slickensided defect. Sandstone could be large blocks within conglomerate 25.2-27.7m. Lost core assumed from bottom of run 25.8-27.3m.
			26		- interval (>300mm) of conglomerate with mudstone clast occupying most of top half.	OWT		- fractured interval (80mm) with 30-60° slickensided defects (broken core). - 45° slickensided defect. - 60° slickensided defect.
			27		- interval (>70mm) of conglomerate between 26.9-27.4mm.			
			28		27.7m CONGLOMERATE with some boulders [FW]; patchy dark grey (green-brown tint) and brown, VWK, calcareous. Variably sized (often >65mm) clasts of mudstone, glauconitic sandstone and some fresh greywacke (mostly <10mm). Indistinct sandy matrix (minor) with pale brown fossil fragments (<10mm).	OWT		Intervals of broken core 27.9-30.7m. - 50° slickensided defect. - 60° slickensided defect. - NV slickensided defect (broken core) 28.55-28.65m.
			29		29.3m Weathered GREYWACKE with shattered intervals above 30.25m [HW]; light greenish grey, VWK. Remnant fractured texture (spacing <20mm) with slickensided defects. Greywacke sandstone by 29.85m.			- 55° slickensided defect. - two 40° slickensided defects 30mm apart. - minimum depth of contact (dips <20°). Clayey seams (<100mm) within shattered rock near top, 29.65 & 30.15m [Minor Faults].
			30		- becoming patchy greenish grey and slightly harder (VWK-WK) below 30.4m [HW-MW]. Less remnant defects (spacing 10-50mm) often coated by chloritic material. Some voids (<5mm) after vein material 30.4-30.7m.	ORH		- pale brown mottled zone (<30mm). - 35° slickensided defect coated by grey clay (<1mm). Intact core from 30.25m. - several 40°-NV slickensided defects coated by chlorite (<1mm) (broken core) 30.4-30.7m.
			31		31.7m - becoming as below (shattered core).			- 30° joint partly coated by brown material (<1mm).
			32		32.1m GREYWACKE SANDSTONE [MW]; brown, MS, partly weathered. Crisscrossed by limonite-stained joints spaced 10-50mm apart.	ORM		- 25° joint coated by brown material to greenish grey clay (<1mm).
			33		GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, MS-S, partly weathered (<15mm along joints) to fresh (<75%). Limonite-stained joints and white veins (<2mm, calcite) spaced 25-75mm apart. - veins spaced 5-20mm apart below 32.6m. - irregular seam (<35mm, 70°) of dark grey siltstone at 33.2m.			- 30° slickensided defect coated by chlorite (<1mm). - 30° slickensided defect coated by chlorite (<1mm). - 40° slickensided defect coated by chlorite (<1mm).
			34		- less weathered [FW>75%] 33.5-35.1m. Interval (100mm, 50°) of dark grey siltstone 33.6-33.75m.			- numerous defects as above (broken core) 31.2-31.7m.
			35		- veins spaced 25-75mm apart between 34.3-34.8m.	RSWb		- NV joint weathered <5mm into the adjacent rock 31.8-32.05m. Losing circulation by 31.8m. - 50° limonite-stained joint coated by silt (<1mm). Defects generally dip >45° below 32m. - 50° joint as above. Core broken along joints (<100mm pieces) 32.25-32.5m.
			36		36.55m - less weathered below 36.2m. Increasing patches of dark grey siltstone.			- irregular NV network of veins (<10mm) with some vuggy voids (<5mm) and partly weathered <15mm into the adjacent rock 32.5-33.3m.
			37		Veined GREYWACKE SANDSTONE to SILTSTONE [MW-SW]; patchy grey-dark grey with irregular brown seams, MS-VS, partly weathered (<10mm along joints) to fresh (<75%). Limonite-stained joints as above with some coated by orange-brown silt. Crisscrossed by white veins (<3mm, calcite) spaced 5-20mm apart. - medium sandstone patches 37.6-37.8m. - interval (50mm, 60°) of medium sandstone 37.6-37.8m. - more weathered below 38.3m. - moderately weathered [MW] along defects 38.5-39.1m.			- 60° joint with siltstone band (<3mm) 5mm above.
			38			RSWb		- 60° limonite-stained vein (<2mm) partly weathered <10mm in the adjacent rock. - 30° vein (<10mm) with another vein (<3mm, 20°) 30mm below. - irregular NV network of veins (<5mm) 34.97-35.5m.
			39		39.65m - moderately weathered [MW] along defects below 39.35m. Veined GREYWACKE SANDSTONE [SW-FW]; grey with irregular	RSWg		- 60° limonite-stained joint coated by sandy silt (<6mm) and associated fractured interval 36.1-36.2m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 33m.	123mm to 33m. 96mm to EOH.

BOREHOLE No. HUN04/9

LOCATION: HUNUA QUARRY **GRID REF:** 321392.59E 676961.43N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 187.77m **SHEET** 3 **OF** 9

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 21-1-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Depth (m)	Legend	LITHOLOGY DESCRIPTION (Name, colour, strength, grain size, (moisture) miscellaneous)	Ref Code	Piezometer Construction	Comments
				32 ← Piezometer Diameters in mm	
41		brown seams, VS, partly weathered (<5mm along joints) to fresh (>75%). Limonite-stained joints spaced 25-100mm apart. Crisscrossed by white veins (<3mm, calcite & quartz) spaced 5-20mm apart.			SWL 3.5m after drilling at 36.3m. SWL 9.8m on morning of 23/1/04. Core broken along several intersecting joints 37.4-37.85m.
		- veins spaced <10mm apart below 41.25m. Some voids along veins.	RSWg		- 65° network of veins (<10mm) and associated seam of partly weathered rock 38.3-38.4m. - 80° joint and vein (<2mm) partly weathered <40mm into the adjacent rock (broken core) 38.5-38.75m.
42		42.3m			- 50° composite vein (<30mm) with some vuggy voids (<5mm) 38.7-39.1m. Associated vein network to 39.2m.
43		Veined GREYWACKE SANDSTONE to SILTSTONE [MW-SW]; patchy grey-dark grey with irregular brown seams, MS-VS, partly weathered (<10mm along joints) to fresh (<75%). Limonite-stained joints spaced <50mm apart. Crisscrossed by irregular white veins (<5mm, calcite) spaced <10mm apart.			- intensely fractured and veined (<10mm, quartz) interval 39.4-39.65m. 70° slickensided defect at 39.6m.
		- veins spaced <5mm apart below 42.85m.	RSWb		Core broken along joints 40-40.3m.
44		- moderately weathered [MW] below 43.7m. Joints spaced 25-75mm apart. Veins (<3mm, calcite) spaced 5-20mm apart.			- irregular patches of dark grey siltstone at 40.3-40.35m.
		- fine sandstone below 44.25m. Veins (<3mm, calcite) spaced 10-50mm apart.			- as above and irregular patches of vein material (<15mm, calcite) 40.5-40.6m.
45		44.85m Veined GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, VS, partly weathered (<10mm along joints) to fresh (>75%). Limonite-stained joints spaced 50-150mm apart. Crisscrossed by white veins (<3mm, calcite) spaced 10-20mm apart.			- partly weathered along several intersecting 20-60° joints (broken core) 41.15-41.25m. - 50° composite vein (<35mm, weathered & quartz). - 55° limonite-stained joint coated by clay-silt (<2mm). - 70° composite vein (<10mm, calcite). Slickensided defects 30mm above (60°) & below (50°).
46					Core broken along several NV joints 42.7-43.8m.
47			RSWg		Core broken along NV joints 44.1-44.95m. - 50° vein (<3mm, calcite).
48		- less weathered 48.05-49m.			Core broken along several NV joints 47-47.5m. - partly weathered along 35° fractured zone 47.95-48.05m. - 50° vein (5mm, calcite).
49					Core broken along NV joints 49.4-49.6m.
50		50.25m Veined GREYWACKE SANDSTONE to ARGILLITE [MW-SW]; patchy grey-dark grey with brown intervals, MS-S, partly weathered to fresh (>50%). Crisscrossed by irregular fractures (some limonite-stained) and white veins (<3mm, calcite & zeolite?) spaced 5-10mm apart.			- contact dips 45°. NV bedding. - 70° slickensided defect. Pyrite patches on broken defect surfaces at 50.68m.
51			RSWb		- NV network of veins 50.68-50.75m. - NV vein (<4mm, weathered) 50.8-52.1m. Associated partly weathered rock becomes confined to central seam (<40mm) below 51.35m.
52		- changing to below across NV contact.			- 70° irregular limonite-stained vuggy vein (<3mm) (broken).
53		52.3m Veined GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, VS, partly weathered (<10mm along joints) to fresh (>75%). Limonite-stained joints spaced 50-200mm apart. Crisscrossed by irregular white veins (<4mm, calcite) spaced 10-20mm apart.			
54			RSWg		- more weathered between two 60° joints coated by orange-brown silt (<1mm) 53.75-53.85m.
		- more weathered below 54.45m. Veins spaced <10mm apart.			SWL 3.5m after drilling at 54.3m. Driller estimates 20% circulation loss. SWL 19.8m on morning of 27/1/04.
55		54.95m Veined GREYWACKE SANDSTONE to SILTSTONE [MW-SW]; patchy grey-dark grey with irregular brown seams, MS-S, partly weathered (<15mm along joints) to fresh (>50%). Limonite-stained joints spaced 25-75mm apart. Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced <20mm apart.			- partly weathered along fractured zone (broken core) 54.95-55.4m. 60-70° joints some coated by light orangish brown clay (<1mm).
56		- less weathered [FW<75%] below 55.85m.			
		- medium sandstone dipping 70° along base 56.55-57.4m.			- 60° joint coated by light orangish brown clay (<1mm).
57		- less weathered [FW>75%] 57-58.9m. Joints spaced 25-125mm apart. Veins spaced 10-50mm apart.	RSWb		- irregular 75° joint-vein (<2mm, calcite) partly coated as above (<1mm).
58					- partly weathered along several intersecting joints 56.8-57m. 70° joint coated as above (<2mm) at 56.9m.
					- 50° joint partly coated as above (<1mm). - 50° network of veins (<5mm, calcite) spaced <10mm apart 57.75-57.8m.
59		- irregular veins (<3mm, calcite & quartz) spaced <15mm apart below 58.9m.			Core broken along irregular NV joints 59.15-59.45m & 59.75-60.15m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 33m.	123mm to 33m. 96mm to EOH.

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BOREHOLE No. **HUN04/9**

LOCATION: HUNUA QUARRY | **GRID REF:** 321392.59E 676961.43N

CLIENT: Winstone Aggregates LTD | **COLLAR ALTITUDE:** 187.77m | **SHEET** 4 **OF** 9

JOB No. WAL04/1 | **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 21-1-04 | **DRILLER:** Brown Bros (NZ) LTD | **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 | **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3 | **ORIENTATION:** | **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%)	Core >100mm (%)	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
25 50 75	0.5 2 10 50 100 (1 5 20)						32 Piezometer Diameters in mm	
			60		60.15m Veined GREYWACKE SANDSTONE [MW-SW]; grey with some brown seams, VS, partly weathered (<10mm along joints) to fresh (<95%). Limonite-stained joints spaced 100-300mm apart. Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 10-30mm apart.			- NV joint partly weathered (<10mm) into the adjacent rock 60.3-60.65m.
			61		- moderately weathered [FW<25%] 61.4-62.2m. Joints spaced 50-100mm apart and veins spaced <15mm apart.			- 45° vein (<3mm, calcite) and irregular dark grey siltstone seam 61.4-61.55m. - 70° joint partly coated by light orangish brown clay (<2mm) and associated fractured zone 61.75-61.85m.
			62		- occasional joints and veins spaced <30mm apart.	RSWb		
			63					- 60° joint with associated fractured zone (<20mm) and partly weathered (<10mm) into the adjacent rock. Core broken along NV joints 63.75-64.2m & 64.35-65.07m. - less weathered [SW] 64.15-64.4m.
			64		- moderately weathered [FW<25%] below 63.85m. Joints spaced 10-50mm apart with some coated by orangish brown clay (<3mm). Veins (<3mm, calcite & weathered) spaced <15mm apart. Siltstone dipping 70° along base 63.85-64.3m.			- 65° joint coated by clay (<2mm). - irregular NV slickensided defect coated by clay (<3mm) 64.8-64.95m.
			65		65.1m GREYWACKE SANDSTONE [SW-FW]; grey with minor brown seams, VS, partly weathered (<5mm along joints) to fresh (<95%). Limonite-stained joints spaced 100-500mm apart. Crisscrossed by white veins (<3mm, calcite & quartz) spaced <50mm apart.			
			66			RSWg		- irregular NV bedding contact and discontinuous vein (<3mm, calcite) 66.1-66.3m.
			67		67.9m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Occasional limonite-stained joints partly weathered (<3mm) into the adjacent rock. Crisscrossed by white veins (<8mm, calcite & quartz) spaced 10-50mm apart.			- 65° joint coated by light orangish brown clay (<1mm). Partly weathered (<5mm) along 20°-NV joints 67.7-67.85m.
			68					
			69					
			70			RFW		- 75° network (<25mm) of veins (<8mm) 69.9-70.15m.
			71					
			72		- slightly weathered [FW>50%] below 72.15m. Veins spaced <10mm apart.			- several intersecting joints partly weathered (<20mm) into the adjacent rock.
			73		72.9m GREYWACKE SANDSTONE with some vein material [MW]; brown with pale brown bands above 73.5m, MS, partly weathered. Limonite-stained joints spaced 50-100mm apart and coated by orange-brown to light greyish brown clay (<2mm). Crisscrossed by weathered veins (<15mm, remnant calcite) spaced <10mm apart.	RW		- 25° interval of banded pale brown (some limonite streaks), weathered vein material 73.15-73.34m. Seam (<60mm) of light brown, low-plasticity clay with some weathered rock fragments (<10mm) [Minor Fault]. Broken core along several NV joints 73.35-73.8m. SWL 3.4m after drilling at 73.6m. Driller estimates 20% circulation loss. SWL 3.8m on morning of 28/1/04.
			74		73.95m - less weathered [FW<50%]. Veined GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, MS-VS, partly weathered (<20mm along joints) to fresh (<75%). Occasional limonite-stained joints. Crisscrossed by irregular white veins (<6mm, calcite & quartz) spaced 20mm apart. - siltstone 75.2-75.65m.	RSWb		
			75					
			76		76.15m Veined GREYWACKE SANDSTONE [MW]; brown with some grey patches, MS, partly weathered [FW<25%]. Irregular limonite-stained joints (mostly >70°) with some coated by orange-brown silt (<1mm). Crisscrossed by irregular weathered veins (<5mm, remnant calcite) spaced <20mm apart.			Core broken along joints 76.3-78.25m.
			77					Shattered rock 77.25-77.35m.
			78			RW		
			79		- siltstone 79.5-79.9m.			Core broken along joints and veins 78.9-79.3 & 79.4-79.8m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 33m.	123mm to 33m. 96mm to EOH.

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BOREHOLE No. HUN04/9

LOCATION: HUNUA QUARRY | **GRID REF:** 321392.59E 676961.43N

CLIENT: Winstone Aggregates LTD | **COLLAR ALTITUDE:** 187.77m | **SHEET** 5 **OF** 9

JOB No. WAL04/1 | **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 21-1-04 | **DRILLER:** Brown Bros (NZ) LTD | **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 | **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3 | **ORIENTATION:** | **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Core >100mm (%) 0.5 1 2 5 10 20 50 100	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							32 ← Piezometer Diameters in mm	
			81		- slighlly weathered [FW>50%] 79.9-81.45m. Joints spaced 25-75mm apart. White veins (<2mm, calcite) spaced 10-50mm apart.			
			82		- joints (mostly >70°) with some coated by orange-brown silt to pale brown clay (<1mm). Irregular weathered veins spaced <10mm apart.	RW		Core broken along joints 81.85-82.5 & 82.7-84m. Circulation lost at 82m.
			83		- siltstone 83.3-83.7m. Fractured (<15mm) below 83.3m.			- indistinct 70° band (<10mm) of silty crushed rock 82.85m. - 70° joint coated by pale brown sandy silt (<3mm).
			84		84m FAULT BRECCIA [MW]; brown, partly weathered, greywacke fragments (<30mm) in hard matrix of light orangish brown, non-plastic sand-silt. Minor irregular voids (<15mm).	RW		- irregular NV contact. SWL 82m after drilling at 84.3m. SWL 82m on morning of 29/1/04.
			85		84.85m Veined GREYWACKE SANDSTONE [MW]; as before. Fractured with some NV seams (<10mm) of above near top. - less weathered below 85.15m. Joints spaced <50mm apart.			- indistinct 60° contact. Core broken along irregular NV joints 85.05-87.05m.
			86		- siltstone 85.8-86.2m. Irregular NV joints coated by orange-brown silt (<2mm). - less weathered [FW<50%] below 86.25m. Veins (<3mm, calcite) spaced 10-30mm apart.	RW		- indistinct shear bands (<2mm) spaced <20mm apart 86.25-94.95m.
			87		86.75m Veined GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, MS-VS, partly weathered (<15mm along joints) to fresh (<75%). Limonite-stained joints spaced 50-150mm apart and coated by orange-brown silt (<3mm). Crisscrossed by white veins (<5mm, calcite) spaced <20mm apart.			
			88					
			89		- moderately weathered [MW] 88.8-89.05m.			Core broken along irregular joints coated by orange-brown silt (<3mm) 88.45-88.8m. SWL 12.8m after drilling at 88.8m. Petraseal used to maintain circulation. SWL 82m on morning of 30/1/04. Core broken along joints coated as above (<2mm) 89.05-89.45m & 89.6-89.85m.
			90					
			91		- moderately weathered [FW<50%] 90.85-91.75m.	RSWb		- 60° veins (<10mm, calcite). - 65° network (<50mm) of irregular veins (<10mm, calcite) 91-91.3m. Core broken along joints 91.45-91.8m.
			92					
			93		- veins spaced <10mm apart 92.75-93.95m.			
			94		- siltstone 93.7-93.8m. - less weathered [FW>75%] below 93.95m. Joints spaced 50-200mm apart.			- two 60° composite veins (<5mm, calcite & quartz) at 93.45 & 93.5m.
			95		- siltstone below 94.95m. Veins spaced <10mm apart.			- contact dips 60°.
			96		- slighlly discoloured and weakened below 95.4m. Fractured <10mm. Pyrite specks on defect surfaces. 95.95m 96.15m Sheared GREYWACKE SILTSTONE [HW-MW]; variable light brown to brownish grey, EWK (hard) to WK, weathered. Slickensided defects spaced <10mm apart. Veins as above. [Minor Fault].	RW		- 25° band (<10mm) of light orangish brown to pale brown clay. Core broken along joints 96.15-98.5m. - 50° composite vein (5mm, calcite).
			97		Veined GREYWACKE SANDSTONE [MW]; brown with some grey patches, MS, partly weathered [FW<25%]. Irregular limonite-stained joints spaced <50mm and coated by orange-brown silt to pale yellow-brown clay (<1mm). Crisscrossed by irregular veins (<3mm, calcite & quartz) spaced <10mm apart. - less weathered [FW<50%] 97.15-97.8m.			
			98			RW	SWL >100m 13/2/04	SWL 14.3m after drilling at 98.5m. Petraseal used to maintain circulation. SWL 82m on morning of 2/2/04. - contact dips 40°. Core broken along irregular NV joint(s) coated by pale brown silty sand to crushed rock
			99		- siltstone below 98.75m. Fractured <20mm.			

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 33m.	123mm to 33m. 96mm to EOH.

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BOREHOLE No. HUN04/9

LOCATION: HUNUA QUARRY **GRID REF:** 321392.59E 676961.43N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 187.77m **SHEET** 6 **OF** 9

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 21-1-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Depth (m)	Legend	LITHOLOGY DESCRIPTION (Name, colour, strength, grain size, (moisture) miscellaneous)	Rel Code	Piezometer Construction	Comments
				32 Piezometer Diameters in mm	
100.2m		Veined GREYWACKE SILTSTONE [SW-FW]; grey with some irregular brown seams, MS-S, partly weathered (<10mm along joints) to fresh (>75%). Limonite-stained joints spaced 25-150mm apart and coated by orange-brown silt (<1mm). Crisscrossed by white veins (<3mm, calcite) spaced <30mm apart.			(<10mm) 98.9-99.95m. Core broken along joints 100.05-100.95m. - indistinct 70° banding in siltstone.
101					Core broken along joints 101.25-102.15m.
102					
103		- less weathered [FW<95%] below 102.35m. Partly weathered <5mm along joints with minimal silt. Veins spaced 10-30mm apart with pyrite specks on broken surfaces.	RSWg		
104					- irregular NV joint(s) partly weathered <10mm into the adjacent rock 104-104.7m. Core broken in lower half.
105					
105.3m		GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Occasional limonite-stained joints partly weathered (<1mm) into the adjacent rock. Crisscrossed by white veins (<5mm, calcite) spaced 10-50mm apart. Some irregular seams of dark grey, S, siltstone dipping 70° above 106.6m.			- 50° composite vein (<6mm, calcite) along contact. - 65° network (<15mm) of veins (<5mm, calcite & quartz).
106					
107					
108					- 45° joint coated by light orange to white vein material (2mm, quartz).
109		- occasional limonite-stained joints partly weathered <2mm into the adjacent rock below 108.95m. - irregular seam(s) (<50mm) of dark grey, S, siltstone dipping >70° between 109.1-109.65m.			- 15° joint coated by orange-brown silt (<2mm). - 60° joint. - irregular 35° joint. Core broken along NV joint(s) partly coated by light orangish brown clay (<1mm) and partly weathered <5mm into the adjacent rock 109.3-110.3m. Some voids along wider veins. SWL 18.2m after drilling at 109.8m. Petraseal used to maintain circulation. SWL 93m on morning of 3/2/04.
110		- veins spaced 50-150mm apart 110.2-111.65m.			
111			RFW		- 35° joint. - irregular 20° joint.
112		- some irregular patches of siltstone 112.1-112.3m.			- 55° vein (<1mm, calcite) with pyrite patches (broken). - irregular 50° joint. - 75° joint. Core broken along NV joints/veins (<1mm, calcite) 111.77-112.3m. 70° vein (<4mm, calcite) near top.
113					
114		- veins (<2mm, calcite) spaced 50-150mm apart below 113.75m.			Core broken along NV joints partly coated by light orangish brown silt (<1mm) and partly weathered <5mm into the adjacent rock 112.55-113.75m. Some pyrite patches on defect surfaces near top.
115					Core broken along NV joint(s) coated by pale brown clay (<1mm) and partly weathered <5mm into the adjacent rock 114.7-116.1m.
116					- 35° vein (<5mm, calcite). SWL >100m after drilling at 115.8m. Aqua-crystals & petraseal used to maintain circulation. Grouted 91.8-115.8m. 4/2/04.
117		- seam (<30mm) of dark grey, MS, argillite dipping >65° between 116.65-116.8m.			Core broken along NV joint(s) coated by orange-brown silt (<1mm) and partly weathered <2mm into the adjacent rock 116.35-117.3m.
117.65m					
118		GREYWACKE SANDSTONE [SW-FW]; grey with some brown seams, VS, partly weathered (<5mm along joints) to fresh (<95%). Limonite-stained joints mostly dipping >70° and coated by orange-brown silt to pale brown clay (<1mm). White veins (<2mm, calcite & quartz) spaced 20-100mm apart.			Core broken along joints 117.6-122.2m.
119		- irregular veins (<10mm, calcite) spaced <10mm apart below 118.9m.	RSWg		
119.8m					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 33m.	123mm to 33m. 96mm to EOH.

BOREHOLE No. **HUN04/9**

LOCATION: HUNUA QUARRY **GRID REF:** 321392.59E 676961.43N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 187.77m **SHEET** 7 **OF** 9

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 21-1-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3 **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Core >100mm (%) 0 5 2 10 50 100 1 5 20 1	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							32 Piezometer Diameters in mm	
			121		GREYWACKE SILTSTONE [SW-FW]; variable dark grey, MS-S, fresh. Limonite-stained joints spaced 25-150mm apart and coated by orange-brown silt (<1mm). White veins (<2mm, calcite & quartz) spaced <100mm apart. Pyrite specks on some joint surfaces.			- 70° vein (<7mm, calcite) along contact.
			122			RFW		- 70° joint-vein (<2mm, calcite). - two intersecting 65° joints coated by orange-brown silt (<1mm). - several intersecting joints. - 70° joint-vein (<1mm, calcite). Parallel joint coated by orange-brown silt (<1mm) 50mm below. Core broken along NV limonite-stained joint(s) coated by orange-brown silt to pale brown clayey crushed rock (<5mm) 122.15-123.7m. Fractured (<20mm). Driller estimates 20% circulation loss. 5/2/04.
			123		123.2m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced 5-30mm apart.			
			124					Lost circulation by 124.8m. SWL 94m on morning of 9/2/04. - irregular 25° joint-vein (<1mm, calcite) with pyrite specks. - irregular 45° joint coated by orange-brown silt. - 50° joint-vein (<1mm, calcite) with pyrite patches. - 10° joint. - irregular 25° joint. Core broken along NV joint-vein (<2mm, calcite) 125.8-126.6m. Core broken along defects 126.75-130.8m.
			125		- seam (<40mm) of dark grey, MS-S, siltstone dipping 65° between 125.25-125.45m.			
			126		- joints spaced 50-200mm and coated by orange-brown (limonite-stained) to pale grey clay-silt (<1mm) and/or vein material (<2mm, calcite). Pyrite specks on many joint surfaces. - irregular NV patch (<40mm) of dark grey, MS, argillite between 126.6-126.75m.			
			127		- dark grey, MS-S, siltstone dipping 75° between 127.3-128.7m. Veins spaced <20mm apart. No limonite-staining along joints below 127.6m.			
			128					- several NV veins (<5mm, calcite & quartz) with associated irregular seam of brecciated rock in vein material (quartz) near base 128.8-129.5m.
			129					
			130					
			131		- clean joints and veins (<2mm, calcite) becoming occasional below 130.7m.			- pale grey, muddy crushed rock (<5mm) along steeply dipping joint (broken core) 130.5-130.7m.
			132		- irregular NV patchy seam (<30mm) of dark grey, MS-S, siltstone between 131.95-132.7m.	RFW		Core broken along NV joints 131.3-132.4m.
			133		- veins (<3mm, calcite) spaced 20-100mm apart below 133.2m.			SWL 42.6m after drilling at 133.5m. Driller estimates 50% circulation loss. SWL 93.5m on morning of 10/2/04. Core broken along NV joints 133.6-134.95m.
			134					
			135					Shattered (<50mm pieces)(upper 400mm) to broken core along NV joints 135.2-136.5m. Some joint surfaces coated by pale grey, silt-sand fines (<3mm). - 70° network (<30mm) of veins (<5mm, calcite) with some vuggy voids and pyrite specks 135.45-135.65m. Lost circulation at 136.2m. Quick seal added. - 65° network (<60mm) of irregular veins (<3mm, calcite & quartz) 136.6-136.8m. - 75° seam (15mm) of veined (<5mm, calcite), fractured (<5mm) and altered (WK) rock with disseminated pyrite specks 137.2-137.5m. Core broken along NV joints 138.15-138.8m.
			136					
			137		- irregular NV seam(s) (<50mm) of banded dark grey, MS, argillite between 136.85-137.55m.			
			138					
			139		- joints spaced 150-400mm apart below 138.8m.			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 33m.	123mm to 33m. 96mm to EOH.

BOREHOLE No. **HUN04/9**

LOCATION: HUNUA QUARRY **GRID REF:** 321392.59E 676961.43N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 187.77m **SHEET** 8 **OF** 9

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 21-1-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-2-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100	Sample 1 5 20	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction 32 Piezometer Diameters in mm	Comments
			141					- indistinct shear bands (<2mm) spaced <30mm apart 141.45-142m.
			142					
			143		- some irregular NV patches of dark grey, MS, argillite between 142.3-144.4m.			
			144					Core broken along irregular NV joints 143.5-143.9m. SWL 93.5m after drilling at 143.8m. 11/2/04.
			145					
			146					
			147					Core broken along NV joints 146.5-147.15m. - some irregular shear bands (<3mm) 146.85-149m.
			148		- joints spaced <100mm and veins (<3mm, calcite & quartz) spaced 5-30mm apart below 147.5m.			Core broken along NV joints 147.5-149.6m.
			149			RFW		
			150					- 60° composite vein (<10mm, calcite & quartz) (broken). - 40° composite vein (<10mm, calcite & quartz).
			151		- joints spaced 50-150mm and veins (<3mm, calcite) spaced 25-100mm apart below 150.7m.			- 65° joint coated by calcite and pale grey sill (<1mm).
			152					Core broken along NV joints 151.8-152.8m.
			153					
			154		- joints spaced 25-75mm apart below 153.3m.			Core broken along NV joints 153.3-154.8m. Some irregular shear bands (<2mm) 153.55-154.3m.
			155		- joints spaced 25-200mm and veins (<3mm, calcite) spaced 10-50mm apart below 154.8m.			- 40° composite vein (<10mm, calcite & quartz). Core broken along NV joints 155.05-161.65m.
			156					Full circulation loss. SWL 94m on morning of 12/2/04.
			157					
			158		- some patches (clasts <10mm) of dark grey, S, siltstone 157.6-157.65m.			
					158m Fractured GREYWACKE SANDSTONE-SILTSTONE [FW]; grey, S, fresh. Crisscrossed by irregular joints-veins (<3mm, calcite) spaced <20mm apart. Pyrite specks on many joint surfaces.			Shattered core (<50mm pieces) 158.05-159.8m.
			159			RFW		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 33m.	123mm to 33m. 96mm to EOH.

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/9

LOCATION: HUNUA QUARRY
GRID REF: 321392.59E 676961.43N
SHEET 9 **OF** 9

CLIENT: Winstone Aggregates LTD
COLLAR ALTITUDE: 187.77m

JOB No. WAL04/1
DATUM: Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 21-1-04
DATE FINISHED: 16-2-04
LOGGED BY: GDF
DRILLER: Brown Bros (NZ) LTD
TYPE OF DRILLING RIG: Rig 8 SIMCO 5000 TR3
STAND PIPE: G.L.
ORIENTATION:
PLUNGE: 90°

Recovery (%) 25 50 75	Core >100mm (%) 0 5 2 1 5 10 20 50 100	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							32 ← Piezometer Diameters in mm	
			161		- irregular NV joint along core. White veins (<1mm, calcite) spaced 10-30mm apart below 160.2m.	RFW		
			162		160.7m GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Joints spaced 50-250mm and coated by calcite (<1mm). White veins (<2mm, calcite & quartz) spaced 20-100mm. Pyrite specks on many joint surfaces.			
			163		- irregular joints spaced 25-100mm apart below 163.2m.	RFW		- NV slickensided defect coated by light grey silt (<1mm) and crushed rock-vein material (<5mm) [Drilling induced?] 163.2-163.4m. Core broken along joints from 163.2m. SWL 94m after drilling at EOH. Full circulation loss. SWL 93.7m on morning of 13/2/04. Hole grouted (>73m) and abandoned after piezometer installation failed 13-17/2/04.
			164					
			165		- veins (<5mm, calcite & quartz) spaced 5-20mm apart below 165m.			
					165.8m			
			166		EOH @ 165.8m			
			167					
			168					
			169					
			170					
			171					
			172					
			173					
			174					
			175					
			176					
			177					
			178					
			179					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 33m.	123mm to 33m. 96mm to EOH.

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/10

LOCATION: HUNUA QUARRY
GRID REF: 321105.27E 676727.00N
SHEET 1 **OF** 8

CLIENT: Winstone Aggregates LTD
COLLAR ALTITUDE: 187.89m

JOB No. WAL04/1
DATUM: Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04
DATE FINISHED: 2-3-04
LOGGED BY: GDF
DRILLER: Brown Bros (NZ) LTD
TYPE OF DRILLING RIG: Rig 8 SIMCO 5000 TR3
STAND PIPE: 0.79m
ORIENTATION:
PLUNGE: 90°

Depth (m)	Legend	LITHOLOGY DESCRIPTION (Name, colour, strength, grain size, (moisture) miscellaneous)	Ref Code	Piezometer Construction	Comments
		Recovery (%) 25 50 75; Core >100mm (%) 0 5 2 10 50 100; Sample 1 5 20		32 ← Piezometer Diameters in mm	
0		UNCERTAIN [Fill, Topsoil to As Below]; minimal recovery of light brown with light grey, light orangish brown and brownish red mottles, firm (disturbed), plastic clayey silt with rootlets and some greywacke aggregate (<50mm). [Mixed uphole material?].	O		RQD entered into penetration field in database from 5.6m.
1.4m		- light orangish brown, stiff, plastic clay with rootlets by base. CLAY; light orangish brown with off-white streaks (and some brownish red near top & base), firm-stiff, plastic. [Residual Soil].	O		- maximum depth of contact.
2.1m		SILT with some sand; patchy pale brown to light orangish brown and brownish red with some irregular black seams, soft-firm (disturbed), slightly plastic. Remnant fractured texture. [HW Greywacke].			- minimum depth of contact.
		- becoming patchy pale brown to orangish brown with some irregular black seams, very soft-firm (disturbed), non-plastic, sandy silt.	ORH		0.3m uphole material at 1.8m.
5.6m		Weathered GREYWACKE; poor recovery (fines washed away). Some pieces (<100mm) of weathered (exteriors) to fresh (interiors) greywacke sandstone from corestones.	ORH		
8.6m		GREYWACKE SANDSTONE [SW]; grey with light orangish brown seams, WK-VS, weathered (<10mm along joints) to fresh (<80%). Irregular limonite-stained joints spaced 25-100mm apart.	RSW		Broken core from 8.6m.
10.35m		GREYWACKE SANDSTONE [HW-MW]; light brown to orange-brown, WK-VWK, weathered. Limonite-stained fractures spaced <20mm apart.	ORH		- 35° joint coated by light brown, slightly plastic silt (<5mm). Shattered core from 10.35m. Some light orangish brown, slightly to non-plastic fines (sandy silt) above 11.5m.
		- siltstone interval (>200mm) near 11.5m. Some less weathered patches (<100mm) below 11.7m.			SWL 0m on morning of 18/2/04.
12.95m		GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, MS-VS, partly weathered (<10mm along joints) to fresh (<75%). Limonite-stained joints spaced 50-300mm apart with some coated by orange-brown, non-plastic silt (<2mm). White veins (<2mm, weathered) spaced 25-100mm apart.	RSWg		- maximum depth of contact. Intact core from 12.95m. Defects generally dip 30-60°.
		- moderately weathered [MW] 14.3-14.6m. Joints spaced <100mm apart below 14.3m.			
15.55m		GREYWACKE SANDSTONE [SW-FW]; grey with some brown seams, VS, partly weathered (<5mm along joints) to fresh (>75%). Limonite-stained joints spaced <200mm apart with some coated by orange-brown, non-plastic silt (<1mm). Occasional white veins (<1mm, quartz).	RSWg		- 20° band (<20mm) of light orangish brown, non-plastic sandy silt. Core broken along NV joints 16.05-16.9m. 30° joint coated by light brown, silty sand to light orangish brown, non-plastic silt (<10mm) at 16.05m. - 30° joint coated by orangish brown, slightly plastic, sandy silt (<10mm). - 75° joint partly weathered <2mm into the adjacent rock. - 30° vein (5mm, quartz), 30° limonite-stained joint coated by orange-brown, non-plastic, silt (<3mm) at 17.45m. - irregular NV limonite-stained joints. - irregular limonite-stained joint.
16.9m		GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Occasional joints. White veins (<3mm, quartz) spaced <100mm apart. Occasional voids (<10mm) after vein material.	RFW		Core broken along NV joint-vein (<1mm,

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

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PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/10**

LOCATION: HUNUA QUARRY **GRID REF:** 321105.27E 676727.00N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 187.89m **SHEET** 2 **OF** 8

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.79m

DATE FINISHED: 2-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3 **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Core >100mm (%) 0 5 2 10 50 100	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							32 ← Piezometer Diameters in mm	
			21			RFW		zeolite?) 19.7-20.35m.
					21.3m Fine GREYWACKE SANDSTONE to SILTSTONE [SW-FW]; patchy grey-dark grey with some brown seams, S, partly weathered (<10mm along joints) to fresh (>75%). Limonite-stained joints spaced 25-150mm apart. Crisscrossed by white veins (<3mm, quartz) spaced 10-50mm. Occasional voids (<5mm) after vein. - seam (<50mm) of moderately weathered [MW] rock 21.8-21.95m.			Core broken along irregular NV limonite-stained joints 21.3-22.1m. - 40° limonite-stained joint coated by light orangish brown, non-plastic, sandy silt (<5mm).
			22					
			23					
			24		- sandstone with irregular siltstone patches (disturbed seams) below 23.4m. Harder (S-VS) with limonite-stained joints spaced 50-200mm apart.	RSWg		- irregular contact dipping 60°. Core broken along NV limonite-stained joints partly weathered <10mm into the adjacent rock 23.4-24.55m.
			25					
			26		- becoming coarser grained ("chipwacke") below 25.5m.			Core broken along NV network (<65mm) of irregular limonite-stained joints spaced <15mm apart 25.25-26.2m. Associated vein (<5mm, weathered) 25.85-26.15m. - NV network (>40mm) of irregular veins (<3mm, quartz) spaced <10mm apart with some voids (<10mm) 26.2-26.4m. - some voids (mostly <3mm) along veins 26.75-30.65m.
			27		26.75m CHIPWACKE to GREYWACKE SANDSTONE [SW-FW]; grey with some dark grey mottles (siltstone clasts <15mm), VS, fresh (<95%). Limonite-stained joints spaced 50-250mm coated by orange-brown silt (<1mm) and partly weathered <5mm into the adjacent rock. White veins (<5mm, quartz) spaced 10-100mm apart.			
			28		- irregular NV seam (<30mm) of dark grey, S, siltstone between 28.05-28.75m.			
			29		- irregular NV seam (>65mm) of dark grey, S-VS, fine-grained rock between 28.8-29.8m.	RSWg		
			30		- discoloured grey to light brown, moderately weathered [MW], sandstone 29.75-30.15m. - less weathered [FW <95%], sandstone below 30.15m.			- 60° seam (30mm) of streaky pale brown to grey, WK-MS, material [weathered composite vein] followed by slickensided defect and seam (20mm) of light orangish brown, non-plastic, sand-silt with some rock fragments 29.82-29.95m. [Minor Fault]. - 25° vein (<5mm, quartz). SWL 0m after drilling at 31.3m. Quick seal added. - 30° as above.
			31		30.65m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Occasional limonite-stained joints. Crisscrossed by white veins (<5mm, calcite) spaced <50mm apart.			
			32					
			33					- 50° composite vein (<5mm, calcite).
			34			RFW		- 75° joint partly weathered <5mm into the adjacent rock.
			35					
			36					- 15° joint partly weathered <3mm into the adjacent rock. - 50° joint partly weathered <3mm into the adjacent rock.
			37		37.1m GREYWACKE SANDSTONE [SW-FW]; grey, VS, fresh (<95%). Limonite-stained joints spaced 50-300mm apart and partly weathered <5mm into the adjacent rock. Crisscrossed by white veins (<3mm, calcite) spaced 10-100mm apart.			
			38			RSWg		- 50° joint coated by orangish brown, non-plastic, sandy silt (<2mm). Occasional voids (<10mm) along veins 37.1-42.6m. - two 50° joints 10mm apart and coated by light orangish brown clay (<1mm). - several intersecting joints partly weathered <5mm into the adjacent rock.
			39					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BOREHOLE No. HUN04/10

LOCATION: HUNUA QUARRY
GRID REF: 321105.27E 676727.00N
CLIENT: Winstone Aggregates LTD
COLLAR ALTITUDE: 187.89m
SHEET 3 **OF** 8
JOB No. WAL04/1
DATUM: Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04
DATE FINISHED: 2-3-04
LOGGED BY: GDF
DRILLER: Brown Bros (NZ) LTD
TYPE OF DRILLING RIG: Rig 8 SIMCO 5000 TR3
STAND PIPE: 0.79m
ORIENTATION:
PLUNGE: 90°

Recovery (%)	Core >100mm (%)	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
25 50 75	0.5 2 10 50 1 5 20 100						32 Piezometer Diameters in mm	
			40			RSWg		
					40.45m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Limonite-stained joints spaced 50-500mm apart and partly weathered <2mm into the adjacent rock. White veins (<3mm, calcite) spaced 20-100mm apart. Minor clasts (mostly <15mm) of dark grey, MS-S, siltstone.			Core broken along interconnected NH voids (some limonite-stained) along veins 40.97-41.02m.
			41					
					- some elongated siltstone clasts (<25mm) 42.25-42.4m.			- several joints partly weathered <1mm into the adjacent rock and interconnected voids as above 42.1-42.2m.
			42		- occasional clean joints and crisscrossed by veins (<5mm, calcite) spaced <50mm apart below 42.6m.			
			43					
			44					
					- network of irregular white to grey veins (<5mm, calcite & quartz) spaced <20mm apart between 44.6-45.45m.			
			45					
			46			RFW		- 20° composite vein (<10mm, calcite & quartz).
					- white to grey veins (<5mm, calcite & quartz) spaced <20mm apart below 46.8m.			
			47					Core broken along limonite-stained joints partly weathered <2mm in the adjacent rock and interconnected voids (<20mm) along veins 47.2-47.5m. 20° band (20mm) of limonite-stained porous rock at top. - intersecting 50° & 30° limonite-stained joints. - NV limonite-stained joint 48.52-48.76m. 60° composite vein (<10mm, calcite) at 48.6m.
			48					
					- interval of dark grey, MS-S, siltstone dipping 30° along base 48.63-48.78m.			
			49					
			50					- 45° white to pale grey composite vein (<15mm, calcite & quartz).
			51					Core broken along two limonite-stained joint-veins (<1mm, calcite) 51.15-51.55m.
			52		52.2m Interbedded GREYWACKE SANDSTONE to SILTSTONE [FW]; grey to dark grey, S-VS, fresh (>95%). Occasional joints. Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced 10-50mm apart.			- bedding dips >70° below 52.2m.
			53					- 75° joint-vein (<2mm, calcite) coated by dark greenish grey material (<1mm) 52.75-53m. Trace pyrite specks on joint surface. SWL 3.2m after drilling at 52.8m. 20/2/04. Core broken along NV joint-composite vein (<5mm, calcite) coated by dark greenish grey material and some pale grey clay (<1mm) 53.1-53.35m. Trace pyrite specks on joint surface.
			54		- veins (<5mm, calcite) spaced 20-100mm apart below 53.9m.			
			55			RFW		- 15° network (150mm) of irregular veins (<15mm, calcite & quartz) spaced <10mm apart and central slickensided defect 54.9-55.1m.
			56					
					- less siltstone seams (<50mm) below 56.4m.			
			57		- limonite-stained joints spaced <50mm apart and partly weathered <5mm in the adjacent rock 57-57.9m. Moderately weathered [FW<50%] and fractured (<20mm) 57.15-57.6m. Some joints coated by light brown to orangish brown, slightly plastic silt (<1mm).			- some voids (<25mm) along veins 57.4-57.5m. NH vuggy vein (<10mm, quartz) at 57.45m.
			58		- fresh below 57.8m.			
					58.35m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Occasional limonite-stained joints. Crisscrossed by white veins (<3mm, calcite) spaced 10-75mm apart.			
			59			RFW		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BOREHOLE No. **HUN04/10**

LOCATION: HUNUA QUARRY | **GRID REF:** 321105.27E 676727.00N

CLIENT: Winstone Aggregates LTD | **COLLAR ALTITUDE:** 187.89m | **SHEET** 4 **OF** 8

JOB No. WAL04/1 | **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04 | **DRILLER:** Brown Bros (NZ) LTD | **STAND PIPE:** 0.79m

DATE FINISHED: 2-3-04 | **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3 | **ORIENTATION:** | **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 1 5 20 100	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							32 ← Piezometer Diameters in mm	
			61		- few limonite-stained joints below 59.85m.			- intersecting 60° & 25° joints partly weathered <5mm into the adjacent rock.
			62					
			63		- veins (<5mm, calcite) spaced 5-20mm apart below 62.65m.			- 50° band (7mm) of greenish grey, WK, altered rock. - 65° joint-vein (<2mm, calcite) partly coated by greenish grey, non-plastic silt. Core broken along irregular limonite-stained joint 62.95-63.35m. - irregular NV joint-vein (<1mm, calcite) (mostly broken core) 63.8-64.4m. Limonite-stained and partly weathered <3mm into the adjacent rock below 64m.
			64					
			65					
			66		- irregular veins (<5mm, calcite & quartz) spaced <10mm apart below 65.6m.			- 20° off-white composite vein (<15mm, quartz) with minor voids (<3mm). - 40° limonite-stained joint partly weathered <2mm into the adjacent rock.
			67		- veins (<3mm, calcite) spaced 20-100mm apart below 66.75m.			- indistinct shear bands (<3mm) spaced <50mm apart by 66.75m. Core broken along limonite-stained joints partly weathered <1mm into the adjacent rock 67.35-67.45m. 21/2/04.
			68					
			69		- irregular veins (<5mm, calcite & quartz) spaced <20mm apart below 69m.	RFW		- 50° limonite-stained joint-vein (<1mm, quartz) partly weathered <2mm into the adjacent rock. - 50° limonite-stained joint partly weathered <3mm into the adjacent rock and coated by light orangish brown clay (<1mm).
			70					- 35° limonite-stained joint-vein partly weathered <3mm into the adjacent rock and along fractures within 30mm.
			71		- veins (<5mm, calcite & quartz) spaced 10-100mm apart below 70.55m.			
			72					- 25° limonite-stained joint partly weathered <3mm into the adjacent rock. - voids (<5mm) along 50° network (<15mm) of irregular veins (<3mm, calcite). Lost circulation at 73. Quick seal added.
			73					
			74		- veins (<3mm, calcite) spaced 50-150mm apart below 73.57m.			SWL 13.8m on morning of 24/2/04.
			75					
			76					- 60° network (<20mm) of irregular veins (<5mm, calcite) 76-76.1m.
			77		77.45m GREYWACKE SANDSTONE [SW-FW]; grey with minor brown seams, VS, partly weathered (<3mm along joints) to fresh (<95%). Limonite-stained joints spaced 50-500mm apart. White veins (<3mm, calcite & quartz) spaced 50-150mm apart.			Core broken along NV joint partly weathered <3mm into the adjacent rock 77.7-78m.
			78			RSWg		
			79					Core broken along NV joint(s) partly weathered <2mm into the adjacent rock 78.8-79.45m.
			80m		- irregular white-grey veins (<5mm, quartz) spaced <20mm apart between 79.42-79.85m.			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BOREHOLE No. **HUN04/10**

LOCATION: HUNUA QUARRY **GRID REF:** 321105.27E 676727.00N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 187.89m **SHEET** 5 **OF** 8

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.79m

DATE FINISHED: 2-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100	Sample 1 5 20	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction 32 ← Piezometer Diameters in mm	Comments
			81		GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Occasional joints. White veins (<3mm, calcite) spaced 20-150mm apart.			- 25° limonite-stained joint partly weathered <3mm into the adjacent rock. Some voids (<10mm) along veins (<3mm, quartz) within 50mm.
					- irregular NV seam (>65mm) of dark grey, S, siltstone between 81.2-81.95m.			- intersecting irregular 40° & 65° limonite-stained joint partly weathered <2mm into the adjacent rock. Mega-swell used to maintain circulation. SWL 34.3m on morning of 25/2/04.
			82		- few discontinuous veins (<3mm, calcite) below 82.35m.			- 25° limonite-stained joint partly weathered <1mm into the adjacent rock. Core broken along NV joint-veins (<2mm, calcite) 82.1-82.26m. 35° limonite-stained joint coated by light orangish brown to greenish brown, non-plastic silt (<1mm) at 82.1m.
			83					- 40° joint coated by calcite and pale greyish green material (<1mm). - intersecting NV & 30° limonite-stained joints.
			84		- joints spaced 50-300mm apart and coated by calcite and/or dark green chloritic material (<1mm) below 83.95m. Crisscrossed by irregular veins (<5mm, calcite) spaced <100mm apart below 84.1m.			- irregular 60° slickensided defect coated by calcite and chloritic material (<1mm). - irregular 60° slickensided defect coated by calcite and chloritic material (<1mm) with remnant patches of light grey, non-plastic, sandy silt (<2mm).
			85					
			86					
			87		- moderately weathered [FW<50%] 86.55-86.6m. Joints spaced 100-400mm apart and veins (<3mm, calcite & quartz) spaced 50-200mm apart below 86.6m.	RFW		Core broken along limonite-stained joints partly weathered <5mm into the adjacent rock 86.35-86.6m. Voids (<10mm) along veins (<2mm) to 87.05m. - two intersecting 50° limonite-stained joints.
			88					- 60° joint-vein (<3mm, calcite) intersecting above. - 65° joint-vein (<3mm, calcite) with trace pyrite specks. - 30° partly weathered band (<20mm) along limonite-stained joint(s).
			89		- veins (<3mm, calcite) spaced 10-50mm apart below 88.9m.			
			90		- veins (<3mm, calcite) spaced <20mm apart below 90m. - veins (<3mm, calcite) spaced 25-75mm apart below 90.3m.			Core broken along irregular NV slickensided defect(s) coated by pale grey, non-plastic silt to dark green chloritic material (<1mm).
			91					
			92		- veins (<3mm, calcite & quartz) spaced 5-30mm apart below 91.75m.			
			93		93.35m			- irregular NV joint(s) coated by greenish grey, low-plasticity clay (<1mm) 92.8-93.3m.
					Veined GREYWACKE SANDSTONE [SW]; grey with some brown, VS, partly weathered (<5mm along joints) to fresh (<95%). Irregular limonite-stained joints spaced 25-200mm apart with some coated by orange-brown, non-plastic silt (<1mm). White veins (<3mm, calcite & quartz) spaced <20mm apart.	RSW		Core broken along 35-50° slickensided defects (some limonite-stained) with common pyrite specks 93.2-93.4m. Core broken along joints 93.6-95.1m. - 25° light grey-white composite vein (<10mm, quartz) with limonite-stained contacts partly weathered <5mm into the adjacent rock.
			94		- joints spaced <30mm apart below 94.7m. - moderately weathered [MW] and fractured (<10mm) below 94.85m.			
			95		95.5m Discoloured grey, MS-S, moderately altered rock with irregular white-grey, veins (<10mm, quartz) spaced <20mm apart below 95.2m. Some voids (<20mm) along veins.			- intersecting 60° slickensided defect coated by calcite and dark green chloritic material (<1mm) and 45° limonite-stained joint partly weathered <2mm into the adjacent rock. - 45° interval of variable off-white and light brown to grey, VS, vein material-siliceous rock 95-95.15m. Shattered core (<20mm pieces) with some brown fines (silty sand) 95.15-95.2m.
			96		GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Occasional joints-broken veins. Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 10-30mm apart. Fractured (<20mm) above 96m.			Core broken along NV limonite-stained defects 95.5-95.9m.
			97		- occasional joints-broken veins. Veins (<3mm, calcite & quartz) spaced 50-200mm below 96.8m.			
			98			RFW		Core broken along irregular NV joints (some limonite-stained) coated by pale greenish grey to orange-brown non-plastic silt (<1mm) 96.4-96.65m. Common pyrite specks on joint surfaces and voids (<3mm) along veins within 20mm. - 30° limonite-stained joint coated by orangish brown non-plastic silt. - 40° calcite vein network (<10mm).
			99					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BOREHOLE No. HUN04/10

LOCATION: HUNUA QUARRY
GRID REF: 321105.27E 676727.00N
SHEET 6 OF 8

CLIENT: Winstone Aggregates LTD
COLLAR ALTITUDE: 187.89m

JOB No. WAL04/1
DATUM: Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04
DATE FINISHED: 2-3-04
LOGGED BY: GDF
DRILLER: Brown Bros (NZ) LTD
TYPE OF DRILLING RIG: Rig 8 SIMCO 5000 TR3
STAND PIPE: 0.79m
ORIENTATION:
PLUNGE: 90°

Recovery (%)	Core >100mm (%)	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
25 50 75	0 5 2 10 50 100 / 1 5 20						32 ← Piezometer Diameters in mm	
			101		- joints-broken veins spaced 50-350mm apart. Veins (<3mm, calcite & quartz) spaced 10-75mm below 100.8m. Common pyrite specks on joint surfaces.			SWL 0m after drilling at 100.5m. Crystal-rain used to maintain circulation. SWL 37.1m on morning of 26/2/04.
			102					
			103					Core broken along irregular NV joint-vein (<1mm, calcite) 103-103.6m.
			104					Core broken along NV joint-vein (<1mm, calcite) 104.1-104.35m.
			105					
			106		- occasional joints-broken veins. Veins (<3mm, calcite & quartz) spaced 25-150mm. Trace siltstone patches (clasts <15mm) by 105.7m.			
			107					
			108		- joints-broken veins spaced 50-350mm apart. Veins (<6mm, calcite) spaced 5-75mm between 107.75-109m.			- 50° calcite vein network (<15mm).
			109		- some elongated patches (<70mm, disrupted NV seams) of dark grey, S, siltstone between 108.45-109.7m.			
			110		- occasional joints-broken veins. Veins (<3mm, calcite) spaced 25-150mm below 109.7m.	RFW		- 65° slickensided defect coated by calcite (<1mm).
			111					
			112		- veins (<5mm, calcite) spaced 10-75mm below 112.1m. Minor elongated patches (clasts <50mm) of dark grey, MS-S, siltstone between 112.2-112.75m.			
			113					
			114					- irregular 75° network (<20mm) of veins (<5mm, calcite).
			115		- joints-broken veins spaced 75-350mm apart. Veins (<4mm, calcite & quartz) spaced 10-50mm below 115.3m.			
			116					- 50° slickensided defect coated by calcite and chloritic material (<1mm).
			117					
			118					
			119		- irregular joints-slickensided defects spaced 25-75mm apart and			Core broken along defects 119.5-120.05m.

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

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PIEZOA HUN GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/10**

LOCATION: HUNUA QUARRY **GRID REF:** 321105.27E 676727.00N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 187.89m **SHEET** 7 **OF** 8

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.79m

DATE FINISHED: 2-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction 32 ← Piezometer Diameters in mm	Comments
			121		coated by calcite and/or chloritic material (<1mm) below 119.5m.	RFW		
					121.3m Sheared to Veined GREYWACKE SANDSTONE [SA]; discoloured grey, S-VS, slighlly altered. Crisscrossed by irregular defects spaced <20mm and coated by calcite and/or chloritic material (<1mm). Discontinuous white veins (<3mm, calcite) spaced <50mm apart. Trace dark grey, S, siltstone patches (<20mm).			
			122					- irregular 60° vein (<5mm, calcite).
			123					
			124		- occasional joints below 123.65m. Irregular veins (<5mm, calcite) spaced <20mm by 124m.			
			125			RFW		- 40° slickensided defect coated by chloritic material (<1mm). Driller estimates 50% circulation loss. SWL 38.6m on morning of 27/2/04. Core broken along irregular NV joint-vein(s) (<1mm, calcite) 125.1-125.45m. - irregular NV seam (>45mm) of brecciated rock (<10mm) cemented by vein material (<5mm, calcite & quartz) 125.8-126.05m.
			126					
			127		- veins (<5mm, calcite) spaced <40mm apart between 126.85-127.9m. Defects spaced <20mm apart by 127.15m.			
			128		- minor elongated patches (<70mm, disrupted NV seams) of dark grey, S, siltstone between 128.2-128.5m.			Core broken along irregular NV defects 127.5-128m.
			129		129.05m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Irregular defects spaced 25-75mm apart and coated by calcite and/or chloritic material (<1mm). Crisscrossed by irregular veins (<3mm, calcite & quartz) spaced <30mm apart. Trace dark grey, S, siltstone patches (clasts <10mm).			
			130					
			131		- minor elongated patches (clasts <15mm & disrupted NV seams <50mm) of dark grey, S, siltstone between 131.2-131.7 & 132.25-132.35m.			
			132					- NV network (<65mm) of irregular defects spaced <20mm apart and coated by calcite and chloritic material (<1mm) 131.95-132.6m.
			133					
			134		- occasional NV defects and veins (<3mm, calcite) spaced 10-50mm apart between 133.4-134.4m.			
			135		- defects spaced 10-50mm apart and veins (<5mm, calcite & quartz) spaced 5-25mm apart below 134.4m.	RFW		- 55° network (<35mm) of irregular veins (<7mm, calcite) spaced <10mm apart. Core broken along defects 135.05-135.3 & 135.6-136.1m.
			136					
			137					- 60° composite vein (<8mm, calcite). Core broken along defects 136.6-137.1 & 137.3-139m. - 60° irregular network (<30mm) of veins (<10mm, quartz) spaced <10mm apart.
			138					- 15° network (50mm) of irregular veins (<10mm, calcite & quartz) spaced <15mm apart.
			139		- minor patches (clasts <30mm) of dark grey, MS-S, siltstone between 138.3-138.7m.			Core broken along defects 139.35-140.35m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BOREHOLE No. **HUN04/10**

LOCATION: HUNUA QUARRY **GRID REF:** 321105.27E 676727.00N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 187.89m **SHEET** 8 **OF** 8

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-2-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.79m

DATE FINISHED: 2-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 1 2 5 10 20 50 100	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							32	← Piezometer Diameters in mm
			140.3m			RFW		
			141		Fractured to Brecciated GREYWACKE SANDSTONE [MA]; patchy discoloured grey, WK-MS, variably altered. Crisscrossed by irregular fractures and white veins (<10mm, calcite) spaced <10mm apart. [Fault Zone].	RW		- 15° defect coated by pale grey, low plasticity clay (<1mm). - 30° band (30mm) of light grey, non-plastic silt. Shattered core (<20mm pieces) with minor fines (silty sand) 140.65-140.75m. - 50° band (5mm) of slickensided defects coated by grey, low plasticity clay (<1mm). - 60° defect coated by light grey, non-plastic silt (<2mm). Core broken to shattered along defects 141.65-141.85m. - 40° composite vein (40mm, quartz). Bedding dips >70° below 141.9m. - intersecting 35° & 65° composite vein-network (15mm, quartz) 143.95-144.15m. SWL 5m after drilling at EOH. Driller estimates 40% circulation loss. SWL 44.2m on morning of 1/3/04. Installing piezometer 1/3/04 & 2/3/04.
			141.9m		- siltstone parent rock by 141.5m.			
			142		Veined GREYWACKE SANDSTONE-SILTSTONE [FW]; dark grey (above 142.4m) to grey, S, fresh. Crisscrossed by irregular white veins (<15mm, calcite & quartz) spaced <20mm apart.			
			143			RFW		
			144					
			144.3m		EOH @ 144.3m			
			145					
			146					
			147					
			148					
			149					
			150					
			151					
			152					
			153					
			154					
			155					
			156					
			157					
			158					
			159					

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BOREHOLE No. HUN04/11

LOCATION: HUNUA QUARRY **GRID REF:** 321298.42E 676704.33N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 185.78m **SHEET** 1 **OF** 8

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 4-3-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.68m

DATE FINISHED: 16-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100 / 1 5 20	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							32 ← Piezometer Diameters in mm	
			0		UNCERTAIN [Topsoil to As Below]; no recovery.	UD		RQD entered into penetration field in database from 6.6m.
					0.73m			
			1		1.13m CLAYEY SILT; light brown to orangish brown with dark brown specks, firm (disturbed), slightly plastic-plastic. Roollets. [Topsoil-Residual Soil].	O		
					1.4m CLAY; variable light orangish brown with off-white mottles, soft-firm (disturbed), plastic. Some roollets. [Residual Soil].	O		- maximum depth of contact. Lost core assumed from top.
			2		UNCERTAIN [Clay]; no recovery.	UD		
			3		3m			
					3.25m CLAY; mixed light orangish brown and light brownish red with some	O		
					3.5m off-white streaks, very soft-firm (disturbed), plastic.	O		
			4		CLAYEY SILT; light brown with pale grey streaks, firm-stiff (disturbed), plastic to slightly plastic.			
					UNCERTAIN [HW-MW Waitemata Group]; minimal recovery of light greyish brown (orange tint) with some light brownish red surfaces, disturbed to tightly packed (very stiff), muddy sand.	O		
			5		- mixed brownish red and light orangish brown with some off-white streaks, very soft (disturbed), plastic clay between 4.5-4.85m. [Uphole material?].			
					5.4m CARBONACEOUS MUDSTONE [SW/FW]; dark brown, EWK (hard). [Te Kuiti Group].	O		- minimum depth of contact. Probable uphole material (light orangish brown, loose (disturbed), fine sand with some silt and hard lumps of grey (some with orange-brown specks), fine sandstone-siltstone) 5.5-5.7m. Geotechnical sample 6.6-7.11m.
			6		- NH bands (<10mm) of coal between 5.95-6.05m.			
					6.3m - disturbed mudstone with patch (>65mm) of grey, VWK, weathered	Un		
					6.6m greywacke sandstone below 6.2m.			
			7		UNCERTAIN [Basal Conglomerate/As Below]; pieces (<100mm) of grey, VWK, weathered greywacke sandstone and uphole material.			Geotechnical sample 7.48-7.8m.
					Weathered GREYWACKE (SANDSTONE) [HW-MW]; patchy pale brown to light greenish grey, EWK-VWK, weathered. Remnant fractured texture (spacing <50mm).			
			8		- greenish grey with some pale brown patches below 7.7m.			Core broken 8.1-11.1m.
					- some less weathered patches between 8.35-8.6m.			
			9		- patchy greenish grey to grey and common less weathered [FW<50%] intervals between 8.75-10.85m. Fractures spaced 10-100mm apart.			
			10					
			11		- greenish grey with pale brown (oxidized?) patches, weathered greywacke siltstone by 10.85m. Remnant fractured texture (spacing <20mm) with slickensided defects 10.85-11.2m.			- 50° slickensided defect.
					- indistinct interval of weathered greywacke sandstone 11.55-12.5m.			- 35° slickensided defect coated by light greenish grey, plastic clay <2mm.
			12					- NH semitransparent vein (30mm, zeolite?) with 10° band (<5mm) of off-white, plastic clay along base.
						ORH		Geotechnical sample 11.65-11.94m.
			13					- black material and pyrite (<2mm) along some fractures. 55° slickensided defect coated by pale brown, plastic clay <2mm at 12.1m.
					- becoming less weathered below 13.6m.			- 55° slickensided defect coated by pale brown, plastic clay <1mm.
			14		- discoloured grey (green-tint) to grey and slightly weathered [FW >50%] between 14-15.6m. Crisscrossed by irregular joints spaced <50mm apart and coated by off-white, non-plastic silt (<3mm). Greywacke sandstone 14.25-15m.			Shattered core (<50mm pieces) from 12.9m. - band (>30mm) of light grey (green-tint), plastic clay with some rock fragments near 13.6m. [Minor Fault].
			15					- seam (>50mm) of clayey crushed rock near 14m. [Minor Fault]. Broken core from 14m.
								- seam (<50mm) of greenish grey, plastic clay and crushed rock near 14.8m. [Minor Fault].
			16		- patchy greenish grey, VWK, weathered greywacke sandstone below 15.6m. Remnant fractured texture (spacing <20mm).			
					- crisscrossed by slickensided defects coated by dark green chloritic material and/or light grey (oxidized pale brown), low plasticity clay (<2mm).			- 70° slickensided defect coated by light grey (oxidized pale brown), low plasticity clay (<5mm).
			17		- slightly weathered [SW] between 16.6-17.4m. Crisscrossed by irregular joints spaced <20mm apart with some coated by off-white, non-plastic silt to light grey (oxidized pale brown), low plasticity clay (<1mm).			- irregular NV joint(s) coated by light grey (oxidized pale brown), low plasticity clay-sand (<5mm) 17.1-17.4m.
			18		- no core recovery 17.4-18.3m.			
					- patchy greenish grey, VWK-WK, weathered greywacke sandstone by 18.3m. Remnant fractured texture (spacing <20mm). Minor irregular			
			19		19.15m bands (<5mm) of pale brown material.			
					GREYWACKE SANDSTONE [MW]; patchy discoloured grey to grey,	ORM		- crisscrossed by irregular defects spaced <20mm apart with some coated by pale brown to light greenish grey, non-plastic silt (<2mm)
					19.6m MS-VS, partly weathered to fresh (<50%). GREYWACKE SANDSTONE [SW]; grey, MS-VS, partly weathered	RSW		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/11

LOCATION: HUNUA QUARRY
GRID REF: 321298.42E 676704.33N

CLIENT: Winstone Aggregates LTD
COLLAR ALTITUDE: 185.78m
SHEET 2 **OF** 8

JOB No. WAL04/1
DATUM: Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 4-3-04
DATE FINISHED: 16-3-04
LOGGED BY: GDF
DRILLER: Brown Bros (NZ) LTD
TYPE OF DRILLING RIG: Rig 8 SIMCO 5000 TR3
STAND PIPE: 0.68m
ORIENTATION:
PLUNGE: 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100 / 1 5 20	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Rel Code	Piezometer Construction (32 ← Piezometer Diameters in mm)	Comments
			21		(indistinct along joints) to fresh (<75%). Crisscrossed by irregular joints spaced 10-75mm apart and coated by dark green, chloritic material (<1mm) and/or pale brown, non-plastic silt to brownish grey, plastic clay (<2mm).			19.15-19.6m. - defects mostly dip >45°.
			22		- less weathered [<95%] 21.2-22.5m. NH clean joints spaced 100-300mm apart and crisscrossed by white veins (<3mm, quartz) spaced 10-100mm apart below 21.2m.	RSW		Intact core 21.2-22.5 & 23.05-23.8m.
			23		- crisscrossed by irregular joints spaced <20mm apart and coated by dark green, chloritic material (<1mm) 22.5-23m. - less weathered [<95%] below 23m.			SWL 2m after drilling at 22.5m. SWL 12.4m on morning of 5/3/04.
			24		23.8m Weathered GREYWACKE (SANDSTONE) [HW-MW]; patchy greenish grey, VWK-WK, weathered. Remnant fractured texture (spacing <20mm). Defects coated by dark green, chloritic material (<1mm) and/or pale brown material (<2mm, after veins).	ORH		
			25		- variable orange to brownish grey near base.			
			26		25.9m GREYWACKE SANDSTONE [MW]; brown with grey patches, MS-VS, partly weathered to fresh (<50%). Crisscrossed by irregular limonite-stained joints spaced <20mm apart with some coated by orange-brown, non-plastic silt (<1mm). Weathered veins (<3mm) spaced 10-50mm apart.			- seam (>50mm) of light orangish brown, muddy crushed rock-vein material (<15mm, quartz) near 25.7m. Fractured (<10mm) rock below to 26.25m. [Minor Fault]. Common voids along veins (<15mm) by 25.9m.
			27			ORM		
			28					
			29		29.35m GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, MS-VS, partly weathered (<10mm along joints) to fresh (>50%). Crisscrossed by irregular limonite-stained joints spaced <20mm apart. Crisscrossed by weathered veins (<3mm) spaced 10-30mm apart.			
			30			RSWb		- intersecting 65° & 15° white-transparent veins (<7mm, weathered & quartz) with voids (<5mm). Mostly intact core from 30.9m.
			31		- less weathered [FW >75%] and joints spaced 20-200mm apart below 31.15m.			
			32					- vuggy voids (<35mm by 10mm) along intersecting veins (<5mm, weathered) 31.7-31.75m.
			33		32.5m - NV seam (>65mm) of finer grained rock 32.3-32.45m. Veined GREYWACKE SANDSTONE [MW]; brown, MS, partly weathered. Crisscrossed by irregular limonite-stained joints spaced <50mm apart with some coated by light orangish brown, slightly plastic, sandy silt (<2mm). Crisscrossed by discontinuous weathered veins (<5mm) spaced <20mm apart.			- 55° network (<20mm) of irregular veins (<7mm, quartz). - 70° limonite-stained, joint-weathered vein (<5mm) coated by silt (<1mm). - 55° weathered vein (<7mm). Core broken along joints 32.7-33.1m.
			34		- becoming less weathered [FW <50%] below 33.2m.	RW		
			35					- 35° limonite-stained, slickensided defect coated by chloritic material (<1mm) and calcite (<2mm). - NV network (<65mm) of irregular weathered veins (<15mm) 34.5-35.4m. - irregular 55° joint-vein filled by light orangish brown, hard material (<10mm). Few voids below 35.4m.
			36		35.4m Veined GREYWACKE SANDSTONE [SW-FW]; grey with some brown seams, VS, partly weathered (<10mm along joints) to fresh (>75%). Limonite-stained joints spaced 100-350mm apart. Crisscrossed by white veins (<5mm, calcite) spaced 10-30mm apart.			
			37			RSWg		
			38					
			39		- veins (<10mm, calcite) spaced 5-20mm apart below 39.3m. Irregular partly weathered seams (<40mm) along NV joint-veins below 39.4m.			- 30° network (<30mm) of composite veins (<10mm, calcite & quartz).

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/11**

LOCATION: HUNUA QUARRY **GRID REF:** 321298.42E 676704.33N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 185.78m **SHEET** 3 **OF** 8

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 4-3-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.68m

DATE FINISHED: 16-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3 **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100 (1 5 20)	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction (32 ← Piezometer Diameters in mm)	Comments
			40		40.25m Veined GREYWACKE SANDSTONE [MW-SW]; patchy grey and brown intervals, MS-VS, partly weathered (discoloured to weakened) to fresh (>50%). Irregular limonite-stained joints spaced 20-50mm apart. Crisscrossed by irregular white veins (<5mm, calcite) spaced <20mm apart. - less weathered [FW >75%] 41.25-41.75m.			
			41					
			42		- less weathered [FW <75%] and joints spaced 25-150mm apart below 42.2m.			
			43			RSWb		
			44					SWL 2m after drilling at 43.8m. Driller estimates 5% circulation loss. SWL 24.1m on morning of 8/3/04.
			45		- becoming more weathered [FW >50%].			
					45.85m - moderately weathered [FW <50%] below 45.5m.			- >70° network (<100mm) of irregular weathered veins (<7mm) 45.5-45.85m. Most defects dip 30-70° by 45.85m.
			46		Veined GREYWACKE SANDSTONE [SW-FW]; grey, VS, fresh (<95%). Limonite-stained joints spaced 50-350mm apart and partly weathered <5mm into the adjacent rock. Crisscrossed by irregular white veins (<5mm, calcite) spaced 5-30mm apart.			- irregular seam (70mm) of intensely veined-brecciated rock with central 30° composite vein (10mm, calcite & quartz).
			47					
			48					- 65° irregular joint with voids (<12mm long) and partly weathered <10mm into the adjacent rock.
			49			RSWg		
			50		- more weathered [FW >50%] between 50.03-51.55m.			- 30° vein (<6mm, calcite). NV joints-network (>65mm) of veins (<10mm, calcite) spaced <20mm apart and associated seam of brown, partly weathered rock 50.03-51.55m. Broken core 50.2-51.55m.
			51					
			52		52.15m - grey, VS, fine sandstone-siltstone below 51.95m. Veined GREYWACKE SANDSTONE with some siltstone [MW]; brown, MS-S, partly weathered with minor fresh patches. Crisscrossed by irregular limonite-stained joints and weathered veins (<5mm, occasional voids (<10mm)) spaced 5-20mm apart. Fine-grained rock above 52.4m.			- NV seam (>65mm) of veined (<10mm, calcite) to brecciated rock (<30mm) 52.05-53.55m.
			53			RW		
			54		- siltstone between 53.95-54.4m.			
					54.55m - becoming less weathered [FW <50%] below 54.3m.			
			55		Veined GREYWACKE SANDSTONE [MW to SW]; grey with brown intervals, MS-VS, partly weathered to fresh (>50%). Occasional limonite-stained joints. Crisscrossed by irregular white veins (<10mm, calcite) spaced <30mm apart.			
			56		- siltstone interval 56.35-57m. Some irregular patches (<100mm, disrupted NV seams) of dark grey, S, siltstone above to 56.25m. - moderately weathered [FW <50%] between 56.45-56.75 & 56.85-57.35m. - joints spaced 50-350mm apart below 57.3m.			- intersecting 35° & 65° joints coated by orange-brown, non-plastic silt (<1mm). Core broken along joints coated as above 56.9-57.3m. - 50° weathered vein (<5mm).
			57			RSWb		
			58					
			59		- moderately weathered [FW <50%] between 58.55-59.6m. Veins (<5mm, weathered & calcite) spaced <20mm apart below 58.55m.			- >65° joint-vein (<7mm, calcite) 59.7-59.9m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

PIEZOA_HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/11**

LOCATION: HUNUA QUARRY **GRID REF:** 321298.42E 676704.33N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 185.78m **SHEET** 4 **OF** 8

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 4-3-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.68m

DATE FINISHED: 16-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100 / 1 5 20	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							32	← Piezometer Diameters in mm
			61		- moderately weathered [FW <50%] between 60.95-61.6m.			
			62		- less weathered [FW >75%] below 62.05m. Veins (<5mm, calcite) spaced <10mm apart.	RSWb		
			63					
			64					- >40° joint-composite vein (<5mm, calcite) coated by pale brown, low-plasticity clay and associated partly weathered seam 64.04-64.14m. 65° joint-vein (<1mm, calcite) coated by light grey, non-plastic silt at 64.5m. - >40° network (<75mm) of joint-veins filled by pale brown, low-plasticity clay with some rock fragments 64.75-64.95m. - white, low-plasticity clay with some rock fragments 65.35-65.45m. [Fault]. - irregular 50° joint coated by off-white to pale brown, low-plasticity clay (<10mm). Core shattered (<50mm pieces) along joints with some fines (sandy silt) 65.85-66.1m. SWL 3m after drilling at 66.1m. Driller estimates 5% circulation loss. SWL 25.9m on morning of 9/3/04. - 15° & 25° slickensided defects coated by light orangish brown, slightly plastic sill (<1mm) at 66.7 & 66.75m. Core broken along joints 67.65-68.1m. - irregular 50° composite vein (<12mm, quartz) 68.95-69.05m. Irregular NV seams (<10mm) of pale brown, WK, material (weathered veins)-brecciated rock (<20mm) to 69.6m. Core broken along joints coated by silt (<1mm) 69-70.1m. - 70° joint filled by light orangish brown, non-plastic sandy silt (<5mm) 70.8-71m. Core shattered (<50mm pieces) along NV joints coated as above (<2mm) 71-71.5m.
			64.7m		Veined GREYWACKE SANDSTONE [MW]; light brown to brown, WK-MS, weathered-partly weathered. Crisscrossed by irregular weathered veins (<5mm) spaced <10mm apart. Siltstone 65.2-65.45m. Interval (<160mm, dip 60°) of off-white to pale grey, vein material (quartz) between 65.45-65.65m. - brown, MS-S and partly weathered below 65.75m. Limonite-stained joint-weathered veins (<5mm) spaced <20mm apart with some coated by light orangish brown, slightly plastic silt (<2mm). - fractured (<10mm) siltstone between 66.55-66.75m.			
			65					
			66					
			67					
			68					
			69		- siltstone between 69.3-69.6m.			
			70					
			71					
			72			RW		- irregular NV, weathered, composite vein (<20mm) 72.5-72.85m.
			73		- occasional voids (<15mm) along veins between 72.8-74.1m. Some indistinct siltstone bands (<20mm, dip 45°) between 73-73.3m.			- irregular >65° composite vein (<15mm, quartz). Core shattered (<50mm pieces) with some light orangish brown fines (sand-sill) (<2mm) 73.9-74m. 25° joint coated as above at 74m. - irregular >45° network of irregular weathered veins (<12mm, some calcite) spaced <20mm apart 74.6-75m.
			74		- sillstone band (<20mm, dip 20°). Joints (some with indistinct slickensided surfaces) spaced 25-100mm by 74m.			
			75					
			76		- joint-weathered veins (<5mm) spaced <20mm apart with some coated by light orangish brown, non-plastic sill (<1mm) between 76.1-76.8m.			- 60° seam of brecciated rock with light brown, silty sand matrix 75.9-76.1m. [Fault]. Core broken along joints 75.9-77m. Core shattered (<50mm pieces) with some light orangish brown fines (sand-sill) 76.5-76.8m. Steeply dipping seam (<30mm) of light orangish brown fines (sand-sill) and crushed rock-vein material near 76.6m. [Fault]. Core broken along mostly NV joints 77.1-79.65m. - some elongated sillstone patches (disrupted bands <10mm) dipping <20° between 77.55-77.6m.
			77		- 40° siltstone seam (<100mm) between 76.87-77.03m. - fine sandstone with some fresh patches (<25%) below 77.03m. Limonite-stained joints spaced 25-200mm apart with some coated by orange-brown, non-plastic silt (<1mm). Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced 5-35mm apart.			
			78					
			79		- slightly weathered [FW >50%] 79.45-80.35m.			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/11

LOCATION: HUNUA QUARRY
GRID REF: 321298.42E 676704.33N
SHEET 5 OF 8

CLIENT: Winstone Aggregates LTD
COLLAR ALTITUDE: 185.78m

JOB No. WAL04/1
DATUM: Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 4-3-04
DATE FINISHED: 16-3-04
LOGGED BY: GDF
DRILLER: Brown Bros (NZ) LTD
TYPE OF DRILLING RIG: Rig 8 SIMCO 5000 TR3
STAND PIPE: 0.68m
ORIENTATION:
PLUNGE: 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100	Sample 1 5 20	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Rel Code	Piezometer Construction 32 ← Piezometer Diameters in mm	Comments
			81		- siltstone seam (<40mm) dipping 50° between 79.8-79.9m. - more weathered [FW <50%] with veins (<2mm, quartz) spaced 20-50mm apart below 80.35m.	RW		- elongated siltstone patch (<40 by 15mm) near 80.25m. Core broken along NV joints 80.55-81.3m.
			82		81.85m INTERBEDDED GREYWACKE SANDSTONE and SILTSTONE [MW]: brown-dark brown with some grey patches, MS-VS, partly weathered to fresh (<50%). Limonite-stained joints spaced 20-100mm apart with some coated by orange-brown, non-plastic silt (<2mm). Crisscrossed by white veins (<3mm, calcite) spaced 20-50mm apart.			Core broken along joints 82-83.9m. Bedding dips 35-65°.
			83			RW		
			84		- joints spaced 50-200mm apart and occasionally coated by orange-brown, non-plastic silt (<1mm).			Core broken along NV joints 84.55-85.75m.
			85		84.9m GREYWACKE SANDSTONE [MW to SW]: grey with irregular brown seams, MS-VS, partly weathered (<20mm along joints) to fresh (>50%). Limonite-stained joints spaced 25-100mm apart. White veins (<3mm, calcite & quartz) spaced 10-50mm apart. Trace siltstone patches (clasts <15mm). - moderately weathered between 86.05-86.25m. Siltstone seam (<50mm, dip 40°) between 86.05-86.2m. Elongated siltstone patch (disrupted band <20mm) near 86.2m.			Core broken along NV joints 86.4-86.95m.
			86					
			87		- less weathered [FW >75%] and joints spaced 50-150mm apart below 86.9m. Indistinctly banded grey-dark grey, S, siltstone between 86.9-87.5m.	RSWb		Core broken along joints 87.1-87.5m.
			88					
			89		- irregular elongated patches (disrupted seam(s) <75mm, dip 55° along top) of black, MS, argillite between 88.6-89.15m.			SWL 5m after drilling at 88.8m. Driller estimates 15% circulation loss. Crystal-rain used to maintain circulation. 9/3/04.
			90		89.3m GREYWACKE SILTSTONE [MW]: brown to dark brown with some grey patches, MS-S, partly weathered to fresh (<50%). Irregular limonite-stained joint-weathered veins (<5mm) spaced <20mm apart (by 89.5m) and some coated by orange-brown, slightly plastic silt (<1mm). Sandstone to 89.9m.	RW		- 55° disrupted band (<10mm) of black, MS, argillite. 50° band (<7mm) of brecciated rock in light brown, non-plastic silt at 89.5m. - siltstone dips 45°. 45° joint and associated band (<5mm) of orange-brown, silty crushed rock-vein material. Core broken along joints 90-90.3m. 50° joint coated by orange-brown, sand-silt (<3mm) and associated weathered vein (<5mm). - 35° joint filled by light orangish brown, slightly plastic sandy silt (<7mm).
			91		91.5m GREYWACKE SANDSTONE to SILTSTONE [MW-SW]: grey to dark grey with irregular brown seams, MS-VS, partly weathered (<20mm along joints) to fresh (<75%). Limonite-stained joints spaced 50-200mm apart with some coated as above. Irregular white veins (<5mm, calcite & quartz) spaced 5-35mm apart.			Shattered core between two 35° joints coated by light brown, slightly plastic silt and silty crushed rock-vein material (<5mm) 91.3-91.35m. [Minor Fault].
			92					
			93		- siltstone between 92.15-92.25 & 92.9-93.05m. - more weathered [FW >50%] and joints spaced 25-100mm apart below 93.1m. Some joints coated by orange-brown, non-plastic silt (<2mm). Irregular siltstone patches (disrupted seams <50mm) below 93.05m. - dark brown to dark grey (indistinct banding dips 55°), S, siltstone below 93.6m. Moderately weathered [FW <25%] between 93.9-94.6m.	RSWb		- 55° displaced vein (<10mm, calcite). - 40° discontinuous band (<30mm) of dark grey, S, siltstone between 92.7-92.8m. Core broken along irregular NV joints 93-93.3m. - 60° network (<15mm) of veins (<3mm, calcite) to breccia (<10mm).
			94					
			95		94.9m INTERBEDDED GREYWACKE and SILTSTONE [SW-FW]: grey to dark grey with some brown seams, S-VS, partly weathered (<10mm along joints) to fresh (>75%). Limonite-stained joints spaced 50-150mm apart with some coated as above (<1mm). Irregular white veins (<5mm, calcite) spaced 10-50mm apart.			- contact dips 50°.
			96		- siltstone between 96.3-96.5m.			
			97		- siltstone between 96.9-97.8m (Sandstone patch 97.1-97.2m).	RSWg		- some vuggy voids (<10mm) along discontinuous irregular veins (<10mm, calcite) 97.6-97.7m. - 70° irregular vein (<15mm, calcite). Associated siltstone patch (>25mm) between 97.85-97.93m.
			98		- siltstone below 98.4m.			Core broken along NV joints 98.55-98.9m.
			99		98.85m GREYWACKE SANDSTONE and SILTSTONE [MW-SW]: grey with irregular brown seams, MS-VS, partly weathered (<20mm along joints) to fresh (<75%). Limonite-stained joints spaced 25-100mm apart with some coated as above (<1mm). Irregular white veins (<3mm, calcite)	RSWb		

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

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PIEZDA_HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/11**

LOCATION: HUNUA QUARRY | **GRID REF:** 321298.42E 676704.33N | **SHEET** 6 OF 8

CLIENT: Winstone Aggregates LTD | **COLLAR ALTITUDE:** 185.78m

JOB No. WAL04/1 | **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 4-3-04 | **DRILLER:** Brown Bros (NZ) LTD | **STAND PIPE:** 0.68m

DATE FINISHED: 16-3-04 | **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3 | **ORIENTATION:** | **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100 / 1 5 20	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction (Piezometer Diameters in mm: 32)	Comments
					spaced 10-50mm apart. - dark brown and dark grey, S, siltstone below 100.05m.	RSWb		- siltstone dips 45°. Core broken along NV joints coated by orange-brown, non-plastic silt 100-101.35m.
			100.85m		GREYWACKE SANDSTONE [MW-SW]; grey with some irregular brown seams, MS-VS, partly weathered (<20mm along joints) to fresh (<75%). Limonite-stained joints spaced 50-150mm apart with some coated as above (<1mm). Irregular white veins (<3mm, calcite & weathered) spaced 10-30mm apart.			- some elongated patches (clasts <20mm) of dark grey, S, siltstone 100.85-100.95m.
			101		- moderately weathered [MW] between 101.7-102.15m.			- 45° joint filled by hard, brecciated rock (<10mm). Core broken along NV joints coated by silt 102.55-103.9m.
			102					
			103					- 40° slickensided defect coated by calcite (<1mm) with common pyrite specks.
			104					- 45° slickensided defect coated as above. Core shattered along joints 104.9-105m.
			105		- moderately weathered [FW <50%] between 104.75-105.15 & 105.4-105.75m.	RSWb		- 30° composite vein (<8mm, calcite & quartz). - irregular weathered veins (<10mm, some calcite & voids <15mm) spaced <20mm apart 105.4-105.75m. Core broken along NV joint 105.75-106.1m. - irregular fractures-weathered veins (<3mm) spaced <15mm apart 106.15-106.3m. Voids (<30mm) along some defects partly filled by light brown, slightly plastic mud.
			106		- moderately weathered [MW] 106.15-106.3m. Band (<20mm, dip 45°) of dark grey, S, siltstone near 106.5m.			Core broken along irregular NV joint coated by orange-brown, non-plastic silt (<1mm) 106.5-107.1m.
			107					
			108		- moderately weathered [FW <50%] between 107.45-108.05m. Veins (<5mm, calcite & quartz) spaced <20mm apart between 107.25-108.3m.			
			109		- moderately weathered [FW <50%] between 108.95-109.2 & 109.4-109.8m. Veins (<10mm, calcite & quartz) spaced <20mm apart below 109.4m.			- common voids (<10mm) along veins (<3mm) in partly weathered rock between 108.95-109.45m. - 25° network (<30mm) of irregular veins (<10mm, calcite & quartz).
			110		110.15m GREYWACKE SANDSTONE [SW-FW]; grey with some brown seams, VS, partly weathered (<10mm along joints) to fresh (>75%). Limonite-stained joints spaced 50-200mm apart. Crisscrossed by white veins (<3mm, calcite & quartz) spaced 5-30mm apart. Voids (<25mm by 3mm) along some defects.			35° joint coated by light orangish brown, non-plastic silt-sand (<2mm) at 109.45m. Network (<30mm) of irregular veins (<15mm, quartz) spaced <15mm apart and associated interval of light greyish brown partly weathered rock to 109.6m. - irregular NV joint-veins (<3mm, calcite) coated by orange-brown, non-plastic silt (<1mm) (mostly broken core) 111.25-111.75m.
			111					
			112				SWL 14.09m (15/4/04)	
			113			RSWb		Driller estimates 20% circulation loss. 11/3/04.
			114					Core broken along irregular NV joint(s) coated by orange-brown, non-plastic silt (<1mm) 113.55-114.4m.
			115		- steeply dipping (>60°) joints coated by orange-brown, non-plastic silt (<1mm) below 114.8m.			
			116		116.15m GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Occasional joints (limonite-stained above 117.6m)-broken veins. Crisscrossed by white veins (<5mm, calcite) spaced 10-50mm apart. Pyrite specks on some defect surfaces.			- veins (<6mm, calcite) spaced <20mm apart 116.15-116.35m.
			117					- 40° network (<150mm) of irregular veins (<3mm, calcite & quartz) spaced <15mm apart to brecciated rock (<10mm) 116.95-117.15m. - NV joint-vein(s) (<1mm, calcite) with common pyrite specks 117.7-118.6m. Broken core between 117.7-118 & 118.15-118.6m.
			118			RFW		
			119		- irregular veins (<5mm, calcite & quartz) spaced 5-30mm apart below			

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

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PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/11

LOCATION: HUNUA QUARRY
GRID REF: 321298.42E 676704.33N
CLIENT: Winstone Aggregates LTD
COLLAR ALTITUDE: 185.78m
SHEET 7 **OF** 8
JOB No. WAL04/1
DATUM: Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 4-3-04
DATE FINISHED: 16-3-04
LOGGED BY: GDF
DRILLER: Brown Bros (NZ) LTD
TYPE OF DRILLING RIG: Rig 8 SIMCO 5000 TR3
STAND PIPE: 0.68m
ORIENTATION:
PLUNGE: 90°

Recovery (%)	Core >100mm (%)	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
25 50 75	0 5 2 10 50 100 (1 5 20)						32 ← Piezometer Diameters in mm	
					119.6m.			- 35° composite vein (<10mm, calcite & quartz) near 119.72m.
			121					- 40° limonite-stained joint-weathered vein (<2mm) coated by light orangish brown, slightly plastic silt (<1mm) and partly weathered <10mm into the adjacent rock.
			122		- more weathered [FW >75%] near joint 121.75-121.9m.			- 50° composite vein (<10mm, calcite & quartz).
						RFW		- 40° composite vein (<20mm, calcite & quartz).
			123					- 35° white to greenish grey composite vein (<10mm, calcite & quartz).
			124		- occasional limonite-stained joints below 123.75m.			- >70° limonite-stained joint-vein (<3mm, calcite) coated by orange-brown, non-plastic silt (<1mm).
			125					
					125.4m GREYWACKE SANDSTONE [SW-FW]; grey, VS, partly weathered (<5mm along joints) to fresh (<95%). Limonite-stained joints spaced 25-100mm apart with some coated by orange-brown, non-plastic silt (<1mm). Crisscrossed by white veins (<5mm, calcite & quartz) spaced 10-50mm apart.			Core broken along joints coated as above 125.4-126.1m. Circulation lost at 125.5m. Attempted to regain circulation using "megaseal".
			126					
			127			RSWp		
					- joints spaced 50-350mm apart below 126.1m. Veins (<2mm, calcite) spaced 20-100mm apart between 126.1-127.5m.			Core broken along joints coated as above 127.5-127.95m.
			128					
					- grey to dark grey (indistinct banding dips 55°), MS-S, argillite-siltstone between 128.55-128.95m.			- 30° vein (<5mm, calcite). Siltstone dips 50°. - 30° network (<30mm) of irregular veins (<10mm, calcite & quartz).
			129					
					129.45m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Occasional joints-broken veins. Crisscrossed by white veins (<5mm, calcite & quartz) spaced 5-30mm apart. Pyrite specks on some defect surfaces.			Core broken along NV joint 129.25-129.45m.
			130					- irregular NV limonite-stained joint-vein (<2mm, calcite) 130.3-130.57m. <15° network (<30mm) of irregular veins (<10mm, quartz) spaced <10mm apart at 130.62m..
			131		- grey to dark grey (disrupted banding), S-VS, siltstone between 131.22-131.6m. Irregular veins (<10mm, calcite & quartz) spaced <20mm apart by 131.2m.			- 10° vein network (<15mm, calcite & quartz). 45° slickensided defect and associated limonite-stained vein (<2mm, calcite) at 131.35m. Limonite-stained along defects within 100mm.
			132					- 30° composite vein (10mm, quartz).
			133		- moderately weathered [FW <50%] and fractured (spacing <20mm) between 133.15-133.25m. Defect surfaces coated by light orangish brown, non-plastic silt (<2mm). Veins (<15mm, calcite & quartz) spaced <15mm apart below 133.15m.			- 45° limonite-stained joint and vein (<10mm, calcite). 12/3/04. Core broken along irregular NV limonite-stained joint 134.05-134.35m.
			134			RFW		
			135		- off-white, VWK, calcareous, vein material with rock fragments (<20mm) between 134.7-134.95m. - irregular joints-broken veins spaced <100mm apart with some coated by dark green, chloritic material (<1mm) (above 135.9m) and discontinuous veins (<15mm, calcite & quartz) spaced <20mm apart below 135.2m. - slighlly weathered [FW >75%] between 135.9-137.35m. Voids (<5mm) along some veins below 135.9m.			- 30° limonite-stained joint with associated band (<10mm) of pale brown to orange-brown, silty crushed rock. [Minor Fault].
			136					- irregular >70° limonite-stained joint coated by pale brown to orange-brown, non-plastic silt (<2mm) and several associated irregular composite veins (<15mm, quartz) 136.02-136.25m. - 45° network (<40mm) of irregular veins (<10mm, calcite) spaced <10mm apart 136.77-136.87m. 25° composite vein (<12mm, calcite & quartz) at 136.9m. Irregular 20-45° bands (<15mm) of composite veins (calcite & quartz) to brecciated rock 136.93-137.02m. - siltstone dips 30°. - 40° slickensided defect partly coated by calcite (<1mm) with pyrite specks. 10° vein (<5mm, calcite) at 138.78m.
			137					
			138					
			139		- joints spaced 50-300mm apart below 139.4m.			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

BOREHOLE No. **HUN04/11**

LOCATION: HUNUA QUARRY **GRID REF:** 321298.42E 676704.33N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 185.78m **SHEET** 8 **OF** 8

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 4-3-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.68m

DATE FINISHED: 16-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Core >100mm (%) 0 5 2 10 50 100 (1 5 20)	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction (32 ← Piezometer Diameters in mm)	Comments
			141					
			142		142.4m	RFW		Total circulation loss. Installing piezometer 15/3/04 & 16/3/04.
					EOH @ 142.4m			
			143					
			144					
			145					
			146					
			147					
			148					
			149					
			150					
			151					
			152					
			153					
			154					
			155					
			156					
			157					
			158					
			159					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/12**

LOCATION: HUNUA QUARRY **GRID REF:** 320907.74E 676685.37N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 139.34m **SHEET** 1 **OF** 5

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-3-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.64m

DATE FINISHED: 25-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3 **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Core >100mm (%) 0 5 2 10 50 100	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							32 Piezometer Diameters in mm	
			0		0.35m CLAYEY SILT; light orangish brown, firm (disturbed)-stiff, plastic. [Residual Soil]. Very soft (disturbed) mud with some sand, minor aggregate and rootlets near top [Fill].	O		RQD entered into penetration field in database from 6.6m. - maximum depth of contact. Some pieces (<10mm) of off-white, hard material (disturbed weathered veins) near 0.55m.
			1		SANDY SILT; patchy pale brown to orangish brown with some light brownish red (above 0.8m), very soft-firm (disturbed), non-plastic. Fractured texture by 0.8m. Surface weathered, greywacke rock (corestones) near 0.7m (<100mm) and 2.15m (<70mm). [HW Greywacke].	ORH		
			2		2.65m - uncertain [HW-MW greywacke] below 2.3m. Recovered sample consists of mottled light orangish brown and off-white, loose (washed sample), sand with some gravel (<50mm). Gravel consists of variably weathered greywacke and off-white, VWK, vein material.			- rock generally crisscrossed by indistinct shear bands (<5mm) spaced <50mm apart.
			3		GREYWACKE SANDSTONE [MW-SW]; grey with some irregular orange-brown seams, WK-VS, weathered to fresh (<75%). Limonite-stained joints spaced 50-200mm apart and coated by off-white to orangish brown, low plasticity silt-clay (<10mm). White veins (<3mm, quartz) spaced 50-200mm apart.			Core broken along irregular NV joint(s) filled by off-white to light orangish brown, low plasticity clay (<10mm) 3.95-4.05m. Core broken along joints 4.15-4.5m.
			4		- minor patches (clasts <15mm) of dark grey, S, siltstone above 3.8m. Irregular >60° seam (<70mm) of fine-grained rock between 3.85-4.15m.			- 35° joint filled by mottled light orangish brown and dark brown, slightly plastic silt (<10mm).
			5			RSWb		
			6		- minor siltstone patches (clasts <10mm) between 5.7-6.15m.			Core broken along joints 5.9-7m. - 35° joint filled by light orangish brown, plastic clay-silt (<10mm).
			7		6.75m GREYWACKE SANDSTONE [SA/FW]; grey, VS, partly altered (weakened <10mm along joints) to fresh (<95%). Joints-broken veins (some limonite-stained) spaced 50-300mm apart. White veins (<3mm, quartz, occasional voids <10mm) spaced 10-100mm apart.			- 50° joint-weathered vein (<5mm). Veins (<5mm, quartz) spaced <20mm apart 6.75-7.1m. Irregular NV seam (<50mm) of grey, S-SV, fine-grained rock and associated irregular elongated patches (<20mm) of dark grey, S, siltstone 6.75-7.25m.
			8		- crisscrossed by veins (<3mm, quartz) spaced 5-50mm apart below 8.55m.			
			9					
			10		- discoloured grey, S and slightly altered 10.3-10.7m.			- 35° & 40° limonite-stained joints filled by orange-brown, non-plastic silt (<2mm) at 9.75 & 9.95m. SWL 2m on morning of 18/3/04.
			11		- less weathered [verging FW], occasional limonite-stained joints and veins (<2mm, quartz, some voids <20mm) spaced 50-200mm apart below 10.7m.			- irregular veins (<5mm, quartz) spaced <20mm apart 10.3-10.7m.
			12		- irregular elongated patches (disrupted NV seam <50mm) of dark grey, S, siltstone between 11.55-11.85m.			- discontinuous veins (<2mm, quartz, some voids (<15mm)) spaced <20mm apart 11.5-12m.
			13			RSWg		Core broken along joints coated by orange-brown, non-plastic, sandy silt (<3mm) and partly weathered <3mm into the adjacent rock 13.05-13.25m.
			14		- discoloured grey, MS-S and moderately altered between 14.45-14.8m.			
			15					- 55° joint partly weathered <2mm into the adjacent rock.
			16					- 15° joint partly weathered <2mm into the adjacent rock. - 40° joint partly weathered <2mm into the adjacent rock.
			17					
			18					- 35° vuggy (<30 by 10mm) band (<25mm) with some remnant veins (<2mm, calcite). 10° joint partly weathered <2mm into the adjacent rock at 17.6m.
			19		- grey with irregular discoloured (brown tint) seams, MS-VS and slightly altered [FW <75%] between 19-20.8m. Brownish red staining along defects and in rock (upper half) above 20.5m.			Core broken along NV joint-weathered veins partly altered <20mm into the adjacent rock 19.14-20.77m. Irregular NV band of altered

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 3.7m.	123mm to 3.7m. 96mm to EOH.

BOREHOLE No. HUN04/12

LOCATION: HUNUA QUARRY **GRID REF:** 320907.74E 676685.37N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 139.34m **SHEET** 2 **OF** 5

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-3-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.64m

DATE FINISHED: 25-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100 / 1 5 20	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction 32 ← Piezometer Diameters in mm	Comments
			21		- clean joints-broken veins spaced 100-600mm apart. Fine-grained with some irregular dark grey, NV, laminations (<2mm) between 20.8-21.4m.			rock-sandy silt (<10mm) 20.2-20.3m. - irregular off-white, weathered veins (<5mm, some vuggy voids (<10mm)) spaced <20mm apart 20.25-20.8m. - 20° vuggy (<10 by 5mm) band (<30mm) with some remnant veins (<5mm, quartz).
			22					- 45° network (<100mm) of irregular off-white veins (<3mm, quartz, common voids (<15 by 5mm)) spaced <20mm apart 21.95-22.05m.
			23		- veins (<3mm, quartz, occasional voids <10mm) spaced 20-100mm apart below 23.3m. Irregular NV seam (<25mm) of dark grey, MS-S, siltstone 24.1-24.95m.			
			24		- patchy discoloured grey, MS-S, moderately altered [FW <50%] and fractured (spacing <20mm) 24.3-24.85m.	RSWg		Interval (<50mm) of shattered core with some dark greenish grey (brown tint) to grey, silty sand fines near 23.75m. Core broken along irregular NV joint coated by dark greenish grey (brown tint), silt-sand (<3mm) 24.3-24.85m.
			25					
			26		- irregular veins (<3mm, quartz) spaced <15mm apart 24.75-26.35m.			
			27		- variable discoloured grey (brown-tint) with some irregular brownish red bands (<3mm), WK-S, moderately altered between 26.3-26.55m. Partly altered <20mm along joint(s) to 27.1m. Veins (<3mm, quartz, some voids <10mm) spaced 10-75mm apart below 26.35m. - irregular NV seam (<20mm) of grey to dark grey, MS-VS, siltstone between 27.25-27.55m.			Core broken along irregular NV joint(s) 26.05-27.1m. Joint coated by grey (green tint), silt-sand (<2mm) 26.7-27m.
			28	28.2m	- discoloured grey, MS, moderately altered patches at 27.9-28.01 & 28.1-28.16m. Calcareous rock below 28m. GREYWACKE SANDSTONE [FW]: grey, VS, fresh. Defects as above.			19/3/04.
			29		- veins (<3mm, quartz) spaced 5-30mm apart between 29.15-30.75m. Discoloured grey (green-tint) rock 29.5-29.8m. - irregular patchy seam (<30mm, dip 70°) of dark grey, MS-S, siltstone between 29.65-29.8m. Minor elongated siltstone patches (<30mm, disrupted bands) below 29.8m. - disrupted siltstone bands (<30mm, dip 70°) between 30.25-31.12m.			- 25° vuggy (<30mm) vein (<5mm, remnant quartz).
			30					
			31					- irregular 65° joint partly altered <3mm into the adjacent rock. - 65° joint coated by dark greenish grey, non-plastic silt (<2mm). - irregular NV band (<3mm) of dark grey, VWK, altered rock 31-31.2m. - 30° network (<200mm) of irregular veins (<3mm, quartz, some voids (<5mm)) spaced <10mm apart 31.65-31.85m.
			32		- disrupted siltstone bands (<20mm, NV) between 31.65-32.05m. Fine-grained sandstone 32.05-35.1m.			
			33		- veins (<3mm, quartz, few voids) spaced 20-100mm apart below 32.5m.			
			34		- some indistinct dark grey laminations (dip 70°) between 34.1-35.1m.	RFW		- NV network (>65mm) of irregular veins (<3mm, quartz) spaced <15mm apart 33.6-33.8m.
			35					- 60° network (<150mm) of irregular veins (<3mm, quartz, some voids (<10mm)) spaced <15mm apart 35.05-35.25m. Broken core 35.05-35.3m.
			36					- 60° network (<200mm) of irregular veins (<3mm, quartz) spaced <20mm apart 35.95-36.3m. - 70° joint-vein (<2mm, zeolite?) 36.3-36.5m. - NV network (<65mm) of irregular veins (<5mm, calcite, common voids (<30mm) above 36.12m) spaced <50mm apart 36.9-37.55m.
			37					
			38		- veins (<2mm, quartz) spaced 20-150mm apart below 37.55m.			
			39					- 35° vein (<5mm, quartz). Circulation lost at 38.6m. Petraseal used to regain circulation.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 3.7m.	123mm to 3.7m. 96mm to EOH.

BOREHOLE No. **HUN04/12**

LOCATION: HUNUA QUARRY **GRID REF:** 320907.74E 676685.37N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 139.34m **SHEET** 3 **OF** 5

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-3-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.64m

DATE FINISHED: 25-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 1 5 10 20 50 100	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							32	← Piezometer Diameters in mm
			41		- mainly fine sandstone between 40-42.1m. - veins (<4mm, quartz, some voids (<5mm)) spaced 10-75mm apart below 40.7m.			
			42		- veins as above spaced <15mm apart 41.85-42.75m. Joints-broken veins spaced 50-200mm apart by 41.95m.			Core broken along NV joint-vein (<1mm, quartz) 41.95-42.5m.
			43		- irregular NV seam (<65mm) of indistinctly banded grey to dark grey, S, siltstone between 42.55-43.75m. Some indistinct fine-grained bands (<15mm, dip 70°) continuing to 43.95m.			Core broken along irregular NV joint coated by off-white to pale grey, non-plastic silt (<1mm) 42.7-43.15m.
			44					- voids (<25mm) along some veins (<2mm, remnant quartz) 43.95-44.05m.
			45					
			46		- fine sandstone crisscrossed by irregular veins (<3mm, quartz, some voids (<10mm)) spaced <15mm apart between 45.5-45.8m.			Crystal-rain used to maintain circulation. 22/3/04.
			47		- occasional joints below 46.5m. Irregular veins (<10mm, calcite & quartz, occasional voids (<15mm)) spaced <15mm apart between 46.75-47.25m.			- 20° composite vein (<10mm, quartz, minor voids) to vein network (<20mm).
			48		- irregular veins (<4mm, calcite) spaced <20mm apart between 48-48.4m.			
			49					
			50			RFW		
			51		- disrupted bands (<20mm, dip 70°) of dark grey, MS-S, siltstone between 50.2-50.8m. Some elongated siltstone patches (disrupted NV bands (<5mm)) above to 49.85m.			- 65° joint coated by off-white to pale grey, non-plastic silt (<2mm). Vuggy void (<25 by 5mm) along discontinuous 70° vein(s) near 50.7m.
			52					
			53		- veins (<2mm, calcite) spaced 25-100mm apart below 52.35m.			- two <10° joints <10mm apart and slightly altered (discoloured grey, weakened) <10mm into the adjacent rock. Circulation lost at 53.1m. Attempted to regain circulation using "crystal-rain" and "petraseal".
			54					
			55					- 15° joint-vein (<1mm, calcite) coated by light grey, silty sand (drilling fines?) (<1mm).
			56					
			57		- elongated patches (disrupted 70° bands (<25mm)) of dark grey, S, siltstone between 56.45-56.95m. Seam (<25mm, dip 70°) of banded (<10mm) sandstone and siltstone between 57.3-57.65m.			- 20° network (<20mm) of veins (<3mm, calcite & quartz) with common voids (<30mm). 15° joint coated by light grey, low-plasticity clay (<3mm) at 56.65m. Core broken along >60° joints-veins 56.85-57.6m. - 40° vein (<5mm, quartz, minor voids (<5mm)). Irregular 70° seam (<15mm) of brecciated rock and vein material (calcite & quartz) associated with siltstone bands 57.3-57.63m. Vuggy void (>60 by 25 by 10mm) along above seam near 57.5m. SWL 22.7m on morning of 23/3/04.
			58					
			59		- trace siltstone patches (clasts <10mm) and joints-broken veins spaced 50-300mm apart below 59.2m. Veins (<3mm, quartz, occasional voids (<5mm)) spaced 50-200mm apart below 59.7m.			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 3.7m.	123mm to 3.7m. 96mm to EOH.

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. HUN04/12

LOCATION: HUNUA QUARRY **GRID REF:** 320907.74E 676685.37N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 139.34m **SHEET** 4 **OF** 5

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-3-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.64m

DATE FINISHED: 25-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Core >100mm (%) 0.5 2 10 50 100	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
	1 5 20						32 Piezometer Diameters in mm	
			61		- veins (<3mm, quartz) spaced 5-40mm apart between 60.9-61.45m.			- 70° composite vein (<10mm, quartz, minor voids (<10mm)) and associated light grey rock above to 60.97m.
			62		- discoloured grey, MS and moderately altered between 61.85-62.05m. Some voids (<15 by 4mm) within upper 50mm. Conglomeratic interval (>65mm, dip 70°) with grey to dark grey, S-VS, siltstone patches (clasts <10mm) between 61.95-62.4m.			- irregular 40° joint coated by white-pale grey, low-plasticity clay (<2mm) and associated vein network (<10mm) with central streaky band (<6mm) of black material-pyrite. 35° joint coated by light grey fines (silt-sand) and vein material (<2mm) at 61.85m.
			63		- occasional joints-broken veins below 63.1m.		SWL 62.82m (15/4/04)	- elongated siltstone patch (disrupted 60° band (<20mm)) 62.15-62.2m. Core broken along irregular NV joints coated by light grey, low-plasticity clay (<2mm) 62.6-63.1m.
			64					- NV joint coated by pale grey (brown tint), low-plasticity clay (<1mm).
			65					
			66		- veins (<3mm, quartz, occasional voids (<10mm)) spaced 10-50mm apart below 65.45m. - discoloured grey, WK-MS (green tint) and moderately altered between 66-66.55m. Slightly altered (<10mm along joints) between 66.55-66.65m & 67-67.7m.	RFW		- 55° vein network (<25mm) with common voids (<10 by 3mm) and associated light grey rock within 100mm. Core broken to shattered along defects 65.8-66.35m.
			67		- patchy bands (<30mm, dip 70°) of dark grey, S, siltstone between 66.65-67m.			- drilling disturbed NV seam (<20mm) of light grey, plastic clay with altered rock fragments to brecciated rock cemented by vuggy vein material (<3mm, remnant quartz) between 66.1-66.35m. Core broken along NV joint-vein(s) (<3mm, zeolite) 66.85-67.7m.
			68		- veins (<2mm, quartz) spaced 25-150m apart below 68.2m.			- 70° vuggy void (<30 by 6mm) with some remnant vein material (quartz) 67.8-68m. Irregular 20° joint at 68m coated by brownish green material (<1mm) with some orangish brown specks.
			69		- elongated siltstone patch (disrupted 70° band (<5mm)) near 68.65m.			Core broken along NV joints coated by pale grey, non-plastic silt (<1mm) 68.55-68.95m. Intersecting 15° joint (and above joints within 50mm) coated by dark green to orange-brown (limonite-stained), non-plastic silt (<1mm) at 68.7m.
			70		- joints spaced 50-300mm apart below 69.8m.			- 70° elongated void (35 by <3mm). - intersecting >40° & NV (to 70.15m) joints coated by pale green material (<1mm). Core broken along NV joint(s) coated (below 70.6m) by orange-brown (limonite-stained) to dark green, non-plastic silt (<1mm) 70.35-71.05m.
			71		- patchy siltstone bands (<30mm, dip 75°) between 71.05-71.5m.			- irregular NV joint (unbroken) partly altered (discoloured & weakened) <5mm into the adjacent rock 71.5-71.9m.
			72		72m Veined GREYWACKE SANDSTONE [SA]; discoloured grey to grey, MS-S, partly to slightly altered (weakened). Joints-broken veins spaced 25-200mm apart. Crisscrossed by irregular white veins (<3mm, quartz, common voids (<20mm)) spaced <20mm apart. - irregular pyrite patch (<70mm) at 73.05m.			- 35° off-white to light grey, composite vein (<50mm, quartz & zeolite?). Core broken along defects 72.3-73.6m.
			73					- 40° slickensided defect-vein (<2mm, quartz) coated by light grey fines (sand-silt) (<1mm). Core broken along joints 74.15-74.45m. 50° slickensided defect-vein (<2mm, quartz) at 74.5m.
			74		- less altered [FW >75%] and veins (<3mm, quartz, common voids (<15mm)) spaced 10-50mm apart below 73.7m.			- 30° composite vein (<8mm, quartz, common voids <2mm), 60° slickensided defect at 74.8m.
			75			RSW		- 30° vein network (<15mm, quartz) with common voids (<10 by 3mm). SWL 20.3m after drilling at 75.8m. Petraseal used to maintain circulation. SWL 19.8m on morning of 24/3/04. 70° slickensided defect-vein (<2mm, quartz) and intersecting 65° joint 75.85-76m.
			76					- >60° irregular joint(s) coated by pale grey, non-plastic silt (<3mm) 76.5-77.3m. Core broken along defects 77-77.3 & 77.35-77.55m. Core broken along defects 77.9-78.5m.
			77		- moderately altered and veins (<5mm, quartz, common voids (<10mm)) spaced <20mm apart between 76.55-77m.			- 45° off-white to light grey, composite vein (60mm, quartz) with associated intensely veined rock below to 78.5m. Core broken along NV joint-vein (<1mm,
			78		- slickensided defects spaced 25-150mm apart and coated by calcite and/or chloritic material (<1mm) below 77.35m.			
			79		78.6m - veins (<3mm, quartz) spaced 5-20mm apart below 78.4m. GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Slickensided defects spaced 50-200mm apart coated by calcite and/or dark green, chloritic material (<1mm). Crisscrossed by irregular white veins (<3mm, calcite) spaced 10-50mm apart. Some pyrite specks on defect surfaces.	RFW		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 3.7m.	123mm to 3.7m. 96mm to EOH.

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

BOREHOLE No. **HUN04/12**

LOCATION: HUNUA QUARRY **GRID REF:** 320907.74E 676685.37N

CLIENT: Winstone Aggregates LTD **COLLAR ALTITUDE:** 139.34m **SHEET** 5 **OF** 5

JOB No. WAL04/1 **DATUM:** Geodetic 1949 (Mt Eden Circuit)

DATE STARTED: 17-3-04 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** 0.64m

DATE FINISHED: 25-3-04 **TYPE OF DRILLING RIG:** Rig 8 SIMCO 5000 TR3 **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Core >100mm (%) 0 5 2 10 50 100	Sample	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							32	← Piezometer Diameters in mm
			81		- veins (<15mm, calcite & quartz) spaced <20mm apart below 81.25m.			calcite) 79.05-79.35m. - 25° slickensided defect coated by pale to light grey, muddy crushed rock-vein material (<5mm, calcite). Core broken along defects 81.3-81.8m.
			82					
			83		- discontinuous band (<10mm, dip 55°) of dark, S, siltstone near 82.75m. - joints-broken veins spaced 100-300mm apart and veins (<3mm, calcite & quartz) spaced <10-50mm apart below 83m. Indistinct zones containing minor siltstone patches (clasts <10mm) by 83.45m.			- <20° network of irregular veins (<20mm, quartz) spaced <10mm apart 82.55-82.65m.
			84					- 60° joint filled by light grey, silty crushed rock-vein material (<5mm, zeolite?).
			85					
			86			RFW		
			87		- mostly NV veins (<5mm, calcite & quartz) spaced <10-100mm apart below 86.25m. - occasional joints-broken veins below 87m. Fine-grained sandstone 87.4-89.7m.			Core broken along NV joint-veins (<2mm, quartz) 86.6-87m.
			88					
			89					
			90					Core broken along NV joint-vein(s) (<1mm, calcite) 90.05-90.7m.
			91					- 50° vein (<5mm, calcite). Installing piezometer 24/3/04 & 25/3/04.
					91.8m			
			92		EOH @ 91.8m			
			93					
			94					
			95					
			96					
			97					
			98					
			99					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 3.7m.	123mm to 3.7m. 96mm to EOH.

PIEZOA HUN.GPJ G_FISHER.GDT 25/4/04

HUNUA QUARRY: Borehole Information for Symonds Hill (31/12/14)

Name	Mt Eden 2000		NZTM 2000		GL(m)	Hole Details:				Vertical Depths (m):								Elevations (m) :								Drilled Length Below (m):		Comments
	Easting	Northing	Easting	Northing		Orientation	Plunge	Method	Logged by	BaseFill	BaseWT	BaseTK	MW	SW Undiff	SW-FW	FW	EOH	BaseFill	BaseWT	BaseTK	MW	SW Undiff	SW-FW	FW	EOH	SW	FW	
SCoreH5	421079.3	776881.0	1777870.8	5893510.8	185.2		90	Core	Unknown				19.2	22.8		28.8	84.0				166.0	162.4		156.4	101.2	61.2	55.2	Details scaled from section. MW level? WT possibly present.
SP7601	420958.0	776868.6	1777749.3	5893500.7	143.9		90	Percussion	A. Happy				4.9	4.9		11.0	16.5				139.0	139.0		132.9	127.4	11.6	5.5	Some veining.
SP7602	421068.9	776843.3	1777859.7	5893473.3	182.9		90	Percussion	A. Happy				23.2	23.2		25.6	33.2				159.7	159.7		157.3	149.7	10.1	7.6	Little recovery below 29.26m.
SP7604	421246.7	776871.5	1778038.1	5893498.2	201.2		90	Percussion	A. Happy		18.3	18.3	18.3	51.8			64.0		182.9	182.9	182.9	149.4			137.2	12.2	None	Details from typed log adopted. Maximum depth of WT adopted. Log from 2nd attempt. Two different pencil versions in files. SW level?
SP7605	421028.3	776905.2	1777820.3	5893535.9	164.3		90	Percussion	J. Carlson				2.4	9.1		21.3	30.5				161.8	155.1		143.0	133.8	21.3	9.1	Details adopted from typed log. Two different pencil versions in files. SW & FW levels?
SP7606	421179.9	777025.0	1777974.1	5893652.9	146.6		90	Percussion	A. Happy				9.1				25.6				137.5				121.0	None	None	Some fresh cuttings.
SP7607	421239.5	777126.2	1778035.6	5893753.0	163.1		90	Percussion	A. Happy				11.0				25.6				152.1				137.5	None	None	Some intervals of SW.
SP7608	421309.0	777080.8	1778104.2	5893706.4	177.4		90	Percussion	A. Happy		8.2	8.2	8.2	34.1			65.2		169.2	169.2	169.2	143.3			112.2	31.1	None	Maximum depth of WT adopted. Veined.
SP7610	421257.7	776953.8	1778050.5	5893580.3	189.9		90	Percussion	A. Happy		14.6	14.6	14.6	21.0			33.8		175.3	175.3	175.3	168.9			156.1	12.8	None	FW 21.03-25.3m. Samples from 26.21m-EOH lost (Driller described as brown mud). Fault 14.63-17.07m. Maximum depth of WT adopted. SW depth from summary table.
SC7601	421006.2	776763.4	1777795.6	5893394.6	149.7		90	Core	G. Simms				8.8	19.2	19.2	21.3	28.8				140.8	130.5	130.5	128.3	120.8	9.6	7.5	Intensely veined.
SC7602	421116.3	776797.1	1777906.3	5893426.2	192.0		90	Core	A. Happy				35.8	39.2		47.2	53.3				156.2	152.8		144.8	138.7	14.1	6.1	Veined.
SC7603	421333.1	776793.8	1778123.0	5893418.9	193.5		90	Core	G. Simms				12.8	43.6	67.1	89.6	92.4				180.7	150.0	126.5	103.9	101.2	48.8	2.7	Veined. FW-SW level? Fault indicated 56.69-57.91m (MW).
SC7604	421240.7	776723.7	1778029.2	5893350.6	182.9		90	Core	G. Simms				22.3	22.3	22.3		38.3				160.6	160.6	160.6		144.6	16.0	None?	Fault indicated 30.48-32m (MW). FW may occur below 32m. Some veining. MW/SW 12.19-16.92m.
SC7605	421192.6	776840.6	1777983.3	5893468.3	205.1		90	Core	G. Simms				16.0	52.7	71.93		78.2				189.1	152.4	133.2		126.9	25.5	None?	Some veins. FW may occur at 71.93m. Fault indicated 68.88-71.02m (MW).
SC7606	421187.7	776915.7	1777979.8	5893543.5	196.6		90	Core	G. Simms				11.3	12.2	12.2	14.3	20.7				185.3	184.4	184.4		175.9	8.5	Suspect	Level of FW anomalous.
SC7607	421002.9	776958.5	1777795.8	5893589.7	146.0		90	Core	G. Simms				1.8	1.8	1.8	22.6	28.2				144.2	144.2	144.2	123.4	117.8	26.4	5.6	Fault indicated 21.64-22.56m (MW). Some veining.
SC7608	421130.5	776998.6	1777924.2	5893627.5	145.4		90	Core	G. Simms				16.5	50.7	50.7	50.7	57.5				128.9	94.6	94.6	94.6	87.9	6.7	6.7	Intensely veined. Probably drilled down fault. MW 16.46m-20.12m.
SC7609	421148.0	776734.5	1777936.8	5893363.0	169.5		90	Core	A. Happy				25.9	25.9	27.4		66.0				143.6	143.6	142.0		103.5	40.1	None	Some veining. Fault 54.56-55.32m (MW, Clayey). MW level?
SC7610	421200.5	777109.1	1777996.3	5893736.6	158.5		90	Core	A. Happy				17.1	23.2		29.4	42.2				141.4	135.3		129.1	116.3	19.1	12.8	Some veining.
SC7611	421333.6	776947.4	1778126.3	5893572.5	198.1		90	Core	A. Happy		28.7	28.7	30.2				66.6		169.5	169.5	167.9				131.5	None?	None	Faults at 41.15m & 51.21-51.82m. Intervals of SW. Intensely veined 51.82-55.47m. MW-SW below EOH.
SC7612	421134.4	777122.9	1777930.4	5893751.6	166.1		90	Core	A. Happy				25.6	56.7		65.9	77.6				140.5	109.4		100.2	88.5	20.9	11.7	
HUN98/1	421180.2	777444.1	1777982.2	5894072.0	204.1		90	Wash/Core	G. Fisher	7.7	75.4	75.4	76.5	82.5	84.3	134.8	144.4	196.4	128.7	128.7	127.6	121.6	119.8	69.3	59.7	61.9	9.7	SW 96.6-113.2m.
HUN98/6	421458.2	777467.2	1778260.6	5894089.9	195.6		90	Wash/Core	G. Fisher	12.0	73.1	73.1	73.1	73.1	73.1	73.1	84.1	183.6	122.5	122.5	122.5	122.5	122.5	122.5	111.5	11.0	11.0	
SP9901	420973.1	776919.3	1777765.3	5893551.1	143.5		90	Percussion	G. Fisher				11.0	11.0	13.8	13.8	17.4				132.5	132.5	129.7		126.1	6.4	None?	Hole depth insufficient to prove FW. MW too thin to differentiate.
SP9902	420979.0	776927.4	1777771.3	5893559.1	144.7		90	Percussion	G. Fisher				7.0	7.0	10.2		13.8				137.7	137.7	134.5		130.9	6.8	None	MW too thin to differentiate.
SP9903	420986.8	776935.2	1777779.3	5893566.7	145.8		90	Percussion	G. Fisher				9.5	9.5	9.5		13.8				136.3	136.3	136.3		132.0	4.3	None	MW & SWb too thin to differentiate.
SP9904	420967.2	776910.1	1777759.3	5893542.0	143.0		90	Percussion	G. Fisher				9.5	9.5	9.5		13.8				133.5	133.5	133.5		129.2	4.3	None	MW & SWb too thin to differentiate.
SP9905	420963.0	776899.1	1777754.8	5893531.1	142.6		90	Percussion	G. Fisher				4.5	4.5	10.0		13.8				138.1	138.1	132.6		128.8	9.3	None	MW too thin to differentiate.
SP9906	420958.3	776888.3	1777749.9	5893520.3	141.8		90	Percussion	G. Fisher				5.5	5.5	10.0		13.8				136.3	136.3	131.8		128.0	8.3	None	MW too thin to differentiate.
SP9907	420951.0	776878.0	1777742.4	5893510.2	140.5		90	Percussion	G. Fisher				3.5	3.5	7.5		12.0				137.0	137.0	133.0		128.5	8.5	None	MW too thin to differentiate.
SP9908	420941.9	776866.9	1777733.2	5893499.2	139.4		90	Percussion	G. Fisher				3.5	3.5	5.0		10.8				135.9	135.9	134.4		128.6	7.3	None	MW too thin to differentiate.
HUN04/9	421424.9	777145.7	1778221.3	5893769.1	187.8		90	Core	G. Fisher	0.0	29.3	29.3	31.7	32.1	100.2	105.3	165.8	187.8	158.5	158.5	156.1	155.7	87.6	82.5	22.0	133.7	60.5	WT possibly in fault contact. Tertiary weathered 29.3-31.7m. MW weathered zones between 72.9-100.2m. Veined/fractured. Faults indicated at 84-84.85 & 95.95-96.15m.
HUN04/10	421137.5	776911.3	1777929.6	5893540.0	187.9		90	Core	G. Fisher				13.0	13.0	15.6	40.5	144.3				174.9	174.9	172.3	147.4	43.6	131.4	103.9	Drilled on track. FW possibly at 30.65m. Faults indicated at 121.3-129.05 & 140.3-141.9m. Veined below 121.3m.
HUN04/11	421330.7	776888.6	1778122.3	5893513.8	185.8		90	Core	G. Fisher	0.0	5.4	6.3	19.2	29.4	110.2	129.5	142.4	185.8	180.4	179.5	166.6	156.4	75.6	56.3	43.4	113.1	13.0	Possible intact TK 5.4-6.6m. Tertiary weathered to 25.9m. Verging on SW below 19.6m. MW zones to 91.5m. Veined. Faults at 23.8-25.9 (HW), 65.35-65.45 & 75.9-76.6m.
HUN04/12	420940.0	776869.7	1777731.3	5893502.1	139.3		90	Core	G. Fisher	0.4			2.7	2.7	6.8	28.2	91.8	139.0			136.7	136.7	132.6	111.1	47.5	89.2	63.6	Drilled on track. Slightly altered & veined 72-78.6m (Inferred fault).
HUN14/1	420863.1	776994.2	1777656.7	5893628.1	118.7		90	Core	G. Fisher		Above 2.25	Above 2.25	13.5	38.5	38.5		85.4				105.2	80.2	80.2		33.3	46.9	None	Tertiary weathered to 12.5m. Variable SA below 38.5m. EOH in MW. Mostly argillite. Veined below 65.1m. Faults indicated 21.4-22.2, 27.8, 39.55 & 76.1-76.6m.
HUN14/2	420925.5	777036.3	1777719.9	5893669.0	123.7	133.6	50	Core	G. Fisher		Above 2.15	Above 2.15															None	Tertiary weathered to 13.7m. Variable SA by 30.55m. EOH in SA. Argillite. Veined. Faults indicated 25.85-26.6, 34.2-36.1, 45.65-48.55, 55.7-56.3, 61.9-63.65 & 79.75-80.3m.
HUN14/2MW	420938.4	777024.0	1777732.6	5893656.4	123.7								21.3								102.4							
HUN14/2SWUN D	420939.7	777022.8	1777733.9	5893655.1	123.7									23.4								100.3				56.6		
HUN14/2SW>75%	420939.7	777022.8	1777733.9	5893655.1	123.7										23.4								100.3					
HUN14/2EOH	420974.1	776990.0	1777767.6	5893621.8	123.7												80.0								43.7			
HUN14/3	420986.1	777068.0	1777781.1	5893699.5	123.8		90	Core	G. Fisher			5.7	15.9	58.4	79.9	93.0	106.2			118.1	107.9	65.4	43.9	30.8	17.6	47.8	13.3	Minimum depth of TK. Tertiary weathered to 13.4m. Variable SA below 58.4m. Mostly argillite. Veined 58.4-70.7m. Faults indicated 7.1-14.6, 35.45-35.7 & 53.85-54.15m.
HUN14/4	421081.7	777073.0	1777876.7	5893702.8	133.7		90	Core	G. Fisher				5.3	11.9	27.1	46.6	81.9				128.4	121.9	106.6	87.1	51.8	70.1	35.3	Maximum depth to MW. MW weathered zone 23.75-27.1m. Verging on FW by 29.3m. Veined 42.7-48.35m. Fault indicated 45.7-46.6m (HW-MW).
HUN14/5	421234.9	777027.8	1778029.2	5893654.7	159.2		90	Core	G. Fisher	Above 0.3			5.3	20.5	27.9	76.8	96.2				153.9	138.7	131.3	82.5	63.0	75.7	19.5	Maximum depth to MW. MA to SA altered zone 5.3-11.05m. Verging on FW by 60.7m. Veined above 27.9m. Fault indicated near 11.2m.
HUN14/6	421333.0	777007.1	1778126.8	5893632.2	188.1		90	Core	G. Fisher		16.0	16.0	16.0	18.3	100.8	109.1	118.6		172.1	172.1	172.1	169.8	87.3	79.0	69.5	100.4	9.5	Tertiary weathered to 25.5m. SA/FW zone 20.9-30.9m. MW weathered zones to 100.8m. Veined intervals between 30.9-113.7m. Possible faults near 15.95, 51.25 & 111.6m.
HUN14/7	421440.8	776991.2	1778234.3	5893614.2	208.4		90	Core	G. Fisher		29.1	29.7	32.6	33.1	117.7	137.7	144.9		179.3	178.8	175.9	175.3	90.8	70.7	63.5	111.8	7.2	Tertiary weathered to 32.35m. Dominantly MW 52.2-69.1 & 85.85-114.7m. Veined intervals below 38.9m. Faults indicated 31.6-32.55, 67.8-68.8, 103.75 & 127-128.9m.

Notes:
Standard abbreviations used for all geological units.
Top of geological units given unless indicated by "base" prefix.
WT undifferentiated in many percussion hole logs.
Additional old bores (unreliable data) in hidden rows.
Magenta indicates drilled depth insufficient to prove SW (>15m) & FW (>10m). Green if considered reliable.

BOREHOLE No. **HUN14/1**

LOCATION: HUNUA QUARRY **GRID REF:** 420863.11E 776994.24N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 118.72m **SHEET** 1 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 20-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 27-8-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		118	0		MUD; intermixed pale brown to light orangish brown, plastic. Some slightly weathered greywacke fragments (<50mm) from surficial aggregate. [Residual Soil].	O		NZTM location (GPS within 3m) of 1777654mE & 5893628mN. RQD entered into penetration field in database from 12.5m. Core boxes photographed. Box 1: 0-4.9m. Low recovery of very soft disturbed core (wet).
			0.9m		SILT-SAND; intermixed pale brown to light orangish brown, non-plastic. [Undifferentiated Soils].	O		- maximum depth of contact. Core run 1-2m has 0.15m of uphole material at top.
		117	1					
			2		- some grey (brown-tint) by 1.8m. Pale brown to orange-brown silt near 2-2.1m. Becoming as below with some limonite-cemented material (<50mm) from 2.1m.			- trace limonite-cemented material (<20mm) by 1.9m. Indistinctly banded (<5mm, NH) near 2-2.1m.
		116	2.25m		CLAY; streaky light orangish brown to pale grey, stiff to very stiff, plastic. [Ancient Soil].			- contact dips 30°. Mostly intact core (moist) from 2.25m. Core run 2.7-3.7m has 0.32m of uphole material at top.
			3					
		115	4					Core run 3.7-5m has 0.2m of uphole material at top.
		114	5		- light grey (blue-green tint) and very stiff by 4.8m. Some light orange streaks below 4.9m.			- indistinctly banded (<5mm, NH) near 4.8-4.9m. Box 2: 4.9-7.65m. - minor uphole material in core run 5-5.5m.
		113	6		- indistinct irregular lighter & darker grey streaks to bands (<10mm, mostly 10-30°) by 6m. No orange.			
		112	7		- some indistinct irregular pale brown-grey patches (<50mm) near 7.1-7.4, 7.7-8.05 & below 8.8m.	O		Core run 6.5-7m has 0.15m of uphole material (mixed) at top.
		111	8		- becoming hard.			Box 3: 7.65-10.3m.
		110	9		- minor specks of black material (pyrite) near 8.7-9.47m.			
		109	10		- variable light orangish brown to pale grey (brown-tint) and hard below 9.47m.			
		108	11		- pale grey between 10.3-10.65 & 11.05-11.25m.			Box 4: 10.3-12.6m.
			11.6m					
		107	12		Clayey SILT; variable orangish brown to light brown-grey, stiff, plastic to slightly plastic. Some disturbed limonite-cemented bands (<25mm). Indistinct remnant fractured texture. [CW/HA Greywacke].	ORC		- contact dips 30°. Mostly disturbed to broken core (<50mm pieces) from 11.6m.
			12.5m		Weathered GREYWACKE (Zst/Arg) [HW-MW]; grey (brown-tint) with irregular orangish brown seams, VWK to MS, weathered to limonite-cemented. Crisscrossed by limonite-stained joints spaced <20mm apart.	ORH		- black material along some remnant fractures by 12.4m. Box 5: 12.6-15.2m. - irregular 70°-NV joint(s) and irregular (indistinct) patches of reddish brown, weathered argillaceous chert 12.85-13.1m. Intact core 12.85-13.15m.
		106	13					
		105	13.5m		Argillaceous CHERT and ARGILLITE [HW/MW]; reddish brown with irregular light grey-brown seams, VWK to MS, weathered to partly weathered (50%). Crisscrossed by limonite-stained to black joints (often coated by orange-brown, non-plastic silt <2mm) spaced <30mm apart.	ORM		21/8/14. Drilling circulation almost lost (10% return) by 13.4m. Core run 13.4-13.7m is mostly uphole material. Maximum depth of contact. Defects mostly dip >30°.
			14					
		104	15		- harder (mostly MS) below 15.2m. [MW].			Intact core with some broken (<75mm pieces) intervals from 14.5m. Box 6: 15.2-17.6m.
		103	16					
			16.25m		ARGILLITE with some cherty intervals [MW]; light grey-brown with some brown (disturbed cherty intervals <300mm), VWK to MS, weathered to partly weathered (>50%). Crisscrossed by limonite-stained joints (some coated by orange-brown, non-plastic silt <2mm) spaced <40mm apart.			Defects have variable dip by 16.25m. - 70° seam (<60mm) of sheared rock between two limonite-stained joints 16.45-16.65m.
		102	17					
		101	18		- some dark greyish brown, MS, less weathered intervals below 17.7m. Minor brown, MS, cherty intervals (<100mm).	ORM		Box 7: 17.6-20.4m. Broken core (<75mm pieces) from 17.7m. Hole cased to 18m. Drilling circulation mostly recovered.
		100	19					
		99						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 18m.	123mm to 18m. 96mm to EOH.

BOREHOLE No. HUN14/1

LOCATION: HUNUA QUARRY **GRID REF:** 420863.11E 776994.24N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 118.72m **SHEET** 2 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 20-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 27-8-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
					20.3m	ORM		- disturbed greyish brown muddy band (<20mm) [Uphole material?]. Box 8: 20.4-23.4m.
		98	21		ARGILLITE [HW/MW]; greyish brown, WK-MS, partly weathered. Crisscrossed by irregular limonite-stained joints spaced <20mm apart. - becoming more weathered [HW/MW]. Light grey with irregular orange-brown seams (<15mm).			
		97	22		- highly weathered [HW] near 21.4-22.2m. Joints spaced <10mm apart occasionally discoloured red <5mm into the adjacent rock.			- some disturbed slightly plastic, muddy bands (<50mm) 21.4-22.2m. [Fault]. Intact core (defects mostly dip >60°) 21.95-22.1m.
		96	23		- grey with irregular (mostly >70°) brown and red (above 23.6m) seams from 22.2m. [Marginal MW].	ORM	S.W.L 23.83m (22/10/14)	
		95	24					Box 9: 23.4-26.2m. More intact core (25-75mm pieces) from 23.6m.
					24.55m			
		94	25		ARGILLITE [MW]; grey (brown-tint) to dark grey (discoloured) with some irregular dark brown seams (<40mm), WK to S, partly weathered. Crisscrossed by limonite-stained joints (some coated by orange-brown, non-plastic silt <2mm) spaced <15mm apart.			
		93	26					Box 10: 26.2-28.8m. Mostly intact core from 26.2m.
		92	27					
		91	28					Shattered core (<50mm pieces, silty) 27.8-28.6m (0.3m of core loss). Disturbed band (<40mm) of light brown, silty sand to light grey, plastic, sandy mud near top [Fault]. 22/8/14. Core run 28.6-29m has 0.1m of uphole rock (<50mm) at top. Box 11: 28.8-31.2m.
		90	29					- disturbed band (<30mm) of light brown to orangish brown, slightly plastic sandy mud 29.25-29.28m.
		89	30					Shattered core (<50mm pieces, silty) 30.4-30.5m.
		88	31					
		87	32		- greyish brown with irregular dark brown seams (<50mm) and softer (WK-MS) by 31.2m. Irregular 45° reddish brown (cherty) seam (<20mm) near 31.5m.	ORM		Box 12: 31.2-33.8m. Irregular NV seam (100mm) of pale brown to orangish brown and grey, weathered rock (fractured <10mm) to slightly plastic, sandy mud 31.4-31.9m.
		86	33					
		85	34		- greyish brown (darker) with minor dark brown seams (<40mm) and mostly MS below 33.8m. Joints (some coated by pale brown to orange-brown, non-plastic silt <2mm) spaced 5-25mm apart.			Box 13: 33.8-36.4m.
		84	35					
		83	36					
		82	37		- mostly dark grey-black, S, fresh argillite between 36.9-37.25m.			Box 14: 36.4-38.9m. 65° joint filled by slightly plastic to non-plastic, sandy silt (<10mm) at 36.7m.
		81	38					- 60° joint filled by non-plastic sand-silt (<20mm)
					38.5m			
		80	39		Fractured ARGILLITE [SA/SW]; dark grey-black, MS, almost fresh. Crisscrossed by limonite-stained to dark green-black (chloritic material <1mm) defects spaced 5-20mm apart. - dark grey (discoloured), WK-MS, slightly altered (pervasive) between 39.25-39.55m. Fractures (often coated by light grey, slightly plastic mud	RSW		Broken core (25-75mm pieces) from 38.5m. Pyrite specks on some defect surfaces near 38.5-39.25 & 39.55-40.7m. Box 15: 38.9-41.2m. - disturbed band (<15mm) of light grey, slightly
		79						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 18m.	123mm to 18m. 96mm to EOH.

BOREHOLE No. HUN14/1

LOCATION: HUNUA QUARRY **GRID REF:** 420863.11E 776994.24N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 118.72m **SHEET** 3 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 20-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 27-8-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		78	41		<2mm) spaced <10mm apart. - dark grey-black with some irregular brown seams, MS to S, partly weathered (<20mm along joints) to fresh (75%) from 39.55m. Joints (some coated by orange-brown, non-plastic silt <2mm) spaced <20mm apart.	RSW		plastic, sand-mud. [Fault].
		77	42		41.55m - less weathered [SW/FW] from 41m. Joints spaced 10-50mm apart and partly weathered <5mm into the adjacent rock. Indistinct irregular (mostly 45°) white veins (<1mm, zeolite?) spaced 5-50mm apart. ARGILLITE [FW]; dark grey-black, MS to S, fresh (>95%). Limonite-stained joints (often coated by orange-brown, non-plastic silt <1mm) spaced 25-100mm. Crisscrossed by irregular (30-60°) white veins (<1mm, zeolite?) to fractures spaced 10-40mm apart.			Box 16: 41.2-43.6m. More intact core from 41.2m. Joints mostly dip 20-50° between 41.55-45.6m. Partly altered (weakened) <5mm into the adjacent rock along occasional joints. Mostly intact core 42-44m.
		76	43					
		75	44		- crisscrossed by limonite-stained joints (often coated by silt <2mm) spaced 10-50mm apart below 44m.	RFW		Box 17: 43.6-45.5m. Core block labelled 43.7m shifted (up 0.15m) to above disturbed NH band (<30mm) of mixed uphole rock (<25mm) and light brown (grey-tint), slightly plastic mud. Pyrite specks on some defect surfaces near 44.6-45.6m.
		74	45		45.6m			25/8/14. Disturbed lump (<50mm, as above) top of core run 44.7-45.1m. Box 18: 45.5-49.05m.
		73	46		ARGILLITE [MW-SA]; dark grey with irregular grey-green (brown-tint) to orangish brown seams, WK to S, partly weathered/altered (<50mm along joints) to fresh (<75%). Crisscrossed by irregular limonite-stained joints (some coated as above) spaced 10-40mm apart.			
		72	47			RSWb		- irregular NV seam(s) of light grey, non-plastic, sandy silt to brecciated rock (<15mm) 46.5-49.1m.
		71	48					
		70	49		- less weathered [FW >75%] below 48.95m.			
		69	50			RSWg		- irregular NV joint(s) coated by silt (<2mm) and partly weathered <10mm into the adjacent rock 48.95-50.5m. Box 19: 49.05-52m.
		68	51		50.5m ARGILLITE [FW]; dark grey-black, MS-S, fresh (>95%). Crisscrossed by irregular limonite-stained joints spaced 10-50mm apart and some partly weathered <2mm into adjacent rock. Occasional irregular (mostly NV) white veins (<2mm, zeolite?).	RFW		- maximum depth of contact. Some joints coated by orange-brown, non-plastic silt (<1mm). Partly altered (discoloured grey-green & weakened) <5mm into the adjacent rock along occasional joints. Box 20: 52-54.4m.
		67	52		52.1m			
		66	53		ARGILLITE [MW-SA]; dark grey-black with greyish green to dark brown seams, WK to S, partly weathered/altered (<50mm along joints) to fresh (75%). Crisscrossed by irregular limonite-stained joints spaced 10-50mm and white veins (<2mm, zeolite?) spaced <100mm apart.	RSWb		- maximum depth of contact. Defects mostly dip >45°. More silt (<2mm) on joints.
		65	54		- partly weathered <10mm into adjacent rock along joints below 54.1m.			26/8/14. Box 21: 54.4-57.8m.
		64	55		- no core recovery between 54.4-55.8m. [As Above?].	UD		
		63	56		55.9m - as before. ARGILLITE [SA-FW]; dark grey with minor irregular grey-green seams, mostly MS to S, partly altered (<25mm along joints) to fresh (>75%). Limonite-stained joints to dark green (chloritic material <1mm) defects spaced 25-75mm. Occasional white veins (<1mm, zeolite?)	RSWb		- maximum depth of contact. Coarser grained rock (Zst?). Defects mostly dip >50°. Some joints coated by orange-brown, non-plastic silt (<2mm) (above 60.5m). Pyrite specks on some defect surfaces near 55.9-58m. Core run 56-56.7m has 0.2m of uphole rock (<75mm) at top. Mostly intact core 56-57m.
		62	57					
		61	58		- no obvious alteration below 58m. Crisscrossed by irregular joints spaced 25-75mm apart and partly weathered <20mm into the adjacent rock. Irregular (50°-NV) white veins (<3mm, weathered) spaced 10-50mm apart. [SW-FW].	RSWg		Box 22: 57.8-60.1m. Joints have variable dip by 58m. Mostly intact core from 58.4m
		60	59					
		59						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 18m.	123mm to 18m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/1

LOCATION: HUNUA QUARRY **GRID REF:** 420863.11E 776994.24N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 118.72m **SHEET** 4 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 20-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 27-8-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		58	60.5m		ARGILLITE [FW]; dark grey, MS-S, fresh. Crisscrossed by irregular (20º-NV) transparent to white veins (<2mm, zeolite?) spaced 10-50mm apart.	RSWg		Box 23: 60.1-62.4m. - irregular contact. Pyrite specks on some broken defect surfaces from 60.5m.
		57	61					
		56	62		- occasional limonite-stained joints often coated by orange-brown, non-plastic silt (<1mm) and partly weathered <3mm into the adjacent rock below 62.15m.	RFW		- indistinct dark bands (<5mm, 50º) near 62m. Broken core (25-75mm pieces) 62.05-63m. Joints mostly dip >40º 62.15-65.1m. Box 24: 62.4-64.7m.
		55	63					
		54	64		63.75m ARGILLITE [MW/MA]; brown and grey (discoloured) intervals, WK-MS, partly weathered to partly altered. Irregular limonite-stained joints spaced 10-200mm. Crisscrossed by irregular (20º-NV) limonite-stained to white veins (<3mm, weathered) to fractures spaced <50mm apart.	RW		- irregular NV limonite-stained joint(s) partly weathered <5mm into the adjacent rock 63.4-63.7m. - irregular 60º contact. Light grey, low-plasticity clay partly coating some defect surfaces. Moderately weathered. - 50º joint filled by pale brown (vein material) to orange-brown (limonite-cemented), non-plastic sand-silt (<10mm) at 63.9m. Moderately altered 63.95-64.25m.
		53	65		65.1m Veined ARGILLITE [SA-FW]; dark grey-black with irregular grey-green seams, WK to S, partly altered (<30mm along joints) to fresh (>75%). Crisscrossed by irregular (30º-NV) white veins (<2mm, zeolite?) to fractures spaced 5-35mm apart. Occasional limonite-stained joints.			- irregular 70-40º joint filled as above. - moderate/slightly altered 64.6-64.9m. Box 25: 64.7-67.3m. - 50º joint. Finer grained rock. Partly weathered <5mm into the adjacent rock along occasional joints from 65.1m. Missing block at 65.7m. Core broken (<150mm pieces) along irregular NV joint coated by grey, low plasticity clay (<1mm) and partly altered <30mm into the adjacent rock 65.85-66.6m. Some pyrite specks.
		52	66					
		51	67		- irregular black band (<10mm, NV) between 66.9-67m.			
		50	68					
		49	69		- veins (<4mm) spaced <20mm apart below 69.2m.	RSWg		- irregular 70º seam (<30mm) of partly weathered rock 66.6-66.9m. - irregular NV joint(s) coated by orange-brown, non-plastic silt (<2mm) and partly weathered <20mm into the adjacent rock 67.1-67.55m. Box 26: 67.3-69.9m. - irregular NV seams of partly altered rock 69.4-69.55 (<50mm) & 69.7-69.9m (<100mm). Box 27: 69.9-72.3m.
		48	70					
		47	71		- brown with some grey (discoloured) patches (<40mm), WK-MS, partly weathered between 70.7-71.25m. Crisscrossed by irregular limonite-stained joints (often coated by light orangish brown to orange-brown, non-plastic silt <3mm) spaced <25mm apart.			Broken core (<75mm pieces) 70.6-71.25m. 70º-NV joint 70.6-70.85m. Joints mostly dip >50º near 70.6-71.3m. - 50º joint 71.2-71.3m. NV seam (<25mm) of greyish green-brown, WK-MS, partly altered rock between 71.55-72.1m.
		46	72					
		45	73		- partly weathered between 72.7-72.75m.			Core broken (<125mm pieces) along NV joints some coated by off-white vein material to light grey, non-plastic silt (<2mm). Box 28: 72.3-74.7m. - 35º & 55º joints at 72.7 & 72.75m. Irregular NV seam (<20mm) of partly weathered rock along joints 72.9-73m.
		44	74		73.65m Veined GREYWACKE SILTSTONE to ARGILLITE [SA/SW]; dark grey, MS to S, slightly altered (pervasive). Crisscrossed by irregular white veins (<4mm, zeolite?) to fractures spaced <20mm apart. Irregular seam (<50mm) of brown, partly weathered rock between 73.85-74.8m.			- irregular NV seam (<40mm) of grey-green (brown-tint), MS, partly altered rock between 73-73.6m. - defects generally have variable dip. Few obvious pyrite specks. - 70º-NV limonite-stained joints (often coated by orange-brown, non-plastic silt) spaced 10-50mm apart 73.85-74.8m. Box 29: 74.7-77.1m. Broken core (<75mm pieces) from 75.05m.
		43	75			RSWb		
		42	76		- darker grey, slightly weaker (MS-S), argillite by 75.5m.			
		41	77		- crisscrossed by irregular fractures (often coated by light grey, non-plastic sand-silt) spaced <10mm apart below 76.1m.			27/8/14. Shattered core (<20mm pieces, silty) near 76.1-76.6m. [Fault]. - irregular 25º contact. Mostly intact core from 76.6m. Coarser grained rock (Zst?). Box 30: 77.1-79.8m.
		40	78		76.6m Veined ARGILLITE [MW to SA]; dark brown with some grey patches, MS, partly weathered. Irregular limonite-stained joints (some coated by orange-brown, non-plastic silt <1mm) spaced 10-50mm apart. Irregular weathered veins (<2mm) spaced <20mm apart. - grey (discoloured), moderately altered [MA] near 77.1-77.3m. - grey (discoloured), MS to S, moderate-slightly altered (pervasive) from 77.65m. Crisscrossed by irregular white veins (<4mm, zeolite?) to fractures (some coated by light grey, slightly plastic, sandy mud <2mm) spaced <15mm apart.	RW		- irregular NV contact between 77.55-77.75m. Broken core (<50mm pieces) 77.75-78.1m.
		39	79			RSWb		
					79.2m Veined ARGILLITE [MW-SW]; dark grey with irregular brown to dark brown seams, MS to S, partly weathered (<20mm along joints) to fresh (>50%). Crisscrossed by limonite-stained joints spaced 10-50mm apart	RSWb		- irregular NV joints (often coated by pale brown to orange-brown, non-plastic silt <5mm) spaced <15mm apart 78.7-78.8m. - 60º joint. Some joints coated by orange-brown, non-plastic silt (<2mm) from

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 18m.	123mm to 18m. 96mm to EOH.

BOREHOLE No. HUN14/1

LOCATION: HUNUA QUARRY **GRID REF:** 420863.11E 776994.24N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 118.72m **SHEET** 5 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 20-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 27-8-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		38	81		to white veins (<4mm, weathered) spaced 5-15mm apart.			79.2m.
					- irregular (70°-NV) weathered veins (<10mm) to vein networks (<20mm) spaced <100mm below 80.7m.	RSWb		Box 31: 79.8-82.3m. 60° composite vein (<10mm, weathered) at 79.95m. - 30° off-white composite vein (<10mm, weathered & quartz) to vein network (<20mm). 40° weathered composite vein (<10mm) to vein network (<15mm) at 80.7m.
		37	82		81.9m GREYWACKE SILTSTONE [MW]; light brown (interiors) to brown, WK-MS, partly weathered. Crisscrossed by weathered veins to limonite-stained joints (often coated by off-white to orange-brown, non-plastic silt <5mm) spaced 10-30mm apart.			Mostly broken core (<150mm pieces) 82.2-83.3m. Box 32: 82.3-84.9m.
		36	83					
		35	84		- some patches (<40mm) of grey (discoloured), MS to S, less weathered rock between 83.4-84.05m. - verging slightly weathered/altered [FW 50%] between 83.7 (70°) & 83.95m (60°).	RW		Partial loss of drilling circulation (40% return) by 83.3m. Broken core (<100mm pieces) from 84.8m. Disturbed band (<30mm) of light brown, slightly plastic, sandy mud with some rock fragments (<50mm) at 85m. Box 33: 84.9-85.4m.
		34	85		85.4m			
		33	86		EOH @ 85.4m			
		32	87					
		31	88					
		30	89					
		29	90					
		28	91					
		27	92					
		26	93					
		25	94					
		24	95					
		23	96					
		22	97					
		21	98					
		20	99					
		19						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 18m.	123mm to 18m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. **HUN14/2**

LOCATION: HUNUA QUARRY **GRID REF:** 420925.52E 777036.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.66m **SHEET** 1 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** 133.62° **PLUNGE:** 50°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		123	1		0.2m CLAY; light orange-brown, plastic, rootlets. Thin light brown (organic), clayey silt near top. [Top soil to Residual Soil].	O	NZTM location (GPS within 3m) of 1777719mE & 5893667mN. RQD entered into penetration field in database from 25.1m. Core boxes photographed. Angles relative to core (parallel is 90°). Box 1: 0-2.75m. Disturbed core (moist, soft to firm).
					Sandy SILT; variable pale brown to orange-brown with red patches (<200mm), firm (disturbed) to stiff, non-plastic. Minor irregular limonite-cemented streaks to disturbed bands (<10mm). [Undifferentiated Soils]. - patch (<100mm) of off-white with light red streaks and orangish brown, silt near 0.8-0.9m.	O	- maximum depth of contact. Some limonite-cemented lumps (<10mm) near 0.1-0.15m. Core run 1.3-2.8m has 0.4m of probable uphole material (very soft & wet) at top.
		122	2		2.15m CLAY; light orangish brown with pale grey to orange and some light red streaks, stiff to very stiff, plastic. [Ancient Soil to CW Greywacke]. - streaky pale brown (grey-tint) to red below 2.5m.		- maximum depth of contact. Disturbed limonite-cemented bands (<10mm) near contact. Intact core from 2.2m. Box 2: 2.75-5.5m.
		121	3		- becoming pale brown with light red and some light grey mottles to patches (<20mm).		
			4		- some irregular limonite-cemented streaks to patches (<20mm) by 3.7m.	O	
		120	5		- pale grey-brown (red-tinted patches) and very stiff below 4.3m. Some orange streaks to patches (<20mm) between 4.55-4.65m.		
		119	6		- pale grey-brown with light orange to orangish brown streaks to patches (<30mm) and less plastic below 5.3m. Indistinct remnant fractured texture. [Ancient CW Greywacke]. - variable red-tint to light red patches (<25mm) between 5.85-6.25m. - pale grey-brown (green-tint) with light grey and minor orange mottles to patches (<15mm) below 6.25m. Harder (very stiff-hard).		Box 3: 5.5-8.1m. Broken core (<100mm) 6.2-7.55m.
			7			ORC	
		118	8		- softer (stiff-very stiff) by 7.6m. Some pale to light red bands (<10mm) near 7.8-8.05m.		Core run 7.3-8.8m has 0.25m of probable uphole material (very soft & wet) at top. - indistinctly banded (<15mm, near-perpendicular) by 7.6m. No obvious green-tint or fractured texture. Box 4: 8.1-10.85m.
		117	9		8.4m Clayey SILT; pale brown to pale grey with irregular orange-brown streaks, very stiff-hard, slightly plastic. Remnant fractured texture. [CW/HA Greywacke].		- maximum depth of contact (35°). Red-tinted patches near 8.45-8.8m. Shattered core (<50mm pieces) from 8.65m. Core run 8.8-10.3m has 0.4m of probable uphole material (very soft & wet) at top.
		116	10			ORC	Mostly intact core 10.25-11.4m.
			11				Box 5: 10.85-13.6m.
		115	12		11.3m SILT; variable light greyish brown to orangish brown, very stiff to hard, slightly plastic to non-plastic. Remnant fractured texture. [HA/HW Greywacke].		Mostly intact core 11.85-12.45m.
		114	13		- becoming harder below 13.3m.		Intact core from 13.25m.
		113	14		- light grey-brown with irregular light orange to orangish brown seams (<50mm), hard (verging on rock) and non-plastic by 13.7m. Crisscrossed by remnant joints spaced <40mm apart. [HW Greywacke].		Box 6: 13.6-16.4m. Remnant joints have variable dip. Broken core (<75mm) 14.2-14.85m.
		112	15				
			16			ORH	Broken core (<75mm) 15.75-16.75m.
		111	17				Box 7: 16.4-19.8m. 45° limonite-stained to white remnant vein (<2mm, weathered) near 16.6m.
		110	18				
		109	19				

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15.5m.	123mm to 15.5m. 96mm to EOH.

BOREHOLE No. **HUN14/2**

LOCATION: HUNUA QUARRY **GRID REF:** 420925.52E 777036.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.66m **SHEET** 2 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** 133.62° **PLUNGE:** 50°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		108	21		- paler brown-grey with some irregular orange streaks, stiff and more plastic near 20.5-20.7m.	ORH	Box 8: 19.8-23.2m. Shattered to broken core (<100mm) 19.7-20.35m. Contact depths adjusted (up 0.3m) between 20.4-23.8m. Broken core (<75mm pieces) 20.95-22.3m. Missing block at 21.3m.
		107	22				Shattered core (<10mm pieces, silty) 21.8-22m.
		106	23		- light grey (brown-tint) with some irregular light orange to orangish brown seams (<15mm), mostly VWK, weathered greywacke (Zst/Arg) near 22.8-23.3m. Joints spaced <20mm apart. - light grey (brown-tint) with some irregular light brown to orange-brown streaks to seams (<30mm), softer (hard), slightly plastic to non-plastic silt. Some remnant joints. - clayey near 23.8-24.1m. Irregular off-white patch (<20mm) near 24.03-24.05m.		- 40° limonite-stained to white vein (<3mm, weathered). - 60° limonite-stained joint. Joints mostly dip 30-60° near 22.8-23.3m. Mostly broken core (<100mm pieces) 23-23.8m. Box 9: 23.2-25.65m. Core run 23.3-23.8m has 0.3m of mixed uphole material at top. Excess core (0.3m) between 23.8-25.1m. Driller indicated dropped and recovered from previous runs.
		105	24				
		104	25		25.15m Weathered GREYWACKE (Zst/Arg) [HW]; light grey (brown-tint) with some irregular light orange to orange-brown seams (<20mm), mostly VWK, weathered. Crisscrossed by irregular limonite-stained joints spaced <20mm apart. - variable light grey to orange-brown, slightly plastic, sandy mud with some greywacke fragments (<15mm) between 25.85-26.6m (includes 0.6m of lost core). [Fault Zone]. - grey (brown-tint) with some irregular orange-brown seams (<30mm) and harder (VWK-WK) by 26.6m. Occasional remnant irregular off-white veins (<3mm, weathered). [HW-MW].	ORH	Broken core (<75mm) from 24.7m. 16/9/14. Maximum depth of contact at 25.15m. Box 10: 25.65-29.15m. Shattered core (<15mm pieces, silty) from 25.8m. - indistinctly banded (<20mm, near-perpendicular) near 25.85-26.6m. Mostly intact core from 26.6m.
		103	26				
		102	27		27.75m ARGILLITE [HW/MW]; brown-grey with irregular dark brown seams (<50mm), WK, partly weathered (marginal). Crisscrossed by limonite-stained joints spaced <20mm apart. - becoming as below.	ORM	- maximum depth of contact. 60° joint. - irregular 90° joint 28.25-29m.
		101	28				
		100	29		29.4m ARGILLITE [MW to SA]; dark grey (discoloured) with irregular light brown (grey-green tint) and dark brown seams, WK to MS, partly weathered (<30mm along joints) to slightly altered (pervasive). Crisscrossed by limonite-stained joints spaced <50mm apart. - becoming as below.	ORM	Box 11: 29.15-31.9m. - maximum depth of contact.
		99	30		30.55m Fractured ARGILLITE [SA]; dark grey-black, MS to S, slightly altered (pervasive). Crisscrossed by irregular fractures (some with dark green surfaces) to indistinct white veins (<1mm, non-plastic silt) spaced <15mm apart.		- 60° weathered vein (<2mm). - maximum depth of contact. Occasional irregular 90° seams (<20mm) of discoloured grey to greyish green (brown-tint), WK, partly altered rock 30.55-34.2m. Mostly broken core (<150mm) 31-32m.
		98	31				
		97	32			RSWg	Box 12: 31.9-35.7m.
		96	33		- irregular near-parallel seam (<25mm) of greyish green (brown-tint), WK, partly altered rock between 32.45-34m.		
		95	34		34.2m FAULT ZONE [SA]; grey, hard, plastic to slightly plastic mud with some sand to gravel (<5mm, as above). - more rock fragments (<15mm) and softer (disturbed) below 34.7m. No core recovery between 34.9-35.7m.		- 45° band (<15mm) of silty brecciated rock near 33.7m. - minimum depth of contact. Some indistinct bands (<15mm, 40-70°) by 34.2m.
		94	35			RW	
			36		- gravelly sand-mud by 35.7m. 36.1m ARGILLITE [SA-FW]; dark grey with some irregular greyish green seams (<25mm), MS to S, partly altered to fresh (>75%). Crisscrossed by irregular joints (clean) to indistinct white veins (<1mm, zeolite?) spaced <50mm apart.		Core run 35.6-35.9m has 0.3m of mixed uphole material at top. Box 13: 35.7-38.5m. Core run 35.9-36.3m has 0.2m of uphole rock (<50mm) at top. Broken core (<100mm) from 36.25m. - maximum depth of contact. 40° joint. Coarser grained rock (Zst?). 30° limonite-stained joint at 36.3m. 17/9/14. Shattered core (mostly <20mm, some silt) 36.7-37.05m. Some grey, slightly plastic, sandy mud lumps (<20mm) near 37m. [Minor Fault]. - disturbed lump (<30mm) of grey, slightly plastic, sandy mud with some rock fragments (<10mm) near 37.9m [Uphole material?]. Box 14: 38.5-40.95m. Some intervals of intact core from 39.1m. Minimal silt. - 80° pale brown to white broken vein (<1mm, zeolite?) 39.45-39.55m. Irregular patch (<15 by
			37				
			38			RSWg	
			39		40.05m		

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15.5m.	123mm to 15.5m. 96mm to EOH.

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BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/2

LOCATION: HUNUA QUARRY **GRID REF:** 420925.52E 777036.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.66m **SHEET** 3 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** 133.62° **PLUNGE:** 50°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		92	41		ARGILLITE [FW]; dark grey, S, fresh (>95%). Crisscrossed by irregular joints (clean) to indistinct white veins (<1mm, zeolite?) spaced <50mm apart. - irregular white veins (<3mm) spaced <50mm apart below 41m.	RFW	20mm) of black argillite near 40.1m. Mostly intact core from 40.8m. Irregular 90° joint coated by pale brown, non-plastic silt (<1mm) 40.85-40.95m. Irregular 90° seam (<15mm) of black argillite near 40.9m.
		91	42				Box 15: 40.95-43.3m. 35° band (<20mm) of black veined argillite then greyish green, MS, partly altered rock (<20mm) near 41.1m. - 50° band (<20mm, disturbed) of grey, gravelly (<10mm) silt-sand. - 90° joint coated by green, low-plasticity clay (<1mm).
		90	43		- irregular black seam (<50mm, 55°) with light greyish brown-green, MS, partly altered patch (<40 by 20mm) near 42.85-43m. - fractured/brecciated argillite below 43.2m. White veins (<2mm, zeolite?) to joints (coated by grey, slightly plastic to non-plastic, sand-silt <5mm) spaced <20mm apart.		18/9/2014. Shattered core (<40mm pieces, silty) 42.2-42.35m. - 60° joint coated by grey, non-plastic sand-silt (<2mm). Broken core (<75mm pieces, some silt) from 43.2m. Box 16: 43.3-45.6m.
		89	44				- 60° black band (<15mm) 43.5-43.7m. Disturbed seam/patches (<20mm) of partly altered rock to 43.75m.
		88	45		- irregular seam (<20mm, >70°) of greyish green, WK-MS, partly altered rock between 45.05-45.45m.		Shattered core (<50mm pieces, silty) 44.3-44.6m.
		87	46		45.65m FAULT ZONE [MA/SA]; light grey (green-brown tint)(oxidizes light orange), WK-MS, moderately altered, brecciated (<10mm, silty) argillite to patchy light to dark grey, muddy sand-gravel (<50mm, as above). - no core recovery between 45.8-46.7m.	RW	Mostly intact core 45-45.5m. Irregular 70° vein (<4mm) at 45.15m. 40° defect at 45.45m. - contact along 65° defect(s) between 45.6-45.7m.
		86	47		- recovered core consists dominantly of probable uphole rock fragments (<75mm) by 46.7m. - light grey with black patches (oxidizes light orange), slightly plastic, sandy gravel (<15mm)-mud near 46.8-46.9m (Disturbed core?). - light grey, slightly to non-plastic, gravelly (<20mm) silt near 47.25-47.3m (Disturbed core?). - some light grey, slightly plastic, gravelly sand-mud lumps near 47.65-47.7m. Becoming as below.	UD	Box 17: 45.6-49.7m. Shattered core (<50mm, silty) from 45.75m. 19-22/9/14. Multiple grouts of unstable hole 46.6-46.9m. Core run 46.6-46.9m has 0.1m of uphole material (mixed rock fragments <75mm and calcareous silt from grout). 23/9/14. Rock fragments are mostly grey to black with variable amounts of greenish grey (brown-tint), WK to S, partly altered to fresh (<75%) argillite.
		85	48		48.55m Fractured ARGILLITE [FW to SA]; dark grey, MS-S, fresh (>95%). Crisscrossed by irregular fractures (clean, some indistinct) spaced <20mm apart. Irregular seam (<30mm, near-parallel) of greyish green (brown-tint), WK-MS, partly altered rock above 48.85m (and adjacent black seam <20mm). - fractures spaced <10mm apart below 49.45m.	RFW	- dominantly greenish grey (brown-tint)(oxidizes light orange), WK to S, partly altered rock fragments (<20mm) near 47.55-48.3m. Core run 48.3-48.7m has up to 0.15m of uphole rock at top. - maximum depth of contact. Finer grained rock.
		84	49		50m ARGILLITE [MA]; greyish green (oxidizes light orange) with some irregular dark grey seams (<40mm, near-parallel), WK to VS, partly altered to fresh (<25%). - crisscrossed by irregular (>40°) white veins (<5mm, zeolite?) spaced <20mm apart below 51m.	RMW	Mostly intact core 48.7-49.55m. Irregular 90° joint(s) and associated seam (<50mm) of shattered rock (<20mm pieces, silty) 48.75-49.4m. - interval (<40mm) of grey with some dark grey mottles, very stiff, plastic, gravelly (<10mm, subrounded) mud near 48.8m [Uphole material?].
		83	50		51.65m Veined ARGILLITE [SA/FW]; dark grey-black, MS to S, fresh (95%). Crisscrossed by irregular (mostly <60°) white veins (<3mm, zeolite?) spaced <20mm apart. - irregular near-parallel seam (30mm) of greyish green (brown-tint) with some irregular dark grey streaks, WK to MS, partly altered rock between 52.5-53.75m. - veins (<2mm) spaced <40mm apart between 53.1-54.75m.		Mostly broken core from 49.65m. Box 18: 49.7-52.2m. Shattered core (<25mm pieces, some silt) 49.95-50m. - near-parallel contact. Indistinctly fractured (<20mm, mostly 90°) 50-52.6m. Mostly intact core from 50.5m. Central seam (<10mm) of greyish green, slightly plastic, sandy silt near 50.5-51.1m. - 60° network (<25mm) of veins (<5mm, zeolite?) spaced <10mm apart. - maximum depth of contact. Broken veins to joints (some with pyrite specks on surfaces) spaced 20-200mm apart below 52m. Broken defects mostly dip 45-60°. Box 19: 52.2-54.6m. 24/9/14. Broken core (<150mm pieces) from 52.6-54.6m. 45° joint coated by grey, slightly plastic mud (<2mm) at 53.65m.
		82	51				
		81	52				
		80	53				
		79	54				
		78	55				
			56		- discontinuous near-parallel seam (<15mm) of greyish green, WK-MS, partly altered rock (and indistinct black bands <15mm) between 52.4-55.55m. Disturbed seam (<20mm, 60°) of partly altered rock 55.65-55.7m. No core recovery 55.8-56.3m. - veins (<3mm) spaced <15mm apart by 56.3m. Irregular near-parallel seam (<15mm) of partly altered rock between 56.3-56.6m.	RFW	- indistinct 90°, darker streaks near 54.5m. Box 20: 54.6-57.25m. - irregular 90° joint coated by grey, silty sand (<2mm) 55.2-55.5m. Broken core (<75mm pieces) 55.65-56.5m. Light grey (brown-tint), very stiff, slightly plastic, gravelly (<15mm) sand to mud 55.7-56.3m (including 0.5m of core loss) [Fault Zone]. Core run 55.8-56.4m has 0.2m of uphole rock (<50mm) at top. - veins have variable dip by 56.3m. Some fractures (indistinct) spaced <20mm apart 56.3-57.6m. - some grey, slightly plastic mud near 56.4m [Uphole material]. - irregular 90° joint(s) near 56.55-57.25m. Shattered core (<50mm pieces, some silt) 57.25-57.6m. Box 21: 57.25-59.7m. Mostly broken core (<100mm
			57				
			58		- harder (mostly S) between 57.6-61m.		
			59		- fractured <20mm below 58.45m.		
					- veins spaced <10mm apart below 59.7m. Fractured <50mm.		

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15.5m.	123mm to 15.5m. 96mm to EOH.

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BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/2

LOCATION: HUNUA QUARRY **GRID REF:** 420925.52E 777036.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.66m **SHEET** 4 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** 133.62° **PLUNGE:** 50°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		77	61			RFW	pieces) from 58m. Shattered core (<20mm pieces, some silt) 58.45-58.55m. Irregular 90° seam (<50mm) of brecciated rock (<25mm) 58.65-59.2m. Shattered core (<20mm pieces, silty >59.3m) 59.2-59.45m. Box 22: 59.7-62.2m. More intact core (<200mm intervals) from 59.7m.
					61.9m		
		76	62		FAULT ZONE [MA/SA]; variable grey, soft (disturbed) to very stiff, gravelly (<10mm) sand to slightly plastic, sandy mud.		Shattered core (<50mm pieces, some silt) 61-61.4m.
			63		- dark grey, WK to MS, moderately altered, brecciated (silty) argillite between 62.45-62.8m. Crisscrossed by irregular white veins (<2mm, zeolite?) spaced <5mm apart. Fractured <20mm.	RW	- 70° sheared contact between dark grey & black argillite 61.4-61.6m. 50° seam (<30mm) of grey, non-plastic, gravelly sand-silt 61.65-61.7m. Shattered core (<25mm, silty) from 61.75m. - minimum depth of contact.
		75			63.65m		
			64		Veined ARGILLITE [SA/FW]; dark grey to black with minor irregular greyish green seams (<20mm), MS to S, partly altered (<20mm along joints) to fresh (95%). Crisscrossed by irregular (20-70°) white veins (<3mm, zeolite?) spaced <15mm apart.		Box 23: 62.2-65.15m. More intact core from 62.2m. Core run 62.8-63.5m has 0.1m of uphole rock (<50mm) at top. Mostly intact core from 63.5m.
		74	65				- 55° slickensided defect along contact. Broken veins to joints spaced 20-200mm apart. Dark grey (discoloured), MS, moderately altered rock 63.65-63.75m.
					- irregular seam (<20mm, 55°) of greyish green, WK-MS, partly altered rock near 65.2m.		- 50° joint partly altered <3mm into the adjacent rock.
		73	66		- irregular seam (<20mm, >55°) of partly altered rock between 65.55-65.7m.	RSWg	- irregular 50° seam (<15mm) of greyish green, MS, partly altered rock.
			67		- intersecting irregular seams (<15mm, 70° & 60°) of partly altered rock near 66.6m.		- 75° joint filled by grey, silt-sand (<10mm). - 65° joint partly altered (WK) <10mm into the adjacent rock. Several intersecting irregular 50-65° transparent to white veins (<3mm, quartz & zeolite?) with minor voids (<10 by 3mm) at 65.1m.
		72			- irregular seam (<20mm, 60°) of partly altered rock near 67.2m. Veins spaced <50mm apart below 67.2m.		Box 24: 65.15-67.7m. Broken core (<75mm pieces) 65.2-65.5m.
			68		- irregular seam (<30mm, 55°) of partly altered rock at 67.65m. Bands (<10mm) of partly altered rock at 68.15 & 68.2m.		- disturbed seam (<50mm) of light grey, slightly plastic to non-plastic, gravelly (<20mm) sand-silt.
					68.2m Fractured ARGILLITE [SA/FW]; dark grey (slightly discoloured), MS-S, almost fresh. Crisscrossed by irregular fractures (some indistinct) spaced 5-25mm apart. Irregular white veins (<3mm, zeolite?) spaced <50mm apart.		- dark grey, gravelly (<10mm) sand to light grey, slightly plastic mud seam (<20mm) along defect adjacent to partly altered seam. Shattered core (<25mm, some silt) 66.8-67m. Box 25: 67.7-70.3m.
		71	69				
		70	70		- fractures <15mm below 69.9m. Occasional veins (<2mm).	RFW	- 45° composite vein with adjacent partly altered band (<5mm). Discontinuous band (<5mm, 50°) of partly altered rock at 68m. - 55° composite vein to vein network (<10mm). Broken veins to joints spaced 20-200mm apart.
		69	71		- crisscrossed by irregular fractures (mostly indistinct) to white veins (<2mm) spaced <20mm apart below 71.1m.		- irregular 90-70° joint filled by light grey, non-plastic silt to grey, silty sand (<10mm) 69.5-69.9m. Irregular subparallel seam (<10mm) of WK, partly altered rock.
			72				Dark green material (<1mm) and/or minor pyrite specks on some broken defect surfaces below 69.9m.
					72.55m		
		68	73		ARGILLITE [SA to FW]; dark grey (darker), MS-S, fresh. Irregular limonite-stained joints (some coated by orange-brown, non-plastic silt <2mm) spaced 20-200mm apart. Irregular white veins (<2mm, zeolite?) spaced 5-50mm apart.		25/9/14. Box 26: 70.3-72.95m.
		67	74			RSWg	- irregular 90° slickensided defect(s) coated by dark green (chloritic material <1mm) and grey, non-plastic silt-sand (<3mm) 70.5-71.1m. Partly altered <5mm into the adjacent rock 70.95-71.1m.
			75		- dark grey (slightly discoloured, some with green-tint), WK to S, partly altered (<25%) to slightly altered (pervasive) between 74.9-76.5. Crisscrossed by irregular fractures (indistinct) spaced 10-30mm apart. Occasional white veins (<2mm) .		- defects have variable dip. Seam (<25mm, 75°) of dark grey, MS, intensely veined (<5mm) to green, WK, partly altered rock 71.6-72m. Core broken along joints coated by orange-brown, non-plastic silt (<2mm) spaced <50mm apart 72.2-72.4m.
		66	76				- minimum depth of contact. 55° joint (coated as above) partly altered <5mm into the adjacent rock. Crisscrossed by irregular indistinct (darker <2mm) defects spaced <10mm apart 72.55-79.75m. Defects mostly dip 15-70°.
		65	77		- as before by 76.5m. Crisscrossed by irregular veins (<3mm) to fractures (some indistinct) spaced <20mm apart.		Box 27: 72.95-75.55m. - irregular 90° joint filled by orange-brown to light grey, non-plastic, sandy silt (<15mm) 73.85-74.85m. - 45° joint coated by sand-silt (<5mm). Broken defects (some coated by dark green material <1mm) spaced 20-200mm apart from 74.9m. Defects have variable dip.
		64	78		- seam (<50mm, 60°) of grey with greyish green streaks, WK-MS, partly altered rock above associated defect at 78m. Crisscrossed by irregular (>50°) joints spaced 5-20mm apart by 78.2m.		- irregular 40° joints at 75 & 75.1m. - irregular 90° joint(s) with some pyrite specks 75.25-75.8m. Box 28: 75.55-78.2m. Irregular 90° joint 75.7-75.9m. - intersecting 70° & 20° joints (clean) with pyrite specks and locally coated by grey, non-plastic sand-silt (<5mm).
		63	79		79.75m	RMW	

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15.5m.	123mm to 15.5m. 96mm to EOH.

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BHFORM3 HUN GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. **HUN14/2**

LOCATION: HUNUA QUARRY **GRID REF:** 420925.52E 777036.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.66m **SHEET** 5 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** 133.62° **PLUNGE:** 50°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		62	81		80.3m FAULT ZONE [MA]; grey-green, WK to MS, mostly partly altered, brecciated (<25mm, silty) argillite. No core recovery 79-80.3m. Fractured ARGILLITE [SA]; dark grey with minor irregular greyish green seams (<15mm, patchy), mostly MS to S, dominantly slightly altered (pervasive). Crisscrossed by irregular fractures to joints spaced 5-25mm apart. White veins (<2mm, zeolite?) spaced 20-200mm apart.	RMW	Some drill circulation loss (85% return) by 76.5m. Broken veins to joints spaced 15-150mm apart by 76.5m. Irregular 90° joint (coated by orange-brown, non-plastic silt <2mm below 77.2m) with some pyrite specks 76.6-77.5m.
		61	82		- some indistinct intervals of darker grey, S, fresh rock by 81.5m. Irregular fractures to joints spaced 10-100mm apart.		- intersecting 70° & 35° joints (and above joint). - intersecting 70° joint and slickensided defect coated by dark green material (<1mm). Pyrite specks.
		60	83		- grey (discoloured), VWK to WK, mostly altered rock (Zst?) between 83.25 (60°)-83.55m. Fractured <20mm. No obvious veins. - slightly altered (as before). Irregular (mostly >60°) fractures to joints spaced <20mm apart. Veins as before. - fresh near 84.1-85m. Crisscrossed by veins (<3mm, zeolite?) to fractures spaced <40mm apart. Irregular joints spaced 50-250mm apart.		- discontinuous black seam (<20mm, 45°) near 77.95m. Irregular black patch (<50 by 20mm, <20°) near 78.1m. Box 29: 78.2-81.35m. 70° slickensided defect (as above) at 78.2m. 50° joint and irregular black seam (<25mm, 35°) near 78.25m. Core broken (<75mm pieces) along several irregular 90° joints (limonite-stained <78.75m) coated by orange-brown to grey, non-plastic sand-silt (<3mm) 78.3-79.05m. Greyish green, partly altered band (<10mm) near 78.8-78.9m.
		59	84				
		58	85		- slightly altered (as before) by 85m. Crisscrossed by irregular (45-70°) veins (<5mm) spaced <20mm apart.	RSWg	- 75° joint (clean) with common pyrite specks. Mostly broken (<150mm) core 79.6-81.4m. - irregular contact between 79.7-79.8m. - maximum depth of contact. Slightly discoloured intervals. 65° defect with pyrite specks near 80.3m. Defects mostly dip 40-90°. Some pyrite specks to patches on broken defect surfaces. Minor partly altered seams of generally greyish green, WK to MS rock.
		57	87		- dark greenish grey and partly altered (associated with defect) between 86.5-86.55m (50°). Fresh between 86.55-88m. Fractured <20mm. Irregular (20-70°) veins (<2mm) spaced 10-100mm apart.		Box 30: 81.35-83.9m. Broken defects spaced 20-200mm apart by 81.5m. Defects mostly dip 35-90°. Irregular 90° joint 82.45-82.8m. - 60° joint partly altered <5mm into the adjacent rock. Shattered core (<50mm) 83.25-83.55m. - discontinuous seam(s) (<20mm, 80°) of partly altered rock 83.85-84.1m. Box 31: 83.9-86.6m. - 30° joint. Defects mostly dip 30-90° by 84.1m. - broken veins to joints spaced <200mm apart by 85m. Partly altered seams (<10mm) mostly dip >25°. Shattered core (<50mm, some silt) 85-85.1m. Broken core (<100mm) 85.35-86m.
		56	88		- slightly altered (as before) by 88m. Irregular joints (clean) spaced 20-200mm apart. Occasional veins (<2mm).		
		55	89		- fresh near 89.55-90.65m. Fractured <40mm. Irregular (mostly 30-70°) joints spaced 20-250mm apart. Occasional veins (<1mm). - fractured <20mm by 89.8m.		- 40° defect coated by dark green-black material (<1mm) and grey, non-plastic silt-sand (<2mm). Defects have variable dip from 86.55m. Broken veins to joints (50-90°) spaced 30-300mm apart near 86.55-88m. Box 32: 86.6-88.9m. Broken core (<75mm) 87.2-87.9m. 26/9/14. Core run 87.9-88.3m has 0.2m of uphole rock (<50mm) at top.
		54	90		90.65m Veined ARGILLITE [SA]; dark grey with minor irregular greyish green seams (<15mm), mostly MS-S, mostly slightly altered (pervasive). Crisscrossed by irregular white veins (<3mm, zeolite?) to fractures spaced <15mm apart. Irregular joints (clean) spaced 15-150mm apart.		
		53	91		- darker grey, fresh rock near 91.7-92.5m.		- more pyrite specks to patches on broken defect surfaces by 88m. Partly altered seams (<15mm) mostly dip 25-90°. Indistinct irregular defects (darker <2mm) spaced <20mm apart near 88-89.55m. Broken core (<100mm) 88.7-89.1m. Box 33: 88.9-91.4m.
		52	92		- veins to fractures spaced <10mm apart between 93.5-95.4m.		- 70° joint partly altered (WK) <3mm into the adjacent rock. - defects mostly dip 20-90° near 89.55-89.8m. Core run 90.5-91.2m has 0.05m of uphole material at top. Broken core (<75mm pieces) 90.6-91.25m. Disturbed seam (<15mm) of greyish green, WK, partly altered rock 90.65-90.85m.
		51	93				
		50	94				
		49	95		- dark grey with minor irregular greyish green seams (<20mm, patchy), MS to S, partly altered to fresh (95%). Veins (<2mm) to fractures spaced <40mm apart. Irregular (30-90°) joints spaced 50-200mm apart.	RSWg	- minimum depth of contact. Slightly discoloured. Partly altered seams (<15mm) mostly dip >60°. Defects have variable dip. Pyrite specks to patches on many broken defect surfaces. - 70° composite vein (<7mm). Box 34: 91.4-94.2m. Mostly broken core (<150mm) 91.4-92.4m. Two 55° joints 20mm apart coated by variable grey, silt-sand (<3mm) and partly altered <5mm into the adjacent rock near 91.45m.
		48	96				
			97		- crisscrossed by irregular (mostly 70-90°) veins (<3mm) spaced <20mm apart below 97.2m. Joints spaced 20-200mm apart.		- 55° transparent to white vuggy vein (<12mm) with grey, non-plastic sand-silt (<5mm) below. - irregular 90° seam(s)(<15mm) of partly altered rock 93.5-94.2m. Broken core (<75mm) 93.9-94.4m. Box 35: 94.2-97.1m.
			98		- slightly discoloured and softer (MS-S) near 98.5-99.6m.		- irregular 70-90° band (<15mm) of variable grey, plastic to slightly plastic silt with associated seam (<50mm, above) of fractured (<10mm, silty) rock 94.4-94.8m. [Minor Fault].
			99		- dark grey-black, slightly altered (as before). Veins (<3mm) spaced		- 55° joint coated by grey, non-plastic sandy silt (<2mm). 30° joint filled by grey, non-plastic silt (<5mm) and partly altered <3mm into the adjacent

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15.5m.	123mm to 15.5m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/2

LOCATION: HUNUA QUARRY **GRID REF:** 420925.52E 777036.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.66m **SHEET** 6 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** 133.62° **PLUNGE:** 50°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		46	101		<40mm apart below 99.6m.	RSWg	rock at 95.1m.
					100.5m		- partly altered seams (<20mm, patchy) mostly dip 40-90° below 95.35m.
					ARGILLITE [SA]; dark grey with minor irregular grey-green seams, MS to S, dominantly slightly altered (pervasive). Crisscrossed by irregular fractures to white veins (<2mm, zeolite?) spaced 5-40mm apart. Irregular joints (20-70°) spaced 50-250mm apart.		- irregular 90-60° seam(s) (<50mm) of variable partly altered rock 95.65-95.85m.
							- 80° joint and black band (<10mm). Irregular 90° joint(s) 95.9-96.5m.
					- discontinuous near-parallel black seam (<15mm) between 101.65-101.8m.		- intersecting 20, 60 & 90° joints partly altered (WK) <5mm into the adjacent rock.
					- more partly altered seams between 101.9-103.75m. Crisscrossed by fractures (some indistinct) spaced 10-50mm apart. Joints (30-90°) spaced 50-200mm apart. Occasional irregular (20-60°) white veins (<2mm).		Box 36: 97.1-99.9m. Less obvious pyrite by 97.2m.
		45	102			RSWg	- irregular 90° joint to vein (<5mm) 97.6-98.5m. Associated seam(s) (<20mm) of partly altered rock 97.8-98m.
					- less altered [SA-FW] by 103.75m. Joints spaced 50-300mm apart. No obvious veins.		- 80° joint with some pyrite and partly coated by grey, non-plastic sand-silt (<5mm) 98.85-99.2m. Associated composite vein (<6mm, quartz & zeolite?). Irregular 90-70° joint 99.3-99.7m.
		44	103				- irregular 90-70° seam (<30mm) of WK, partly altered rock 99.55-100.15m. Associated joint 99.75-100.1m. Box 37: 99.9-102.7m.
			104		104.4m		- minimum depth of contact. Slightly discoloured. Defects mostly dip 50-90° below 100.5m. Pyrite specks to patches on many broken defect surfaces. Irregular 90° seam (<30mm) of grey-green, WK-MS, partly altered rock 100.5-101m.
		43	105		EOH @ 104.4m		- 65-90° joint partly altered <15mm into the adjacent rock 101.7-101.9m. Partly altered seams (<20mm) mostly dip 45-90° below 101.9m. Defects mostly dip 35-90° below 101.9m. Less obvious pyrite near 101.5.103.75m. Box 38: 102.7-104.4m.
			106				- irregular 90° joint coated by grey, non-plastic sand-silt (<2mm) 102.9-103.4m. Adjacent seam (<30mm) of partly altered rock.
		42	107				- crisscrossed by irregular indistinct (darker <2mm) defects spaced <15mm apart by 103.75m. Irregular 70° joint partly coated by dark green (chloritic material <1mm) and partly altered <5mm into the adjacent rock at 103.75m. Defects have variable dip.
			108				
		41					
			109				
		40					
			110				
		39					
			111				
		38					
			112				
		37					
			113				
		36	114				
			115				
		35					
			116				
		34	117				
			118				
		33					
			119				
		32					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15.5m.	123mm to 15.5m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. **HUN14/3**

LOCATION: HUNUA QUARRY **GRID REF:** 420986.09E 777067.99N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.79m **SHEET** 1 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 28-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		123	1		0.35m SILT; light brown, firm to stiff, slightly plastic to plastic, some rootlets (tree fern). Clayey below 0.2m. [Top soil to As Below]	O	S.W.L 1.745m (22/10/14)	NZTM location (GPS within 3m) of 1777779mE & 5893700mN. RQD entered into penetration field in database from 5.8m. Core boxes photographed. Box 1: 0-2.7m. Disturbed core (damp) above 0.15m. Single piece (<65mm) of moderately weathered greywacke at top.
					CLAY; light orangish brown with off-white to orange streaks, stiff (disturbed) to very stiff, plastic. [Residual Soil].	O		- irregular light grey patch (<50 by 25mm) near 1.4m.
		122	2		1.6m - light brown (orange-tint) with orange streaks, softer (firm), less plastic and some sand (fine) below 1.35m.			- light brown to brown (organic), clay (50mm) along NH contact.
					MUD; dark brown (organic), stiff (disturbed) to hard, plastic to slightly plastic. [Weathered As Below].	OTK		
		121	3		- less plastic between 2.85-3.35m.			Box 2: 2.7-5.5m. Lumpy (<15mm) disturbed core 2.7-2.85m (Uphole material?).
					3.55m			
		120	4		Carbonaceous MUDSTONE [MW/SW]; dark brown-brown, EWK (hard) to VWK. Occasional carbonaceous flecks to horizons. [Te Kuiti Group].	OTK		- indistinctly banded (<5mm, NH) by 3.55m. - indistinct 50° defect.
					- no intact core near 4.2-4.7m.			Core run 4.2-5.8m has up to 0.5m of probable uphole material (damp) at top.
		119	5		4.95m - dark brown with indistinct patchy texture (<30mm, rounded) near 4.7-4.8m.			- indistinct 60° defect. Banded (<10mm, NH) from 4.95m.
					Carbonaceous SILTSTONE [FW]; light brown-brown, VWK. Common carbonaceous flecks to coal laminations (<3mm). 5.65m	OTK		Box 3: 5.5-8.2m. Broken core (mostly <50mm pieces) 5.7-6.7m.
		118	6		Variably Altered GREYWACKE SANDSTONE [HA to SA]; light grey-grey (green-tint), EWK (hard) to S, altered to partly altered (<50%). [Boulder?].	R		- indistinct 65° defect.
		117	7		- light grey (green-tint) to grey, variably altered to fresh (<25%) below 6.25m. 7.1m			- indistinct 50° joint coated by pale grey, non-plastic sandy silt (<3mm). - disturbed NV contact between 6.9-7.3m.
					Clayey SILT; variable light grey (green-tint), stiff to very stiff, plastic to slightly plastic. Indistinct brecciated/fractured texture. [Ancient CW Greywacke]	ORC		
		116	8		- hard and non-plastic below 8.4m. Becoming as below. 8.8m			Box : 8.2-10.9m. Broken core with intact intervals (<150mm pieces) from 8.65m.
		115	9		Altered GREYWACKE (Zst/Arg) [HA]; light grey-grey (green to brown tint), EWK (hard) to VWK. Remnant intensely fractured texture. [HA Greywacke].			- maximum depth of contact. Indistinct irregular patches to seams.
		114	10					
		113	11			ORH		Box 5: 10.9-13.7m.
		112	12		- harder (VWK) by 12.1m.			Mostly intact core from 12m.
		111	13		13.4m			
		110	14		Weathered GREYWACKE (Arg) [HW-MW]; light brown with irregular orangish brown seams (<15mm), VWK to WK, weathered to limonite-cemented. Remnant limonite-stained joints spaced <15mm apart.			- contact dips 10°. Remnant joints mostly dip 30°-NV. Box 6: 13.7-16.6m.
		109	15		- light greyish brown to grey (discoloured) patches and slightly harder below 14.6m. Less obvious joints.	ORH		
		108	16		15.9m ARGILLITE [MW]; brown (grey-tint), WK-MS, partly weathered (marginal). Crisscrossed by irregular limonite-stained joints (some coated by light brown to orange-brown, non-plastic silt <2mm) spaced 5-20mm apart.			- irregular contact. 50° joint coated by light orangish brown, non-plastic silt (<3mm) at 15.85m.
		107	17		- light brown, VWK, weathered interval (disturbed) between 17-17.05m.			- 60° seam (<50mm) with pale to dark brown bands (<10mm) 16.3-16.5m. Box 7: 16.6-19.2m.
		106	18			ORM		- 30° band (<40mm) of light brown, VWK-WK, crushed rock (<10mm, silty) [Drilling induced?]. Irregular 70° seam (<15mm) of light brown, VWK, weathered rock at 17.4m.
		105	19		- brownish grey to light brown (below 18.8m), WK to VWK, weathered interval between 18.7-19m. - darker brown (grey-tint) with some irregular light brown seams (<50mm) and harder (mostly MS) from 19.2m. Joints (some coated by orange-brown, non-plastic silt <2mm) spaced 10-20mm apart.			- 45° joint with associated seam (<20mm) of weathered rock. - 60° joint. 60° pale brown band (<10mm) at 19.1m. - 20° joint. Box 8: 19.2-21.5m.
		104						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15m.	123mm to 15m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/3

LOCATION: HUNUA QUARRY **GRID REF:** 420986.09E 777067.99N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.79m **SHEET** 2 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 28-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		103	21					Broken core (<100mm pieces) 19.5-19.7m.
								Broken core (<100mm pieces) 20.5-21.2m.
		102	22		- some dark greyish brown intervals below 21.7m. Crisscrossed by limonite-stained joints (some coated by light orangish brown to orange-brown, non-plastic silt <4mm) spaced <15mm apart.			Box 9: 21.5-23.9m. Band (<10mm, 10°) of orangish brown, non-plastic sand-silt at 21.7m.
		101	23		- light brown-grey, softer (WK), more weathered interval between 22.4-25.05m. Fractured <10mm.			- 30° band (<20mm) of light brown to orange-brown, non-plastic sandy silt. 30° joint coated by light orangish brown, silty sand (<5mm) at 22.55m.
		100	24					- intersecting 70° & 40° joints coated by light orangish brown, non-plastic silt (<4mm). Broken core (<75mm pieces) from 23.65m. 29/8/14. Hole cased to 15m. Box 10: 23.9-26.65m.
		99	25					- 60° band (<10mm) of light brown, slightly plastic sand-mud. Band (<15mm, 60°) of crushed rock (<10mm, silty) at 24.95m. Intact core from 25.6m. Irregular light brown to dark grey-brown bands (<20mm, 60°) off-set by limonite-stained defects 25.6-26.1m.
		98	26					
		97	27		- light brown to dark grey-brown and softer (WK to MS) from 26.65m. Joints (some coated by light brown to orange-brown, non-plastic silt <2mm) spaced <15mm apart.			- defects have variable dip by 26.65m. Box 11: 26.65-29.6m. Broken core (mostly <75mm pieces) 26.65m. Shattered core (<25mm pieces, silty) with some indistinct lumps of light brown to orange-brown, slightly plastic, sand-mud 27.4-27.6m [Minor Fault?].
		96	28					
		95	29		- dark grey-brown and harder (MS) from 28.3m. Joints (some coated by orange-brown, non-plastic silt <1mm) spaced <20mm apart.			Mostly intact core from 28.7m.
		94	30					- 65° joint and associated band (<10mm) of light brown, softer (WK) rock. Box 12: 29.6-32.8m. Irregular NV weathered vein (<3mm) 29.9-30.3m.
		93	31		- band (<50mm, 70°) of light greyish brown, softer (WK-MS), greywacke (Zst) 30.1-30.25m.			- 65° joint coated by light brown, slightly plastic silt (<2mm). 60° joint at 30.4m. Irregular seam(s)(<20mm) of light brown, VWK-WK, weathered greywacke (Sst) between joints. Broken core (<100mm pieces) from 31.1m.
		92	32					- no core recovery between 31.7-32.3m.
		91	33					Shattered core (<25mm pieces) 32.6-33m. Some indistinct lumps of light brown, slightly plastic sand-mud 32.8-32.9m. Box 13: 32.8-35.2m.
		90	34		- occasional irregular (50°-NV) weathered veins (<3mm) by 33.5m.			Core run 33-34m has up to 0.15m of uphole rock (<25mm) at top. - irregular 50° seam (<30mm) of light brown, softer (WK-MS) rock. Disturbed band (<10mm) of light brown, slightly plastic mud with some sand at 33.95m.
		89	35					1/9/14. Shattered core (<50mm pieces, silty) with light brown to light orangish brown, slightly plastic, sand-mud lumps (>35.45m) 35.05-35.7m [Fault]. Box 14: 35.2-38.1m.
		88	36		- dark greenish to brownish grey with some irregular dark (above 36m) to light red-brown patches to seams (<50mm), MS, partly altered/weathered from 35.7m. Joints to weathered veins (<3mm) spaced 5-25mm apart.			Mostly intact core from 35.7m. Defects mostly dip 30°-NV. Some joints coated by orange-brown to off-white, non-plastic silt (<2mm). - irregular 60°-NV joint (coated by light brown, non-plastic, sandy silt <2mm) and associated band (15mm) of light grey-brown, softer (WK) rock. Irregular NV seams (<30mm) of light brown to brown-red, softer (WK) rock 37.05-38.1m.
		87	37					
		86	38		- dark grey-brown with some irregular light brown seams (<50mm), WK to MS, partly weathered from 38.1m. Joints spaced 5-15mm apart. Occasional limonite-stained to white veins (<3mm, weathered).			Box 15: 38.1-40.8m. Mostly orange-brown, non-plastic silt (<2mm) along joints. Irregular NV seam of brecciated rock (<10mm) 38.1-38.3m.
		85	39					Broken core (<150mm pieces) from 38.9m.
		84			- dark grey-brown and harder (MS) below 39.25m.			

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15m.	123mm to 15m. 96mm to EOH.

BOREHOLE No. **HUN14/3**

LOCATION: HUNUA QUARRY **GRID REF:** 420986.09E 777067.99N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.79m **SHEET** 3 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 28-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		83	41					Shattered core (<25mm pieces, silty) 40.25-40.35m. - 45° band (20mm) of light brown-brown, softer (WK-MS) rock (Sst). Box 16: 40.8-43.3m.
		82	42		- grey-brown and softer (WK-MS) near 41.95-42.2m. Dark greenish to brownish grey by 42.4m. Joints spaced 5-20mm.			Shattered core (<25mm pieces, silty) 41.95-42.2m. More intact core (<200mm intervals) 42.25-43.2m. - dark brown (red-tint) patch (<50mm, indistinct) near 42.7m. Irregular bands (<10mm, 50°) of light greyish brown and brownish red, softer (WK-MS) rock spaced <10mm apart 43.1-43.2m. - indistinctly banded (<20mm, NV) below 43.2m. Box 17: 43.3-46.15m. Mostly intact core from 44.2m.
		81	43		- dark grey-brown (green-tint) with some irregular light brown seams (<250mm, WK-MS) below 43.2m. Joints spaced <20mm apart.			
		80	44					
		79	45					
		78	46		- some irregular dark grey (brown-tint), MS-S, less weathered patches (<50mm) by 45.35m. Crisscrossed by limonite-stained joints to weathered veins (<2mm) spaced <40mm apart.			- defects mostly dip 40°-NV. Some joints coated by orange-brown, non-plastic silt (<2mm). More broken core (<150mm intact) 46-47.7m. Box 18: 46.15-48.9m. - 60° joint filled by light brown, slightly to non-plastic sandy silt (<10mm).
		77	47					- indistinct bands to seams mostly dipping <40° by 47.1m.
		76	48					
		75	49					Core shattered to broken (<150mm pieces) along irregular NV joint(s) to seam (<50mm) of brecciated (<15mm, silty) rock 48.6-49.95m. Box 19: 48.9-51.4m.
		74	50		- joints to weathered veins spaced 5-20mm apart by 50.1m. Occasional dark grey patches (<100mm).			- 35° joint with band (<10mm) of light brown (orange-tint), slightly plastic, sand-mud to light grey-brown, softer (WK) rock. - defects mostly dip 30°-NV by 50.1m. No obvious banding. 35° joint coated by light brown, slightly plastic to non-plastic, sandy mud (<5mm).
		73	51					
		72	52		- dark grey-brown (green-tint) by 51.6m. Limonite-stained joints to white veins (<4mm, weathered) spaced 5-25mm apart.			- band (10mm, disturbed) of pale brown to light orangish brown, slightly plastic to non-plastic, sandy mud. - 30° off-white vein(s) (<4mm, weathered). Box 20: 51.4-53.8m.
		71	53		- irregular seam(s) (<100mm, disturbed) of light brown, softer (WK) rock between 52.9-53.05m.			- 25° joint. Some joints coated by orange-brown, non-plastic silt (<2mm). 2/9/14. Irregular seam (<15mm) of light brown, slightly plastic, mud to sandy mud associated with 50° joint at 52.1m.
		70	54		54.15m - light grey (<53.91m) to light brown, very stiff to hard, slightly plastic to non-plastic, silt with some rock fragments (<10mm) between 53.85-54.15m. [Fault].			- 50° limonite-stained joint filled by light orangish brown, slightly plastic, sandy mud (10mm). 70° joint coated by light orangish brown, slightly plastic, mud (<2mm) and associated band (<10mm) of light brown, softer (WK) rock at 52.8m.
		69	55		GREYWACKE SILTSTONE [MW]; greyish brown, MS, partly weathered. Crisscrossed by irregular limonite-stained joints (some coated by orange-brown, non-plastic silt <2mm) spaced <20mm apart. Occasional limonite-stained to white veins (<4mm, weathered).			- 30° joint coated by pale brown, slightly plastic, sandy mud (<5mm).
		68	56		- irregular seams (<50mm) of brecciated rock (<20mm) with some light brown to orangish brown, non-plastic silt-sand 55.65-56.55m.	ORM		- patch (<70mm) of dark grey, MS-S, almost fresh rock at 53.75m. 65° joint coated by orange-brown, non-plastic, silt (<1mm) at 53.8m. Box 21: 53.8-56.5m. - 55° limonite-stained slickensided defect at 53.85m. 50° indistinct slickensided defect at 54.05m. 30° limonite-stained slickensided defect at 54.15m.
		67	57		- irregular NV seams (<100mm) of brecciated rock (<30mm) with some light orangish brown, non-plastic silt-sand 56.9-57.9m. Some irregular dark brown seams (<10mm) along joints below 57.8m.			- 30° slickensided defect below seam (<20mm) of brecciated rock (<10mm, silty). Broken core (<75mm pieces, silty) 55.9-56.5m. Box 22: 56.5-59.3m. Broken core (<100mm pieces, silty) 57-57.6m. - 60° limonite-stained slickensided defect with light orangish brown, non-plastic silt (<5mm) along top.
		66	58		58.4m			
		65	59		Veined ARGILLITE [SA/SW]; dark grey with some irregular dark brown seams, MS to S, partly weathered (<20mm along joints) to almost fresh (>50%). Limonite-stained joints spaced 50-200mm apart. Crisscrossed by irregular white veins (<5mm, zeolite?) spaced 5-25mm apart. - harder (MS-S) and less weathered [FW >75%] by 59.35m.	RSWb		
		64						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15m.	123mm to 15m. 96mm to EOH.

BOREHOLE No. **HUN14/3**

LOCATION: HUNUA QUARRY **GRID REF:** 420986.09E 777067.99N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.79m **SHEET** 4 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 28-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		63	61		- irregular NV seam (<100mm) of light grey-brown (green-tint), WK-MS, partly altered rock between 60.25-60.55m. Irregular dark green (chloritic material <1mm) defects spaced <10mm apart. - irregular NV seam (<50mm) of partly altered rock (as above) between 60.8-61m.	RSWb		- irregular NV seam (<25mm) of brecciated rock (<20mm) with light grey to orange-brown, non-plastic silt-sand 58-58.3m. - 70° joint. Veins have variable dip. Joints (some coated by orange-brown, non-plastic silt <2mm) mostly dip 30-70°. Box 23: 59.3-61.8m. - some pyrite specks on defect surfaces. - 70° joint (clean) with pyrite patches. Irregular NV joint coated by orange-brown, non-plastic silt (locally <6mm) and partly weathered <30mm into the adjacent rock 61.8-62.7m. Box 24: 61.8-64.5m. - irregular (40°-NV) limonite-stained joints (often coated by light brown to orange-brown, slightly plastic to non-plastic silt <3mm) spaced 10-100mm apart 61.9-63.9m. - 70° joint coated by silt (<2mm). Defects have variable dip. Irregular 40-70° joint partly weathered <10mm into the adjacent rock at 64m. Box 25: 64.5-67.05m. - 60° joint (coated by pale grey, low plasticity clay) with pyrite specks and band (<4mm) of light greenish grey-brown, WK, partly altered rock. - 65° joint 65.6-65.85m. Joints mostly dip 35°-NV below 65.6m. Some joints coated by orange-brown, non-plastic silt (<2mm). - 25° joint coated by light grey, non-plastic silt (<2mm). Box 26: 67.05-69.85m. 40° slickensided defect(s) coated by pale brown, low plasticity clay (<2mm) and associated band (<10mm) of light greenish brown, WK, partly altered rock. Broken core (<75mm pieces) 67.05-67.5m. - disturbed 35° transparent-white to limonite-stained vein (<7mm, quartz) at 67.2m. - irregular 20° band (<10mm) of light brown, partly weathered rock. Irregular (25°-NV) limonite-stained joints (coated as above) spaced 50-400mm apart from 67.55m. Indistinctly bedded (<200mm, 30-40°). - 35° slickensided defect with band (<15mm) of brecciated rock (<10mm, silty). - irregular NV seam (<100mm) of partly weathered/altered rock along joints to white veins (<5mm, weathered & quartz) with some voids (<50 by 6mm) 69-69.6m. Box 27: 69.85-72.5m. 20° joint to vuggy (<20mm) vein (<10mm, quartz) at 69.9m. - 45° light grey-brown (WK-MS) and black (MS) bands (<6 & 7mm) at 70.2m. - 55° joint with adjacent seam (<30mm, above) of light brown (green-tint), WK, partly weathered rock. Irregular (40°-NV) limonite-stained to clean joints spaced 50-250mm apart 70.7-73.8m. Pyrite specks on some joint surfaces. - 50° black (MS) & light brown-grey (green-tint, WK) bands (<10 & 15mm). - 45° joint(s) coated by orange-brown, non-plastic silt (<1mm) and partly weathered <5mm into the adjacent rock. Box 28: 72.5-75.1m. Partly weathered seam (<30mm) along irregular NV joint(s) 72.7-73.8m. - 35° limonite-stained joint. Defects have variable dip. Pyrite specks to patches on many joint surfaces. - 45° joint with brown to greyish green with red streaks, WK, partly weathered to partly altered rock up to 50mm from joint. Box 29: 75.1-77.7m. Box 30: 77.7-80.3m. - irregular network of veins (<4mm, calcite) spaced <15mm apart along NV seam (<40mm) of brownish green with red-brown streaks to indistinct mottles, partly altered rock (Sst/Zst?) 78.1-78.5m. - irregular NV seam (<30mm) of greenish brown to brownish red, partly altered rock
					61.9m			
		62	62		Veined ARGILLITE [MW]; variable brown to dark grey (green-tint), WK-MS, partly weathered (<30mm along joints) to slightly altered (pervasive, <50%). Crisscrossed by irregular limonite-stained to white veins (<2mm, weathered) spaced <15mm apart.	RMW		
		61	63					
		60	64		63.9m ARGILLITE [SA/FW]; dark grey, MS-S, almost fresh. Irregular limonite-stained joints (often coated by orange-brown, non-plastic silt <1mm) spaced 50-250mm apart. Crisscrossed by irregular indistinct fractures to white veins (<1mm, zeolite?) spaced <40mm apart.	RFW		
		59	65		- irregular seam (<15mm) of brown, partly weathered rock between 65-65.05m.			
		58	66		65.7m ARGILLITE [SA to MW]; dark grey with irregular variable brown seams, mostly MS, partly weathered (<30mm along joints) to slightly altered (pervasive, >50%). Crisscrossed by limonite-stained joints spaced 25-75mm apart. Fractures to veins (<4mm) as above. - more weathered below 66.55m.	R		
		57	67		- moderately weathered [MW] by 66.95m. Variable light greyish brown to dark brown. Slightly altered/weathered between 67.55 (20°)-67.7m.			
		56	68		67.9m Veined ARGILLITE [SW/SA]; dark grey (discoloured) to black with some irregular brown seams, MS to S, partly weathered (<20mm along joints) to fresh (75%). Crisscrossed by irregular fractures (indistinct) to white veins (<5mm, weathered & quartz) spaced <20mm apart.	RSW		
		55	69					
		54	70		- less weathered/altered [FW >75%] by 69.75m.			
		53	71		- dark grey with some irregular greyish green (brown-tint) seams, WK to S, partly altered (<30mm along joints) to fresh (75%) from 70.7m. Fractures spaced 10-30mm apart. Occasional white veins (<2mm, zeolite?).			
		52	72					
		51	73		- more weathered [MW-SA] by 72.95m. Partly weathered near 73.7-73.8m.			
		50	74		73.8m GREYWACKE SILTSTONE [SA]; dark greenish grey with some irregular brown to green seams (<50mm), WK to S, partly weathered-altered (25%) to slightly altered (pervasive). Limonite-stained to clean joints spaced 10-100mm apart. Fractured 10-50mm. Occasional veins (<3mm, as above).			
		49	75		- more weathered-altered seams with some irregular brownish red bands (<30mm, 30-70°) by 75.25m.			
		48	76		- common irregular (30-70°) variable green and/or brownish red, partly altered seams (<50mm) by 75.85m. Mostly clean joints (30-70°) spaced 10-150mm. Few obvious fractures. Occasional irregular white veins (<2mm).	RSWb		
		47	77					
		46	78					
		45	79		- slickensided defects coated by black material (<1mm) spaced 10-150mm by 78.65m.			
		44						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15m.	123mm to 15m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/3

LOCATION: HUNUA QUARRY **GRID REF:** 420986.09E 777067.99N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.79m **SHEET** 5 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 28-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		43	81		- less altered (mostly S) below 79.9m. Irregular red to reddish brown, MS to VS (cherty), seams (<30mm) spaced 50-200mm apart. [SA-FW]. - irregular seam (<150mm) of variable green (brown-tint, reddish band <10mm near base), WK-MS, partly altered rock between 83.05 (>30°) & 83.4m (<10°). - crisscrossed by white veins (<3mm, calcite & quartz) spaced 5-50mm apart. Joints spaced 20-200mm apart. - occasional red-brown seams (<15mm) below 81.55m. Veins (<3mm, quartz) (some with voids <15 by 3mm) spaced 10-50mm apart.			78.45-79.05m. Shattered core (<30mm pieces, some silt <79.2m) 79.05-79.3m. - 45° interval of variable green with red horizons to indistinct red-brown patches (<10mm), WK, partly altered rock. - pyrite specks to patches on many joint surfaces. Box 31: 80.3-83.05m. - irregular NV patch-seam (<40mm) of red-brown, siliceous rock (chert). - darker below 81.55m. Veins mostly dip 30°-NV. Joints mostly dip 50°-NV. Less pyrite 81.55-84.9m. 3/9/14. Box 32: 83.05-85.6m.
		42	82			RSWg		
		41	83		- irregular seam (<150mm) of variable green (reddish band <10mm near base), WK-MS, partly altered rock between 83.05 (>30°) & 83.4m (<10°).			
		40	84		- becoming as below.			
		39	85		84.9m ARGILLITE [SA-FW]; dark grey with minor green seams (<50mm), mostly S-VS, partly altered to fresh (<95%). Crisscrossed by slickensided defects coated by black material (<1mm). Occasional irregular limonite-stained joints and white veins (<2mm, quartz & zeolite?). - veins (<3mm, quartz) spaced 20-100mm by 85.6m.			- maximum depth of contact. Finer grained rock (Zst?). Irregular 50° seam (<20mm) of light brown-green, partly altered rock near 84.9m. Defects mostly dip 40°-NV. - crisscrossed by joints spaced 10-30mm apart and partly weathered <10mm into the adjacent rock 85.35-85.65m. Box 33: 85.6-87.9m. - seam (<50mm, disturbed) of partly altered rock 86.4-86.5m. - irregular bands (<15mm) of WK, partly altered rock (Sst to Zst) 86.95-87m.
		38	86					
		37	87					
		36	88		- mostly clean joints below 87.9m.			- 55° joint with adjacent band (<20mm) of variable brown, partly weathered rock. 50° defect coated by light brown, low plasticity clay (<1mm) and partly altered (green to reddish brown) <15mm into the adjacent rock at 87.65m. Box 34: 87.9-90.5m. Joints have variable dip below 87.9m. Irregular NV joint (limonite-stained >88.4m) with pyrite specks to patches 87.9-88.5m. - 55° joint. - 65° joint coated by pale brown, non-plastic silt and partly altered <10mm into the adjacent rock. - irregular 55° seam (<20mm) of dark greenish grey to green, WK to MS, partly altered rock (Sst to Zst). 60° seam (<20mm) of green (laminated), WK, partly altered rock at 90.1m. - limonite-stained joint coated by orange-brown, non-plastic silt (<3mm). 40° limonite-stained joint coated by light grey, slightly plastic to non-plastic silt (<7mm) at 90.25m. Core broken (<100mm pieces) along crisscrossing defects (coated by black material <1mm) spaced 5-50mm apart 90.25-90.9m. Box 35: 90.5-93.1m. - 60° joint partly weathered <15mm into the adjacent rock. 55° band (<15mm) of dark greyish green, WK, partly altered rock at 90.95m. - NV clean to limonite-stained joint. Irregular (50°-NV) joints spaced 10-20mm apart and partly weathered <15mm into the adjacent rock 91.4-91.65m. - crisscrossed by irregular joints spaced 5-30mm apart and partly weathered <5mm into the adjacent rock 91.75-92m. Band (<20mm, 50°) of greyish green-brown, WK, partly altered rock at 92m. - 60° joint partly altered <10mm into the adjacent rock. Irregular NV joint partly weathered <5mm into the adjacent rock 92.65-92.95m. - joints mostly dip NH-30° and some coated by pale brown-grey, non-plastic silt (<1mm, drilling induced?) from 92.95m. Pyrite specks to patches on some broken defect surfaces. Box 36: 93.1-95.8m. 35° slickensided defect with pyrite specks and coated by transparent-white vein material (<2mm,
		35	89		- green with some dark grey patches (<50mm), mostly WK, partly altered (Zst) between 88.55 & 88.9m (55°). Veins spaced <10mm apart.	RSWg		
		34	90		- seam (<150mm) of green to dark greenish grey, WK to MS, partly altered rock between 89.2 (65°) & 89.4m (55°).			
		33	91		- irregular seam (60mm) of dark brown, MS, partly weathered rock between 90.15-90.25m.			
		32	92		- disturbed seam (<50mm, 55°) of green (laminated), WK, partly altered rock between 90.8-90.9m.			
		31	93		92.95m ARGILLITE [FW]; dark grey, S-VS, fresh (>95%). Crisscrossed by irregular (30°-NV) fractures to white veins (<2mm, quartz & zeolite?) spaced 10-100mm apart. Joints spaced 20-200mm apart. - some joints coated by black material (<1mm) by 93.75m.			
		30	94					
		29	95					
		28	96		- white veins (<5mm) spaced 10-50mm apart below 95.95m. Joints-broken veins spaced 50-400mm apart.	RFW		
		27	97					
		26	98		- 55° seam (<20mm) of green, WK-MS, partly altered rock near 97.4m. Seam (<70mm, 60°) of brownish green, partly altered rock between 97.8-97.9m (70°).			
		25	99					
		24			- joints-broken veins spaced 20-100mm apart below 99.7m. Disturbed			

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15m.	123mm to 15m. 96mm to EOH.

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BOREHOLE No. **HUN14/3**

LOCATION: HUNUA QUARRY **GRID REF:** 420986.09E 777067.99N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 123.79m **SHEET** 6 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 28-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		23	101		seam (<15mm) of green with indistinct red-brown streaks, WK, partly altered rock near 99.9m. - 50° seam (<20mm) of greyish green, MS, partly altered rock near 100.4m. Irregular (70°) limonite-stained joints spaced 20-50mm and partly weathered <5mm into the adjacent rock 100.4-100.75m.			quartz). Irregular NV-70° joint(s) with pyrite specks to limonite-stained (>93.35m) 93.2-93.8m. - 55° seam (<50mm) of grey (discoloured), partly altered rock disrupted by subparallel defects with pyrite specks and coated by black material (<1mm). - 40° slickensided defect with light grey, silty crushed rock to vein material (<5mm). Box 37: 95.8-98.6m. - veins mostly dip 30-60° below 95.95m. - 35° joints partly weathered <2mm into the adjacent rock at 96.4 & 96.45m. - irregular 70°-NV joint(s) partly weathered <5mm into the adjacent rock 96.8-97m. - 60° slickensided defect (coated by black material <1mm) with associated transparent-white intensely veined band (<7mm). - darker laminations (<3mm) dipping 60° between 97.75-97.9m. - 70° & 60° joints partly weathered <5mm into the adjacent rock at 98.1 & 98.3m. - 60° joint(s) partly weathered <3mm into the adjacent rock. Box 38: 98.6-100.95m. - NV limonite-stained joint 98.9-99m
		22	102		- irregular white veins (<3mm) spaced 10-100mm apart by 101.7m. Irregular limonite-stained joints (coated by pale brown to orange-brown, non-plastic silt <5mm) spaced 5-50mm and partly weathered <10mm into the adjacent rock 100.8-101.2m (clean to <101.5). - 40° seam (<30mm) of partly altered rock between 102.55-102.6m.			
		21	103		- joints-broken veins (some coated by black material <1mm) spaced 50-250mm apart below 103.2m.	RFW		
		20	104					
		19	105		- 60° & 65° seams (<20 & 30mm) of partly altered rock near 104.3 & 104.5m. - irregular (30-70°) veins (<5mm, quartz) some with voids (<10 by 3mm) and spaced 5-50mm apart below 105m.			
		18	106		106.2m			
		17	107		EOH @ 106.2m			- dark grey & black band (<10mm, 50°). - 50° defect coated by light grey, non-plastic sand-silt (<10mm). Box 39: 100.95-103.6m. 80° limonite-stained joint 101.15-101.35m. - 50° joint coated by grey, slightly plastic to non-plastic silt (<3mm). Intersecting 30-60° joints spaced 25mm apart and partly weathered <5mm into the adjacent rock 101.6-101.7m. - veins mostly dip 20-60° by 101.2m. - 35° defect (coated by black material <1mm) with some pyrite specks and limonite-stained patch. 40° slickensided defect (coated by black material <1mm) with some pyrite specks at 102.05m. irregular NV joint(s) coated by orange-brown, non-plastic silt <1mm) and partly weathered <10mm into the adjacent rock 102.3-103.2m. - defects mostly dip 30°-NV below 103.2m. Pyrite specks to patches on some broken defect surfaces. Box 40: 103.6-106.2m. - 65° band (<5mm) of greenish grey (laminated) with red-brown streaks, partly altered rock. Irregular NV joint(s) partly weathered <3mm into the adjacent rock 103.65-104.1m. - 70° slickensided defect coated by vein material (<2mm). Core broken (<50mm pieces) along NV limonite-stained joint(s) below 105.95m.
		16	108					
		15	109					
		14	110					
		13	111					
		12	112					
		11	113					
		10	114					
		9	115					
		8	116					
		7	117					
		6	118					
		5	119					
		4						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 15m.	123mm to 15m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. **HUN14/4**

LOCATION: HUNUA QUARRY **GRID REF:** 421081.66E 777073.01N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 133.70m **SHEET** 1 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 11-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		133	1		SAND-SILT with variable gravel; variable light brown to orange-brown with some black mottles (intermixed above 0.5m), non-plastic. Some limonite-cemented material (<10mm, >0.25m). Some variably weathered greywacke fragments (<50mm) from surficial aggregate. [CW to HW Greywacke]. - remnant fractured texture by 0.5m. More sand. - disturbed intervals (corestones) of variably weathered greywacke rock between 1-2.15m. Low core recovery between 3-5.3m. [HW-MW].	ORH	S.W.L 2.43m (22/10/14).	Drilled on excavated access track. NZTM location (GPS within 3m) of 1777879mE & 5893702mN. RQD entered into penetration field in database from 5.3m. Core boxes photographed. Box 1: 0-3.5m. Disturbed core (wet to damp). Minor red-tinted patches near top. Intact core (stiff-very stiff) 0.5-1m. Moist. Core mostly recovered as rock fragments (<100mm) from 1m. Fine-medium grained greywacke. More intact core near 2.15-3m.
		132	2					
		131	3					Core run 3-3.5m is mostly uphole rock (<70mm pieces). Box 2: 3.5-6.95m. Core run 3.5-3.8m has up to 0.15m of uphole rock at top. Core run 3.8-4.3m has up to 0.1m of uphole rock at top.
		130	4		- recovered core is dominantly light orangish brown to grey, VWK to VS, variably weathered (FW <50%), greywacke sandstone with common limonite-stained joint surfaces by 3.5m. [HW/MW].	O		
		129	5					
		128	6		5.3m GREYWACKE SANDSTONE [MW]; variable light orangish brown to brown with grey patches, VWK to VS, variably weathered to fresh (<50%). Crisscrossed by limonite-stained to black joints spaced <75mm apart. Occasional limonite-stained to white remnant veins (<5mm, quartz & weathered).	ORM		- maximum depth of contact. 5/9/14. Core run 6.5-6.9m has 0.15m of uphole rock (<15mm) at top.
		127	7		- joints (often coated by light brown to orange-brown, non-plastic sand-silt <10mm) spaced 10-100mm apart by 6.95m.			Box 3: 6.95-9.6m. More intact core from 6.95m. Some silty intervals. Defects have variable dip.
		126	8		- more grey, VS, fresh intervals (<150mm, 50%) below 7.6m. [MW/SW].			
		125	9					Lost drilling circulation at 8.3m. Hole cased to 7.5m.
		124	10		- light brown with irregular brown seams (<15mm), VWK-WK, weathered argillaceous rock near 9-9.25m (40°). - variable brown to light brown, MS to S, partly weathered greywacke siltstone between 9.5 (30°) & 9.6m (60°).	RMW		Mostly intact core from 9m. Crisscrossed by irregular (30°-NV) limonite-stained to white veins (<2mm, weathered) spaced <20mm apart 9.3-9.6m. Box 4: 9.6-12.1m. 60° vein (<10mm, weathered) at 9.6m.
		123	11		- irregular (40°-NV) veins (<3mm) spaced 10-100mm apart by 10.1m.			
		122	12		11.85m GREYWACKE SANDSTONE [SW]; grey with some irregular brown seams, MS to VS, partly weathered (mostly <10mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 15-150mm apart. Limonite-stained to white veins (<3mm, quartz & weathered) spaced <150mm apart.			- irregular (40-60°) veins (<10mm, weathered) spaced 5-20mm apart 11.2-11.3m. - irregular 60°-NV limonite-stained joint. Medium grained. Joints mostly dip 30°-NV and often coated by light brown to orange-brown, non-plastic silt (<2mm) from 11.85m. Half indistinct partly weathered rock along joints. Veins mostly dip 35-65°. Box 5: 12.1-14.75m.
		121	13					
		120	14			RSWb		- indistinct irregular (40-70°) defects ("shear bands") spaced 5-50mm apart 13.3-13.7m. No joints. - 40° joint coated by light orangish brown, silt (<2mm). Joints have variable dip. Shattered core (<25mm, silty) 14.5 (60°)-14.55m (30°). - 35° joint-vein filled by off-white, non-plastic silt (<5mm). Some joints coated by orange-brown, non-plastic silt (<2mm) from 14.65m. Box 6: 14.75-17.1m.
		119	15		- variable brown with minor grey (discoloured) patches (<40mm), WK to S, moderately weathered [MW] between 14.25-14.65m. Joints spaced 10-20mm apart. - variable brown to grey and more weathered [FW 50%] from 14.65m [MW/SW]. Joints spaced 10-50mm apart and partly weathered <20mm into the adjacent rock. Occasional white veins (<1mm, quartz).			
		118	16		15.9m GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, MS to VS, partly weathered (<20mm along joints) to fresh (>75%). Limonite-stained joints spaced 25-100mm apart. Irregular limonite-stained to white veins (<3mm, quartz & weathered) spaced 25-250mm apart.			Broken core (10-100mm pieces) 15.05-15.9m. - irregular NV joint. Maximum depth of contact. Joints (<1mm silt) mostly dip 30°-NV from 15.9m. Veins mostly dip 50-70°. - irregular 50° weathered veins (<3mm) spaced 5-50mm apart 16.8-17.1m. Box 7: 17.1-19.7m. - joints mostly dip 20°-NV below 17.3m. Occasional indistinct shear bands (<3mm, 45-70°) near 17.3-18.8m.
		117	17					
		116	18		- joints spaced 15-150mm apart and partly weathered <5mm into the adjacent rock below 17.3m.	RSWg		
		115	19		- more weathered [FW 75%] below 18.8m. Joints spaced 10-100mm apart and partly weathered <20mm into the adjacent rock. Irregular (30-65°) veins (<3mm) spaced 10-50mm apart.			- joints have variable dip below 18.8m. - irregular 50-65° veins (<3mm, weathered &
		114						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 7.5m.	123mm to 7.5m. 96mm to EOH.

BOREHOLE No. HUN14/4

LOCATION: HUNUA QUARRY **GRID REF:** 421081.66E 777073.01N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 133.70m **SHEET** 2 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 11-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments ← Piezometer Diameters in mm
		113	21		- irregular (60º-NV) off-white veins (<5mm, weathered) spaced <50mm apart between 21.2-21.9m.	RSWg		quartz) spaced <40mm apart 19.5-19.7m. Box 8: 19.7-22.3m. - irregular NV joint(s) to off-white vein (<3mm, weathered, >20.2m) partly weathered <20mm into the adjacent rock 19.7-20.5m. - irregular NV joint(s) partly weathered <20mm into the adjacent rock 20.8-22.05m.
		112	22					
		111	23		- more weathered [FW >50%] below 22.6m. Crisscrossed by irregular (40-60º) limonite-stained to white veins (<3mm, quartz) spaced <25mm apart. [MW-SW].			- irregular NV joint(s) coated by pale brown to light orangish brown, non-plastic silt (<2mm) and partly weathered <30mm into the adjacent rock 22.2-23.7m. Box 9: 22.3-24.9m. 8/9/14. 40º irregular band (<7mm) of dark grey-black, S, argillite at 23m.
		110	24		23.75m - dark grey with some irregular brown seams (<20mm), MS to S, argillaceous rock between 23.05 (40º) & 23.35m. - more weathered [FW 50%] from 23.35m. [MW/SW].			- maximum depth of contact. Joints mostly dip 40-70º and often coated by light brown to orange-brown, non-plastic sand-silt (<5mm) 23.75-25.25m.
		109	25		GREYWACKE SANDSTONE [MW]; variable light brown (orange-tint) to brown, VWK to MS, weathered-partly weathered. Crisscrossed by irregular limonite-stained joints spaced 5-35mm apart. Harder (WK to S) below 24m. [HW to MW]. - dominantly grey, VS, fresh rock (finer-grained) between 24.55-24.65m - fresh patch (<40mm) near 25m.	RW		- elongated patch (<75 by 30mm) of grey (discoloured), MS, partly weathered rock 24.1-24.2m. Mostly broken core from 24.2m. - 30º band (<5mm, disturbed) of off-white vein material (weathered?). 30º off-white vein (<5mm, weathered) at 24.95m. Box 10: 24.9-27.35m.
		108	26		- variable light brown-brown and grey, MS to VS, partly weathered (<20mm along joints) to fresh (50%) from 25.25m. Joints (some coated by orange-brown, non-plastic silt <2mm) spaced <50mm apart. [MW/SW].	RMW		Intact core 25.9-26.35 & below 27.1m. Block incorrectly labelled 26.1m. Shattered core (<25mm pieces, silty) 27-27.1m.
		107	27		27.1m			- joints mostly dip 30º-NV from 27.1m. Some joints coated by orange-brown, non-plastic silt (<1mm). Occasional indistinct shear bands (<3mm, mostly 25-50º) by 27.6m. Box 11: 27.35-30.1m.
		106	28		GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, mostly VS, partly weathered (<5mm along joints) to fresh (<95%). Limonite-stained joints spaced 20-200mm apart. Irregular (40º-NV) white veins (<3mm, quartz) spaced 10-100mm apart.	RSWg		- 35º seam (<50mm) of dark grey, VS, sandstone-siltstone 27.7-27.75m.
		105	29		- irregular patch (<100mm) of light brown-brown, WK to S, partly weathered rock between intersecting joints (45-80º).			
		104	30		29.3m GREYWACKE SANDSTONE [SW/FW]; grey, VS, fresh (>95%). Limonite-stained to clean joints spaced 50-300mm apart. Irregular (45º-NV) white veins (<2mm, quartz) spaced 50-300mm apart.			- maximum depth of contact. Joints mostly dip 35-80º. Indistinct shear bands (<5mm, mostly 45-70º) spaced <100mm apart. Box 12: 30.1-32.7m.
		103	31		- more weathered (FW 95%) below 31m.			- 10º joint filled by light brown, non-plastic sandy silt to crushed rock (<10mm) and partly weathered <10mm into the adjacent rock. - 75º-NV joint(s) partly weathered <5mm into the adjacent rock.
		102	32					
		101	33		- crisscrossed by irregular limonite-stained joints-broken veins spaced 15-75mm apart. - fresh rock near 33.35-34.2m. Occasional veins (<1mm, 40-60º). No joints.	RFW		Box 13: 32.7-35m. Broken core (15-75mm pieces) 32.95-33.35m. - joints mostly dip 30-60º and often coated by off-white (vein material) to orange-brown, non-plastic silt (<3mm) below 32.95m. - crisscrossed by indistinct shear bands (<3mm) spaced 10-100mm apart.
		100	34		- limonite-stained joints spaced 20-200mm apart and partly weathered <5mm into the adjacent rock below 34.2m. Occasional dark grey-black, argillite clasts (<5mm, S) by 34.6m.			9-10/9/14. Driller off. Joints mostly dip 30º-NV joints (minimal silt) below 34.2m. - NV joint partly weathered <2mm into the adjacent rock 34.75-35.25m.
		99	35					- occasional indistinct shear bands (<3mm) by 35m. Box 14: 35-38m. - argillaceous streaks dip 40º-NV.
		98	36		- finer grained rock with minor argillaceous streaks to argillite patches (<50 by 15mm) between 35.5-36.2m.			- 60º band (<20mm) with irregular black streaks spaced <5mm apart at 36.05m.
		97	37		- irregular seam (<50mm, 55º) of dark grey, S, finer-grained rock between 36.9-37m.			
		96	38		- finer-grained rock between 37.65 (65º) & 38.05m (65º). Crisscrossed by white veins (<1mm, calcite) spaced 5-50mm apart.			- irregular 50º seam (<15mm) of variable brown, MS to S, partly weathered rock along joint(s). 55º indistinct defect (<3mm) at 37.55m.
		95	39		38.25m GREYWACKE SANDSTONE (Fine) to SILTSTONE [SW-FW]; grey to dark grey with some irregular dark brown seams, S to VS, partly weathered (<20mm along joints) to fresh (>75%). Limonite-stained joints spaced 10-100mm apart. Irregular limonite-stained to white veins (<2mm, weathered) spaced 10-50mm apart.	RSWg		- some black specked bands (<5mm, NH-45º) 37.65-38.05m. 50º joint coated by light brown, non-plastic silt (<2mm) and partly weathered <10mm into the adjacent rock at 38.25m. Box 15: 38-40.8m. Indistinctly layered (<100mm, 50º) 38.25-39.9m. Joints have variable dip from 38.25m. Some joints coated
		94			- variable brown, WK to MS, moderately weathered [MW] between 39.4-39.65m. 39.9m			

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

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Drilling Methods	Casing Depths	Hole Diameters
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BOREHOLE No. HUN14/4

LOCATION: HUNUA QUARRY **GRID REF:** 421081.66E 777073.01N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 133.70m **SHEET** 3 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 11-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		93	41		GREYWACKE SANDSTONE [SW/FW]; grey, VS, fresh (95%). Irregular limonite-stained joints spaced 20-200mm apart and partly weathered <5mm into the adjacent rock. Crisscrossed by irregular (35°-NV) white veins (<3mm, calcite & quartz) spaced <50mm apart.			by light brown to orange-brown, non-plastic sand-silt (<2mm). Veins mostly dip (45-70°). Few obvious shear bands.
		92	42		- grey to black (banded <25mm, 70°), S to VS, slightly weathered, sandstone (mostly fine) to argillite between 41.25-41.4m (45°).			- 50° bedding contact. 40° joint coated by light orangish brown, non-plastic silt (<2mm) and partly weathered <5mm into the adjacent rock at 38.85m.
		91	43		- irregular (20°-NV) white veins (<5mm, calcite & quartz) with occasional voids (<7 by 3mm) spaced 5-20mm apart between 42.7-44.05m.	RFW		- 55° joint. 50° band (<20mm) of brown, WK-MS, partly weathered rock between joints near 39.75m.
		90	44		- variable brown, MS to S, partly weathered between 43.65-43.75m.			- 45° bedding contact. Medium to fine grained greywacke. Joints mostly dip 20°-NV. Occasional indistinct shear bands (<3mm, 70°). Bands (<10 & 20mm, 50°) of dark grey, S, siltstone at 39.95 & 40m.
		89	45		- irregular (40°-NV) veins (<5mm, quartz) with occasional voids (<10 by 3mm) spaced 5-20mm apart below 44.9m.			- 65° joint with pyrite specks. 45° slickensided defect coated by white to dark green vein material (<2mm, chlorite & quartz) at 40.65m.
					45.7m			- 60° vein (<5mm, quartz) with some voids (<10 by 3mm). Indistinct shear bands (30-70°) spaced 10-100mm by 40.8m. Box 16: 40.8-43.5m.
		88	46		Weathered GREYWACKE (Sst) [HW-MW]; light orangish brown, VWK to WK, weathered-partly weathered. Crisscrossed by irregular limonite-stained joints spaced <15mm apart. Some indistinct weathered remnant veins (<3mm). [Probable Fault].	RW		- irregular seam (<30mm) of variable brown, MS to S, partly weathered rock along intersecting irregular (20°-NV) joints 41.25-41.35m. Irregular NV transparent-white vein (<4mm, quartz) with some voids (<15 by 3mm) 41.35-41.75m.
					46.6m			Box 17: 43.5-46.3m. Broken core (<50mm pieces) 43.65-43.75m. 30° joint coated by pale brown, non-plastic silt (<3mm) at 43.75m. Elongated void (<30 by 7mm, 45°) at 43.8m.
		87	47		GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Irregular limonite-stained to green joints spaced 20-200mm apart and partly weathered <3mm into the adjacent rock. Crisscrossed by irregular white veins (<5mm, quartz) spaced 5-25mm apart.			- 50° off-white vein (<5mm, weathered).
		86	48		- grey to black, MS to S, disrupted (some brecciated), sandstone to argillite between 47.9 (40°) & 48.1m (40°).			- irregular NV network (<20mm) of veins (<5mm, weathered & quartz) spaced <10mm apart 45.35-45.7m.
		85	49		- minor black flecks below 48.35m. Occasional joints partly weathered <2mm into the adjacent rock. Veins (<5mm) spaced 5-50mm apart.			- 65° joint-broken vein. Joints (& veins) have variable dip from 45.7m. Broken to shattered core (<75mm pieces, silty) 45.75-46.6m. Box 18: 46.3-49.1m.
		84	50		- irregular black, S, argillite patch (<15 by 7mm) near 49.87m.			- medium grained greywacke. Indistinct shear bands (<3mm, 40°-NV) spaced 5-50mm apart from 46.6m.
		83	51		- variable dark grey to black, S to VS, fine sandstone to argillite between 50-50.1m (55°). Some argillaceous flecks to disrupted argillite laminations (<5mm) between 50.1-50.6m. Irregular patch (<150mm) as above between 50.3-50.45m.			- 60° transparent-white vein (<5mm, quartz). Box 19: 49.1-51.6m.
		82	52		- irregular (40-70°) white veins (<3mm, quartz) spaced 10-200mm apart below 50.6m.			- 80° limonite-stained joint (unbroken) 49.6-49.8m.
								- 50° joint partly weathered <2mm into the adjacent rock. Lump (<25mm) of probable uphole silt. Indistinctly banded (<20mm). Irregular NV limonite-stained joint 50-50.3m.
		81	53		- fine sandstone between 52.55 (40°) & 52.65m (55°). Irregular (40°-NV) limonite-stained joints spaced 10-400mm apart and partly weathered <3mm into the adjacent rock below 52.6m.	RFW		- finer grained greywacke 50-50.6m.
		80	54					- two parallel 60° joints partly weathered <2mm into the adjacent rock. Indistinct shear bands spaced <100mm apart below 51.5m. Box 20: 51.6-54.2m.
		79	55		- occasional veins (<2mm) by 54.6m.			- 55° joint partly weathered <2mm into the adjacent rock. 65° limonite-stained joint to off-white vein (<2mm, weathered) at 51.85m.
		78	56					- 55° joint partly weathered <1mm into the adjacent rock. 60° vein (<5mm, quartz) with some voids (<15mm) at 52.15m.
		77	57					- irregular seam (<20mm, disturbed) of partly weathered rock along limonite-stained joints near 52.6m.
		76	58					- broken 65° veins (<2mm, zeolite?) at 54.1 & 54.25m. Box 21: 54.2-57.1m.
		75	59		- joints spaced 150-400mm apart and partly weathered <2mm into the adjacent rock below 58.5m. Veins (<2mm) spaced 10-300mm apart.			- irregular NV joint(s) partly weathered <10mm into the adjacent rock 55.1-56.7m. Associated discontinuous seam (<20mm) of light orangish brown, VWK, weathered greywacke 55.35-55.45m. Box 22: 57.1-59.8m.
		74						- 40° limonite-stained to off-white vein (<5mm, weathered/zeolite?). Indistinct shear bands (<5mm, 20-70°) spaced 10-100mm apart below 58.5m. 11/9/14.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 7.5m.	123mm to 7.5m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. **HUN14/4**

LOCATION: HUNUA QUARRY **GRID REF:** 421081.66E 777073.01N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 133.70m **SHEET** 4 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 11-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		73	61		- limonite-stained joints spaced 10-200mm apart and partly weathered <5mm into the adjacent rock below 60.6m. Irregular (40°-NV) limonite-stained to white veins (<3mm, quartz & weathered?) spaced 10-100mm apart.			- 60° joint coated by black material (<2mm). Box 23: 59.8-62.3m. - 50° vein (<5mm, calcite) with occasional voids (<3mm). 70° vein (<5mm, calcite) at 60.3m. - joints mostly dip 40°-NV. Occasional indistinct shear bands (<2mm, 45-70°) below 60.6m. - 60° white to pale grey vein (<3mm, quartz). 60° white composite vein (<5mm, weathered?) with some voids (<5mm) at 61.7m. - 60° joint coated by light brown, non-plastic silt (<5mm) and partly weathered <10mm into the adjacent rock. Box 24: 62.3-65.05m. Core broken (25-100mm pieces) along joints spaced <50mm apart and partly weathered <10mm into the adjacent rock 62.5-62.7m. - three intersecting 70°-NV joints partly weathered <10mm into the adjacent rock.
		72	62					
		71	63					
		70	64					
		69	65		- mostly NV veins (<3mm, calcite & weathered) with some voids (<15 by 3mm) and spaced <50mm apart between 64.7-65.7m. Joints spaced 20-400mm apart below 65.2m.	RFW		Box 25: 65.05-67.9m. - joints mostly have variable dip below 65.2m. Occasional indistinct shear bands (<3mm, 30-60°). - irregular 70°-NV joints (some coated by light brown to orange-brown, non-plastic silt with some sand <2mm) spaced <50mm apart and partly weathered <10mm into the adjacent rock 65.8-66.3m. Core broken (50-150mm pieces) along joints spaced 20-50mm apart and partly weathered <3mm into the adjacent rock 67.2-67.7m. 70° weathered vein (<2mm) at 67.85m. Box 26: 67.9-70.6m.
		68	66		- irregular (30-60°) white veins (<1mm, quartz) spaced 150-450mm apart by 65.7m.			
		67	67					
		66	68		- crisscrossed by limonite-stained joints (some coated by pale brown to orange-brown, non-plastic silt <2mm) spaced 20-200mm apart below 67.2m.			
		65	69		- crisscrossed by irregular (45°-NV) veins (<4mm, quartz & weathered?) with occasional voids (<5mm) and spaced 10-50mm apart below 68.6m. Seam (<20mm, 65°) of fine sandstone near 68.7m.			- 50° joint coated by light brown, low plasticity clay (<3mm). Three intersecting 70°-NV joints partly weathered <10mm into the adjacent rock at 68.7m. - 70° seam (<15mm) of lighter grey, fine-grained rock (sheared) with associated network (<30mm) of veins (<5mm, quartz) spaced <10mm apart. - 40° joint filled by brown, non-plastic sand-silt (<5mm). 40° joint with associated band (<40mm) of shattered rock (<20mm, some silt) near 70.34m. - joints mostly have variable dip. Occasional indistinct shear bands (<3mm, 30-50°). Box 27: 70.6-73.4m. 40° slickensided defect coated by dark green material to transparent-white, vein material (<1mm, quartz) at 70.65m. Three intersecting NV-15° joints partly weathered <3mm into the adjacent rock 70.7-70.8m. - NV joint partly coated by off-white, non-plastic silt (<1mm, vein material) 71.2-71.7m. - several intersecting 70° clean to limonite-stained joints partly weathered <3mm into the adjacent rock. Box 28: 73.4-76.15m. Irregular NV joint(s) partly weathered <3mm into the adjacent rock 73.6-74.2m. Band (<10mm) of lighter grey, fine-grained rock (sheared) with white vein (<1mm, quartz) along top at 74m. - joints mostly dip 15-30° between 74.15-74.4m. NV joint(s) partly weathered <3mm into the adjacent rock 74.4-74.7m. 30° limonite-stained joint intersecting above joint near 74.55m. - 65° off-white vein (<5mm, quartz) with some voids (<15 by 3mm). - NH joint with associated band (<10mm) of shattered rock (<10mm, silty) near 75.85m. Box 29: 76.15-78.7m - 60° network (<50mm) of white to greenish grey veins (<10mm, quartz) spaced <25mm apart between 77.45-77.55m. Box 30: 78.7-81.9m. 65° joint partly weathered <2mm into the adjacent rock at 78.7m. Three intersecting 65, 15 & 60° joints partly weathered <2mm into the adjacent rock at
		64	70					
		63	71		- variable brown with irregular grey patches (top 0.2m), MS to S, moderately weathered [FW <50%] between 70-70.35m. Joints spaced 5-25mm apart. Occasional irregular limonite-stained to white veins (<3mm, weathered). - limonite-stained to clean joints spaced 20-400mm apart and some partly weathered <3mm into the adjacent rock from 70.35m. Irregular (30°-NV) white veins (<3mm, quartz) spaced 50-300mm apart.			
		62	72		- joints spaced 20-75mm apart and partly weathered <3mm into the adjacent rock between 72-72.3m.			
		61	73					
		60	74		- joints spaced 15-50mm apart and partly weathered <1mm into the adjacent rock between 74.15-74.4m.			
		59	75		- irregular (25°-NV) joints spaced 10-100mm apart and partly weathered <10mm into the adjacent rock between 75-75.85m.			
		58	76		- irregular (70°-NV) veins (<3mm) spaced 5-50mm apart below 76.3m. Irregular (70°-NV) limonite-stained joints coated by weathered vein material (<2mm) spaced 10-100mm apart between 76.8-78.3m.			
		57	77					
		56	78		- irregular elongated patch of dark grey, S, argillaceous rock near 78m.			
		55	79		- occasional limonite-stained joints partly weathered <2mm into the adjacent rock below 78.9m.			
		54			- network (<100mm, 70°) of irregular white veins (<10mm, quartz)			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 7.5m.	123mm to 7.5m. 96mm to EOH.

BOREHOLE No. **HUN14/4**

LOCATION: HUNUA QUARRY **GRID REF:** 421081.66E 777073.01N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 133.70m **SHEET** 5 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 11-9-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		53	81		spaced 5-25mm apart between 79.65-80.15m.			78.8m. - 60° joint. 60° joint with dark green chloritic material (<1mm) at 79.15m. 60° joint at 79.2m. - 40° partly limonite-stained joint. Several intersecting <65° joints spaced <100mm apart and partly weathered <2mm into the adjacent rock 80.6-80.8m. - intersecting 80° green joint and 15° clean joint near 80.95m. 20° joint at 81.05m. Broken 70° off-white veins (<1mm, zeolite?) below 81.5m. Partial loss of drilling circulation (30% return) by EOH. Core sample taken by K Barber.
		52	81.9m					
		51	82		EOH @ 81.9m			
		50	83					
		49	84					
		48	85					
		47	86					
		46	87					
		45	88					
		44	89					
		43	90					
		42	91					
		41	92					
		40	93					
		39	94					
		38	95					
		37	96					
		36	97					
		35	98					
		34	99					

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 7.5m.	123mm to 7.5m. 96mm to EOH.

BOREHOLE No. **HUN14/5**

LOCATION: HUNUA QUARRY **GRID REF:** 421234.94E 777027.78N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 159.22m **SHEET** 1 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-8-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		159			0.3m FILL (Surficial materials); weathered to limonite-cemented, greywacke (Sst) fragments (<40mm) with some light brown (orange-tint), non-plastic silt-sand.	OF	Drilled in initial excavation. NZTM location (GPS within 3m) of 1778029mE & 5893652mN. RQD entered into penetration field in database from 2m. Core boxes photographed. Box 1: 0-2.75m. Broken core (<70mm pieces). Damp above 0.3m.
					SILT-SAND; variable light brown (orange-tint) to orange-brown, very	ORH	
		158	1		1.25m stiff to hard, non-plastic. Remnant fractured texture. [HW Greywacke].		Intact core 0.3-0.75m.
					Weathered GREYWACKE (Sst) [HW-MW]; light brown (interior patches) to orange-brown, VWK to MS, weathered to limonite-cemented. Irregular remnant fractures spaced <60mm apart.		Mostly intact core from 1.1m.
		157	2				- grey, less weathered patch 1.75-1.8m.
						OAH	
		156	3				Box 2: 2.75-5.5m.
					3.7m		
		155	4		GREYWACKE (Sst) [HW/MW]; light brown to orange-brown with grey (discoloured) patches, WK to MS, weathered to partly weathered (50%). Crisscrossed by irregular limonite-stained joints spaced <50mm apart. Common indistinct white veins (<1mm, weathered).	ORH	
			5				Broken core (<60mm pieces) from 4.55m.
		154			5.3m		
					Veined GREYWACKE SANDSTONE [MA]; grey (discoloured), MS to S, partly altered. Irregular defects (coated by grey, non-plastic silt to dark green, chloritic material <2mm) spaced <100mm. Crisscrossed by irregular white veins (<3mm, weathered) spaced <25mm apart.	RMW	Intervals of intact core from 5.4m. Box 3: 5.5-7.75m. Medium grained greywacke.
		153	6				- 40° slickensided defect along top of weathered interval 5.8-6m.
					6.5m		
		152	7		Veined GREYWACKE SANDSTONE [SA]; grey, MS-S, slightly altered (pervasive). Irregular defects (coated as above) spaced 50-100mm. Crisscrossed by irregular white veins (<3mm, weathered) spaced <25mm apart.		- maximum depth of contact. Mostly intact core from 6.5m. Defects mostly dip <50°. Shattered core (<30mm pieces, silty) 6.95-7.05m.
		151	8		- irregular limonite-stained joints spaced <50mm apart between 7.75-9.3m.		- altered interval (<50mm) with irregular 45° defects (some limonite-stained) spaced <10mm apart. Box 4: 7.75-10m. Broken core (<50mm pieces) 7.95-9.3m.
						RSWb	
		150	9		- slightly harder (S) between 9-10m.		
		149	10		- irregular (40-50°) off-white composite veins to vein networks (<20mm) spaced <10mm apart below 10m.		- 30° patchy off-white weathered veins at 9.75m (<30mm) & 9.9m (<20mm). 60° joint at 10m. Box 5: 10-12.2m. Shattered core (<35mm pieces, silty) 10.3-10.5m.
					11.05m		
		148	11		Veined GREYWACKE SANDSTONE [MW]; light grey (brown-tint) to greyish brown (below 11.5m), MS, partly weathered/altered. Irregular limonite-stained joints (often coated by orange-brown, non-plastic silt <2mm) spaced <100mm. Indistinct off-white veins (<3mm, weathered) spaced <20mm apart.		- finer greywacke by 11.05m. Defects have variable dip.
		147	12		- grey (discoloured), MS-S, less altered interval between 12.4-12.55m. Joints spaced 50-150mm and more distinct veins (<5mm) spaced <30mm below 12.4m. Brown (partly weathered) below 12.55m.		- disturbed band (<20mm) of light grey, non-plastic silt with some crushed rock (<5mm) at 11.2m [Fault]. Core broken (<50mm pieces) along joints spaced <25mm apart 12.05-12.4m. Box 6: 12.2-14.7m.
		146	13				
						RW	
		145	14				
		144	15		- some grey, VS, fresh patches (<40mm) between 14.6-14.8m.		Box 7: 14.7-17.3m.
		143	16		- grey with irregular brown seams, MS to S, slightly weathered [FW <75%] between 15.2-15.9m. Partly weathered <15mm into the adjacent rock along joints.		- disturbed 60° weathered vein (<10mm).
		142	17		- light brown to grey (interior patches), MS to S, less weathered (FW <50%) below 16.75m.		
		141	18		- grey, S-VS, fresh greywacke between 17.45-18.5m. Joints spaced 50-200mm. Crisscrossed by irregular transparent-white veins (<3mm, quartz) spaced <15mm apart.		- 50° transparent-white vein (<4mm, quartz). Box 8: 17.3-19.95m.
						RMW	
		140	19		- minor fresh patches (<40mm) below 18.5m. Joints (some coated by light brown to orange-brown, non-plastic silt <3mm) spaced 25-100mm. Weathered veins (<3mm) spaced <30mm apart.		- joints mostly dip 25-60° near 18.5-20m.
					- no fresh patches below 19.4m.		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN14/5**

LOCATION: HUNUA QUARRY **GRID REF:** 421234.94E 777027.78N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 159.22m **SHEET** 2 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-8-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		139			- some fresh patches (<50mm) below 20m. Joints spaced 25-200mm apart.	RMW	Box 9: 19.95-22.5m.
			20.5m				
		138	21		Veined GREYWACKE SANDSTONE [MW/SW]; patchy grey with some irregular brown seams, mostly S to VS, partly weathered (<15mm along joints) to fresh (<75%). Limonite-stained joints (some coated by orange-brown, non-plastic silt <2mm) spaced 25-100mm. Veins as above.	RSWb	
			21.85m		- moderately weathered [MW] between 21.1-21.55m.		
		137	22		Veined GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, MS to VS, partly weathered (<10mm along joints) to fresh (>75%). Limonite-stained joints spaced 50-300mm apart. Crisscrossed by irregular white veins (<3mm, quartz) spaced 5-30mm apart.		- veins mostly dip >30° near 21.85-25.3m. Some joints coated by orange-brown, non-plastic silt (<2mm) above 22.2m. Box 10: 22.5-25.1m.
		136	23				
		135	24			RSWg	
					- veins (<5mm, weathered & quartz) spaced <20mm between 24.35-24.55m.		
		134	25				Box 11: 25.1-27.75m. 50° vein (<5mm, quartz) at 25.2m.
			25.6m				
		133	26		Veined GREYWACKE SANDSTONE [SW to MW]; grey with irregular brown seams, MS to VS, partly weathered (<30mm along joints) to fresh (<75%). Limonite-stained joints spaced 25-150mm apart. Crisscrossed by irregular off-white veins (<5mm, quartz) spaced 5-30mm apart.		- 45° composite vein (<20mm, weathered). 14/8/14. Some loss of drilling circulation (70% return) by 26m. Missing block at 26m. Driller recorded full recovery 25.6-26.4m.
		132	27		- moderately weathered [FW <15%] between 26.25-27.1m.	RSWb	- 70° composite vein (<10mm, quartz). Coarser greywacke by 27m.
			27.9m				
		131	28		GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, S to VS, partly weathered (<10mm along joints) to fresh (>75%). Limonite-stained joints spaced 50-250mm apart. Crisscrossed by irregular white veins (<4mm, quartz) spaced 10-50mm apart.		Box 12: 27.75-30.5m.
		130	29				
		129	30		- less weathered [FW <95%] between 29.75-31.5m.		
							Box 13: 30.5-33.05m.
		128	31				
		127	32		- more weathered [FW <75%] below 31.5m. Joints (some coated by light brown to orange-brown, non-plastic silt <1mm) spaced 50-250mm apart and partly weathered <20mm into the adjacent rock.		- joints mostly dip >60° near 31.5-33.05m.
		126	33		- less weathered [FW >75%] by 33.05m. Joints spaced 25-300mm apart and partly weathered <10mm into the adjacent rock.		- crisscrossed by indistinct shear bands (<2mm) spaced 5-25mm apart by 33.05m. Joints mostly dip >30°. Box 14: 33.05-35.6m.
		125	34			RSWg	Core broken (<150mm) along joints spaced 25-100mm apart 33.5-35m.
		124	35				
							Box 15: 35.6-38.3m.
		123	36		- more weathered [FW 75%] below 36.25m.		- few obvious shear bands 36.25-39.5m.
		122	37				- 50° vein (<7mm, quartz) with occasional voids (<10 by 3mm).
		121	38		- joints spaced <50mm apart and partly weathered <20mm into the adjacent rock 37.95-38.8m.		Box 16: 38.3-41m.
		120	39		- less weathered [FW <90%] below 38.9m. Occasional voids (<10 by 3mm) along veins.		- 25° vein (<5mm, quartz) with occasional voids (<5 by 2mm). 35° vein (<4mm, quartz) with void (<25 by 3mm) at 38.88m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/5

LOCATION: HUNUA QUARRY **GRID REF:** 421234.94E 777027.78N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 159.22m **SHEET** 3 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-8-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		119	41		- joints spaced 50-200mm apart below 42.1m.		- 40° composite vein (<10mm, quartz) with some voids (<10 by 2mm). - 75° joint partly weathered <15mm into the adjacent rock 40.8-41.1m. Box 17: 41-43.7m.
		118	42				- joints mostly dip 30-70° below 42.1m. Few obvious shear bands 42.1-47.9m.
		117	43		- more weathered [FW >75%] below 43m. Partly weathered <20mm into the adjacent rock along joints.	RSWg	
		116	44				Box 18: 43.7-46.2m.
		115	45		- grey, VS, fresh [FW >95%] from 44.2m. Occasional 10-40° joints between 44.2-45.15m.		
		114	46		- slightly weathered [FW <95%] below 45.15m. Partly weathered <10mm into the adjacent rock along joints.		- joints have variable dip by 45.15m.
		113	47		- more weathered [FW >75%] below 46.2m.		Box 19: 46.2-48.9m.
		112	48		46.8m GREYWACKE SANDSTONE [MW to SW]; brown with minor grey patches (<50mm), mostly MS, partly weathered (FW <15%). Occasional irregular limonite-stained joints. Irregular (>70°) white veins (<10mm, weathered) with occasional voids (<20 by 5mm) spaced 5-40mm apart.	RW	- irregular contact between 46.7-46.9m.
		111	49		- grey with irregular brown seams, S to VS, slightly weathered [FW 50%] from 47.9m. Joints spaced 100-300mm apart and partly weathered <20mm into the adjacent rock. Irregular (40°-NV) veins (<3mm) spaced 25-75mm apart.	RSWb	
		110	50		49m GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, mostly VS, partly weathered (<15mm along joints) to fresh (<95%). Limonite-stained joints spaced 50-300mm apart. Irregular white veins (<3mm, calcite & quartz) spaced 15-150mm apart.		- intersecting 70° & 30° joints coated by pale brown, low plasticity clay (<3mm). Box 20: 48.9-51.5m. - irregular NV joint (coated by orange-brown, non-plastic silt <2mm) to white vein (<2mm, calcite) (by 49.68m) 49.42-49.82m. - 70° vein (<1mm, calcite) 49.82-50.07m. - splaying irregular 50-70° joint-veins (<2mm, weathered with pyrite patches) and partly weathered <10mm into the adjacent rock.
		109	51		- lighter grey (indistinct) and slightly weaker (S-VS) between 50.8-54.35m [SA/FW]. Crisscrossed by joints spaced 25-100mm apart between 50.8-52.3m.		15/8/14. Box 21: 51.5-54.4m.
		108	52		- irregular (45°-NV) veins (<3mm, calcite) spaced 50-150mm apart below 51.7m.		
		107	53		- joints spaced 50-150mm and partly weathered <10mm into the adjacent rock between 52.5-52.95m.	RSWg	
		106	54				- 70° composite vein (<4mm, calcite) to irregular vein network (>65mm).
		105	55		- joints spaced 25-100mm and partly weathered <10mm into the adjacent rock 53.95-54.4m.		18/8/14. Box 22: 54.4-57m.
		104	56		- more weathered [FW >75%] below 54.82m. Joints spaced 50-100mm and partly weathered <20mm into the adjacent rock. Veins (<3mm, quartz) spaced 25-75mm.		- some irregular 60-80° dark grey flecked laminations to bands (<10mm) 54.85-55.3m. Few obvious shear bands below 54.85m.
		103	57		56.45m GREYWACKE SANDSTONE [SW]; grey with irregular brown seams, MS to VS, partly weathered (<30mm along joints) to fresh (>50%). Crisscrossed by limonite-stained joints spaced 10-100mm apart and irregular (<70°) white veins (<3mm, quartz) spaced 10-50mm apart.		- 30° limonite-stained to white vuggy vein (<10mm, quartz). Joints mostly dip 40-70° below 56.45m. - 65° vein (<15mm, quartz) with brecciated rock (<10mm). 50° vein (<6mm, quartz) with minor voids (<3 by 2mm) at 56.95m. Box 23: 57-59.7m.
		102	58		- joint (coated by orange-brown, non-plastic silt <1mm) to veins (<5mm, weathered) spaced 25-50mm apart between 57.7-60.85m.	RSWb	- mostly NV joints between 57.7-60.85m.
		101	59		- moderately weathered [FW <25%] between 58.5-59.5m. Brown with some irregular grey patches.		
		100					Box 24: 59.7-62.3m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/5

LOCATION: HUNUA QUARRY **GRID REF:** 421234.94E 777027.78N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 159.22m **SHEET** 4 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-8-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		99			- less weathered [FW >75%] by 60.1m. Partly weathered <10mm into the adjacent rock along joints.	RSWb	
					60.7m		
		98	61		GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Irregular white veins (<3mm, quartz) spaced 50-300mm apart.		- contact along 75° limonite-stained joint. Occasional indistinct shear bands (<2mm) by 60.7m. Veins mostly dip 30-70°.
		97	62				- 80° limonite-stained joint.
		96	63				Box 25: 62.3-65.1m. Three intersecting NV limonite-stained joints 62.35-62.85m.
		95	64		- discontinuous interval (<40mm) of dark grey, S, siltstone dipping 30° at 64.2m.	RFW	- indistinct shear bands (<5mm, mostly <30°) spaced <100mm apart and some disrupted dark grey, fine-grained laminations (<3mm) between 63.6-64.2m. - some indistinct disrupted fine-grained bands (<5mm) dipping 70° near 64.2m.
		94	65		- some irregular patches (<90mm, disrupted seams) of dark grey, S, siltstone to argillite clasts below 65.15m. Crisscrossed by veins (<3mm, calcite) spaced 10-50mm apart.		- 50° slickensided defect. Coarser greywacke below 65.15m. Box 26: 65.1-67.7m.
		93	66		66.2m GREYWACKE SANDSTONE and SILTSTONE/ARGILLITE [FW]; grey with irregular dark grey-black patches to intervals, MS to VS, fresh. Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 10-50mm apart.		- veins have variable dip by 66.2m. Argillaceous rock between 66.55 (25°) & 66.85m (50°).
		92	67		- dark grey, S, siltstone with some indistinct NV disrupted bands (<5mm) of argillaceous rock between 67.3 (30°) & 67.7m (70°).		
		91	68		- siltstone between 68.15 (60°) & 68.35 (35°). Veins spaced 10-150mm apart below 68.35m. - siltstone between 68.55 (50°) & 68.75m (30°).		Box 27: 67.7-70.4m. - veins mostly dip >45° below 68.35m.
		90	69				
		89	70			RFW	Box 28: 70.4-73.2m.
		88	71		- siltstone between 71.15 (55°) & 71.3m (60°).		
		87	72		- argillite with indistinct banding (<5mm, 70°) between 72.25 (55°) & 72.6m (irregular <60°). Occasional veins below 72.25m.		
		86	73				Box 29: 73.2-75.8m.
		85	74		- argillite between 74.05 (65°) & 74.25m (25°). - irregular NV seam (<50mm) of argillite with indistinct banding (<10mm) between 74.35 & 74.85m. Crisscrossed by irregular limonite-stained joints spaced 25-100mm apart below 74.45m.		
					74.9m		
		84	75		GREYWACKE SANDSTONE and SILTSTONE/ARGILLITE [MW to FW]; grey to black with irregular brown seams, MS to VS, partly weathered to fresh (>50%). Crisscrossed by irregular limonite-stained joints spaced 25-50mm apart and white veins (<2mm, calcite) spaced 10-100mm apart. Less weathered below 75.2m.	RSWb	- contact along irregular 30-40° limonite-stained joint(s). Veins mostly dip 30-70°. Moderately weathered (<20mm along joints) above 75.2m (50°). Two vuggy networks (<10mm) of limonite-stained to off-white weathered veins at 74.95 (40°) & 75m (30°).
		83	76		- occasional joints partly weathered <5mm into the adjacent rock below 75.6m.		Box 30: 75.8-78.3m.
		82	77		- greyish brown, MS, moderately weathered, argillaceous rock between 76.25-76.75m. Joints spaced 25-75mm apart and partly weathered <30mm into the adjacent rock. Irregular (25-45°) weathered veins (<3mm) spaced <25mm apart. [MW].	RFW	- joints dipping 60° and coated by orange-brown, non-plastic silt near 76.25-76.75m. Veins have variable dip below 76.75m.
					77.4m		
		81	78		- fresh below 76.75m. Occasional veins (<2mm, quartz). GREYWACKE SANDSTONE [FW]; grey, VS, fresh (FW >95%). Irregular white veins (<2mm, calcite & quartz) spaced 50-200mm apart. Trace argillite clasts (<10mm).		- several 45° irregular slickensided defects to NV limonite-stained joints spaced 10-50mm and partly weathered <3mm into the adjacent rock 76.95-77.05m.
		80	79		- irregular limonite-stained joints spaced 10-75mm apart and partly weathered <2mm into the adjacent rock between 78.1-78.55m. - irregular (30°-NV) veins (<7mm) spaced 10-40mm apart between 78.6-79.05m.	RFW	- irregular contact between 77.35-77.45m. Three NV limonite-stained (above 77.7m) joints to dark green and transparent-white vein (<1mm, chlorite & calcite) with minor pyrite specks 77.4-77.9m. Box 31: 78.3-80.95m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN14/5**

LOCATION: HUNUA QUARRY **GRID REF:** 421234.94E 777027.78N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 159.22m **SHEET** 5 **OF** 5

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-8-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-8-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		79	81				- 20° joint with some pyrite patches. - 65° joint with minor streaky pyrite patches. - crisscrossed by indistinct shear bands (<3mm, mostly 40-60°) spaced 5-50mm apart below 80.6m. Box 32: 80.95-83.6m. 40° network of veins (<7mm, calcite) spaced <10mm apart 80.97-81m.
		78	82				
		77	83				
		76	84				Box 33: 83.6-86.15m.
		75	85				- irregular NV transparent-white vein (<1mm, calcite) 84.35-84.7m.
		74	86		- irregular (45°) white veins (<4mm, calcite) spaced 5-25mm apart between 85.5-86.05m.		
		73	87				- two 50° subparallel slickensided defects with white vein material (<1mm, calcite). Box 34: 86.15-88.7m. - 60° network of veins (<10mm, calcite & quartz) spaced <15mm apart 86.45-86.5m. - 70° joint-vein (<2mm, calcite) with some limonite-stained patches. 19/8/14. 55° slickensided defect at 87.95m.
		72	88			RFW	
		71	89		- veins (<3mm) spaced 10-150m apart below 88.9m.		Box 35: 88.7-91m.
		70	90				
		69	91				- intersecting 60 & 20° limonite-stained joints. - 15° limonite-stained joint. - intersecting 45°-NV joint-veins (<2mm, calcite) spaced <25mm apart and partly weathered <10mm into the adjacent rock 90.8-91.05m. Box 36: 91-93.65m. - intersecting 20° & 55° joints partly weathered <3mm into the adjacent rock. - intersecting 20-50° limonite-stained joints spaced <50mm apart. - irregular NV vein (<7mm, quartz) to network (<30mm) of veins spaced <15mm apart 92.1-92.7m.
		68	92				
		67	93				
		66	94				- three 40-50° joints spaced 40mm apart and partly weathered <2mm into the adjacent rock. Box 37: 93.65-94.8m (plus last 0.25m). 80° vein(s) (<3mm, calcite) with pyrite specks to patches 93.85-94.3m.
		65	95				
		64	96		- irregular (40°-60°) veins (<3mm) spaced 10-100mm apart by 94.8m.		- indistinct shear bands (<3mm, mostly 40-60°) spaced 10-100mm apart by 94.8m. 60° vein(s) (<2mm, calcite) at 95.8m. 30° vein (<1mm, calcite) with pyrite specks at 96m. Lost core (0.2m) probably from EOH. Core sample taken by K Barber. Hole backfilled.
		63	96.2m				
		62	97		EOH @ 96.2m		
		61	98				
		60	99				

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. **HUN14/6**

LOCATION: HUNUA QUARRY **GRID REF:** 421333.00E 777007.08N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 188.08m **SHEET** 1 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 30-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 7-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		187	1		Clayey SILT; streaky light brown to orangish brown, firm-stiff, plastic to slightly plastic. Indistinct intervals with some fine sand above 0.9m. [Residual Soil].			Drilled on excavated platform. NZTM location (GPS within 3m) of 1778127mE & 5893633mN. RQD entered into penetration field in database from 16.1m. Core boxes photographed. Box 1: 0-3m. Intact core (moist). - indistinctly banded (<10mm, <25°).
					- pale brown with some orange streaks (above 1.3m) and more plastic from 0.9m (25°). Light brown (orange-tint), slightly plastic silt near 1.6-1.65m.	O		
		186	2		- greyish brown, stiff to very stiff and slightly plastic. Some indistinct sandy bands (<30mm, NH). [HW to MW Waitemata Group].			
					2.5m			
		185	3		Silty SAND; grey (brown-tint) to dark grey (green-tint), tightly packed (hard). [MW/SW Waitemata Group].	OWT		- contact is NH. Indistinctly laminated (<5mm, 10°) by 2.5m. Box 2: 3-5.9m.
					3.45m			
		184	4		Fine-medium SANDSTONE with some siltstone [SW to FW]; grey to dark grey, mostly VWK, calcareous by 3.8m. [Waitemata Group].			- laminated (<3mm, 10°). Broken core (<40mm pieces, softer) 3.85-4.05m. Irregular NV limonite-stained joint partly weathered <5mm into the adjacent rock near 3.79-3.85m.
		183	5		- fine sandstone to siltstone from 4.7m.			- irregular 70° limonite-stained joint partly weathered <15mm into the adjacent rock. Core run 4.6-6.1m has up to 0.1m of uphole material at top. 10° band (15mm) of dark grey, calcareous mudstone at 4.7m. Indistinctly banded (<25mm, 10°) 4.7-5.4m.
		182	6		- fine to medium sandstone between 5.4-6.1m. Some harder (WK), calcite-cemented intervals.	OWT		- bedding contact dips 10°. Some indistinct NH laminations (<5mm). Disturbed core (softer) 5.4-5.65m. Rounded patch (<30 by 15mm) of sandstone-siltstone at 5.75m. Box 3: 5.9-8.8m. NV limonite-stained joint 5.9-6.1m.
					- some mudstone bands (<20mm, 10°) between 6.1-7.4m.			
		181	7		- fine to medium sandstone from 7.4m (10°).			- NH band (<15mm) of coarse sandstone with some white fossil fragments (<3mm, indistinct). Banded (<50mm, NH) 6.1-7.4m.
		180	8					- laminated (<5mm, NH) 7.4-8.5m. Irregular NV limonite-stained fracture partly weathered <5mm into the adjacent rock 7.44-7.5m.
					8.5m			- bedding contact is NH. Box 4: 8.8-11.8m.
		179	9		Silty SANDSTONE (Fine) [FW]; dark grey, WK, calcareous. Occasional indistinct muddy laminations (<5mm). [Waitemata Group].		S.W.L 9.06m (22/10/14).	
		178	10		- dark grey to grey, VWK, fine to medium sandstone from 9.8m (NH).			- mudstone band (<20mm, NH) near 9.7m. Indistinctly laminated (<5mm, <30°) from 9.8m.
		177	11		- grey with black & white mottles, conglomeratic sandstone between 10.35-10.65m. Some distinguishable fossil fragments (<5mm). - silty sandstone with some mudstone bands from 10.75m (10°).			- indistinctly banded (<50mm, 10°) from 10.75m.
					- mudstone band (60mm, 10°) near 11.46m.	OWT		- NH band (<30mm, disturbed) of dark grey, calcareous siltstone near 10.85m. Indistinctly banded (<25mm, 10°) 4.7-5.4m. Box 5: 11.8-14.8m.
		176	12					
		175	13					- 10° band (<15mm, drilling induced?) of dark grey, soft (disturbed), slightly plastic mud at 12.7m. - 55° joint. Minor brown to black, mudstone clasts (<10mm) near 13.54-13.6m.
		174	14		- no mudstone bands below 13.32m. Medium-coarse sandstone with minor brown to black, mudstone clasts (<10mm) near 13.54-13.6m. - mostly dark grey, mudstone to grey-brown, disturbed (very soft), slightly plastic mud between 13.75-13.9m. Noncalcareous below 13.9m.			- bedding contact dips 20°. Some indistinct bands (<15, 30°) from 13.75m. 30° polished defect at 13.9m. Disturbed 15° band (<50mm, drilling induced?) of dark grey, non-plastic silt near 14.25m.
					14.25m			
					14.65m CONGLOMERATE [FW]; patchy grey with some white, VWK, calcareous. Variably sized clasts (mostly <20mm) of noncalcareous fine sandstone to mudstone (<50mm) and some greywacke (<20mm). Some sandy matrix material with white to pale brown fossil fragments (<20mm).	OTK		
		173	15		15.25m Fine SANDSTONE [FW]; grey, WK, calcareous.	OWT		- grey, calcareous sandstone 14.37-14.5m. Clast (<50mm, indistinct) of brown, carbonaceous siltstone near 14.55m.
					16m Conglomeratic SANDSTONE to CONGLOMERATE [FW]; mottled white to black, VWK to WK, calcareous. Variably sized clasts (<10mm) mostly of noncalcareous mudstone with some greywacke and fossil fragments (<10mm). Becomes sandy conglomerate by 15.55m. - coarser conglomerate dominantly composed of dark grey (green-tint) & brown, mudstone clasts (<20mm, indistinct) below 15.75m.	OWT		- dark grey (green-tint), mudstone near 14.6-14.65m (Clast?). NH band (30-40mm) of coarse sandstone near 14.65m. Box 6: 14.8-17.3m.
		172	16					
		171	17			ORM RMW		- 60° joint coated by light grey, non-plastic silt (<3mm). - contact is NH. Grey, VWK to WK, calcareous sandstone 15.35-15.37m.
		170	18		GREYWACKE SANDSTONE [HA/MA]; grey (discoloured) with some grey-brown (interior patches <30mm), WK to MS, altered to partly altered (50%). Crisscrossed by irregular joints (some coated by grey, non-plastic sand-silt <3mm) spaced 10-50mm apart.			- 60° slickensided defect 15.9-16m. Discontinuous dark grey (green-tint), noncalcareous mudstone crisscrossed by dark green defects spaced <20mm apart below defect 15.9-16m (clast?). [Possible Fault].
					18.25m - some dark green-black joint surfaces by 16.7m. Harder (mostly MS-S) by 17m [MA]. Occasional remnant white veins (<1mm, weathered) by 17.85m.			
		169	19		GREYWACKE SANDSTONE [SA]; grey (less discoloured), mostly S, slightly altered (pervasive). Crisscrossed by irregular dark green-black joints spaced 5-35mm apart. Occasional white veins (<2mm,	RSWb		- contact dips 10°. Medium grained greywacke. Defects have variable dip. Broken core (<150mm, pieces) from 16m. Box 7: 17.3-20m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/6

LOCATION: HUNUA QUARRY **GRID REF:** 421333.00E 777007.08N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 188.08m **SHEET** 2 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 30-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 7-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
					weathered)	RSWb		- defects mostly dip 30°-NV from 18.25m. Some joints coated by light grey, non-plastic silt (<1mm, drilling induced?). Mostly intact core from 19.5m. Box 8: 20-22.65m.
		167	21		- becoming as below [SA/FW].	RSWg		- irregular 45° vein(s)(<3mm, calcite). Broken 45° light grey (green-tint) vein (<3mm, calcite) with pyrite specks at 20.2m. Broken 70° vein (<1mm, calcite) 20.4m. 40° joint coated by grey, non-plastic sand-silt (<3mm) at 20.45m.
					21.4m GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 5-50mm apart. Occasional irregular defects (indistinct) to joints with dark green surfaces.			- maximum depth of contact. Finer grained greywacke 21.4-23.9m. Defects have variable dip. 1/10/14. Box 9: 22.65-25.4m. 30° dark green (chloritic material <1mm) joint at 22.78m. 30° joint at 22.8m.
		166	22					- joints mostly dip 40-70° below 23m.
		165	23		- veins (<3mm, quartz & zeolite?) spaced <15mm apart between 22.65-22.8m. Limonite-stained joints (some coated by orange-brown, non-plastic silt <1mm) spaced 50-500mm apart below 23m.	RFW		- 25° transparent-white vein(s) (<7mm, quartz). Occasional orange-brown patches (<30mm, surface oxidized?) near 23.4-23.9m.
		164	24		- fine sandstone with some dark grey horizons (60-70°) between 23.4-23.9m. Indistinctly banded (<15mm, 50°) grey to black, MS to VS, fine sandstone to argillite between 23.7-23.9m.			- 50° & 65° joints coated by orange-brown, non-plastic silt (<1mm) at 23.88 & 23.93m. Intersecting 70 & 20° composite veins (<5mm, quartz) at 24.4m.
					24.75m GREYWACKE SANDSTONE [SA to SW]; grey, S-VS, slightly altered (pervasive). Limonite-stained joints spaced 20-200mm apart. Crisscrossed by irregular white veins (<5mm, quartz) some with voids (<30 by 5mm) spaced <40mm apart. [SA/FW].			- defects mostly dip 30-70° by 24.75m. Some joints coated by orange-brown, non-plastic silt (<1mm) near 24.75-25.5m.
		163	25					Box 10: 25.4-28.25m. Brecciated rock (<50 by 15mm) to transparent-white vein material (>25.5m, quartz) 25.45-25.55m. 45° joint coated by light orangish brown, non-plastic silt (<2mm) below vein material.
		162	26		- grey with some irregular brown seams, S to VS, partly weathered (<10mm along joints) to fresh (>75%) from 25.5m. Joints spaced 10-50mm apart. Mostly indistinct white veins (<2mm, quartz) spaced <20mm apart. [SW-FW].	RSWg		- joints mostly dip 20°-NV from 25.5m. Veins have variable dip.
					- fresh [FW] near 26.25-27.1m. Joints spaced 50-350mm. Crisscrossed by veins (<3mm, calcite & quartz) spaced 10-100mm apart.			- indistinct irregular (30-60°) defects ("shear bands") (<3mm) spaced <50mm apart by 26.05m. Joints mostly dip 20-60° below 26.25m.
		161	27		- joints (often coated by orange-brown, non-plastic silt <1mm) spaced 50-150mm apart and partly weathered <15mm into the adjacent rock below 27.1m.			- shear bands spaced 50-200mm apart by 26.5m. 60° dark green-black (chloritic material <2mm) joint at 26.8m.
					27.6m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Irregular limonite-stained joints spaced 50-350mm apart. Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 10-100mm apart.			- joints & veins have variable dip 27.1-27.6m. Intersecting 30° joint (coated by orange-brown, non-plastic silt <1mm) and 55° weathered vein (<5mm). Partly weathered <50mm into the adjacent rock.
		160	28		- joints spaced 20-200mm apart and partly weathered <2mm into the adjacent rock between 28.25-28.65m.			Box 11: 28.25-31.1m.
		159	29		- clean joints between 28.8-29.35m.	RFW		- several intersecting 30° & 60° locally limonite-stained joints coated by chloritic material (<1mm).
		158	30		- joints often coated by dark green chloritic material (<1mm) and spaced 40-250mm apart by 29.35m. Irregular (40-70°) veins (<3m, calcite) spaced 10-100mm apart.			- 25° & 45° joints at 30.35 & 30.5m. 30° joint at 30.8m.
					30.9m Veined GREYWACKE SANDSTONE [MW]; brown with some irregular grey patches, MS to S, partly weathered to fresh (<50%). Irregular limonite-stained joints spaced 30-300mm apart. Crisscrossed by irregular limonite-stained to white veins (<5mm, quartz & weathered) spaced <20mm apart.			- 55° joints coated by light orangish brown, non-plastic silt (<2mm). Joints & veins have variable dip from 30.9m. Joints often coated by orange-brown, non-plastic silt (<2mm) 30.9-33.7m. No obvious shear bands. Box 12: 31.1-33.8m.
		157	31					- some irregular patches (indistinct) of limonite-stained to transparant-white vein material (<15mm, quartz & weathered) with some voids (<25 by 5mm, >31.5m) 31.4-31.7m.
		156	32			RMW		- 70° joint coated by light orangish brown, non-plastic silt (<3mm) and associated seam (30mm) of weathered rock.
		155	33		- grey, S to VS, slightly altered [FW >50%] between 32.9 & 33.12-33.42m.			- irregular 70°-NV limonite-stained joint-vein (<1mm, calcite) partly weathered <15mm into the adjacent rock 33.7-33.9m. Box 13: 33.8-36.6m.
					33.7m GREYWACKE SANDSTONE [SW]; grey with minor irregular brown patchy seams (<20mm, some indistinct), mostly VS, partly weathered to fresh (<95%). Crisscrossed by irregular (30-70°) white veins (<5mm, calcite) spaced 10-50mm apart.			- 35° white to light grey vein (<10mm, quartz).
		154	34		- veins spaced 5-25mm apart below 34.5m.			- 55° limonite-stained to white vein (<15mm, weathered & calcite) with some brecciated rock (<15 by 5mm).
		153	35		- brown, MS-S, moderately weathered [MW] between 34.9-35.5m. Irregular (NH-75°) limonite-stained to white veins (<5mm, variable) spaced 5-40mm apart. Some fresh patches (<80mm) by 35.35m. Irregular limonite-stained joints spaced 25-250m apart from 34.9m.			- finer grained greywacke 35.5-39.45m. Joints (minimal silt) mostly dip 25-75°.
		152	36		- grey with some irregular brown seams, S to VS, partly weathered (<15mm along joints) to fresh (>75%) by 35.5m. Veins (<3mm, quartz) spaced 5-50mm apart.	RSWb		Box 14: 36.6-39.3m. 75° limonite-stained to off-white composite vein (<10mm, quartz) at 36.85m.
		151	37		- veins (<5mm, quartz) spaced <20mm apart below 36.55m. Veins spaced <10mm apart below 37.7m.			- 55° off-white composite vein (<7mm, quartz). Joints (some coated by light orangish brown, non-plastic silt <1mm) mostly dip 20-40° near 37.85-38.25m.
		150	38		38.25m - moderately weathered [MW] below 37.85m. Irregular (20°-NV) fractures to weathered veins (<10mm) spaced <20mm apart. Joints spaced 20-150m apart.			
		149	39		GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, mostly VS, partly weathered (<10mm along joints) to fresh (95%). Limonite-stained joints spaced 30-300mm apart. Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced 5-50mm apart.	RSWg		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN14/6**

LOCATION: HUNUA QUARRY **GRID REF:** 421333.00E 777007.08N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 188.08m **SHEET** 3 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 30-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 7-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		147	41		- fine sandstone with black flecks (carbonaceous?) between 39.3-39.45m. More weathered [FW <95%] below 39.45m. Joints spaced 50-400mm apart and partly weathered <20mm into the adjacent rock. - irregular limonite-stained to white veins (<10mm, calcite) spaced <20mm apart between 40.4-40.8m. Irregular seam (50mm, 40-50°) of brown to grey (discoloured), MS to S, partly weathered rock near 40.6-40.65m. - irregular seam (<50mm, 60°) of brown, partly weathered rock near 41.05-41.3m. Irregular interval of brown with some grey patches, S, partly weathered to fresh (<50%) between 42-42.1m. - more weathered [FW >75%] below 42.1m. Limonite-stained joints spaced 25-250mm apart and partly weathered <30mm into the adjacent rock. Crisscrossed by irregular (35-65°) white veins (<3mm, calcite & quartz) spaced 10-100mm apart.	RSWg		- 30° weathered composite vein (<10mm). Some irregular grey (discoloured), S, less altered patches (<65 by 25mm) near 37.9-38m. - irregular 60° seam (<15mm) of brecciated rock (<10mm, WK-MS, silty) and partly coinciding weathered vein (<10mm). - contact dips 55°. Defects have variable dip from 38.25m. Box 15: 39.3-42.1m. Banded (<10mm, 70°) 39.3-39.45m. Occasional black, S, argillite clasts (<10mm) below 39.45m. - irregular (45-70°) veins (<5mm, quartz) spaced <20mm apart 41.55-41.8m. - 35° vein (<5mm, quartz). Box 16: 42.1-44.9m.
		146	42					
		145	43					
		144	44		- irregular seam (<100mm, NV) of brown, S, partly weathered rock along several joints spaced <100mm apart between 43.7-44.3m.			- 15° joint coated by light orangish brown, non-plastic silt (<3mm).
		143	45					Box 17: 44.9-47.7m.
		142	46					
		141	47		47.3m			
		140	48		Veined GREYWACKE SANDSTONE [SW]; grey with irregular brown intervals, S to VS, partly weathered to fresh (>50%). Limonite-stained joints spaced 25-250mm apart. Crisscrossed by irregular (NH-70°) limonite-stained to white veins (<5mm, quartz) spaced 5-25mm apart.			- irregular contact dips 35°. Joints mostly dip NH-65° from 47.3m. Partly weathered intervals 47.3-47.55, 47.7-47.9 & 48.45-48.55m. Box 18: 47.7-50.4m.
		139	49		- grey with some irregular brown seams, less weathered [FW >75%] from 48.55m (35°). Partly weathered <30mm along joints. Pale brown to white veins (<5mm, quartz & weathered) spaced 10-50mm apart.	RSWb		- veins have variable dip from 48.55m.
		138	50		- irregular (35-70°) veins spaced <20mm apart below 50.05m. Occasional NH joints.			- 60° pale brown vein (<5mm, quartz). - 45° pale brown composite vein (<20mm, quartz). 70° pale grey vein (<15mm, quartz). Box 19: 50.4-53m.
		137	51		50.9m Veined GREYWACKE SANDSTONE [MW]: greyish brown (above 51.1m) to brown, S, partly weathered. Irregular limonite-stained joints spaced 50-200mm apart. Crisscrossed by irregular off-white veins (<5mm, quartz) spaced <20mm apart.	RMW		- 65° transparent-white to pale green-grey composite vein (<20mm, quartz). - defects have variable dip from 50.9m. - 55° weathered composite vein (<60mm) between 51.2-51.3m. Shattered core (<25mm pieces, some silt) along vein. - joints mostly dip NH-65° from 51.9m.
		136	52		51.9m GREYWACKE SANDSTONE [SW]; grey with irregular brown seams, S to VS, partly weathered (<50mm along joints) to fresh (>50%). Limonite-stained joints spaced 50-250mm apart. Crisscrossed by irregular limonite-stained to white veins (<5mm, quartz) spaced 5-50mm apart.			- 50° network (<20mm) of limonite-stained to off-white veins (<5mm, quartz) spaced <5mm apart.
		135	53		- grey with minor irregular brown seams, less weathered [FW <95%] from 53m. Partly weathered <15mm along joints. Irregular (30°-NV) white veins (<3mm, quartz) spaced 5-50mm apart.			- 50° joint coated by light brown, non-plastic sandy silt (<2mm). Joints mostly dip 20-70° from 53m. Box 20: 53-55.5m.
		134	54			RSWb		
		133	55		- brown with grey patches (<100mm), S to VS, moderately weathered [FW <50%] from 54.45m. Joints spaced 25-100mm apart. Limonite-stained to white veins (<5mm, quartz) spaced 10-50mm apart.			- defects have variable dip from 54.45m.
		132	56		- grey with irregular brown seams, less weathered [FW <75%] below 55.25m. Joints spaced 25-150mm apart and partly weathered <30mm into the adjacent rock. Veins (<3mm) spaced 10-100mm apart from 55.5m.			- 20° network (<60mm) of white veins (<3mm, quartz) spaced <10mm apart 55.22-55.28m. - indistinct shear bands (<3mm, 15-30°) spaced 150mm apart by 55.55m. Irregular (patchy) 15° white vein (<10mm, quartz) at 55.65m. Box 21: 55.5-58m.
		131	57		56.5m GREYWACKE SANDSTONE [MW]; brown with some grey (elongated patches), S to VS, partly weathered (<30mm along joints) to fresh (<50%). Crisscrossed by irregular (30°-NV) limonite-stained to white veins (<3mm, calcite) spaced 10-100mm.	RMW		- irregular 70°-NV joint(s) partly coated by orange-brown, non-plastic (<1mm) 56.05-57.2m. 2/10/14.
		130	58		57.65m GREYWACKE SANDSTONE [MW-SW]; grey with some irregular brown seams, S to VS, partly weathered (<30mm along joints) to fresh (75%). Limonite-stained joints spaced 50-200mm apart. Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 10-100mm apart.			- 55° & 10° limonite-stained joints at 57.2 & 57.45m. Veins (25°-NV) spaced 5-50mm apart 57.2-57.65m.
		129	59		- more weathered [FW >50] by 58.5m. Joints spaced 25-100mm.	RSWb		- irregular 45° network of off-white veins (<15mm, calcite) to brecciated rock 57.52-57.6m. 45° limonite-stained joint along base. - joints & veins mostly dip 20-70° from 57.65m. Occasional indistinct shear bands (<5mm,

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN14/6**

LOCATION: HUNUA QUARRY **GRID REF:** 421333.00E 777007.08N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 188.08m **SHEET** 4 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 30-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 7-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments ← Piezometer Diameters in mm
		127	61		- less weathered [FW <95%] by 60.1m. Joints spaced 50-200mm.	RSWb		20-70°). Box 22: 58-60.85m. - 50° joint coated by light orangish brown, non-plastic silt (<2mm). - 65° vein (<5mm, calcite). Joints have variable dip by 60.1m. Irregular 70° network (<20mm) of veins (<4mm, calcite) spaced <15mm apart near 60.65m. - irregular contact dips 35°. Veins have variable dip from 60.8m. Some joints coated by orange-brown, non-plastic silt (<1mm) near 60.8-63.5m. No obvious shear bands. Box 23: 60.85-63.4m. - no grey, fresh patches 61.25-62.25m. Veins spaced 5-35mm apart. - 30° vein (<5mm, calcite). Irregular 40° network (<100mm) of veins (<15mm, calcite & weathered) spaced <15mm apart 61.75-61.9m. Box 24: 63.4-66.1m. - irregular contact dips 45°. - crisscrossed by 40-70° limonite-stained joints spaced 50-150mm apart and partly weathered <30mm into the adjacent rock 64.05-64.5m. Occasional indistinct shear bands (<3mm, 10-35°) near 64.15-65.5m. - veins have variable dip by 64.8m - 30° limonite-stained joint-broken vein (<1mm) partly weathered <30mm into the adjacent rock. - occasional irregular (30°-NV) off-white veins (<3mm, calcite & weathered) 65.5-66.2m. Box 25: 66.1-68.6m. - joints mostly dip 45°-NV between 66.2-66.9m. Joints often coated by orange-brown, non-plastic silt (<1mm) near 66.2-68.1m. - maximum depth of contact. Joints have variable dip. Box 26: 68.6-71.4m. Veins have variable dip from 68.8m. 20° off-white vein (<4mm, calcite) with some voids (<5mm) within 15mm (above) at 68.9m. - 35° joint coated by light brown to orange-brown, non-plastic silt (<2mm). Irregular NV joint(s) coated by orange-brown, non-plastic silt (<1mm) 69.5-70.55m. Both joints partly weathered <30mm into the adjacent rock Box 27: 71.4-73.8m. - maximum depth of contact. Joints mostly dip 20°-NV near 73.6-75.3m. Box 28: 73.8-76.3m. - 55° weathered, fractured (<10mm), composite vein (35mm) 74.6-74.65m. Core broken (<100mm pieces) along joints spaced 10-50mm apart 74.75-75.3m. - some patches (<50mm, angular) of dark grey-black, S, argillite 75.45-75.6m. Box 29: 76.3-78.95m. - 55° weathered composite vein (<20mm) partly weathered <100mm into the adjacent rock. Dark greyish brown, MS, partly weathered, argillite clasts (<10mm) near 76.85m. - defects mostly dip 30°-NV below 77.15m. - argillite clast (<8mm) near 77.6m. - some argillite patches (<75mm, as above) 78-78.85m. Indistinctly banded (<50mm, 40°-NV) 78.25-78.85m. Box 30: 78.95-81.5m. 30° joint coated by light orange-brown, non-plastic silt (<3mm) at 79.2m.
					60.8m GREYWACKE SANDSTONE [MW]; brown with some grey patches, S to VS, partly weathered (<50mm along joints) to fresh (25%). Limonite-stained joints spaced 50-250mm apart. Crisscrossed by irregular off-white veins (<5mm, quartz & weathered) spaced 10-100mm apart.	RMW		
		126	62					
		125	63		- slightly weathered [FW <75%] between 62.9-63.25m.			
		124	64		63.5m GREYWACKE SANDSTONE [SW]; grey with minor irregular brown seams (<50mm), mostly VS, partly weathered to fresh (<95%). Crisscrossed by irregular (20-70°) white veins (<3mm, calcite & quartz) spaced 10-100mm apart.			
		123	65		- veins (<6mm, calcite & quartz) spaced 5-50mm apart by 64.8m.	RSWb		
		122	66		- brown with some grey patches, S to VS, moderately weathered [FW <25%] between 65.5 (45°) & 66.2m (55°). Crisscrossed by irregular (30°-NV) limonite-stained joints spaced 10-50mm apart and partly weathered <50mm in the adjacent rock.			
		121	67		- grey with irregular brown seams, S to VS, partly weathered (<20mm along joints) to fresh (<75%) from 66.2m. Irregular (45°-NV) limonite-stained joints spaced 50-200mm apart. Occasional veins (<2mm, calcite). 66.9m GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, mostly VS, partly weathered (<10mm along joints) to fresh (<95%). Irregular limonite-stained joints spaced 25-250mm apart. Occasional irregular (20-70°) white veins (<1mm).			
		120	68					
		119	69		- more weathered [FW <75%] from 68.8m (30°). Joints spaced 15-150mm and partly weathered <30mm into the adjacent rock. Occasional limonite-stained to white veins (<2mm, weathered & quartz).			
		118	70		- less weathered [FW 75%] by 70m.	RSWg		
		117	71					
		116	72					
		115	73		73.6m			
		114	74		GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, S to VS, partly weathered (<50mm along joints) to fresh (<75%). Crisscrossed by limonite-stained joints spaced 15-150mm apart and limonite-stained to white veins (<3mm, quartz & weathered) spaced <100mm apart. - more weathered [FW 50%] from 73.95m. Irregular seam (<150mm, 55°) of variable brown, MS-S, partly weathered rock associated with vein between 74.5-74.75m. - moderately weathered [MW] near 75-75.3m. Less weathered [FW <75%] by 75.3m. Joints spaced 15-200mm apart and partly weathered <30mm into adjacent rock White veins (<5mm, calcite & quartz) spaced 5-50mm apart.			
		113	75					
		112	76			RSWb		
		111	77		- moderately weathered [MW] between 76.6-77.15m.			
		110	78		- verging on fresh [FW 95%] between 77.15-78.25m. Veins (<3mm, calcite & quartz) spaced 5-100mm apart and occasionally partly weathered <20mm into the adjacent rock.			
		109	79		- grey to black with irregular brown to dark brown seams, MS to VS, partly weathered to fresh (<75%), greywacke sandstone to argillite below 78.25m. Joints spaced 50-200mm apart. Irregular (30-60°) white veins (<4mm, calcite) spaced 10-100mm apart. 79.3m - sandstone below 78.85m (55°). GREYWACKE SANDSTONE [MW]; brown with minor grey patches (<40mm), mostly S, partly weathered to fresh (<25%). Crisscrossed by	RMW		

BHFORM3 HUN GPJ G_FISHER.GDT 3/2/15

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN14/6**

LOCATION: HUNUA QUARRY **GRID REF:** 421333.00E 777007.08N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 188.08m **SHEET** 5 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 30-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 7-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		107	81		irregular limonite-stained joints spaced 20-200mm apart and off-white veins (<5mm, quartz & weathered) spaced 10-50mm apart. - darker brown, greywacke sandstone to argillaceous rock below 80.15m. White veins (<3mm, quartz) spaced 10-50mm apart.			- irregular contact dips 70°. Defects have variable dip from 79.3m. Some joints coated by orange-brown, non-plastic silt (<1mm) near 79.3-80.8m. 3/10/14.
					80.8m GREYWACKE SANDSTONE-SILTSTONE with some argillaceous bands (<20mm) [SW/FW]; dark grey, mostly S, almost fresh (95%). Occasional irregular limonite-stained joints partly weathered <10mm into the adjacent rock. Crisscrossed by irregular white veins (<3mm, calcite & weathered) spaced 5-50mm apart.	RSWg		- irregular NH off-white vein (<5mm, quartz). Veins mostly dip 20°-NV from 80.15m. - elongated NV patch (<60 by 25mm) of slightly weathered rock near 80.7m. Indistinctly banded (<100mm, 50-60°) near 80.8-84.2m. Joints mostly dip 20°-NV.
		106	82		82.05m GREYWACKE SANDSTONE (Fine) to SILTSTONE [MW]; dark brown, MS to S, partly weathered. Irregular limonite-stained joints spaced 25-250mm apart. Crisscrossed by irregular off-white veins (<3mm, calcite & weathered) spaced 5-50mm apart.			Box 31: 81.5-84.1m. - irregular contact dips 55°. Defects have variable dip from 82.05m.
		105	83		- veins spaced <20mm apart below 83m.	RMW		- some patches (<100mm) of dark grey, S, fresh rock 82.6-83m.
		104	84		- veins spaced <10mm apart between 83.7-84.2m. 84.2m GREYWACKE SANDSTONE [MW]; brown with some grey patches (<100mm), MS to S, partly weathered to fresh (<25%). Crisscrossed by irregular limonite-stained joints spaced 10-50mm apart and weathered veins (<3mm) spaced 5-50mm apart.			Box 32: 84.1-86.65m. Irregular 35-40° network (<50mm) of off-white veins (<3mm, calcite) spaced <5mm 84.15-84.2m. - maximum depth of contact. Occasional voids along veins (<8mm).
		103	85					
		102	86		- grey with irregular brown seams, S-VS, slightly weathered [FW >50%] between 86.1 (NV) & 86.8m (NV). White veins (<4mm, quartz) spaced <50mm apart.	RMW		- irregular NV joint(s) partly weathered <30mm into the adjacent rock 85.8-86.65m.
		101	87		- joints spaced 15-150mm apart from 88.35m. Veins (<10mm, quartz & weathered) spaced 5-50mm apart.			Box 33: 86.65-89.35m. Irregular NV joint(s) partly coated by orange-brown, non-plastic silt (<1mm) 86.75-88.1m. Brown with some grey patches (<200mm) from 86.8m.
		100	88		88.35m GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, S to VS, partly weathered (<30mm along joints) to fresh (>75%). Limonite-stained joints spaced 30-300mm apart. Crisscrossed by irregular white veins (<5mm, quartz) spaced 5-50mm apart.			- joints mostly dip 20°-NV near 88.35-91m.
		99	89			RSWg		- irregular NV joint(s) partly weathered <15mm into the adjacent rock <15mm. Box 34: 89.35-91.5m. - 60° composite vein (<15mm, quartz).
		98	90					
		97	91		91m GREYWACKE SANDSTONE [MW]; brown with some grey patches (<100mm), S to VS, partly weathered (<50mm along joints) to fresh (<50%). Crisscrossed by limonite-stained joints spaced 10-100mm apart and irregular white veins (<5mm, quartz & weathered) spaced 5-50mm apart.	RMW		- irregular contact dips 40°. Defects have variable dip. Box 35: 91.5-94m. Intersecting 65° & 50° joints coated by orange-brown, non-plastic silt (<2mm) at 91.85m.
		96	92		91.95m - becoming as below [FW 50%].			- irregular contact dips 40°. Joints mostly dip 20°-NV near 91.95-97.75m. 6/10/14. Some loss of drilling circulation (80% return) by 92.6m.
		95	93		GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, mostly VS, partly weathered (<15mm along joints) to fresh (<95%). Limonite-stained joints spaced 25-250mm apart. Irregular white veins (<3mm, calcite & quartz) spaced 5-50mm apart.			
		94	94		- more weathered [FW >75%] between 94.4-96.2m. Joints spaced 25-100mm apart.	RSWg		Box 36: 94-96.45m. Irregular NV joint(s) partly weathered <20mm into the adjacent rock 94.4-96.2m.
		93	95					- 15° off-white vein (<5mm, quartz) with occasional voids (<3mm).
		92	96					- 50° off-white vein (<4mm, weathered) with some voids (<5mm). Box 37: 96.45-98.8m.
		91	97		- some disrupted bands (<10mm, 50°-NV) to patches (<20mm, angular) of dark grey, S, siltstone between 97.05-97.4m. - becoming as below [FW <75%].			- irregular 30° seam (<40mm) of brecciated rock (<25mm) in vein material (<3mm, quartz). - irregular contact dips 45°.
		90	98		97.75m Veined GREYWACKE SANDSTONE to SILTSTONE [MW]; brown with some grey patches (<100mm), MS to S, partly weathered to fresh (<25%). Irregular limonite-stained joints spaced 50-300mm apart. Crisscrossed by irregular off-white veins (<5mm, quartz & weathered) spaced <30mm apart.	RMW		- finer grained below 98.4m. 20° white vein (<7mm, quartz) at 98.6m. Irregular 65° network (<25mm) of white veins (<10mm, quartz) spaced <15mm apart near 98.7m. Box 38: 98.8-101.3m.
		89	99					- irregular 30° network (<150mm) of veins

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

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BOREHOLE No. **HUN14/6**

LOCATION: HUNUA QUARRY **GRID REF:** 421333.00E 777007.08N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 188.08m **SHEET** 6 **OF** 6

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 30-9-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 7-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		87	101		100.8m - dark brown with some dark grey patches (<100mm), S, siltstone with some argillaceous streaks to patches (<20 by 5mm, 55°) below 99.9m. Joints spaced 20-200mm apart. Limonite-stained to white veins (<3mm, quartz & weathered) spaced 5-50mm apart.			(<5mm, quartz) spaced <10mm apart 99.7-99.85m. - 55° joint coated by silt (<2mm). Minimum depth of contact. Joints often coated by orange-brown, non-plastic silt (<2mm) 99.9-100.8m.
		86	102		GREYWACKE SANDSTONE-SILTSTONE [MW-SW]; dark grey with dark brown seams, S to VS, partly weathered (<50mm along joints) to fresh (>50%). Irregular limonite-stained joints spaced 25-250mm apart. Crisscrossed by irregular white veins (<3mm, quartz) spaced 5-35mm apart.	RSWb		7/10/14. 30° joint at 100.8m. Some indistinct dark grey-black bands (<40mm, 55°) near 100.8-102.75m. Box 39: 101.3-103.95m. Irregular 70°-NV joint(s) coated by orange-brown, non-plastic silt (<2mm) and partly weathered <30mm into the adjacent rock at 101.4m. - irregular 60°-NV joint(s) coated by orange-brown, non-plastic silt (<1mm) and partly weathered <50mm into the adjacent rock. Splaying 70° & 60° off-white composite veins (<5mm, weathered) to vein network (<15mm) near 101.9m. - 60° joint coated by orange-brown, non-plastic sandy silt (<3mm) and partly weathered <30mm into the adjacent rock. Seam (<50mm, 65°) of dark grey-black, S, argillite between 102.7-102.8m. - 45° joint partly weathered <2mm into the adjacent rock. Maximum depth of contact. Argillaceous seams dip 55°. Joints mostly dip 30-60° near 102.75-104.75m. - irregular 55°-NV seam (<60mm) of dark grey-black, S, argillite near 103.1m. Box 40: 103.95-106.4m. Broken 50° transparent-white vein (<1mm, calcite) with pyrite specks at 103.95m. 60° transparent-white composite vein (<10mm, quartz) to brecciated rock seam (<40mm). - 20° joint partly weathered <3mm into the adjacent rock. Minimum depth of contact. Some indistinct patchy bands (<10mm, 55°) near 104.75-109.1m. Box 41: 106.4-109.1m. - indistinct dark grey-black, MS-S, argillaceous bands (<20mm, 65°) near 107.65m. - intersecting 45° & 65° joints partly weathered <20mm into the adjacent rock. - maximum depth of contact. 50° limonite-stained joint. 70° composite vein (<15mm, quartz). Indistinctly banded (<20mm, 70°). Defects have variable dip. Box 42: 109.1-111.8m. - irregular 30° limonite-stained joint. - intersecting 30° & 60° joints partly weathered <15mm into the adjacent rock with band (<50mm) of shattered rock (<30mm pieces, some silt). Irregular NV limonite-stained joint 111.2-111.4m. - 30° defect. Irregular NV joint partly weathered <1mm into the adjacent rock 111.6-111.7m. Box 43: 111.8-114.2m. Irregular NV joint(s) partly weathered <10mm into the adjacent rock 111.8-112.6m. Irregular 70° network (<10mm) of veins (<3mm, calcite) spaced <3mm apart (and <10mm apart within 50mm) near 112.6m. - intersecting NV & 30° joints partly weathered <2mm into the adjacent rock. Irregular 50° limonite-stained joint partly weathered <2mm into the adjacent rock at 113m. - pyrite specks on some defect surfaces below 113.7m. Box 44: 114.2-116.8m. 30° joint coated by orange-brown, non-plastic silt (<1mm) and partly weathered <2mm into the adjacent rock at 114.6m. Indistinct banding (<10mm) dips 60-70° near 115.9-116.2m. - bedding contact dips 70°. Medium grained greywacke. Three intersecting 20° to NV joints some coated by orange-brown, non-plastic silt (<1mm) near 116.2m. ~~Box 45: 116.8-118.6m. Several intersecting~~ 75-50° veins (<5mm, quartz) near 117m. Broken core (<50mm pieces) between 117.45-117.85m.- 30° band (<5mm) of light grey, non-plastic silt (vein material) at 117.75m. Some pyrite patches on defects.
		85	103		102.75m GREYWACKE SANDSTONE-SILTSTONE [FW]; dark grey with some dark grey-black seams (<60mm, patchy), S to VS, fresh (>95%). Limonite-stained joints spaced 30-200mm apart and partly weathered <2mm into the adjacent rock. Crisscrossed by irregular white veins (<5mm, quartz) spaced <30mm apart. - veins spaced <75mm apart below 103.45m. Occasional joints.	RFW		
		84	104		104.75m			
		83	105		GREYWACKE SANDSTONE-SILTSTONE [SW-FW]; dark grey with minor irregular dark brown seams, S to VS, partly weathered (<20mm along joints) to fresh (<95%). Limonite-stained joints spaced 25-250mm apart. Crisscrossed by irregular white veins (<3mm, quartz) spaced <50mm apart.			
		82	106					
		81	107			RSWg		
		80	108					
		79	109		109.1m GREYWACKE SANDSTONE-SILTSTONE [FW]; dark grey, S to VS, fresh. Crisscrossed by irregular white veins (<4mm, quartz) spaced <100mm apart.			
		78	110		- veins spaced <20mm apart below 110.1m.			
		77	111		- streaky transparent-white to dark grey, VS, vein material (<20mm, quartz) to siliceous rock between 111.2-111.6m.			
		76	112			RFW		
		75	113		- pyrite specks to patches on some defect surfaces by 112.7m.			
		74	114		- seam (<40mm, 60°) of dark grey-black, S, argillite near 113.4m. Veins (<3mm, calcite) spaced 5-75mm apart below 113.7m. Joints-broken veins spaced 50-350mm apart.			
		73	115					
		72	116		116.2m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Crisscrossed by irregular white veins (<5mm, calcite) spaced 10-100mm apart. Joints-broken veins spaced 50-200mm apart. Patch (<30 by 10mm, angular) of black, MS-S, argillite near 117m.			
		71	117			RFW		
		70	118		- grey (discoloured), S, slightly altered (pervasive) between 117.6-117.75m. Veins (<5mm, calcite) spaced <20mm apart.			
		69	119		118.6m EOH @ 118.6m			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/7

LOCATION: HUNUA QUARRY **GRID REF:** 421440.82E 776991.16N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 208.41m **SHEET** 1 **OF** 8

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-10-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 21-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		208	0		0.15m CLAY; light brown (orange-tint), stiff, plastic. [Residual Soil].	O		NZTM location (GPS within 3m) of 1778233mE & 5893616mN. RQD entered into penetration field in database from 30.2m. Core boxes photographed. Box 1: 0-2.8m. Mostly intact core (moist).
					Clayey SILT; variable light brown to light orangish brown, disturbed (very soft) to stiff, slightly plastic. Some irregular orange-brown (limonite-stained) to black mottles to indistinct bands (<10mm, NH). [CW to HW Waitemata Group].			- minimum depth of contact. Disturbed core (wet) 0.15-1.2m.
			1					
		207			- variable light brown with some orange mottles to streaks, very stiff, plastic to non-plastic silt with variable sand and clayey bands (<50mm, NH) by 1.2m. Minor orangish brown to black mottles to streaks (60°-NV, some along remnant joints) above 2.4m.		
			2			OWT		
		206			- becoming hard. Some bands (<50mm, NH) of greyish brown, plastic to slightly plastic mud between 3-3.9m.			
			3					Box 2: 2.8-6.2m.
		205						
			4		4.15m - softer below 3.9m.			
		204			Sandy SILT with clayey bands; light brown to orange-brown, very stiff to hard, plastic to non-plastic. [HW to MW Waitemata Group].			Disturbed core (soft to firm) 4.15-4.45m. Indistinctly banded (<50mm, NH) from 4.15m. Core block mislabelled 7.7m.
			5					
		203				OWT		
			6					Core run 6-6.9m has excessive length (0.2m assumed recovered from previous run). Box 3: 6.2-8.8m.
		202			- more clayey bands below 6.2m.			
			7		- some bands (<10mm, NH) of greyish brown, plastic to slightly plastic mud by 6.9m. Greyish brown, hard, slightly plastic mud between 7.15 (10°) & 7.25m.			- banded (<15mm, NH) near 6.9-7.15m. - NV limonite-stained joint 7.15-7.35m. 10° limonite-stained joint at 7.21m.
		201			- light brown-brown with occasional orange-brown streaks, hard, slightly plastic to non-plastic sand-silt with indistinct muddy bands (<50mm, NH).			Core run 7.7-9.2m has 0.1m of uphole material at top.
			8					
		200						Box 4: 8.8-11.6m.
			9		- some dark brown mottles between 9-9.06m.			
		199			9.4m Fine SANDSTONE to SILTSTONE [MW]; light brown-brown, EWK (hard) to VWK. Crisscrossed by irregular (60°-NV) limonite-stained joints (indistinct) spaced <100mm apart. [Waitemata Group].			- maximum depth of contact.
			10					
		198			- some indistinct mudstone bands (<50mm, 10°) by 10.4m.			
			11			OWT		- indistinct 20-40° partly limonite-stained defect(s).
		197						Box 5: 11.6-14.2m. 60° & 55° limonite-stained joints at 11.6 & 11.75m.
			12					
		196			12.8m			
			13		SILTSTONE to MUDSTONE [SW to MW]; dark grey with some irregular light orangish brown seams (<100mm, <25%), EWK (hard) to VWK, calcareous. [Waitemata Group].			20° limonite-stained joint. 15° slickensided defect at 12.75m. Contact dips 50° at 12.8m. Indistinctly banded (<50mm, <15°).
		195				OWT		
			14		- light brown-brown below 13.8m.			
		194			14.6m			Box 6: 14.2-18.2m.
			15		Fine SANDSTONE to SILTSTONE with some mudstone bands [MW]; light brown-brown, EWK (hard) to VWK. Occasional irregular light orangish brown to orange-brown seams (<50mm). [Waitemata Group].			- minimum depth of contact. No core recovery near 14.6-15.1m. Mudstone bands (<50mm, indistinct) are NH. - irregular 45°-NV limonite-stained joint(s) near 15.1-16.7m.
		193						
			16					- NH limonite-stained joint near 16.05m.
		192				OWT		
			17					
		191						
			18		- more mudstone bands by 17.5m. Some light orangish brown to orange-brown bands (<15mm, 10°) by 17.85m.			- irregular NV white composite vein (<7mm, weathered) 107.8-108.15m. Box 7: 18.2-21.4m.
		190			18.4m			- maximum depth of contact. Limonite-stained bedding contact dips 15° at 18.4m. Indistinctly laminated (<5mm, <10°).
			19		Silty SANDSTONE (Fine to medium) [MW]; light brown with minor orange-brown streaks, EWK (hard) to VWK. Occasional irregular (70°-NV) limonite-stained joints. [Waitemata Group].	OWT		
		189						

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 24.5m.	123mm to 24.5m. 96mm to EOH.

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BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

BOREHOLE No. HUN14/7

LOCATION: HUNUA QUARRY **GRID REF:** 421440.82E 776991.16N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 208.41m **SHEET** 2 **OF** 8

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-10-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 21-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		188	21		- coarser sandstone (>100mm) between 20.1-20.7m. Low core recovery.			Core run 21.2-22m has up to 0.15m of uphole material (wet) at top.
		187	22		- coarser sandstone between 21.6-21.8m. Streaky light brown to brown, very stiff, plastic to slightly plastic mud near 21.8-22m.	OWT		Box 8: 21.4-24.6m. Band (<15mm, 40°) of light orange-brown with dark brown-black streaks, soft, plastic clay at 21.6m.
		186	23		- light brown (darker), fine-medium sandstone below 22.8m.			Broken core (<50mm pieces with some with limonite-stained surfaces) 22-22.2m (plus lost core).
		185	24		23.95m			- streaky light brown to orange-brown, disturbed, slightly plastic mud near 22.55-22.6m. 60° defect at 22.7m. Some bands (<30mm, NH) of greyish brown, hard, slightly plastic mud near 22.7-22.8m.
		184	25		SILTSTONE [MW to FW]; light brown (above 24.2m) to grey (brown-tint), VWK, calcareous. [Waitemata Group].	OWT		Broken core (<75mm pieces).
		183	26					- some indistinct laminations (mostly <5mm, <15°) below 23.3m. Irregular 60°-NV limonite-stained joint at 23.85m.
		182	27		26.65m			- maximum depth of contact. Light yellowish brown, disturbed (soft) to hard, plastic mud 23.95-24m.
		181	28		26.9m Sandy to Pebbly LIMESTONE [FW]; mottled white to dark grey, MS. Abundant indistinct fossil fragments (<10mm). Variably sized clasts (<15mm, mostly <5mm) of greywacke with some noncalcareous mudstone. [Waitemata Group].	OWT		- probable fossil (<30 by 10mm). Box 9: 24.6-27.6m.
		180	29		27.05m 27.3m 27.6m SILTSTONE [FW]; grey (brown-tint), VWK, calcareous. Fossil shell (<25mm).	OWT		- irregular NV joint coated by black material (<1mm).
		179	30		28.2m CONGLOMERATE [SW]; patchy dark grey (brown-green tint) with some dark brown. Indistinct variably sized clasts (<75mm) mostly of calcareous to noncalcareous mudstone. Some sandy matrix material with indistinct off-white fossil fragments (<5mm). [Waitemata Group].	OWT		10/10/14. Hole cased to 24m at 26m.
		178	31		29.1m MUDSTONE [FW]; dark grey (brown-tint), EWK (hard) to VWK, calcareous. Darker below 27.5m.	OTK		- bedding contact dips 10°.
		177	32		29.65m Glauconitic SANDSTONE (Fine-medium) [FW]; dark greenish grey (brown-tint), VWK, calcareous. Minor fossil shell fragments (<20mm).			- possible boulder between 26.9 (30°) & 27.05m. Broken to disturbed core (<50mm pieces).
		176	33		CONGLOMERATE [SW]; dark brown with some dark grey (brown-green tint), disturbed to VWK. Indistinct variably sized clasts (<250mm) mostly of noncalcareous to calcareous mudstone in sandy matrix material with indistinct off-white fossil fragments (<10mm). [Waitemata Group].	ORH		- possible boulder 27.3-27.6m. Irregular <40° fossiliferous band (<10mm) at 27.5m.
		175	34		Carbonaceous MUDSTONE [FW]; dark brown, disturbed (stiff) to VWK. [Te Kuiti Group].			Box 10: 27.6-30.7m. Indistinctly banded (<10mm, NH) 27.6-28.2m.
		174	35		31.6m Altered GREYWACKE (Sst) [HA-MA]; grey (green-tint) to light grey (brown-tint, interior patches), VWK-WK, altered. Indistinct remnant fractured texture.	ORH		- bedding contact dips <10°.
		173	36		32.55m - light grey (green-tint) and softer (VWK) near 30.25-30.8m.	ORM		- contact dips <10°.
		172	37		33.1m - crisscrossed by irregular slickensided defects often coated by dark green, chloritic material (<1mm) and spaced 15-75mm apart by 30.6m.	RSWg		- 60° white remnant vein (<4mm, weathered). Defects have variable dip by 30.6m. Box 11: 30.7-33.35m.
		171	38		- light grey (green-tint) and softer below 31.4m. Orange to light orangish brown and EWK (hard) below 31.5m.			- 60° defect with associated bands (<30mm) of light grey, plastic clay and dark brown, limonite-cemented rock. Broken core (<100mm pieces) 30.7-31.3m. 35° defect at 32.5m.
		170	39		Clayey SILT to Sandy SILT; light grey to grey, very stiff to hard, plastic to non-plastic. Indistinct remnant fractured texture below 31.9m. [Altered Fault Zone].			- maximum depth of contact. Medium grained greywacke. 30° dark brown, limonite-cemented band (<10mm). Some joints coated by orange-brown, non-plastic silt (<2mm) near 32.55-33.1m.
		169			34.15m - variable light orangish brown, harder, weathered greywacke (Sst) from 32.35m.	RSWg		Occasional irregular 50-70° limonite-stained to white remnant veins (<1mm, weathered) near 32.9-33.1m.
					GREYWACKE SANDSTONE [MW]; brown, MS, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 10-50mm apart. Some grey, S, less weathered patches (<150mm) below 32.9m.			- finer grained greywacke from 33.1m. Box 12: 33.35-36m. Broken core (<75mm pieces) 33.35-33.65m.
					GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, S to VS, partly weathered (<10mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 10-100mm apart.			- elongated patch (<100 by 50mm) of dark grey-black, S, argillite between 34-34.1m.
					36.5m - crisscrossed by irregular defects often coated by dark green-black material (<2mm) and spaced <100mm apart below 33.85m.	RMW		- contact dips 55°. Indistinctly banded (<100mm, 55°) 34.15-36.5m. Irregular 15° band (<15mm) of brecciated rock in vein material (quartz) at 34.35m.
					37.1m GREYWACKE SANDSTONE to ARGILLITE [SW-FW]; dark grey to black, S to VS, almost fresh (95%). Irregular limonite-stained joints spaced 30-300mm apart and partly weathered <5mm into the adjacent rock. Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 10-100mm apart.			- two subparallel 50° joints partly weathered <20mm into the adjacent rock. Box 13: 36-38.6m.
					- veins spaced <20mm apart between 34.6-35.6m. Grey, S-VS, coarser sandstone below 36.3m.	RSWg		- 55° joint below band (<15mm) of black, MS-S, argillite. Some defects coated by light orangish brown, slightly plastic silt (<3mm) 36.5-37.1m.
					GREYWACKE SILTSTONE to SANDSTONE (>36.9m) [MW]; dark brown (grey-tint) to brown, MS, partly weathered. Crisscrossed by irregular limonite-stained joints to weathered veins (<2mm) spaced 10-30mm apart.			- 50° network (<100mm) of irregular (45-70°) limonite-stained to white veins (<10mm, weathered) spaced <10mm apart. Some vuggy voids (<75 by 10mm).
					GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular			- joints mostly dip 30-70° from 37.1m.
								- irregular 40° band (<15mm) of black, S, argillite.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 24.5m.	123mm to 24.5m. 96mm to EOH.

BOREHOLE No. HUN14/7

LOCATION: HUNUA QUARRY **GRID REF:** 421440.82E 776991.16N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 208.41m **SHEET** 3 **OF** 8

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-10-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 21-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		168	41		brown seams, mostly VS, partly weathered (<15mm along joints) to fresh (<95%). Limonite-stained joints spaced 20-200mm apart. Crisscrossed by irregular white veins (<2mm, calcite & quartz) spaced 10-100mm apart. - veins (<3mm) spaced <40mm apart by 38.9m. Irregular seam (<25mm, 70°) of black, S, argillite between 39.15-39.3m. - irregular seam (<50mm, disrupted) of dark grey, S-VS, siltstone between 41.2-41.3m.	RSWg		- several subparallel 60° dark green-black defects 38.5-38.7m. Box 14: 38.6-41.2m. - veins mostly dip 30°-NV by 38.9m. - irregular NV joint(s) partly weathered <30mm into the adjacent rock 39.3-39.85m. Irregular 50° & 40° bands (<10mm) of dark grey, S, greywacke siltstone near 39.45 & 39.5m. - some irregular patches (<30mm) of dark greyish brown, S, siltstone near 39.65m. Band (<10mm, disturbed) of black, MS-S, argillite at 39.85m. - 40° joint partly weathered <30mm into the adjacent rock. - two parallel 55° bands (<30mm, 15mm apart) of dark grey to black, argillaceous rock 40.35-40.42m. Two clasts (<35 by 15mm) of black, S, argillite near 40.8m. - irregular 65° seam (<20mm) of light grey, vein material (quartz) to brecciated rock (<10 by 3mm). Box 15: 41.2-43.7m. - defects have variable dip from 41.45m. Irregular NV-50° seam(s) (<50mm) of dark greyish brown to dark grey, S, partly weathered to fresh greywacke siltstone 41.45-41.8m. Becomes medium grained greywacke below 41.8m. - irregular NV seam (<65mm) of black to dark grey, S, argillaceous rock between 42.6-43.05m. Indistinctly banded (<20mm, 55°-NV). Box 16: 43.7-46.6m. - irregular 70° seam (<40mm) of brecciated rock (<40 by 15mm) in white to pale grey vein material (quartz) 45-45.2m. Box 17: 46.6-49.1m. 55° limonite-stained to transparent-white veins (<6mm, quartz) at 46.95m. - minimum depth of contact. Occasional indistinct irregular (40°-NV) defects ("shear bands")(<5mm) 47.95-52.2m. Box 18: 49.1-51.5m. 13/10/14. Drilling circulation from 51.5m. Box 19: 51.5-54m. - maximum depth of contact. Defects have variable dip. Joints often coated by light orangish brown to orange-brown, low plasticity clay to silt (<3mm). Finer grained greywacke below 52.2m (40°). Broken core (10-75mm pieces) 52.3-52.85m. - irregular 65° seam (<50mm) of dark greyish brown, S, argillaceous rock 52.9-53.05m. - 45°-NV limonite-stained joint(s) coated by light orangish brown, non-plastic, sandy silt (<4mm). Box 20: 54-56.6m. - irregular NV-55° seam (<30mm) of dark greyish brown, dark grey to black, S, greywacke sandstone to argillite 54.85-55.15m. Indistinctly banded (<15mm). - 60° joint filled by light orangish brown, slightly plastic mud (<15mm). Disrupted 55°-NV seam (<30mm) of dark greyish brown, MS to S, argillaceous rock 55.35-55.65m. - disrupted 55° seam (<40mm) of dark greyish brown, S, siltstone 56-56.15m. Indistinct fine grained interval (<150mm, 45°) with occasional dark greyish brown to dark grey, MS to S argillaceous patches (<20mm, angular) 56.25-56.45m. - medium grained greywacke 56.45-58.95m. Some joints coated by light orangish brown, slightly plastic to non-plastic silt (<3mm) below 56.45m. Box 21: 56.6-59.3m. - shattered rock (<50mm pieces, silty)
		167	42		41.45m Veined GREYWACKE SANDSTONE with occasional argillaceous seams above 43.05m [SW-FW]; mostly grey with some irregular brown seams, S to VS, partly weathered (<50mm along joints) to fresh (>75%). Joints as above. Crisscrossed by irregular limonite-stained to white veins (<5mm, calcite & quartz) spaced <30mm apart.			
		166	43					
		165	44					
		164	45			RSWg		
		163	46		- veins (<10mm, quartz & weathered) spaced <20mm apart between 44.9-45.6m.			
		162	47		- joints spaced 20-250mm apart by 45.75m. Veins (<5mm, quartz) spaced 5-50mm apart.			
		161	48		- grey with black flecked bands (<15mm, indistinct), fine sandstone between 47.1 (55°) & 47.25m (50°). 47.95m			
		160	49		GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, mostly VS, partly weathered (<20mm along joints) to fresh (<95%). Limonite-stained joints spaced 10-450mm apart. Crisscrossed by irregular transparent-white veins (<4mm, calcite & quartz) spaced <100mm apart. - joints spaced 10-100mm below 48.9m.			
		159	50			RSWg		
		158	51		- some dark green-black joints between 50.5-51.5m.			
		157	52		- more weathered [FW 50%] below 51.75m. 52.2m			
		156	53		Veined GREYWACKE SANDSTONE with minor argillaceous seams [MW]; brown, mostly S, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 10-100mm apart and veins (<3mm, weathered) spaced <30mm apart. Some grey, VS, fresh patches (<50mm) between 52.95-53.35m. - irregular seam (<100mm, 60°) with indistinct dark greyish brown to black, mottles to disrupted bands (<15mm) of argillaceous rock 53.3-53.45m. Veins spaced <15mm apart below 53.45m.			
		155	54					
		154	55		- slightly weathered [FW >75%] between 54.75 (55°) & 55.1m (55°). Partly weathered <20mm along joints into the adjacent rock. - silty brecciated to intensely veined (<10mm) rock between 55.15-55.65m.	RMW		
		153	56					
		152	57		- some fresh rock patches (<65mm) [FW <25%] below 56.45m. Veins (<3mm) spaced <30mm apart.			
		151	58					
		150	59		58.95m Veined GREYWACKE SANDSTONE to SILTSTONE [MW]; brown-dark brown with occasional dark grey patches (<30mm), S, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 20-200mm apart and limonite-stained to white veins (<3mm,	RMW		
		149						

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 24.5m.	123mm to 24.5m. 96mm to EOH.

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BOREHOLE No. HUN14/7

LOCATION: HUNUA QUARRY **GRID REF:** 421440.82E 776991.16N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 208.41m **SHEET** 4 **OF** 8

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-10-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 21-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		148			weathered) spaced <20mm apart. - some indistinct disrupted bands (<30mm, 55°) of dark greyish brown, MS, argillaceous rock below 60.15m.	RMW		58.25-58.4m (65°) [Minor Fault]. Irregular 60° network (<50mm) of disrupted off-white to light brown veins (<5mm, quartz) spaced <10mm apart 58.85-58.95m. - joints often coated by light orange-brown, non-plastic silt (<3mm) from 58.95m. Box 22: 59.3-62.05m.
		147	61		61.1m - becoming as below. Veined GREYWACKE SANDSTONE to ARGILLITE [SW]; grey to dark grey-black with some irregular dark brown seams, mostly S to VS, partly weathered (<30mm along joints) to fresh (>75%). Crisscrossed by irregular limonite-stained to white veins (<3mm, calcite & quartz) spaced <30mm apart.			- maximum depth of contact. Banded (<30mm, 55°) siltstone to argillite by 61.1m. Crisscrossed by irregular limonite-stained joints (minimal silt) spaced 15-150mm apart. Defects have variable dip.
		146	62		- more weathered [FW >50%] below 62m (NH). Veins spaced <15mm apart between 62.85-63.75m.	RSWb		- fine-medium sandstone minor argillite patches (<60 by 30mm) from 61.4m (55°). Box 23: 62.05-64.7m. Interlayered (<200mm) fine sandstone to argillite below 62.3m.
		145	63					- 70° white vein (<5mm, calcite).
		144	64		- less weathered [FW >75%] below 63.85m.			- medium to fine sandstone below 64.4m (55°). Box 24: 64.7-67m (uncorrected). 14/10/14.
		143	65		64.8m Veined GREYWACKE SANDSTONE to SILTSTONE [MW]; brown to dark brown with occasional grey to dark grey intervals, mostly S, partly weathered (FW <25%). Crisscrossed by irregular limonite-stained to white veins (<3mm, quartz & weathered) spaced <20mm apart. - slightly weathered [FW >75%] between 65.55-65.8m. Partly weathered <20mm along joints into the adjacent rock. - limonite-stained joints (some coated by light orangish brown, slightly plastic to non-plastic silt <3mm) spaced 10-50mm apart below 66.2m. - some irregular bands (<50mm, 55°) of dark greyish brown to dark grey-black MS to S, partly weathered to fresh, argillaceous rock below 66.75m. Some dark grey, mostly VS, fresh intervals (<100mm, patchy) between 66.8-67.2m.			- fine sandstone minor siltstone patches (<100mm) from 64.8m (60°). Limonite-stained joints (some coated by light orange-brown, non-plastic silt <2mm) spaced 20-200mm apart.
		142	66			RMW		- sandstone-siltstone from 65.8m (55°). No fresh patches. 30° joint coated by light orangish brown, slightly plastic silt (<5mm) near 66.4m. Block mislabelled 66.4m. 55° joint coated by light orangish brown, non-plastic silt (<15mm). Broken to shattered core (<50mm pieces, silty >67.8m) near 67.3-68.2m.
		141	67					Box 25: 67-70.3m (uncorrected).
		140	68		67.8m Fractured to Brecciated (<50mm) GREYWACKE SILTSTONE [MW to HW]; dark brown to patchy light orangish brown, S to WK, partly weathered to weathered. Crisscrossed by irregular limonite-stained joints to remnant vein material (<5mm, weathered) spaced <20mm apart. Low core recovery.	RW		- minimum depth of contact.
		139	69		68.8m 69.1m Veined GREYWACKE SANDSTONE [MW]; brown, S, partly weathered. Irregular limonite-stained joints spaced 20-50mm apart. Crisscrossed by irregular weathered veins (<3mm) spaced <20mm apart.	RMW		- maximum depth of contact. Fine-medium grained greywacke by 68.8m (50°). - limonite-stained joints (some coated by orange-brown, non-plastic silt <2mm) spaced 20-200mm apart from 69.1m. Indistinctly banded fine sandstone to argillite 69.3-69.6m (55°).
		138	70		GREYWACKE SANDSTONE with occasional argillaceous seams [SW-FW]; grey to dark grey-black with some irregular brown seams, S to VS, partly weathered (<30mm along joints) to fresh (75%). Crisscrossed by limonite-stained to white veins (<5mm, calcite & quartz) spaced 10-50mm apart.			Box 26: 70.3-72.7m (uncorrected).
		137	71		- minor partly weathered seams (<100mm) below 71.25m.	RSWg		- minimal silt on joints below 71.25m.
		136	72		- dark grey to black with some irregular dark greyish brown seams (<100mm), S, more weathered [FW <75%] argillaceous rock between 72.35 (55°) & 73 (55°).			- indistinctly banded (<30mm, 55°) 72.35-73m.
		135	73		- veins spaced <30mm apart by 73.3m.			Box 27: 72.7-75.4m.
		134	74		73.95m Veined GREYWACKE SILTSTONE [SW to MW]; dark grey with irregular dark brown seams, S to VS, partly weathered (<50mm along joints) to fresh (<75%). Crisscrossed by limonite-stained joints spaced 15-150mm apart and veins (<3mm, as above) spaced <30mm apart.			- some dark grey-black, argillaceous patches to bands (<30mm, 50°) 73.95-75.3m. Defects have variable dip.
		133	75		- dark brown with occasional dark grey patches (<50mm), mostly S, moderately weathered [MW] below 75.3m. Disrupted veins spaced <20mm apart.	RSWb		Box 28: 75.4-77.8m.
		132	76		76.2m GREYWACKE SANDSTONE [SW]; grey with irregular brown seams, S to VS, partly weathered (<50mm along joints) to fresh (>50%). Limonite-stained joints spaced 15-150mm apart. Crisscrossed by irregular white veins (<5mm, quartz) spaced 5-50mm apart.			- contact dips 45°. Medium grained greywacke from 76.2m. Minor irregular black, MS-S, argillite clasts (<25mm) near 76.2-79.5m. - 55° vein (<10mm, calcite) with occasional voids (<15 by 5mm).
		131	77					
		130	78		- less weathered [FW >75%] below 78.5m (65°). Veins (<5mm, calcite & quartz) spaced 5-50mm apart.	RSWb		Box 29: 77.8-80.4m. Irregular 55° band(s) (<20mm) of dark grey, S, finer grained greywacke near 78.1m.
		129	79					- irregular 55° band (<10mm) of dark grey, S,

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 24.5m.	123mm to 24.5m. 96mm to EOH.

BOREHOLE No. **HUN14/7**

LOCATION: HUNUA QUARRY **GRID REF:** 421440.82E 776991.16N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 208.41m **SHEET** 5 **OF** 8

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-10-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 21-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments (← Piezometer Diameters in mm)
		128			- light brown-brown with some grey patches (<150mm), S to VS, moderately weathered [FW <50%] below 80.2m.			greywacke siltstone. Box 30: 80.4-83.3m.
		127	81		- grey with irregular light brown-brown seams, slightly weathered [FW 75%] by 81m (65º).	RSWb		Missing block at 81.3m. 50mm of probable uphole material. Crisscrossed by indistinct shear bands (<2mm, 20-60º) spaced <50mm apart near 81.55-81.7m. Irregular 60º transparent to pale brown vein (<6mm, calcite) near 82.05m.
		126	82		82.65m GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, S to VS, partly weathered (<30mm along joints) to fresh (>75%). Limonite-stained joints spaced 25-250mm apart. Crisscrossed by irregular white veins (<4mm, calcite & quartz) spaced <50mm apart.			- maximum depth of contact (65º). Defects have variable dip. Indistinct shear bands (<4mm, 20-60º) spaced <150mm apart near 82.65-83.5m. 15/10/14. Casing to 24.5m. Minor drilling circulation (10% return) by 82.7m. Box 31: 83.3-85.9m.
		125	83					
		124	84			RFW		
		123	85		- interval (<200mm, 55º) with common dark greyish brown to dark grey-black, S, argillaceous patches (<50mm, angular) between 84.8-85.05m. Minor dark grey-black, S, argillite patches (<15mm, some clasts) below 85.05m.			Block probably mislabelled 83.8m. 55º joint-broken vein coated by light orange-brown, non-plastic silt (<2mm) and partly weathered <30mm into the adjacent rock at 83.95m. - 30º composite vein (<10mm, calcite & quartz) partly weathered <10mm into the adjacent rock.
		122	86		85.85m Veined GREYWACKE SANDSTONE [MW]; brown with some grey patches (<75mm), mostly S, partly weathered (FW <25%). Irregular limonite-stained joints spaced 30-300mm apart. Crisscrossed by irregular limonite-stained to white veins (<3mm, quartz & weathered) spaced <30mm apart.			- 50º joint-broken vein coated by light orangish brown, non-plastic silt (<2mm) to off-white vein material (<3mm, calcite). - irregular contact dips 65º. Finer grained greywacke from 85.85m. Box 32: 85.9-88.55m.
		121	87		- dark brown with some dark grey patches (<75mm, 25%), siltstone between 87.15 (60º) & 87.55m (65º).			
		120	88		- slightly weathered [FW <95%] between 87.75 (65º) & 88.05m (30º) between 87.75-88.05m. No fresh patches below 88.25m.			- black, S argillite clast (<15mm) at 88.15m. 55º seam (<100mm) of light orange-brown with brown patches (angular), WK to S, partly weathered brecciated rock (<60 by 25mm) in weathered vein material 88.45-88.6m. Box 33: 88.55-91m.
		119	89		- occasional dark brown, argillaceous patches (<20mm, some clasts) below 88.6m. Veins (<10mm, calcite, some with voids <20 by 3mm) spaced <20mm apart between 89.05-89.25m.	RMW		
		118	90		- some grey, VS, fresh patches (<100mm, 25%) between 89.6-90.85m. Occasional patches (<20mm, angular) of dark brown to dark grey-black, argillaceous rock by 89.8m.			- intersecting 60º joints coated by light orange-brown, non-plastic silt (<2mm) and spaced 10-100mm apart 89.15-89.8m. - patch (<50mm, angular) of dark brown, siltstone at 89.6m.
		117	91		- becoming darker brown by 90.85m (55º-NV).			Box 34: 91-93.5m. Irregular NV off-white vein (<20mm, quartz) with some brecciated rock (<10mm) 91.15-91.65m.
		116	92		- mostly dark brown, siltstone between 91.6 (60º) & 92.05m (55º). Occasional patchy bands (<30mm) of brown to grey, S to VS, sandstone.			
		115	93		- brown with some grey patches (<200mm), S to VS, less weathered [FW <50%] from 92.4m. Joints spaced 25-250mm apart. Veins (<4mm) spaced <40mm apart.			- intersecting 75º & 55º joints coated by orange-brown, non-plastic silt (<1mm). 60º limonite-stained joint coated by orange-brown, non-plastic silt (<2mm) at 92.4m.
		114	94		- some dark greyish brown to dark grey-black, S, argillaceous patches (<50mm, some clasts) near 97.65m (and occasional patches (<20 by 3mm) to 94.75m).			Box 35: 93.5-96.1m. 10º transparent-white composite vein (<7mm, quartz) near 93.5m. Core run 93.9-94m has excessive length (0.2m assumed recovered from previous run).
		113	95		- joints often coated by light orange-brown, non-plastic silt (<2mm) and spaced 15-150mm apart below 95.05m.			
		112	96		95.6m Veined GREYWACKE SANDSTONE [MW-SW]; brown to grey, S to VS, partly weathered to fresh (<75%). Limonite-stained joints (some coated as below <1mm) spaced 50-250mm apart. Crisscrossed by irregular limonite-stained to white veins (<4mm, calcite, quartz & weathered) spaced <30mm apart.	RSWb		- irregular contact dips 60º. Medium grained greywacke near 95.6-98.6m. Joints mostly dip 20-70º near 95.6-97.65m. Box 36: 96.1-98.9m.
		111	97		97.65m Veined GREYWACKE SANDSTONE [MW]; brown, S, partly weathered. Irregular limonite-stained joints (some coated by orange-brown, non-plastic silt <2mm) spaced 25-250mm apart. Crisscrossed by irregular limonite-stained to off-white veins (<5mm, weathered & quartz) spaced <20mm apart.			- irregular contact dips 40º.
		110	98		- dark greyish brown, argillaceous rock between 98.7-98.95m (50º).	RMW		- 50º joint coated by orange-brown, non-plastic sandy silt (<5mm). Box 37: 98.9-101.65m.
		109	99					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 24.5m.	123mm to 24.5m. 96mm to EOH.

BOREHOLE No. HUN14/7

LOCATION: HUNUA QUARRY **GRID REF:** 421440.82E 776991.16N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 208.41m **SHEET** 6 **OF** 8

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-10-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 21-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	S.W. Piezometer Completion (22/10/14)	Comments
								← Piezometer Diameters in mm
		108					▼	16/10/14. Missing block at 100.2m.
		107	101		- irregular 50-60° seam (<80mm) of dark greyish brown, MS to S, argillaceous rock between 100.65-100.75m. Minor argillaceous patches (<50 by 15mm, 50-60°) below 100.75m. - becoming darker brown (grey-tint). Occasional argillaceous patches (<20mm) below 101.1m. - veins spaced <15mm apart by 101.75m.	RMW		- irregular NV network (<50mm) of limonite-stained to transparent-white veins (<15mm, quartz & weathered) spaced <15mm apart 100.75-102.4m. Box 38: 101.65-104.85m. Broken core (<75mm pieces) 101.75-102m.
		106	102		- dark grey-brown, WK to S, greywacke siltstone from 102.3m. Crisscrossed by limonite-stained to off-white veins (<5mm, weathered & quartz) spaced <10mm apart. No core recovery near 102.6-103.3m. Sandstone by 103.3m.			- joint-broken veins (some coated by light orange-brown, non-plastic sandy silt <2mm) spaced <100mm apart near 102.3-103.6m. Broken core (<100mm pieces) 102.3-104m.
		105	103					
		104	104		- mottled white to light grey with some orange, less weathered, vein material (quartz & weathered) between 103.6-104m. - brown and mostly S from 104m (45°). Joints (minimal silt) spaced 20-200mm apart. Veins (<3mm) spaced <20mm apart.			Silty 103.65-103.75m. 45° polished defect with associated band (20mm) of pale brown, low plasticity clay at 103.75m [Fault]. 45° clay band (<10mm, as above). - 50° limonite-stained to off-white composite vein (<10mm, quartz). Box 39: 104.85-107.6m.
		104	105					
		103	106					Broken core (<150mm pieces) 106-107.5m.
		102	107		- dark greyish brown, MS-S, argillaceous rock between 106.6-107.3m. Veins spaced <15mm apart.			- NV seam (>50mm) of partly weathered brecciated rock (<50 by 15mm) with pale brown, EWK (hard), slightly plastic, sandy silt matrix 106.4-106.6m. - NH transparent-white to grey, MS to VS, vein material (quartz & weathered) near 107.3-107.35m. NH transparent-white, composite vein (<10mm, quartz) at 107.5m. Box 40: 107.6-110.1m. - irregular NV white composite vein (<7mm, weathered) 107.8-108.15m. - indistinct contact dips 50°. Defects mostly dip 20°-NV 108.05-110.25m. Indistinctly banded (<50mm, 50°). - 40° white composite vein (<20mm, quartz).
		101						
		100	108		108.05m Veined GREYWACKE SILTSTONE to ARGILLITE [MW]; dark brown to dark greyish brown, MS to S, partly weathered. Irregular limonite-stained joints spaced 25-250mm apart. Crisscrossed by irregular limonite-stained to white veins (<10mm, weathered & quartz) spaced <20mm apart.	RMW		
		99	109					
		98	110		110.25m Veined GREYWACKE SANDSTONE [MW]; brown, S, partly weathered. Occasional grey, VS, fresh patches (20mm). Irregular limonite-stained joints spaced 50-500mm apart. Crisscrossed by irregular limonite-stained to off-white veins (<5mm, calcite & weathered) spaced <40mm apart.	RMW		Box 41: 110.1-112.6m. 30° limonite-stained to transparent-white composite vein (<20mm, quartz) at 110.55m. - contact dips 55°. Coarse-medium grained greywacke from 110.25m. Defects have variable dip. - 25° off-white composite vein (<30mm, quartz). - medium grained greywacke from 111.95m. Joints mostly dip 20°-NV near 111.95-114.7m. 30° off-white composite vein (<7mm, quartz) at 112.05m. Box 42: 112.6-115.3m. - irregular NV joint(s) 113.1-114.35m. 15° white composite vein (<6mm, quartz) at 113.7m.
		97	111					
		96	112		- brown to grey, S to VS, less weathered [FW <50%] from 111.95m. Joints spaced 15-300mm apart. White veins (<3mm, quartz) spaced <40mm apart.			
		95	113					
		94	114		- veins spaced <15mm apart by 114.15m. Irregular NV patch (<40 by 10mm) of dark brown, siltstone near 114.65m.			
		93	115		114.7m Veined GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, S to VS, partly weathered (<50mm along joints) to fresh (<75%). Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced <40mm apart. Limonite-stained joints spaced 15-150mm apart below 115.3m.	RSWb		- irregular contact dips 30°. Fresh rock near 114.7-115.3m (70°). Disrupted 50° & 65° bands (<6 & 3mm) of dark grey, VS, siltstone at 114.8 & 114.85m Box 43: 115.3-117.8m.
		92	116					
		91	117		- brown to dark grey, more weathered [FW 50%], fine sandstone to siltstone from 117m. Joints spaced 10-100mm. Limonite-stained to white veins (<3mm, quartz) spaced <40mm apart. Darker brown argillaceous rock by 117.35m.			- indistinctly banded (<20mm, 45°) 117-117.65m. Medium grained greywacke 117.2-117.35m. - 55° joint coated by light orange-brown, non-plastic silt (<1mm) and associated irregular network (<100mm, below) of transparent-white veins (<20mm, calcite) with some brecciated rock spaced <10mm apart 117.2-117.35m. - intersecting 55° & 70° joints at 117.35m. - irregular contact dips 50°. Joints mostly dip 20°-NV from 117.65m.
		90	118		117.65m Veined GREYWACKE SANDSTONE [SW/FW]; grey with minor irregular brown seams, mostly VS, partly weathered (<10mm along joints) to fresh (95%). Limonite-stained joints spaced 50-400mm apart. Crisscrossed by irregular white veins (<5mm, quartz) spaced <40mm apart. - some irregular dark grey, finer grained patches (<200mm, indistinct) by 118.95m. More weathered [FW <75%] below 119.4m. - irregular patches (<100mm) of black, MS-S, argillite between	RSWg		
		89	119					

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 24.5m.	123mm to 24.5m. 96mm to EOH.

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BOREHOLE No. HUN14/7

LOCATION: HUNUA QUARRY **GRID REF:** 421440.82E 776991.16N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 208.41m **SHEET** 7 **OF** 8

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-10-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 21-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments ← Piezometer Diameters in mm
		88	121		119.5-119.65m. Moderately weathered [FW <25%] near 119.65-119.8m. - less weathered [FW 95%] by 119.95m. Joints spaced 15-150mm apart.			Box 44: 117.8-120.4m. 60° composite vein (<15mm, calcite) 118.2-118.4m. - elongated NV patch (<40 by 6mm) of dark grey-black, S argillite. - some 55° bands (<20mm) of dark grey-black, S-VS, siltstone by 118.95m. - discontinuous 20° off-white composite vein (<20mm, calcite). Finer grained greywacke below 119.65m. Joints mostly dip 45°-NV from 119.95m.
		87	122		- grey with some black flecks, fine sandstone between 121.25-121.7m. - more weathered [FW >75%] below 121.7m. Limonite-stained joints spaced 10-100mm apart. Limonite-stained to white veins (<5mm, calcite & weathered) spaced <40mm apart.			Box 45: 120.4-123.6m. 17/10/14. Some patches (<15 by 3mm, subrounded) of dark grey-black, S, argillite near 121.25m. Core run 121.3-121.7m has some uphole material at top.
		86	123					
		85	124		- veins with occasional voids (<5mm) spaced <20mm apart by 123.6m. Some fine grained patches (<30mm, indistinct) below 123.65m. - less weathered [FW 95%] by 123.9m. White veins (<10mm, calcite & quartz) spaced <20mm apart. Dominantly dark grey, softer siltstone between 123.9-124m (60°) and 124.3 (40°) & 124.55m (50°).	RSWg		- irregular 60°-NV joint(s) coated by light orangish brown, hard, low plasticity clay (<3mm) near 121.5-121.7m. Some black flecked patches (<50mm) near 121.55-121.7m. - depths adjusted up 0.2m to coring mark near 121.7m. Joints (some coated by light orange-brown, non-plastic silt <1mm) mostly dip 30°-NV below 121.7m.
		84	125		- more weathered [FW <95%] by 124.85m. Veins (mostly <5mm) spaced <30mm apart.			Broken core (<150mm pieces) near 122.15-123.6m. 70° joint filled by pale brown (orange-tint), non-plastic silt (<10mm) near 122.15-122.25m.
		83	126					21/10/14. Drillers at safety induction 20/10/14.
		82	127		127m - more weathered [FW >75%] by 126.8m. Joints spaced 5-50mm apart.			Box 46: 123.6-126.45m. - finer grained greywacke 123.9-124.55m. Indistinctly banded (<50mm, 55°). Few joints. Occasionally partly weathered <5mm into the adjacent rock along veins.
		81	128		BRECCIATED ROCK to VEIN MATERIAL [MW-SW]; greyish brown to grey, S to VS, surface weathered (<5mm), greywacke sandstone fragments (<50mm) in matrix of off-white to light orange-brown, EWK (hard) to WK, non-plastic sand-silt to vein material. [Fault Zone].	RW		
		80			- transparent-white to grey, MS to VS, vein material (>60mm, calcite & quartz) below 128.35-128.6m (70°).			- joints (some coated by orange-brown, non-plastic silt <1mm) mostly dip 20°-NV by 124.85m. Intersecting 55° & 20° limonite-stained to white composite veins (<15mm, calcite & quartz) at 125m.
		79	129		128.9m Veined GREYWACKE SANDSTONE [SW/FW]; grey with minor irregular grey-brown seams, mostly VS, partly weathered (<5mm along joints) to fresh (95%). Limonite-stained joints spaced 100-300mm apart. Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced <20mm apart.			Broken core (<100mm pieces) 125.25-126.25m.
		78	130		- some patches (<30mm, angular) of black, S, argillite near 130-130.2m.	RSWg		Box 47: 126.45-128.85m. 45° transparent-white composite vein (<20mm, quartz) at 126.55m. Irregular NH patch (<65 by 20mm) of mottled white to greyish green, vein material (quartz) at 126.7m.
		77	131		131.35m			- irregular NV contact between 126.9-127.25m. Core broken (<150mm pieces) along irregular NV joint(s) coated by light orangish brown, non-plastic silt (<2mm, 128.35-128.5m) between 127.25-128.9m.
		76	132		Veined GREYWACKE SANDSTONE [SA]; grey, S to VS, slightly altered (pervasive) with some indistinct fresh intervals. Limonite-stained joints spaced 50-300mm apart. Crisscrossed by irregular white veins (<5mm, calcite) spaced <20mm apart.			Box 48: 128.85-131.75m. - maximum depth of contact. Finer grained greywacke by 128.9m (55°). Band (20mm) of dark grey, S, siltstone. Joints (minimal silt) mostly dip 50°-NV. - NV joint(s) 129.7-131.35m.
		75	133		- occasional patches (<20mm, subrounded) of black, MS, argillite below 133.1m. No limonite-stained joints.			- irregular NV seam (<65mm) of grey, S to VS, variably altered, sandstone fragments (<50mm) in matrix of variable white to grey, WK, sandy vein material with some indistinct limonite-stained seam(s) (<50mm) 129.75-131.35m.
		74	134		- darker grey, almost fresh by 134.15m. Veins (<4mm) spaced <30mm apart. No argillite.	RSWg		- NV joints below 130.6m. Minor voids (<5mm) near 131.1-131.35m. - maximum depth of irregular contact (70°). Joints mostly dip 20°-NV by 131.35m. Medium grained greywacke by 131.8m.
		73	135					- 35° composite vein (<15mm, calcite) and associated network (<50mm, below) of veins spaced 10mm apart. Box 49: 131.75-134.3m.
		72	136					- irregular (mostly 30°) veins (<10mm, calcite) spaced <15mm apart 132.9-133.1m. Broken veins (some with pyrite specks to patches) spaced 50-400mm apart below 133.1m.
		71	137		- more altered [FW >75] by 136.45m. Veins (<4mm) spaced 10-100mm apart. Green joints-broken veins spaced 50-250mm and partly altered <10mm into the adjacent rock.			Box 50: 134.3-137m. - 50° dark green, slickensided defect partly coated by transparent-white vein material (<2mm, calcite).
		70	138		137.7m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 5-50mm apart. Joints-broken veins (some limonite-stained) spaced 50-300mm above 139.4m.	RFW		- irregular NV locally green joint-broken vein (<2mm, calcite)(some pyrite) partly altered <3mm into the adjacent rock. - 55° composite vein(s) (<15mm, calcite). - defects have variable dip by 136.45m. Pyrite
		69	139		- occasional broken veins below 139.4m.			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 24.5m.	123mm to 24.5m. 96mm to EOH.

BOREHOLE No. HUN14/7

LOCATION: HUNUA QUARRY **GRID REF:** 421440.82E 776991.16N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 208.41m **SHEET** 8 **OF** 8

JOB No. WAL14/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-10-14 **DRILLER:** Brown Bros (NZ) LTD **STAND PIPE:** G.L.

DATE FINISHED: 21-10-14 **TYPE OF DRILLING RIG:** Rig 9 UDR 650

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		68	141		- veins (<15mm, calcite & quartz) spaced <20mm apart by 140.4m.			specks to patches on many broken defect surfaces near 136.45-137.7m. Box 51: 137-139.6m. Shear band (<5mm, 35º) at 137.2m. 70º vein (<4mm, calcite) at 137.45m. 60º off-white vein (<10mm, calcite) at 137.5m. Irregular 60º slickensided defect coated by transparent-white vein material (<1mm, calcite) at 137.65m. - maximum depth of contact. 60º transparent-white composite vein (<25mm, calcite). Finer grained greywacke 137.7-141.75m. 60º slickensided defect coated by pale grey, non-plastic silt (<1mm) to vein material (<2mm) (some pyrite) at 137.8m. - irregular 50º limonite-stained joint. Box 52: 139.6-141.9m. 45º slickensided defect and vein material (<5mm, calcite) at 139.8m. - irregular 70º network (<50mm) of white to light grey veins (<20mm, calcite) spaced <10mm apart 140.9-141.25m. 70º defect coated by pale grey, non-plastic silt (<2mm, some vein material) at 141.1m. - veins mostly dip 30º-NV 141.75-142.4m. 60º joints (clean) spaced 10-100mm. Box 53: 141.9-144.4m. Irregular NV seam (<30mm) of brecciated rock (<15mm) 141.9-142.2m. - defects have variable dip by 142.4m. Pyrite specks to patches on many broken defect surfaces. 50º transparent-white vein (<7mm, quartz) at 142.6m. - 65º vein (<7mm, calcite) at 143.85m. Intersecting 70º & 40º limonite-stained joints at 143.95m. Box 54: 144.4-144.9m. Broken core (<100mm pieces) from 144.4m.
		67	142		- grey (slightly discoloured), MS to VS, dominantly slightly altered (pervasive) between 141.75 (65º) & 142.4m. Veins (<5mm, calcite) with minor voids (<15 by 2mm, >142m) spaced <20mm apart. - veins (<5mm, calcite & quartz) spaced 10-75mm apart by 142.4m. Joints-broken veins spaced 50-250mm apart.	RFW		
		66	143					
		65	144					
		64	144.9m					
		63	145		EOH @ 144.9m			
		62	146					
		61	147					
		60	148					
		59	149					
		58	150					
		57	151					
		56	152					
		55	153					
		54	154					
		53	155					
		52	156					
		51	157					
		50	158					
		49	159					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 24.5m.	123mm to 24.5m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 3/2/15

SYMONDS HILL 2015: Predicted & Actual Drilling Interceptions Levels (Preliminary Results)

Name	Predicted Elevations (m) :					Actual Elevations (m) :					Vertical Difference (m):					Comments:
	HW	MW	MW-SW	SW-FW	FW	HW	MW	MW-SW	SW-FW	FW	HW	MW	MW-SW	SW-FW	FW	
HUN15/1		114.0	114.0	107.1	49.9		113.8	110.0	110.0	93.1		-0.2	-4.1	2.8	43.2	SW 7.2-9.35m. Verging on FW by 11.75m. SA 40.35-43.7m. Faulted SA argillite below 88.85m.
HUN15/2		123.0	87.8	78.4	55.1		114.7	109.6	50.0	28.2		-8.3	21.8	-28.4	-26.9	Variable SA to SW-FW 20.9-62.25m. Faults at 22.75-23.25 (vein material) & 61.55-61.65m. Greywacke siltstone (above 53m) to argillite below 24m.
HUN15/3		135.4	107.7	105.5	92.1		134.2	106.0	106.0	71.0		-1.2	-1.7	0.5	-21.1	Verging on SA/SW 27.2-30.6m. Fault near 14.9m. Some argillaceous rock below 14.9m.
HUN15/4	180.7	177.9	158.7	130.1	81.4	183.1	183.1	183.1	68.7	68.3	2.4	5.2	24.4	-61.4	-13.1	SW/FW 16.1-32.4m. Dominantly MW 40.5-120.65m. Faults at 25.6-25.9, 78.2 & 119.1-119.65m.
HUN15/5	193.8	182.8	153.8	137.0	115.3	189.0	186.7	166.6	166.6	76.0	-4.8	3.9	12.8	29.6	-39.4	FW 38.65-62.45m. SW-FW 135.5-137.55m. Fault at 39.1-39.65m. Some argillaceous rock above 74.95m.
HUN15/6		150.4	145.6	143.0	142.1		157.8	157.1	138.0	136.0		7.5	11.6	-5.0	-6.1	Fault at 29.75-29.85m. Vein material 77.15-77.43m. Some argillaceous rock 32.55-48.45m.
HUN15/7	148.2	139.2	130.4	94.1	63.9	123.4	121.8	77.8	53.9	49.7	-24.8	-17.4	-52.5	-40.2	-14.2	Faults at 27.45-29, 67.6-68.5, 72.5-73 & 76.6-77.1m. Argillite.
HUN15/8	175.4	164.1	152.2	127.3	82.2	176.3	149.2	100.6	96.9	96.5	0.9	-14.9	-51.6	-30.4	14.3	Te Kuiti above 4.7m. Marginal MW. Significant faults at 52.5-54.15 & 79.1-80.2m. Dominantly argillaceous rock 31.8-40.85, 58.2-64 & below 80.2m.
HUN15/9	148.4	146.2	141.3	126.2	84.6	151.3	151.3	149.7	139.2	100.3	2.9	5.1	8.5	13.0	15.7	Marginal FW. Fault at 16.25m. Intervals of argillaceous conglomerate by 79.75m.
HUN15/10	146.9	144.1	133.0	122.8	89.7	121.4	121.2	71.9	65.3	61.7	-25.5	-22.9	-61.2	-57.5	-28.0	Verging on SA 70.5-85.75m. Faults at 58.45-59.3, 64.65-64.7 & 79.3m. Argillite to greywacke siltstone (by 85.75m).
HUN15/11	164.5	162.1	156.6	104.5	97.1	164.8	154.6	100.0	99.6	95.5	0.3	-7.5	-56.6	-5.0	-1.6	Te Kuiti 55-59.25m. Tertiary weathered 59.25-64.3m. SW intervals 70.45-99.6m. Several faults. Vein material 81.75-83.8m. Minor argillaceous rock.

Notes:

Blue indicates levels more than 10m above modelled level (2014).

Green indicates levels more than 10m below modelled level (2014).

Levels based on preliminary assessment of field data only.

BOREHOLE No. **HUN15/1**

LOCATION: HUNUA QUARRY **GRID REF:** 420925.63E 776958.41N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 121.01m **SHEET** 1 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 8-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		120	1		0.3m FILL (Aggregate to Disturbed Colluvial Soil); variable light orangish brown, plastic to non-plastic, sandy mud to sandy silt (below 0.2m) intermixed with some moderately weathered greywacke fragments (<20mm, Zst). Some rootlets. Larger rock fragment (<90mm) & weathered corestone (<70mm) above 0.1m.	OF RSW	NZTM location (GPS within 3m) of 1777720mE & 5893592mN. RQD entered into penetration field in database from 6.6m. Core boxes photographed. Box 1: 0-3.6m. Disturbed core (wet, very soft).
					0.46m GREYWACKE SANDSTONE [SW]; mostly grey, VS, surface weathered (<7mm). [Natural Boulder?].		
					0.95m CLAY; light orangish brown, stiff, plastic. [Residual Soil].	O	- measured depth of contact (15°). Mostly intact core (moist) from 0.3m.
		119	2		- patchy light brown to orange-brown and less plastic below 0.8m.		- contact dips 25°.
					Sandy SILT; patchy light brown (orange-tint) to orange-brown, disturbed (very soft) to firm, slightly plastic to non-plastic. Remnant fractured texture. [CW Greywacke].		Lost core (0.85m) assumed 2.35-3.2m. 30° white remnant vein (<5mm) near 2.1m.
		118	3		- pale brown with some light orange to orange-brown streaks to patches (<100mm), softer and non-plastic below 1.7m. Indistinct interval of orange-brown to light brown, EWK (hard) to WK, weathered greywacke (Sst) near 2.15-2.25m (corestone).	ORC	- irregular 75°-NV polished defect. Box 2: 3.6-6.8m.
		117	4		- variable light brown (orange-tint) to orange-brown and disturbed (soft) to stiff below 3.5m. Hard patch (indistinct) near 4.15-4.2m		
					- pale brown and softer between 4.2 (40°) & 4.4m. Some black material (<5mm, disturbed) along irregular remnant joints below 4.35m.		
		116	5		- pale brown with some light orange to orange-brown streaks to bands (<20mm, indistinct) and firm to stiff by 4.9m. Remnant joints (as below) spaced <50mm apart.		- defects have variable dip.
					5.8m Silty SAND; light brown, tightly packed (stiff to very stiff). Crisscrossed by irregular limonite-stained to black remnant joints spaced 10-50mm apart. [HW Greywacke].	ORH	- minimum depth of contact. Remnant joints mostly dip 30°-NV near 5.8-6.6m.
		115	6		6.6m Weathered GREYWACKE (Sst) [HW-MW]; variable light brown to orangish brown, EWK (hard) to VWK, weathered. Crisscrossed by irregular limonite-stained to black joints spaced 10-50mm apart.	ORH	Box 3: 6.8-9.55m.
		114	7		7.2m GREYWACKE SANDSTONE [SW]; grey with minor irregular light orangish brown to brown seams, mostly VS, fresh (<95%). Occasional limonite-stained joints weathered to partly weathered <15mm into the adjacent rock.	RSW	- 35° joint coated by mottled light brown, dark brown & black, non-plastic silt to silty sand (<5mm). Medium grained greywacke. Core split along irregular 60°-NV joint(s) coated by light brown to orange-brown, non-plastic silt (<3mm) and partly weathered <15mm into the adjacent rock.
		113	8		- some irregular patches (<20 by 10mm) of dark grey (some with green-tint), S, argillite between 8.45-8.5 & 8.95-9.0m. Occasional irregular white veins (<2mm, quartz) below 8.9m.		- 50° joint filled by mottled light brown & black, non-plastic silt to silty sand (<10mm) and partly weathered <15mm into the adjacent rock.
		112	9		9.35m Weathered GREYWACKE (Sst) [HW]; light orangish brown with orange streaks, tightly packed (stiff), silty sand with remnant fractured texture (<15mm). Light brown to brown with some grey patches (<60mm), WK to VS, less weathered rock between 9.4-9.6m (corestone).	ORH	- indistinctly banded (<50mm, 65°) 8.35-8.55m. Occasional irregular indistinct defects ("shear bands") (<5mm, 15°-NV) spaced <150mm apart near 8.65-9.35m.
					9.95m - light brown and harder (very stiff) below 9.65 (40°). Crisscrossed by irregular limonite-stained remnant joints spaced <100mm apart.	ORH	- indistinctly banded (<20mm, 60°) 9-9.2m. 15° joint coated by light brown, non-plastic silt to silty sand (<5mm) and partly weathered <5mm into the adjacent rock at 9.2m. 20° joint at 9.3m. Box 4: 9.55-12.35m.
		111	10		11.05m Weathered GREYWACKE (Sst) [HW-MW]; light brown (some with orange-tint) with minor brown to grey patches (<100mm), VWK to VS, variably weathered [FW <15%]. Crisscrossed by irregular limonite-stained joints spaced 10-100mm apart.	RSWg	- 35° joint coated by orange, non-plastic silt (<3mm) and partly weathered <20mm into the adjacent rock.
		110	11		11.75m - band (30mm) of paler brown (orange-tint), EWK (hard), weathered, fine grained rock between 10.95 (55°) & 11m (45°).		- irregular 45° limonite-stained defect coated by pale brown, low plasticity clay (<3mm). Joints (minimal silt) mostly dip 30°-NV from 11.05m.
		109	12		GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, mostly VS, fresh (<95%). Limonite-stained to dark green-black joints spaced 30-300mm apart.		Core split along irregular NV limonite-stained (above 11.7m) to dark green-black joint(s) partly weathered to partly altered <15mm into the adjacent rock 11.15-11.8m. Fine grained rock near 11.5-11.75m. Indistinctly banded (<20mm, 55°).
		108	13		GREYWACKE SANDSTONE [SA/FW]; grey, mostly VS, fresh (95%). Crisscrossed by irregular dark green-black joints spaced 30-300mm apart and partly altered (indistinct, S) <15mm into the adjacent rock.		- maximum depth of contact. Coarser greywacke by 11.75m. Occasional shear bands (<5mm, 30-70°).
		107	14		- joints spaced 10-50mm apart and partly altered <15mm into the adjacent rock between 12.35-12.8m.		- indistinct band (<50mm, 55°) of finer greywacke 11.85-11.95m. Associated band (<70mm, 75°) of mottled dark, conglomeratic (<10mm) sandstone 11.95-12.05m. Box 5: 12.35-15.2m. Core broken (<100mm pieces) along intersecting joints 12.35-12.8m.
		106	15		- occasional irregular (30-60°) white veins (<2mm, quartz) by 14m.		5/5/15. SWL 9.2m.
		105	16		- black, S, argillite clasts (<30 by 15mm) near 15.4m.	RFW	- 35° dark green-black joint coated by brown-grey, non-plastic silt-sand (<3mm) and partly altered <12mm into the adjacent rock. Core split along irregular 45°-NV dark green-black joint(s) partly altered <5mm into the adjacent rock 13.45-13.9m. Occasional pyrite specks on broken joint surfaces.
		104	17		- less altered [FW >95%] from 16.7m. Limonite-stained to dark green-black joints spaced 15-300mm apart. Crisscrossed by fractures to white veins (<2mm, quartz & zeolite?) spaced 5-50mm apart.		- several intersecting 55° joints coated by orange-brown, non-plastic silt (<2mm) and partly weathered <5mm into the adjacent rock 14.5-14.65m.
		103	18		- dark green-black joints spaced 15-60mm apart and partly altered <5mm into the adjacent rock between 18.05-18.3m. White veins (<3mm, quartz) spaced 10-200mm apart by 18.3m.		Box 6: 15.2-18.1m. 60° joint coated by dark green-black, chloritic material (<2mm) at 15.4m. Core broken (<75mm pieces) along intersecting joints partly weathered <5mm into the adjacent rock 15.65-15.9m.
		102	19				

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/1

LOCATION: HUNUA QUARRY **GRID REF:** 420925.63E 776958.41N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 121.01m **SHEET** 2 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 8-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		100	21		- some indistinct bands (<40mm, 70°) of darker grey, S-VS, fine grained rock between 19.85-21.1m.		Broken core (<100mm pieces) 16.7-16.9m. Some joints coated by pale brown to grey, vein material (<2mm, zeolite?) from 16.7m. Fine-medium grained greywacke. Defects have variable dip.
		99	22		- irregular seam (<100mm, 65°) of grey (discoloured), WK-MS, partly altered rock between 21.3-21.65m.		- 70° joints partly altered <15-10mm into the adjacent rock at 17.35 & 17.55m. Box 7: 18.1-20.5m. Joints (coated by pale grey to light orange-brown, hard, low plasticity material <4mm) mostly dip 30°-NV 18.05-18.3m.
		98	23		- irregular seam (<20mm, 70°-NV) of grey, S, finer grained rock between 22.75-22.9m. Occasional joints below 22.9m.	RFW	- coarser greywacke by 18.3m. Joints mostly dip NH-70°. Partly broken splaying 55° & 45° limonite-stained fractures at 18.5m.
		97	24				- splaying 65° & 70° joints coated by grey, hard silt (<4mm) and partly altered <3mm into the adjacent rock.
		96	25		25m		- 45° vein (<4mm, quartz). Box 8: 20.5-23.3m. Occasional shear bands (<5mm, 30-60°) by 20.7m.
		95	26		GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, MS to VS, partly weathered (<10mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 10-100mm apart. Occasional irregular white veins (<1mm, quartz). Less weathered [FW <95%] below 25.8m.		- irregular NV-NH joint partly weathered <3mm into the adjacent rock. Two intersecting 45° joints coated by light grey to dark green-black (chloritic) material (<5mm) at 21.3m. Irregular 55-75° limonite-stained joint at 21.6m.
		94	27		- joints spaced <50mm apart between 26.25-26.65m. Irregular (NH-60°) white veins (<3mm, quartz) spaced <100mm apart by 26.5m.	RSWg	- 80° joint partly weathered <3mm into the adjacent rock. 60° joint coated by orange-brown, non-plastic silt (<2mm) and partly weathered <5mm into the adjacent rock.
		93	28		27.9m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Crisscrossed by irregular white veins (<10mm, calcite & quartz) spaced 10-200mm apart.		- 70° dark green-black joint coated by pale grey, VWK, material and partly altered <10mm into the adjacent rock. Box 9: 23.3-26.0m.
		92	29				- discontinuous band (<10mm, 65°) of grey, VS, fine grained greywacke. Irregular patch (<15mm) of black, WK, material near 23.55m.
		91	30		- crisscrossed by limonite-stained joints (some coated by orange-brown, non-plastic silt <2mm) spaced 30-300mm apart and partly weathered <5mm into the adjacent rock between 29.6-31.1m.		- disturbed 50° pale grey vein (<2mm, zeolite?) partly altered <10mm into the adjacent rock. Disturbed 30° joint (coated as below) and partly weathered <10mm into the adjacent rock at 24.15m. Core run 24.5-25.0m has excessive length (0.8m assumed recovered from previous run).
		90	31		- irregular seams (<30mm, NV) of grey, S, sandstone-siltstone between 30.85-31.3 & 31.4-31.9m (patchy).		- 40° limonite-stained joint. Joints (some coated by orange-brown, non-plastic silt <2mm) mostly dip 15°-NV from 25m. Veins mostly dip 30-60°. Broken core (<200mm pieces) 25.1-25.8m. No obvious shear bands near 25-26.1m.
		89	32		- crisscrossed by irregular limonite-stained joints spaced <30mm apart and partly weathered <15mm into the adjacent rock between 31.8-32m. Some black, S, argillite clasts (<35 by 10mm, mostly NV) between 31.9-32.2m.		Box 10: 26.0-28.8m. Core broken (<100mm pieces) along intersecting 55°-NV joints (some coated by light brown to orange-brown, non-plastic sand-silt <5mm) 26.25-26.65m.
		88	33				- maximum depth of contact (50°). Defects mostly dip 25°-NV by 27.9m. Indistinct seam (<40mm, NV) of grey, S, greywacke sandstone-siltstone near 27.9-28.8m. Box 11: 28.8-31.4m.
		87	34		- some argillite clasts (<25 by 10mm, NV) between 33.8 (70°) & 34.35m.	RFW	6/5/15. SWL 10.1m. Occasional voids (<20 by 5mm) along veins by 31.25m. Box 12: 31.4-34.1m. Joints (some coated by orange-brown, non-plastic silt <2mm) have variable dip 31.8-32m. Coarser greywacke below 31.9m.
		86	35				- disturbed 30° seam (<50mm) of light orangish brown, gravelly (<30mm, weathered rock fragments) sand 31.95-32m. 25° limonite-stained joint coated by silt (<2mm, as above) at 32.1m. Occasional argillite clasts (<15mm) below 32.2m.
		85	36		- minor argillite clasts (<25 by 10mm) concentrated into indistinct seams (<50mm, NV) between 35.45 & 36.65m.		Core split along irregular NV vein (<2mm, zeolite?) to limonite-stained (32.55-32.65m) joint 32.3-33.2m.
		84	37		- minor argillite clasts (<10mm) below 37m. Some irregular patches (<100mm) of lighter grey, MS, partly altered rock associated with veins between 37.55-37.9m. Crisscrossed by limonite-stained joints to broken veins spaced 20-200mm apart below 37.9m.		- 50° joint coated by silt (<1mm, as above) and partly weathered <5mm into the adjacent rock. Box 13: 34.1-36.9m. Irregular patches (<100 by 40mm) of finer greywacke below 34.15m. Fine-medium grained greywacke by 34.35m. Indistinctly banded (<50mm, 70°-NV).
		83	38				- irregular 30° network (<15mm) of white to light brown veins (<10mm, zeolite?) with some voids (<15 by 2mm) spaced <5mm apart. Coarse grained greywacke below 35.45m.
		82	39		- veins (<3mm, quartz & zeolite?) spaced <40mm apart by 38.65m. Broken veins to joints spaced 15-150mm apart below 39.2m.		- several intersecting 45-75° joints to broken veins (<2mm, zeolite?) partly weathered <5mm into the adjacent rock. 10° joint partly weathered <3mm into the adjacent rock at 36.05m.
							- crisscrossed by shear bands (<5mm, 30°-NV) spaced <200mm apart below 36.55m. Probable uphole rock fragments (<45mm, variably weathered) near 36.45-36.5m.
							- irregular 55° network (<50mm) of veins (<10mm, calcite & quartz) spaced <15mm apart 36.6-36.7m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. HUN15/1

LOCATION: HUNUA QUARRY **GRID REF:** 420925.63E 776958.41N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 121.01m **SHEET** 3 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 8-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		80	41		40.35m - some argillite clasts (<15mm, NV) below 40m. Becoming weaker (S) and slightly altered (pervasive) below 40.15m. Veins spaced <20mm apart.	RSW RW	Fine-medium grained greywacke 36.65-37m. Box 14: 36.9-39.75m. - 20° joints (coated by silt <1mm) and partly weathered <3mm into the adjacent rock at 37.9 & 38m. Joints (some coated by orange-brown, non-plastic silt <1mm) mostly dip 15-75° from 37.9m.
		79	42		40.75m VEIN MATERIAL [MA/SA]; mottled white to light grey and grey-green, WK to VS, variably altered to fresh (50%). Brecciated to fractured texture (<10mm). Veined GREYWACKE SANDSTONE with some argillite [SA]; grey (slightly discoloured) with some irregular dark grey-black patches (<50 by 20mm, 45°-NV), mostly S, slightly altered (pervasive). Crisscrossed by irregular white veins (<5mm, quartz & zeolite?) spaced <20mm apart. Broken veins spaced <200mm apart. - minor black, S, argillite clasts (<5mm) below 42.4m.	RSW	- 35° joint (coated by silt <1mm) and partly weathered <2mm into the adjacent rock. Veins have variable dip by 38.65m. - joints mostly dip 25°-NV below 39.2m. Mostly broken core (<200mm pieces) from 39.4m. Box 15: 39.75-42.7m. - 30° joint. 30° slickensided defect coated by grey, VWK, material (<2mm) at 40.4m [Fault].
		78	43		43.7m		- maximum depth of contact (0.25m assumed lost below 40.5m). Medium-coarse grained greywacke by 40.75m. Defects have variable dip. No obvious shear bands. Disturbed 70° band (<15mm) of silty brecciated rock to vein material (zeolite?) near 41m.
		77	44		GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<5mm, quartz) spaced <40mm apart. Broken veins spaced 15-200mm apart.		- 60° slickensided defect. Box 16: 42.7-45.6m. - maximum depth of contact. Crisscrossed by shear bands (<5mm, mostly 45°-NV) spaced <100mm apart by 43.7m.
		76	45		- minor black, S, argillite clasts (<20mm, NV) by 44.55m. Veins spaced 5-100mm apart by 45.3m.		- shear bands (<10mm) spaced <30mm apart 44.05-44.3m. Mostly intact core by 44.3m. - veins mostly dip NH-70° by 45.3m. Box 17: 45.6-48.45m.
		75	46				
		74	47		- veins (<10mm) spaced 5-50mm apart near 46.8-47.95m.		- 60° slickensided defect coated by grey, slightly plastic mud (<3mm) and associated transparent-white composite vein (<5mm, quartz). Veins mostly dip 30-60° near 46.8-47.95m. Broken 55° off-white composite vein (<7mm, quartz) at 47m.
		73	48				Box 18: 48.45-51.2m.
		72	49		- broken veins spaced 15-300mm apart by 48.95m. Occasional argillite clasts (<5mm).		- 55° composite vein (<10mm, quartz). Core split along irregular 65°-NV joint with some pyrite specks 49.9-50.7m.
		71	50				
		70	51		- minor argillite clasts (<15mm, NV) between 50.9-51.7m.		- 40° slickensided defect partly coated by dark green-black, chloritic material (<1mm).
		69	52			RFW	- 55° slickensided defect partly coated by chloritic material (1mm) and associated (below) composite vein(s) (<10mm, quartz) with minor voids (<3mm). Box 19: 51.2-54.0m. Broken core (<100mm pieces) 51.4-51.8 & 53.8-54.3m. Core run 51.6-53.2m has 0.1m of possible uphole rock (<40mm) at top. 30° joint partly altered (discoloured grey, WK to MS) <40mm into the adjacent rock at 51.75m.
		68	53		- veins (<3mm) spaced <20mm apart near 52.85-53.2m.		- veins mostly dip NH-60° near 52.85-53.2m.
		67	54				- 45° slickensided defect partly coated by chloritic material (<1mm) and associated transparent-white composite vein (<5mm, quartz). Intersecting 40° & 65° slickensided defects coated by dark green-black material (<2mm) at 53.9m. Box 20: 54-56.6m. 40° slickensided defect coated by dark green-black and vein material (<3mm, chloritic & quartz) at 54.1m.
		66	55		- broken veins spaced 15-200mm apart below 54.9m.		- irregular 55° network (<30mm) of veins (<10mm, quartz) spaced <10mm apart 55-55.1m. 60° slickensided defect coated by chloritic material (<1mm). Disrupted NV band(s) (<15mm) of darker grey rock 55.4-55.9m.
		65	56		- some darker grey patches with argillaceous streaks (<80 by 25mm) to argillite clasts (<5mm, 60°-NV) between 56.4-56.8m. Occasional dark grey-black to clean joints by 56.5m.		- 50° green joint. 20° transparent-white to light grey composite vein (<20mm, quartz) with some voids (<15 by 5mm) at 56.15m. Irregular 55° green joint at 56.55m. Box 21: 56.6-59.5m. 30° dark green-black joint at 56.6m.
		64	57				- irregular 40° network (<40mm) of veins (<5mm, quartz) spaced <10mm apart 57.25-57.35m. Veins mostly dip NH-70° below 57.7m. Core split along irregular NV green joint 57.25-57.8m. 7/5/15. SWL 10.1m.
		63	58		- veins (<3mm) spaced <200mm apart below 57.7m. Broken veins to joints spaced 50-250mm apart.		- indistinct 65° bands (<10mm) of darker grey (finer grained) rock 58.1-58.5m. 65° joint with pyrite
		62	59		- veins (<4mm) spaced 5-50mm apart by 59.5m. Broken veins spaced		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. HUN15/1

LOCATION: HUNUA QUARRY **GRID REF:** 420925.63E 776958.41N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 121.01m **SHEET** 4 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 8-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Comments
					60.4m 50-300mm apart.	RFW	specks at 58.6m. Veins mostly dip 25°-NV by 59.5m. Box 22: 59.5-62.2m.
		60	61		GREYWACKE SANDSTONE to SILTSTONE [FW]; variable grey to dark grey, S to VS, fresh. Crisscrossed by irregular white veins (<3mm, quartz) spaced <50mm apart. Broken veins spaced 50-300mm apart. - veins spaced 15-150mm apart by 61m. Dominantly grey, VS, sandstone near 61.2 (60°) & 61.55m (75°).	RFW	- irregular 60° bedding contact. Fine grained rock (dominantly Zst) 60.4-61.2 & 61.55-62.25m. Indistinctly banded (<20mm, 60-75°) from 60.4m. No obvious shear bands. Irregular 50° network (<40mm) of veins (<7mm, quartz) spaced <10mm apart at 60.6m.
		59	62		62.25m		- 55° slickensided defect coated by dark green, chloritic material (<1mm) to vein material (<3mm, quartz). 55° joint (clean) at 61.4m. Box 23: 62.2-65.0m.
		58	63		GREYWACKE SANDSTONE with some siltstone [FW]; grey with irregular dark grey bands (<20mm, 80°), S to VS, fresh. Crisscrossed by irregular white veins (<5mm, quartz & zeolite?) spaced <30mm apart (<100mm above 62.5m). Broken veins spaced 15-200mm apart. - dominantly sandstone by 63.4m. Minor to some patches (<30 by 10mm, some clasts) of dark grey to black, S, greywacke siltstone to argillite. Veins spaced <50mm apart below 63.7m.		- minimum depth of contact (80°). Fine to coarse grained greywacke. Veins mostly dip 25-75° by 62.5m. Broken 70° vein (<1mm, zeolite?) to green joint at 62.45m. Occasional voids (<30 by 5mm) along veins by 62.8m.
		57	64			RFW	- coarse grained greywacke by 63.4m. Mostly broken core (<150mm pieces) 64.1-65.05, 65.5-65.9 & 66.3-67m. Dark grey-black, chloritic material (<1mm) on some broken defect surfaces by 64.6m. Box 24: 65.0-67.3m.
		56	65		- patchy seams (<0.1m, 55°) of dark grey-black, MS-S, argillite below 65.3m.		- irregular NV green joint 65.5-65.8m.
		55	66		65.9m GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<3mm, quartz & zeolite?) spaced 5-50mm apart. Broken veins to joints spaced 15-200mm apart.	RFW	- maximum depth of contact. Joints coated by chloritic material (<1mm). Veins mostly dip 25°-NV by 65.9m. Drilling circulation lost by 66m. 60° joint with pyrite specks at 66.15m. Occasional voids (<20 by 5mm) along veins by 66.6m.
		54	67		67m Veined GREYWACKE SANDSTONE [SA/FW]; grey (slightly discoloured), S to VS, slightly altered (pervasive) to almost fresh. Crisscrossed by irregular white veins (<15mm, quartz) spaced <40mm apart. Broken veins spaced <15-300mm apart.		- 40° defect coated by chloritic material (<1mm). - minimum depth of contact. Variable coarse to medium grained greywacke below 67m. Defects have variable dip. Irregular 75°-NV composite vein(s) (<20mm, quartz) with minor voids (<20 by 3mm) 67-68m. Box 25: 67.3-70.3m.
		53	68			RSWg	- irregular NV green joint(s) 67.75-68.15m. - irregular NV green joint(s) 68.5-68.9m.
		52	69				- intersecting 45° & 70° slickensided defects coated by chloritic material (1mm) and associated veins (<7mm, quartz) with some voids (<3 by 1mm). 55° joint partly coated by chloritic material (<1mm) at 69.25m.
		51	70		69.75m - becoming as below. Patchy seam(s) (<200mm, indistinct) of coarse grained rock below 69.4m. Minor black, S, argillite clasts (<5mm). GREYWACKE SANDSTONE with conglomerate interval [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced <50mm apart. Broken veins to joints spaced 15-200mm apart. - veins (<4mm) spaced 10-250mm apart below 70.3m. Broken joints spaced 50-350mm apart.		- 60° green joint and associated vein (<4mm, quartz) with minor voids (<3 by 1mm). - maximum depth of contact. Defects have variable dip. Joints coated by dark grey-black, chloritic material (<1mm). 60° slickensided defect(s) coated by chloritic material (1mm) at 70m. 8/7/15. SWL 60m. Box 26: 70.3-73.2m. 35-55° band (<50mm) of finer grained rock 70.6-70.7m. Coarse grained greywacke by 70.7m.
		50	71				
		49	72		- mottled grey to dark grey, S to VS, sandy conglomerate between 71.45-72.45. Mostly argillaceous rock clasts (<30 by 15mm).	RFW	
		48	73		- irregular patches (<60mm) to bands (<20mm, 65°) of dark grey to black, S, siltstone to argillite between 72.25-72.45m.		- 55° slickensided defect coated by dark green, chloritic material to transparent-white vein material (<2mm, calcite). Bedding dips 75° at 71.45m.
					73.35m		- 25° joint (coated by chloritic material 1mm) with occasional pyrite specks and associated composite vein (<10mm, quartz). Dark grey, VS, greywacke siltstone clast (<60 by 40mm) at 71.85m.
		47	74		GREYWACKE CONGLOMERATE (Argillaceous) to SANDSTONE [FW]; patchy grey to black, mostly S, fresh. Variably sized clasts (<50mm) of siltstone to argillite. Some sandstone matrix. Crisscrossed by disrupted white veins (<5mm, quartz) spaced <50mm apart. Broken veins to joints spaced 20-250mm apart. - veins spaced <20mm apart between 74.35-74.65m.	RFW	- 25° joint with pyrite patches. Fine-medium grained greywacke by 72.45m. 55° vein(s) (<15mm, quartz) with rock fragments (<25 by 5mm) at 72.75m.
		46	75		- dominantly sandstone with some conglomeratic patches to seams (<100mm, indistinct) below 75.1m (70°). Veins (<4mm) spaced <100mm apart. Broken veins to joints spaced 50-350mm apart.		- 45° slickensided defect coated by chloritic material (1mm) to transparent-white vein material (<5mm, calcite). Box 27: 73.2-75.9m.
					75.9m		55° joint coated by dark green, chloritic material (<1mm) to white vein material (<2mm, quartz) and associated sheared band (<15mm, below). Irregular NV seam (<30mm along side of core) of dark grey-black, MS-S, argillite 73.55-73.7m.
		45	76		GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<4mm, calcite) spaced <5-100mm apart. Broken veins spaced 50-300mm apart. Occasional black, MS-S, argillite clasts (<10mm).	RFW	
		44	77		- some irregular patches (<30 by 15mm, indistinct) of dark grey to black, S to VS, sandstone-siltstone to argillite between 76.9-77.05m.		- irregular NV contact 73.3-73.4m. Some joints coated by dark green-black, chloritic material (<1mm). Occasional pyrite specks on broken defect surfaces by 73.4m. Disrupted veins (<5mm, quartz) spaced <20mm apart 73.8-74.1m.
					77.55m		- 30° slickensided defect coated by chloritic material (<1mm) to vein material (<2mm, quartz). Intersecting 70° & 60° joints (coated by chloritic material <1mm) with pyrite specks at 74.2m.
		43	78		Veined GREYWACKE SANDSTONE [SA/FW]; grey (lighter), S to VS, slightly altered-fresh. Crisscrossed by irregular white veins (<10mm, calcite) spaced <40mm apart. Broken veins to joints spaced 15-200mm apart by 77.75m.		- two broken splaying 60° & 70° veins (<3mm, zeolite) to joints with some pyrite patches 74.95-75.15m. Associated network (<30mm either side) of veins (<4mm, zeolite) with occasional voids
		42	79		- some irregular patches (<30mm, some clasts) of dark grey to black, mostly S, siltstone to argillite between 78.7-79m.	RFW	
					- some patches (<100mm, indistinct) of dark grey, S, siltstone below		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. HUN15/1

LOCATION: HUNUA QUARRY **GRID REF:** 420925.63E 776958.41N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 121.01m **SHEET** 5 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 8-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		40	81		79.6m. - patchy grey to dark grey, mostly S, sandy conglomerate between 80.2-80.45 & below 80.85m. Mostly argillaceous rock clasts to fragments (<30 by 15mm).	RFW	(<15 by 5mm) spaced <15mm apart. - variable medium to coarse grained greywacke below 75.1m. Box 28: 75.9-78.6m. - maximum depth of contact (NV).
					80.95m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<3mm, quartz) spaced <40mm apart. Broken veins to joints spaced 15-200mm apart.		- 35° slickensided defect coated by chloritic material (<1mm) to vein material (<3mm, quartz). 55° slickensided defect coated by chloritic material (<1mm) to vein material (<2mm, calcite) at 77m.
		39	82		- minor irregular patches (<10mm, some clasts) of dark grey to black, S, siltstone to argillite between 81.65-82.3m. Broken veins to joints spaced <100mm apart below 81.8m.	RFW	- irregular patch (<35 by 15mm) of black, MS, material. - minimum depth of contact. Some joints coated by chloritic material (<1mm). Occasional voids (<40 by 5mm) along veins below 77.55m. Core broken (<150mm pieces) 77.75-78.5m.
		38	83				- 50° dark green-black joint coated by dark greyish green (brown-tint), slightly plastic silt (<3mm). 35° slickensided defect partly coated by vein material (<2mm, quartz) at 78.5m.
		37	84		- variable grey to dark grey, S to VS, almost fresh, sandstone to siltstone below 83.5m (30°). - no core recovery below 83.85m [Possible Fault].	UD	Box 29: 78.6-81.5m. 30° dark green-black (chloritic) joint filled by dark greyish green, mud-sand at 78.8m. Intact core (no joints) 79.35-79.7m. Broken core (<100mm pieces) 80.2-81m. Pyrite specks on some joint surfaces near 80.4m.
					84.45m Veined ARGILLITE [SA/FW]; black with occasional grey-green seams (<30mm, indistinct), MS to VS, almost fresh. Crisscrossed by disrupted white veins (<3mm, quartz) spaced <10mm apart. Broken fractures to joints (clean) spaced <100mm apart.		
		36	85		- less obvious veins (<2mm) by 85.1m. Low core recovery.	RSWg	- grey & dark grey, S, greywacke sandstone (medium) to siltstone between 80.45-80.85m. Indistinctly banded (<15mm). - 70° slickensided defect coated by dark green-black, chloritic material (<1mm) to vein material (<1mm, quartz) at 80.6m. Irregular patch (<50 by 15mm, NH) of black, VS, argillite at 80.75m.
		35	86				- coarse grained greywacke from 80.95m. Some joints coated by dark grey-black, chloritic material (<1mm). Veins mostly dip 15-60°. Box 30: 81.5-85.1m.
		34	87		87.1m Fractured ARGILLITE [MA/SA]; dark greyish green with occasional black patches (<50mm), MS-S, moderately/slightly altered (pervasive). Crisscrossed by irregular fractures spaced <15mm apart. Occasional disrupted white veins (<3mm, quartz).	RSW	Broken core (<60mm pieces) 81.9-82.3m. Broken core (<150mm pieces) from 82.5m. - maximum depth of contact. Indistinctly fractured (<10mm) by 84.45m. Pyrite specks to patches on many broken defect surfaces. Veins mostly dip 45°-NV. Disturbed greenish grey to dark grey, MS-S, marginal slightly altered argillite 84.45-84.6m.
		33	88		87.95m 88.2m FAULT ZONE [SA]; light grey, disturbed to firm, plastic to slightly plastic mud with minor rock fragments (<5mm).	RW	
		32	89		Veined to Fractured ARGILLITE [SA]; dark grey, MS-S, almost fresh. Crisscrossed by fractures (indistinct) to disrupted white veins (<3mm, quartz) spaced <10mm apart. Broken fractures spaced <150mm apart. - more altered [MA/SA] below 88.8m. Becoming dark greyish green with some variable green seams (<30mm, 70°-NV, minor red streaks), MS to S, partly altered to slightly altered (>75%, pervasive) by 89.15m. Broken fractures spaced <100mm apart.	RSW	- three irregular 50° bands (<15mm) of greenish grey, MS, partly altered rock 84.85-85m. Shattered core (<50mm pieces) from 85m. Box 31: 85.1-89.2m. Intact core 86.5-86.85m. Irregular 65° joint coated by light grey, non-plastic sand-silt (<3mm) at 86.8m. - minimum depth of contact. Disturbed band (<30mm) of grey, silty sand 87.1-87.15m [Fault]. Defects have variable dip below 87.1m. Intact core 88.2-89m.
		31	90		90.8m		
		30	91		EOH @ 90.8m		- 60° polished defect. Patchy grey to dark grey, WK to S, moderately altered, brecciated rock (<15mm, silty) 88.2-88.25m [Fault]. Core run 88.3-89.6m has excessive length (0.2m assumed recovered from previous run). - irregular 55° black band (<30mm). Broken core (<50mm pieces) from 89m. Irregular NV veins (<3mm, quartz) with occasional voids (<5 by 2mm) spaced <10mm apart near 89.05-89.15m. - light grey, gravelly (<5mm) sand with some silt 89.15-89.2m [Fault]. Box 32: 89.2-90.8m. Mostly intact core 89.6-90.5m. - 60° joint filled by light grey, gravelly (<10mm) sand with some silt (<15mm). Hole terminated after bit worn-out. Hole blocked near surface.
		29	92				
		28	93				
		27	94				
		26	95				
		25	96				
		24	97				
		23	98				
		22	99				

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/2**

LOCATION: HUNUA QUARRY **GRID REF:** 421028.04E 777021.28N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 128.90m **SHEET** 1 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 11-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 15-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		128	1		0.35m FILL (Aggregate to Disturbed As Below); moderately weathered, greywacke fragments (15-50mm, mostly Zst).	OF	S.W.L. 2 128m (18/05/15)	NZTM location (GPS within 3m) of 1777823mE & 5893653mN. RQD entered into penetration field in database from 6.3m. Core boxes photographed. Box 1: 0-3.0m. Disturbed core (wet).
					0.5m - intermixed light brown to light orangish brown, disturbed (firm), plastic mud with some gravel (<20mm) from 0.25m.	O		
					1.2m SILT with some sand; brown (organic), very stiff, slightly plastic. Some	O		- measured depth of aggregate fill. More intact core (moist) from 0.25m.
					1.5m rootlets. [Top Soil].	O		- maximum depth of contact.
		127	2		CLAY; mottled to patchy (<30mm) light brown to orange, disturbed (stiff) to very stiff, plastic. Occasional rootlets. [Residual Soil].			
					Sandy GRAVEL: orangish brown, VWK, limonite-cemented material to partly weathered greywacke fragments (<50mm, Sst) with variable	ORC		Limonite-cemented patch (<40 by 15mm) at 0.75m.
					2.6m content of light brown to orange-brown, slightly plastic to non-plastic			Disturbed core 1.2-1.5m.
		126	3		3m sand-silt. [Weathered Corestone].	ORM		- maximum depth of contact. Fine-medium greywacke.
					SILT with some sand; light brown (pale) with some orange-brown and dark brown-black streaks to patches (<30mm), disturbed (stiff) to hard, slightly plastic to non-plastic. Remnant fractured texture. [CW to HW Greywacke].			- irregular 55° off-white remnant vein (<2mm). Broken core (<100mm pieces) 2.6-3.2m.
		125	4		- sandy below 2.35m.			- disturbed 30° contact. Defects have variable dip.
					GREYWACKE SANDSTONE [MW]; variable light brown to brown with some grey patches (<100mm, discoloured), disturbed (EWK) to S,			Box 2: 3.0-7.1m. Remnant joints mostly dip 50°-NV from 3m. Core run 3.2-4.1m has up to
		124	5		weathered to partly weathered (>50%). Crisscrossed by irregular limonite-stained joints spaced <50mm apart. [Corestone].	ORH		0.1m of probable uphole rock (<40mm) at top.
					SAND-SILT; variable light brown to light orangish brown with irregular orange-brown streaks, hard, non-plastic. Crisscrossed by irregular limonite-stained remnant joints spaced <40mm apart near top. [HW Greywacke].			- occasional remnant joints below 3.3m. Minor black mottles 3.4-4.1m.
		123	6		- more weathered below 4.35m. Dominantly light orangish brown and			Core run 5.6-6.3m has 0.1m of probable uphole material at top. Broken core (<120mm pieces) from 6.2m.
					6.5m slightly plastic. Few obvious remnant joints.			
		122	7		Weathered GREYWACKE (Sst) [HW-MW]; variable light brown to orangish brown with some grey patches (<100mm, discoloured), EWK (hard) to S, weathered to partly weathered (<50%). Crisscrossed by irregular limonite-stained joints spaced <50mm apart. Low recovery (<75mm pieces) below 7.1m.			- defects have variable dip by 6.5m. Irregular 60° limonite-stained to white remnant vein (<4mm) at 6.8m. Box 3: 7.1-10.9m.
		121	8					
		120	9			ORH		Mostly intact core from 9.3m. Coarser greywacke. Light brown (orange-tint), hard, slightly plastic silt with some sand 9.3-9.4m [Possible Fault].
		119	10		- more weathered by 9.3m. Variable light orangish brown with some irregular orange-brown streaks and EWK (hard) to VWK from 9.4m.			12/5/15. SWL 4m. Box 4: 10.9-14.7m.
		118	11		- dominantly light brown and harder (VWK) below 10.3m. Minor patches (<100mm) of grey, VS, fresh rock.			
		117	12		- light brown with irregular brown seams (<30mm) and mostly WK below 11.25m.			Shattered core (<40mm pieces) 11.9-12.4m. Core run 13.1-13.6m has 0.1m of probable uphole rock (<50mm) at top.
		116	13		- no core recovery below 12.1m.	UD		
					13.3m SAND-SILT; light brown with some orange-brown seams (<50mm), disturbed (stiff) to hard, non-plastic. Remnant fractured texture. [HW Greywacke].	ORH		- maximum depth of contact. Core run 13.6-14.7m has 0.1m of uphole material at top. Possibly uphole rock 14-14.2m.
		115	14		14.2m - becoming as below. Core recovered as light brown to brown, VWK to MS, weathered to partly weathered (<25%) rock pieces (<50mm,	RMW		- maximum depth of contact. Joints often coated by orange-brown, non-plastic silt (<1mm) by 14.2m. Irregular 40° white vein (<1mm, weathered) at 14.65m. Box 5: 14.7-17.55m.
		114	15		14.75m subrounded) below 13.9m. GREYWACKE SANDSTONE [MW]; variable light brown (darker) with some grey patches (<150mm, some discoloured), MS to VS, partly weathered to fresh (<50%). Crisscrossed by irregular limonite-stained joints spaced 5-50mm apart.	RSW		- coarse grained greywacke 14.75-19.35m. Some joints coated by silt (<1mm) from 14.75m. Veins mostly dip 30-75°.
		113	16		15.8m GREYWACKE SANDSTONE [SW]; grey with minor irregular brown seams, S-VS, partly weathered (<10mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 15-150mm apart and limonite-stained to white veins (<1mm, quartz) spaced 10-100mm apart.			- 60° joint. Joints often coated by silt (<5mm). Broken core (<60mm pieces) 16.2-16.8m.
		112	17		- occasional dark grey-black, S argillite clasts (<6mm) by 15.1m.			
		111	18		GREYWACKE SANDSTONE [MW]; variable light brown to orangish brown, WK to MS, mostly partly weathered. Crisscrossed by irregular limonite-stained joints spaced 10-50mm apart. Some dark brown-grey, argillite clasts (<15mm) above 16.2m.	RW		Box 6: 17.55-20.2m. Core run 17.7-19.0m has 0.1m of uphole rock (<50mm) at top.
		110	19		- some grey patches (<100mm, discoloured) below 17.1m. Dominantly grey between 17.4-17.7m. Occasional irregular (45°-NV) remnant veins (<5mm, weathered) by 17.8m.			
					- no grey patches below 18.2m. Lighter brown below 18.35m.			Shattered core (<50mm pieces, some silt) 18.75-19m.
		109			19.35m GREYWACKE SANDSTONE [MW/SA]; grey (discoloured) with minor brown seams, MS to S, partly weathered (<15mm along joints) to	RSW		- 45° joint. Some joints coated by silt (<1mm) from 19.35m. Veins mostly dip 30-70°.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. HUN15/2

LOCATION: HUNUA QUARRY **GRID REF:** 421028.04E 777021.28N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 128.90m **SHEET** 2 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 11-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 15-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		108	21		slightly altered (>50%, pervasive). Crisscrossed by limonite-stained joints spaced 15-150mm apart to white veins (<2mm, weathered) spaced 5-50mm apart.	RSW		Box 7: 20.2-23.05m. Mostly broken core (<100mm pieces) 20.65-22.45m.
					20.9m - some grey, VS, fresh rock by 20.15m. Veined GREYWACKE SANDSTONE [SA to MA]; grey, S-VS, slightly altered (pervasive). Crisscrossed by limonite-stained joints spaced 20-100mm apart and irregular white veins (<3mm, quartz & zeolite?) spaced <30mm apart.	RSW		- maximum depth of contact. 20° joint at 20.9m. Joints (often coated by orange-brown, non-plastic silt <1mm above 21.2m) mostly dip 45-70° by 20.9m. Veins have variable dip by 20.9m.
		107	22		- joints spaced 10-150mm apart below 21.7m. Veins (<5mm) spaced <20mm apart.			- joints (often coated by silt <3mm) have variable dip below 21.7m.
					22.75m - grey (discoloured), mostly MS, moderately altered [MA] by 22.3m. Broken veins spaced <150mm apart. No limonite-stained joints below 22.4m.	RSW		- 60° off-white composite vein (<20mm, quartz). Intersecting 60° & NH joints coated by silt (<3mm) and partly weathered <15mm into the adjacent rock at 22.35m.
		106	23		23.25m Sheared VEIN MATERIAL [SA]; variable white to grey, WK to VS, almost fresh. Fractured texture (<10mm, mostly 45-60°).	RSW		- 30° polished defect and associated band (<30mm, 30-60°) of grey, slightly plastic mud [Fault].
		105	24		24m Veined GREYWACKE SANDSTONE [SA]; grey (discoloured), MS to S, mostly slightly altered (pervasive). Crisscrossed by irregular white veins (<3mm, zeolite?) spaced <20mm apart. Broken veins spaced <120mm apart.			- 45° defect with associated band (<30mm, above) of grey, non-plastic sandy silt. Box 8: 23.05-25.95m.
		104	25		Veined ARGILLITE [FW]; dark grey, MS-S, fresh, Crisscrossed by irregular white veins (<10mm, quartz & zeolite?) spaced <20mm apart. Broken veins to green joints spaced <200mm apart.	RFW		- minimum depth of contact. Band (<20mm, disturbed) of grey, slightly plastic, sandy mud with some rock fragments (<5mm) near 23.25m [Fault].
		103	26					- disturbed 40° contact. Relatively coarse grained rock (Zst?). Irregular 55° green joint filled by pale brown, non-plastic silt to dark green silty sand (<10mm) at 24.6m.
					26.8m			- indistinctly banded (<15mm, 55°) near 25.7m. Box 9: 25.95-29.2m.
		102	27		Veined ARGILLITE [SW-FW]; dark grey-black with some irregular dark grey-brown seams, MS-S, partly weathered (<15mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 15-100mm apart to white veins (<3mm, quartz & zeolite?) spaced <30mm apart.	RSWg		- indistinctly banded (<50mm, 20°) near 26.2-26.8m.
		101	28		28.1m			- 75° joint coated by silt (<3mm) and partly weathered <5mm into the adjacent rock. Fine grained rock from 26.8m. Minimal silt on joints below 26.8m.
		100	29		Veined ARGILLITE [MW-SW]; dark grey-black with irregular dark grey-brown seams, MS-S, partly weathered (<20mm along joints) to fresh (50%). Crisscrossed by limonite-stained joints spaced 10-100mm apart to white veins (<3mm, quartz & zeolite?) spaced <30mm apart.			- disturbed limonite-stained to white vein (<20mm, quartz) with some rock fragments (<15mm). Box 10: 29.2-31.9m.
		99	30					- slightly coarser grained rock by 29.65m. Core run 30.0-31.1m has 0.1m of uphole rock (<40mm) at top.
		98	31		- less weathered [FW <95%] between 30.3-31.5m.	RSWb		- joints often coated by orange-brown, non-plastic silt (<2mm) by 30.85m.
		97	32		- dark grey-brown to dark brown, WK-MS, moderately weathered [MW] between 31.5 (65°) & 31.8m (55°).			- 45° joint coated by sandy silt (<5mm). 50° weathered composite vein (<15mm) at 31.8m. Box 11: 31.9-35.05m.
		96	33					- 60° joint filled by orange, non-plastic silt (<5mm). 50° weathered composite vein (<15mm, some quartz) and associated joints partly weathered <5mm into the adjacent rock near 32.55m. Mostly broken core (<100mm pieces) 32.5-33.5m.
					33.45m			- maximum depth of contact. Defects have variable dip. Indistinctly banded (<50mm, 55-65°) by 33.45m. Irregular NV off-white vein (<5mm, weathered) partly weathered <5mm into the adjacent rock 33.2-33.3m.
		95	34		Veined ARGILLITE [FW]; dark grey to black, S-VS, fresh (>95%). Crisscrossed by irregular white veins (<5mm, quartz & zeolite?) spaced <30mm apart. Broken veins spaced 50-200mm apart.	RFW		- intersecting irregular 75° & 20° limonite-stained joints. 50° limonite-stained joint at 33.65m. 60° composite vein (<10mm, quartz) and irregular 40° limonite-stained joint at 33.7m. Broken core (<120mm pieces) 34.8-35.5m.
		94	35		34.9m Veined ARGILLITE [MW-SW]; dark grey-black with irregular dark brown seams, MS to S, partly weathered (<15mm along joints) to fresh (>50%). Crisscrossed by limonite-stained joints spaced 10-50mm apart to white veins (<3mm, quartz & weathered) spaced <30mm apart.	RSWb		- irregular 70-50° contact. Joints often coated by silt (<2mm). Box 12: 35.05-38.25m. Two subparallel 60° & 70° weathered composite veins (<10mm, some quartz) at 35.5 & 35.55m.
		93	36		35.9m Veined ARGILLITE [FW]; dark grey, S, fresh (>95%). Crisscrossed by irregular limonite-stained to green joints spaced 30-400mm apart and white veins (<4mm, quartz) spaced <30mm apart.			- joints (minimal silt) mostly dip NH-60° from 35.9m. Coarser grained rock (Zst?). Bedding dips 70° near 35.95m.
		92	37			RFW		- 30° limonite-stained joint coated by light orangish brown, non-plastic silt (<2mm). Core run 36.9-38.4m has excessive length (0.1m assumed recovered from previous run).
		91	38		- limonite-stained joints to fractures spaced 5-50mm apart and partly weathered (dark brown to dark grey-brown, MS-S) <10mm into the adjacent rock near 37.45-37.75m.			- joints (some coated by silt <1mm) have variable dip from 37.45m. Indistinctly banded (<50mm, 75°) near 37.75-38m. Core split along
					38.6m			
		90	39		Veined ARGILLITE [MW-SW]; dark grey-black with irregular dark brown to dark grey-brown seams, MS to S, partly weathered (<50mm along joints) to fresh (>50%). Crisscrossed by limonite-stained joints spaced 5-100mm apart to white veins (<4mm, weathered) spaced <20mm apart.	RSWb		
		89						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/2**

LOCATION: HUNUA QUARRY **GRID REF:** 421028.04E 777021.28N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 128.90m **SHEET** 3 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 11-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 15-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		88	41		- less weathered [FW 75%] 40.3-41m. Joints (minimal silt) spaced 10-100mm and partly weathered (indistinct) <15mm into the adjacent rock. Fractures to white veins (<3mm) spaced <100mm apart. - limonite-stained joints spaced 10-150mm apart below 41m. Limonite-stained to white veins (<3mm) spaced <75mm apart.	RSWb		NV transparent-white to light greenish grey, vein(s) (<2mm, zeolite?) 37.75-38.7m. Few obvious joints below 37.8m. Box 13: 38.25-40.9m. 50° joint coated by light orange-brown, non-plastic silt with some sand (<3mm) and partly weathered <25mm into the adjacent rock at 38.9m.
		87	42		- less weathered [FW >75%] between 41.9-42.5m.			- some joints coated by silt (<1mm). Disturbed 75° off-white composite vein (<7mm, weathered) near 39.05m. Box 14: 40.9-43.6m.
		86	43		- brown, WK to MS, moderately weathered [MW] between 42.8-43.1m.			- some joints coated by orange-brown, non-plastic silt (<2mm) below 41m. Defects have variable dip. Irregular 55-30° network (<40mm) of weathered veins (<4mm, some quartz) spaced <10mm apart at 41.6m. 13/5/15. SWL 4.1m.
					43.35m			
		85	44		ARGILLITE [SW-FW]; dark grey-black with minor irregular brown seams, MS to S, partly weathered (<10mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 25-250mm apart to white veins (<2mm, weathered) spaced 5-50mm apart.			- irregular NV joint(s) coated by silt (<2mm) and partly weathered <50mm into the adjacent rock 42.5-43.25m. - 35° joint coated by sand-silt (<4mm). Slightly finer grained rock 43.35-48.6m. Joints (often coated by silt <2mm) mostly dip 25-60°. Box 15: 43.6-46.1m.
		84	45					
		83	46		- more weathered [FW 50%] between 45.5-46.1m (70°). Limonite-stained to clean joints spaced 30-300mm apart from 46.1m. Limonite-stained to white veins (<4mm, weathered/zeolite) spaced <50mm apart.	RSWg		- 65° joint partly weathered <10mm into the adjacent rock and associated discontinuous limonite-stained vein (<5mm, weathered). - indistinctly banded (<50mm, 55°) near 45.05-45.25m. Broken core (<150mm pieces, minor silt) 45.8-46.1m. 65° joint(s) coated by light orangish brown, non-plastic silt (<5mm) and partly weathered <20mm into the adjacent rock at 45.9m.
		82	47					
		81	48					Box 16: 46.1-49.0m. Some black flecks to disrupted argillaceous bands (<10mm, 55°-NV) from 46.1m. Defects have variable dip. Minimal silt on joints.
		80	49		48.6m - dark brown (grey-green tint), MS, moderately weathered [MW] below 48.35m. Joints spaced <50mm apart. Limonite-stained veins (<4mm, weathered) spaced <20mm apart. Veined ARGILLITE [FW]; dark grey to black, mostly S, fresh (95%). Crisscrossed by irregular white veins (<3mm, zeolite?) spaced <30mm apart. Broken veins to dark green-black (chloritic material <1mm) joints spaced 25-250mm apart. - veins (<5mm, zeolite?) spaced <20mm apart by 50m. Occasional irregular limonite-stained joints below 50.4m.			Core broken (<50mm pieces) along irregular 70°-NV joint(s) filled by orange-brown, non-plastic, sandy silt (<8mm) to dark green-black (chloritic material 1mm) and partly weathered <15mm into the adjacent rock 46.45-46.6m.
		79	50					- 35° limonite-stained joint. Several irregular NH-30° limonite-stained joints coated by light brown, non-plastic sand-silt (<2mm) 48.35-48.6m.
		78	51		- dark brown, MS, partly weathered rock between 50.85-50.95m.	RFW		- irregular 35° contact. Indistinctly banded (<50mm, 70°-NV) from 48.6m. Veins mostly dip 30°-NV. Some pyrite specks to patches on broken defect surfaces by 49.3m.
		77	52					Box 17: 49.0-51.6m. 55° slickensided defect coated by chloritic material (<1mm) to transparent-white, vein material (<3mm, quartz) at 49.15m.
		76	53		53m Veined ARGILLITE [MW]; brown with some dark greyish brown patches (<100mm), MS, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 10-150mm apart and remnant limonite-stained veins (<2mm, weathered) to fractures spaced <30mm apart.			- veins mostly dip 45°-NV by 50m. 65° vein (<5mm, quartz & zeolite?) with void (<10 by 5mm). Irregular NV joint partly weathered (indistinct) <5mm into the adjacent rock 50.4-50.6m.
		75	54			RMW		- irregular NH joint partly weathered <5mm into the adjacent rock. 10° joint partly weathered <5mm into the adjacent rock at 50.8m.
		74	55		- dark grey (discoloured) between 54.6-54.75m (55°). Few obvious veins below 54.6m.			- subparallel 50° joints partly weathered <20mm into the adjacent rock at 50.9, 50.93 & 50.95m. Core split along irregular NV, limonite-stained (51.5-51.7m) to white vein (<3mm, zeolite?) 51.4-52.1m. Box 18: 51.6-54.5m.
					55.35m			
		73	56		ARGILLITE [SW to SA]; dark grey-black with irregular brown seam (<100mm, 55.8-55.8m), MS-S, almost fresh (95%). Limonite-stained joints spaced 30-150mm apart. Occasional irregular white veins (<1mm, zeolite).	RSW		- irregular 70° contact. Fine grained rock from 53m. Defects have variable dip. Joints often coated by light brown, non-plastic sand-silt (<5mm). Broken core (<100mm pieces, minor silt) 53.15-53.95m.
		72	57		56.9m - green, WK, altered-partly altered rock below 56.7m (40°).			
		71	58		ARGILLITE [FW]; dark grey-black, MS-S, fresh. Occasional irregular white veins (<2mm, zeolite?). Broken fractures spaced 50-300mm apart.	RFW		- some lumps (<30mm, soft) of light brown, slightly plastic mud near 53.7m. Core split along irregular NV joints 53.95-54.5m. 60° joint filled by light brown (orange-tint) silty sand (<7mm) at 54.1m. Box 19: 54.5-57.3m. Indistinct fractured texture (<20mm) below 54.6m.
		70	59					- NH limonite-stained joint. Some joints coated by orange-brown, non-plastic silt (<2mm) from
		69						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/2

LOCATION: HUNUA QUARRY **GRID REF:** 421028.04E 777021.28N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 128.90m **SHEET** 4 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 11-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 15-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		68	61			RFW		55.35m. Pyrite specks to patches on some broken defect surfaces. Several intersecting 20°-NV joints partly weathered <20mm into the adjacent rock 55.8-55.9m.
					- crisscrossed by irregular (60-80°) limonite-stained joints spaced <40mm apart between 61.4-61.65m.			- mostly clean joints to broken fractures spaced 100-150mm apart below 55.9m.
		67	62		- dark grey-black and greenish grey (brown tint), disturbed to tightly packed (hard), muddy sand-gravel (<20mm rock fragments) between 61.6 (60°) & 61.85m [Fault Zone].			- 45° partly limonite-stained joint coated by light brownish green to orange-brown, non-plastic silt (1mm).
					62.25m - limonite-stained joints to white veins (<2mm, zeolite) spaced <20mm apart from 61.85m.			- 70° contact. Veins mostly dip 45°-NV from 56.9m. Box 20: 57.3-60.1m.
		66	63		Fractured ARGILLITE [MW]; dark grey-brown with some dark grey-black patches (<150mm, NV), MS to S, partly weathered to fresh (<50%). Crisscrossed by irregular limonite-stained fractures to joints spaced <20mm apart. Occasional remnant limonite-stained to pale	RMW		- irregular NV network (<40mm) of veins (<10mm, zeolite?) spaced <20mm apart 59.35-59.8m.
								Box 21: 60.1-63.05m. Broken core (<150mm pieces) 61.4-62.95m.
		65	64		64.25m brown veins (<3mm).			- some to common plastic to slightly plastic fines 61.55-61.85m. Defects have variable dip from 61.65m. No obvious pyrite. 75° limonite-stained joint coated by silt (<1mm) 62-62.25mm.
		64	65		Fractured ARGILLITE [MW-SW]; dark grey-black with irregular dark brown seams, WK to S, partly weathered (<50mm along joints) to fresh (<75%). Crisscrossed by limonite-stained joints spaced <40mm apart to white veins (<1mm, weathered) spaced <100mm apart.	RSWb		- defects mostly dip 25°-NV from 62.25m. Some joints coated by orange-brown, non-plastic silt (<1mm).
					65.6m			Box 22: 63.05-65.7m. 75° joint(s) with associated seam (<20mm, below) of light brown, VWK-WK, weathered rock 64-64.3m. Mostly broken core (<130mm pieces) 64.1-65.6m.
		63	66		ARGILLITE [FW]; dark grey-black, MS-S, fresh. Irregular limonite-stained to clean joints spaced 20-200mm apart. Occasional irregular white veins (<1mm, zeolite?).	RFW		- irregular 75° contact 61.4-64.4m. Defects have variable dip from 64.25m. Joints often coated by silt (<1mm). Core run 64.4-64.7m has 0.1m of uphole rock (<60mm) at top.
		62	67					- irregular 70°-NV joint(s) partly weathered <50mm into the adjacent rock and associated seam (<40mm) of light brown with orange-brown mottles, silty sand with some rock fragments 65.1-65.6m [Minor Fault]. Box 23: 65.7-68.8m.
					67.5m			- maximum depth of contact (NV). Joints (some coated by silt <1mm) mostly dip NH-75° by 65.6m. No obvious fractures. Pyrite specks on some broken defect surfaces by 66m.
		61	68		ARGILLITE [MW-SW]; dark grey-black with irregular dark brown intervals (<0.5m), mostly MS, partly weathered to fresh (>50%). Crisscrossed by limonite-stained joints spaced 20-200mm apart to white veins (<3mm, weathered/zeolite) spaced <100mm apart.			- 75° joint coated by dark green-black, chloritic material (<1mm).
					- moderately weathered [FW <50%] between 67.9-68.5m (65°).			- 70° joint partly weathered <20mm into the adjacent rock. Joints (some coated by silt <2mm) have variable dip from 67.5m. Indistinct fractured texture (<20mm). No obvious pyrite.
		60	69			RSW		- irregular 70°-NV seam (<30mm) of fractured (<20mm, limonite-stained) rock to light brown silty sand (<15mm wide) 67.9-68.25m. Box 24: 68.6-71.4m.
		59	70		- moderately weathered [MW] between 69.6 (NV) & 69.9m (75°).			- irregular 20° contact. Joints (some coated by light brown to orange-brown, non-plastic silt <3mm) mostly dip NH-70°. Veins mostly dip 45°-NV. Box 25: 71.4-74.2m. Shattered core (<40mm pieces, some silt) 71.45-71.55m.
		58	71		71m			- almost fresh intervals 71.85 (65°) & 72.1 (65°), 72.75 (NV) & 72.9 (NV), 73.1 (NV) & 73.45 (55°) & 74.1-74.3m.
					Veined ARGILLITE [MW]; dark brown, WK to MS, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 20-200mm apart to off-white veins (<3mm, weathered) spaced <20mm apart.			- irregular 70° seam (<30mm) of silty brecciated rock (<20mm) 72.4-72.6m. 14/5/15. SWL 4.1m.
		57	72		- some intervals (<350mm) of grey, MS-S, almost fresh rock below 71.85m.			Broken core (<50mm pieces) 74-74.3m. Box 26: 74.2-76.8m. Irregular NV limonite-stained vein (<3mm, weathered) 74.3-75.45m.
		56	73			RMW		- maximum depth of contact. Broken limonite-stained joints (some coated by orange-brown, non-plastic silt <1mm) spaced 20-200mm apart. Defects have variable dip. Broken core (<100mm pieces) 75.3-75.8m.
		55	74		- dark grey-black between 74.1-74.3m.			- irregular 70° seam (<75mm) of light brown, slightly plastic, sand-mud 75.45-75.7m [Fault]. Box 27: 76.8-79.45m. Irregular 60°-NV joint coated by light brown, silty sand (<5mm) and partly weathered <20mm into the adjacent rock at 77.25m.
		54	75		75.2m - dark greyish brown and harder (MS) below 74.9m.			- 70° joint. Box 28: 79.45-82.1m.
					Fractured-veined ARGILLITE [MW-SW]; dark grey-black with irregular dark brown seams (<200mm), MS to S, partly weathered to fresh (50%). Crisscrossed by fractures (often indistinct) and limonite-stained to white veins (<2mm, weathered) spaced <30mm apart.			- maximum depth of contact (55°). Veins mostly dip 45°-NV. Indistinct fractured texture (<20mm). Pyrite specks to patches on many broken defect surfaces.
		53	76					
		52	77		- less weathered [FW >75%] by 76.8m.	RSWb		
		51	78		- dark brown, MS, moderately weathered [MW] from 78.2m (NV).			
		50	79		78.9m ARGILLITE [FW]; dark grey-black, MS-S, fresh (>95%). Crisscrossed by irregular white veins (<2mm, zeolite?) spaced 5-100mm apart. Broken fractures to veins spaced 50-250mm apart.	RFW		
		49						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. HUN15/2

LOCATION: HUNUA QUARRY **GRID REF:** 421028.04E 777021.28N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 128.90m **SHEET** 5 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 11-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 15-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		48	81		- white veins (<2mm, zeolite?) spaced <200mm apart. Broken veins to clean joints spaced 50-250mm apart. - broken band (<5mm, 55°) of greenish grey, WK, altered rock at 81.05m.	RFW		- indistinctly banded (<50mm, 55°) by 80.3m. Defects have variable dip. Few obvious fractures. Irregular 50° seam (<40mm) of greenish grey, VWK, altered rock 80.4-80.5m. Patchy 45° band (<10mm) of grey, MS, material at 80.7m.
		47	82		- irregular seam (<30mm, 60°) of altered rock at 82.05m.			Box 29: 82.1-84.7m. Broken NV, brown vein (<1mm, zeolite?) 81.9-82.25m.
		46	83					
					83.55m ARGILLITE [SA]; dark grey-black with some irregular greyish green seams (<100mm, 55°-NV), WK to S, partly altered to fresh (>75%). Irregular clean joints spaced 20-400mm apart. Crisscrossed by irregular mostly white veins (<3mm, zeolite?) spaced <200mm apart.			- irregular 70° contact. Joints mostly dip 25°-NV. Veins mostly dip 45°-NV. Pyrite specks to patches on many broken defect surfaces. Irregular NV seam (100mm) of greyish green, WK-MS, partly altered rock 83.8-84.4m.
		45	84					Box 30: 84.7-87.55m. Some indistinct bands (<50mm, 55°) by 85.2m.
		44	85					
		43	86					
		42	87					
		41	88		- broken veins (<2mm) to joints spaced 50-500mm apart below 87.8m			Box 31: 87.55-89.6m. Disturbed 50° joint coated by light grey, slightly plastic, sand-mud (<3mm) and altered (green-grey, WK) <20mm into the adjacent rock at 87.75m. Veins mostly dip 30°-NV below 87.8m. - 65° partly altered seams (<50mm) between 88.65-88.9m.
		40	89					- 65° vein(s) (<3mm, zeolite?) with occasional voids (<20 by 4mm). Box 32: 89.6-92.6m. - 65° joint with pyrite patches and associated seam (<20mm, above) of greenish grey, WK, altered rock.
		39	90					
		38	91					
		37	92		- irregular seam(s) (<30mm, 65°-NV) of grey-green, WK, altered rock between 91.85-92.3m.	RSW		
		36	93		- dark grey-black, S, fresh between 92.8 (75°) & 93.8m (75°). Occasional veins (<1mm) below 93m. Broken veins to joints spaced 50-500mm apart.			Box 33: 92.6-95.4m. Veins mostly dip 40°-NV below 93m. Pyrite specks to patches on some broken defect surfaces.
		35	94					
		34	95		- seam (100mm, 75°) of greyish green, WK, altered rock between 95-95.35m.			
		33	96					Box 34: 95.4-97.3m. 60° band (<4mm) of dark greenish grey, MS, rock at 95.65m.
		32	97					Broken core (<80mm pieces) 96.9-97.3m. Box 35: 97.3-100.05m.
		31	98		- broken veins (<2mm) to joints spaced <100mm apart below 98.2m.			Mostly broken core (<120mm pieces) 98.2-99.45m. Disturbed band (<50mm) of light grey, muddy sand with some rock fragments (<5mm) 98.2-98.25m [Minor Fault].
		30	99					- patchy 50°-NV band (<20mm) of pale grey, vuggy vein material (zeolite?) at 99.05m. Joints have variable dip below 99.45m. Pyrite on
		29			- less altered [FW 95%] below 99.45m. Joints spaced 50-150mm apart.			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/2

LOCATION: HUNUA QUARRY **GRID REF:** 421028.04E 777021.28N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 128.90m **SHEET** 6 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 11-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 15-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		28	101		100.7m - seam (<30mm, NV) of greyish green, WK, altered rock below 100.3m.	RSW		many broken defect surfaces. Core run 99.6-100.3m has excessive length (0.15m assumed recovered from previous run). Box 36: 100.05-102.85m. 15/5/15. SWL 4.1m.
		27	102		ARGILLITE [FW]; dark grey-black, MS-S, fresh (>95%). Crisscrossed by irregular clean joints spaced 50-300mm apart. Occasional irregular white veins (<3mm, zeolite?).			- maximum depth of contact (NV). Some indistinct bands (<50mm, 40°-NV). Joints have variable dip. Veins mostly dip 40-75° by 100.7m. Indistinct fractured texture (<30mm). Pyrite specks to patches on many broken defect surfaces.
		26	103					- few obvious fractures below 102.3m. Irregular NV joint to seam (<15mm, broken) of greenish grey, WK, altered rock between 102.7-103.45m. Broken 75° brown vein(s) (<1mm, zeolite?) at 102.55m. Box 37: 102.85-105.6m.
		25	104		- broken seam (<40mm, 50°) of greenish grey, WK, altered rock at 104.05m.			- elongated patch (<50 by 10mm, 15°) of altered rock at 103.9m.
		24	105					Core run 104.6-106.1m has excessive length (0.1m assumed recovered from previous run). Irregular patches (<150 by 30mm, NV) of grey, MS, almost fresh rock 104.6-104.8m.
		23	106			RFW		- broken 75° joint altered <5mm into the adjacent rock. Box 38: 105.6-108.45m.
		22	107					
		21	108					Core split along irregular NV joint filled by light grey silty sand (<10mm) and altered <10mm into the adjacent rock 107.6-108.65m.
		20	109		- no altered seams below 108.65m. Irregular fractures to joints spaced 5-50mm apart below 109.05m.			Core run 108.2-109.1m has excessive length (0.1m assumed recovered from previous run). Box 39: 108.45-110.2m. Broken core (<100mm pieces) from 109.75m. Hole terminated after bit worn-out.
		19	110		110.2m			
		18	111		EOH @ 110.2m			
		17	112					
		16	113					
		15	114					
		14	115					
		13	116					
		12	117					
		11	118					
		10	119					
		9						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/3**

LOCATION: HUNUA QUARRY **GRID REF:** 421160.82E 777009.13N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.30m **SHEET** 1 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 10-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 17-4-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		150	0		Aggregate to Rock FILL; low recovery of slightly weathered greywacke fragments (mostly <50mm) with trace light brown, non-plastic, sandy silt.	OF	S.W.L 2.575m (21/04/15).	Drilled on existing access track. NZTM location (GPS within 3m) of 1777954mE & 5893641mN. RQD entered into penetration field in database from 11.4m. Core boxes photographed. Box 1: 0-9.9m.
		149	1		1m - boulders (probably <0.25m) of dark grey-black, S to VS, fresh, veined argillaceous rock near 0.45-0.9m. UNCERTAIN [Residual Soil to As Below].; no core recovery.			Cored twice between 0.65-0.9m [Suspected uphole rock from 0.45-0.7m]. - measured depth of contact (approximate).
		148	2					
		147	3			O		
		146	4					Core run 3.9-5.4m has uphole rock (<70mm) at top.
		145	5		5.3m Sandy SILT; light orangish brown with some irregular black streaks, very stiff, slightly plastic to non-plastic. Remnant fractured texture. [CW Greywacke].			Intact core (moist) from 5.3m. Mostly greywacke sandstone.
		144	6					Broken core (<65mm pieces) below 6.15m.
		143	7		- low recovery of slightly plastic, sandy mud to sand-silt and intact weathered greywacke (<50mm pieces) between 6.9-8.4m.	ORC		Disturbed core (very soft & wet) 6.9-8.4m.
		142	8					
		141	9		9.5m SAND-SILT; light orangish brown with some irregular orange-brown streaks, disturbed (firm) to hard, non-plastic. Irregular limonite-stained to black remnant joints spaced <50mm apart. [HW Greywacke]. - low recovery below 9.9m. Light brown (orange-tint) to light orangish brown. Some slightly plastic, sandy mud and intact weathered greywacke (<30mm pieces).			- maximum depth of contact. - irregular 60° limonite-stained to white remnant vein(s) (<3mm, weathered) near 9.8m. Box 2: 9.9-14.4m. Disturbed core (very soft & wet) from 9.9m [Possibly uphole material].
		140	10			ORH		
		139	11		11.25m Weathered GREYWACKE (Sst) [HW-MW]; patchy light brown (orange-tint) to orange-brown, mostly VWK, weathered. Crisscrossed by irregular limonite-stained to black joints spaced <20mm apart.			- minimum depth of contact. Broken core (<100mm pieces, some silty sand) from 11.25m. Fine-medium grained greywacke. Defects have variable dip. 13/4/15.
		138	12					
		137	13		- more weathered near 12.7-12.9m. Mostly light orangish brown below 12.7m. Remnant joints spaced 5-75mm apart by 12.9m. Occasional irregular limonite-stained to white remnant veins (<3mm, weathered).	ORH		Intact core (moist) from 12.9m. Finer greywacke 12.9-15.4m.
		136	14		- crisscrossed by pale brown veins (<7mm) spaced <30mm apart by 13.5m. Veins (<20mm) spaced <20mm apart near 14.9-15m.			- 45° slickensided defect and associated off-white weathered vein (<80mm, below). 35° off-white vein (<20mm, weathered) near 14.2m. Box 3: 14.4-17.4m.
		135	15		- less weathered [HW/MW] by 15m. Darker rock. Limonite-stained joints spaced 15-150mm apart. Limonite-stained fractures to veins (<5mm, weathered) spaced <20mm apart. Brown to dark greyish brown, WK, argillaceous rock between 15-15.4m (50°).			- disturbed 20° white to pale brown vein (<15mm, weathered). 50° polished defect with associated seam (>60mm, above) of pale brown, very soft, plastic clay at 14.9m [Fault].
		134	16		16.15m Fractured & Veined GREYWACKE SANDSTONE [SA to MW]; grey (discoloured), S, slightly altered (pervasive). Crisscrossed by irregular limonite-stained joints spaced <30mm apart and white veins (<2mm, weathered) spaced <20mm apart.	RSW		- maximum depth of contact. Joints often coated by light brown to orange-brown, non-plastic silt (<2mm) 15-16.15m. Fractures-veins mostly dip 30-60°. Broken core (<75mm pieces) 15.6-15.9 & 16.15-16.9m.
		133	17		17.3m - light brown-brown with irregular light orange to brown seams (<50mm), WK to MS, weathered-partly weathered from 16.8m. Limonite-stained fractures to veins (<2mm) spaced 5-30mm apart.	ORM		- irregular 45° contact. Intersecting 65° & 45° joints at 17.1m. Broken core (<150mm pieces) from 17.2m.
		132	18		GREYWACKE SANDSTONE to ARGILLITE [MW]; variable brown to dark brown with minor brown-grey patches (<50mm), WK to MS, mostly partly weathered. Crisscrossed by irregular limonite-stained joints spaced 5-50mm apart and off-white veins (<3mm, weathered) spaced <50mm apart.			- irregular 70° contact 17.2-17.4m. Mostly fine grained rock. Broken joints (minimal silt) spaced <200mm apart. Veins mostly dip 45°-NV near 17.3-21.2m. Box 4: 17.4-20.2m.
		131	19		- minor irregular light orangish brown, WK, weathered seams (<50mm) below 18.1m.	ORM		- common grey (discoloured) to dark grey, MS to VS, less weathered [FW <50%] rock 17.5-17.8m. Indistinctly banded (<10mm, 75°). - some joints coated by pale brown to

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 18m.	123mm to 18m. 96mm to EOH.

BOREHOLE No. **HUN15/3**

LOCATION: HUNUA QUARRY **GRID REF:** 421160.82E 777009.13N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.30m **SHEET** 2 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 10-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 17-4-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		130	21			ORM		orange-brown, non-plastic silt to silty sand (<3mm) below 18.1m. Mostly intact core from 18.5m. Shattered core (<50mm pieces, some silt) 19.3-20.1m.
		129			21.2m - more weathered [HW/MW] below 20.9m. Mostly light orangish brown. GREYWACKE SANDSTONE [MW]; orangish brown to dark brown with occasional light brown patches (<50mm) by 21.45m, WK to MS, mostly partly weathered. Crisscrossed by irregular limonite-stained joints to weathered veins (<3mm) spaced <50mm apart. More weathered above 21.4m.	ORM		Box 5: 20.2-22.3m. Mostly broken core (<150mm pieces) from 21.1m. 40° off-white vein (<7mm, weathered) at 21.2m.
		128	22		22.65m - occasional patches (<10mm, some clasts) of dark brown, WK, argillaceous rock by 22m. GREYWACKE SANDSTONE (Fine) to ARGILLITE [MW]; variable brown with minor brown-grey patches (<75mm), MS, partly weathered. Crisscrossed by irregular limonite-stained joints to veins (indistinct) spaced <20mm apart.	ORM		- medium grained greywacke from 21.2m. Defects have variable dip. Broken joints (often coated by pale brown to light orange-brown, non-plastic silt <3mm) spaced 5-100mm apart. Fractures-veins spaced <20mm apart near 21.2-21.4m.
		127	23		- irregular weathered veins (<5mm) spaced <20mm apart by 23.4m.	ORM		Shattered core (<20mm, silty) near 21.25-21.35 [Fault]. Core run 21.4-21.6m has 0.15m of uphole rock (<50mm) at top.
		126	24		24.25m GREYWACKE SANDSTONE [MW]; variable brown (orange-tint), mostly MS, partly weathered. Crisscrossed by irregular limonite-stained fractures to joints spaced 10-100mm apart and weathered veins (<5m, often indistinct) spaced <50mm apart.			- 65° pale brown vein (<4mm, weathered). Disturbed patch (<50mm) of grey (discoloured), MS-S, less weathered rock near 22.2m. Box 6: 22.3-24.9m. Irregular NV band(s) (<15mm, patchy) of dark brownish grey, WK, argillite 22.25-22.35m.
		125	25		- mostly variable light orangish brown and softer (WK-MS) below 24.9m. Some grey (discoloured), MS to S, less weathered patches (<50mm) between 24.9-25.35m.	ORM		- broken joints spaced 5-100mm apart. 14/4/15. Cased to 18m. More intact core from 22.9m. Grey (discoloured) with some brown seams (<15mm), coarser sandstone near 23.3-23.4m. Veins mostly dip 30°-NV by 23.4m.
		124	26		- occasional grey (discoloured) to dark grey, less weathered patches (<50mm) below 26.35m. Irregular seam (<65mm, NV) of light to dark brown with some brown-grey bands (<10mm, patchy), argillaceous rock between 26.9-27.2m.			- irregular NV bedding contact 24-24.5m. Broken joints (minimal silt) spaced <400mm apart from 24.25m. Box 7: 24.9-27.45m. Core run 24.9-26.1m has excessive length (0.1m assumed recovered from previous run).
		123	27		- verging on slightly altered from 27.2m (55°). Grey (discoloured) with irregular light orangish brown to brown intervals (<300mm) and harder (mostly MS). Limonite-stained to white veins (<3mm, weathered) spaced <50mm apart.	RMW		Mostly intact core from 25.1m. 50° off-white vein (<20mm, weathered) at 25.35m.
		122	28		- occasional grey, VS, fresh patches (<100mm) by 28.5m.			- 40° off-white vein (<10mm, weathered) at 25.75m. 50° pale brown vein (<7mm, weathered) at 26.2m.
		121	29		29.15m GREYWACKE SANDSTONE to SILTSTONE [MW/SW]; dark brown to dark grey, WK to VS, partly weathered (<50mm along joints) to fresh (50%). Crisscrossed by irregular limonite-stained joints spaced 10-100mm apart and weathered veins (<4mm) spaced <50mm apart. More weathered [FW <50%] below 29.5m.	RMW		- irregular NV seam (<50mm) of light brown to brown-grey with some irregular orangish brown (<15mm), greywacke sandstone to siltstone 26.5-26.75m. Indistinctly banded (<10mm, NV). Broken core (<100mm pieces, some silt >27.45m) 26.75-27.7m.
		120	30		30.6m			- intersecting 55° & 70° off-white veins (<7mm, weathered).
		119	31		31.3m GREYWACKE SANDSTONE [MW]; brown (orange-tint) with some grey patches (<100mm, discoloured) above 30.8m, MS, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 15-150mm apart and weathered veins (<3mm) spaced 10-50mm apart.	RMW		- broken joints (often coated by pale brown to orange-brown, non-plastic silt <3mm) spaced <200mm apart from 27.2m. Veins mostly dip 20-70°. Box 8: 27.45-29.9m.
		118	32		GREYWACKE SANDSTONE to SILTSTONE [MW]; dark brown with minor grey to dark grey patches (<50mm, discoloured) above 32.85m, MS, mostly partly weathered. Crisscrossed by irregular limonite-stained fractures to pale brown veins (<3mm, weathered) spaced 10-50mm apart.			- irregular 70° band (<30mm, patchy) of dark grey, MS to S, almost fresh, argillaceous rock 27.7-27.9m.
		117	33		- some patches (<60mm) of mostly dark grey, VS, fresh rock between 33.4-34.35m.	RMW		- 25° pale brown vein (<7mm, quartz & weathered). 20° off-white vein (<20mm, weathered) at 28.95m.
		116	34					- 70° bedding contact. Mostly fine grained rock. Minimal silt on joints. Veins mostly dip 40°-NV from 29.15m. Box 9: 29.9-32.9m.
		115	35		- irregular veins (<5mm) spaced <20mm apart below 34.9m.			- 50° joint coated by light orangish brown, non-plastic sand-silt (<3mm). Medium grained greywacke 30.6-31.3m. Joints (often coated by light brown to orange-brown, non-plastic silt <3mm) have variable dip. Veins mostly dip 20-70° from 30.6m.
		114	36		35.4m GREYWACKE SANDSTONE [MW]; brown with occasional grey patches (<50mm, discoloured), mostly MS, partly weathered. Crisscrossed by limonite-stained joints spaced 10-150mm apart and limonite-stained to white veins (<5mm, weathered) spaced <50mm apart.			- minimum depth of contact. Core run 31.3-32.5m has 0.1m of probable uphole rock (<75mm) at top. Broken joints (often coated by light orangish brown, non-plastic silt <3mm) spaced 10-100mm apart below 31.3m. Defects have variable dip.
		113	37		- some patches (<40 by 15mm, mostly 55°, some clasts) of mostly dark brown, MS-S, greywacke siltstone between 37.1-37.3m. Common grey (mostly discoloured), S, less weathered patches (<100mm) between 37.15-37.3m (70°).	RMW		- 40° pale brown vein (<3mm, weathered). Shattered core (<50mm pieces, some silt) near 31.9-32.65m (including lost core).
		112	38		- fine grained rock near 38.05-38.45m. Some grey, S-VS, almost fresh patches (<50mm) between 38.05-39m.			Box 10: 32.9-35.2m. Missing block at 32.9m. Broken core (<150mm pieces) from 33m.
		111	39					- 55° limonite-stained joint coated by silt (<4mm). Parallel 55° off-white vein(s) (<7mm, weathered) at 35m. Shattered core (<50mm pieces, some silt) 35-35.2m. Box 11: 35.2-38.1m. Mostly intact core below 35.35m.
					40m			- 30° pale brown vein (<15mm, weathered) with some rock fragments (<3mm). Minimum depth

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 18m.	123mm to 18m. 96mm to EOH.

BOREHOLE No. HUN15/3

LOCATION: HUNUA QUARRY **GRID REF:** 421160.82E 777009.13N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.30m **SHEET** 3 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 10-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 17-4-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		110	41		GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, S to VS, partly weathered (<20mm along joints) to fresh (<75%). Crisscrossed by irregular limonite-stained fractures to joints spaced <50mm apart and white veins (<2mm, quartz & weathered) spaced 10-50mm apart.	RSWb		of contact. Medium grained greywacke below 35.4m. Joints (some coated by pale brown to orange-brown, non-plastic silt <3mm) mostly dip 20°-NV.
		109	42		41.25m GREYWACKE SANDSTONE [MW]; variable brown with minor grey patches (<50mm, some discoloured), mostly MS, partly weathered [FW <15%]. Crisscrossed by limonite-stained fractures to joints spaced <50mm apart and limonite-stained to white veins (<3mm, weathered) spaced 5-100mm apart.			- irregular interval (30-100mm) of pale brown, weathered vein material with some rock fragments (<5mm) between 35.65 (45°) & 35.75m (30°). 20° pale brown vein (<7mm, weathered) at 35.75m. Shattered core (<50mm pieces, some silt) near 37.9-38m. 65° limonite-stained vein (<10mm, weathered) at 38.05m.
		108	43			RMW		15/4/15. Box 12: 38.1-40.75m. Core run 38.1-39.1m has excessive length (0.1m assumed recovered from previous run). 60° joints coated by light orangish brown, non-plastic silt (<3mm) at 38.25 & 38.35m. Bedding dips 55° at 38.45m.
		107	44		- common grey (discoloured), S, almost fresh patches (<50mm) between 43.1-43.6m. Irregular pale brown veins (<3mm) spaced <10mm apart by 43.85m. Interval of pale brown, MS, fractured (<5mm), vein material between 44.02-44.12m.			- 35° joint coated by orange-brown, silty sand (<5mm). 40° off-white vein (<10mm, weathered) at 39.7m.
		106	45		44.3m Veined GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, S to VS, partly weathered (<20mm along joints) to fresh (75%). Crisscrossed by limonite-stained joints spaced 15-150mm apart and white veins (<3mm, quartz & weathered) spaced <20mm apart.			- broken joints (some coated by orange-brown, non-plastic silt <2mm) spaced 10-150mm apart from 40m. Joints have variable dip. Veins mostly dip 20°-NV.
		105	46		- verging on fresh below 45.7m. Joints spaced 20-400mm apart and partly weathered <10mm into the adjacent rock. Veins (<3mm, calcite & quartz) spaced <40mm apart.	RSWg		Box 13: 40.75-43.6m. Variable greywacke sandstone to siltstone near 40.9-41.25m. Indistinctly banded (<20mm, 60°).
		104	47		- joints spaced 50-300mm apart by 46.95m. Veins (<5mm) spaced 5-100mm apart. Some patchy black flecked bands (<15mm, indistinct) between 47.05-47.3m.			- maximum depth of contact. Broken joints (some coated by light brown to orange-brown, non-plastic silt <3mm) spaced 10-100mm apart by 41.25m. Veins mostly dip 30°-NV. Finer greywacke 41.25-47.3m.
		103	48		48m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Crisscrossed by irregular white veins (<3mm, quartz) spaced 10-150mm apart.			- irregular 40° joint filled by light orangish brown with dark brown-black specks, VWK, material (<10mm) and partly weathered (light brown, MS) <20mm into the adjacent rock. Broken core (<100mm pieces) 42.3-43m.
		102	49					Disturbed 25° joint coated by light orangish brown, plastic mud (<4mm) near 42.65m.
		101	50		- veins (<5mm, calcite & quartz) spaced <50mm apart. Irregular dark grey to black flecked seam (<20mm, NV) 49.65-50.25m.			Box 14: 43.6-46.5m. Veins mostly dip NH-45° by 43.85m. Irregular 20-50° seam (<70mm) of silty brecciated rock (<25mm) 44.12-44.22m [Fault]. 20° joints coated by light orangish brown, non-plastic silt (<3mm) along vein material at 44.02 & 44.12m.
		100	51					- irregular 45° contact. Minimal silt on joints. Veins mostly dip 30°-NV from 44.3m.
		99	52			RFW		Crisscrossed by irregular indistinct defects ("shear bands") (<3mm, NH-50°) spaced <150mm apart.
		98	53		- more weathered [FW 95%] between 51.85 (55°) & 53.85m (65°). Irregular (25°-NV) limonite-stained joints spaced 50-300mm apart and partly weathered <15mm into the adjacent rock.			- occasional shear bands below 45.1m. Box 15: 46.5-49.4m.
		97	54		- some patches (<40 by 10mm, angular) of dark grey, S-VS, greywacke sandstone-siltstone near 53-53.25m.			- maximum depth of contact. Shear bands (<3mm, 25-75°) spaced <150mm apart. 50° vein (<6mm, quartz) at 48.15m. 45° partly limonite-stained joint at 48.35m. 5° joint partly weathered <5mm into the adjacent rock at 48.55m.
		96	55		- white to pale grey veins (<5mm, calcite & quartz) spaced <50mm apart below 53.85m.			- 25° joint partly weathered <10mm into the adjacent rock. Box 16: 49.4-52.1m. Finer greywacke 49.65-50.25m. Occasional shear bands (<5mm, 30°-NV) below 49.65m.
		95	56		55.45m GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, S to VS, partly weathered (<40mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 20-200mm apart and limonite-stained to white veins (<5mm, quartz & weathered) spaced <50mm apart. - some irregular patches (<50 by 15mm, 75°) of dark grey-black, S-VS, argillite between 56.35-56.65m.			- irregular 60° limonite-stained joint. - splaying 60° & 30° vein(s) (<15mm, quartz). Irregular seam (<100mm, 50°) of brown, MS, partly weathered rock along intersecting joints (coated by light brown to orange-brown, non-plastic silt <3mm) spaced 10-50mm apart 51.9-52.05m.
		94	57					Box 17: 52.1-54.9m. Crisscrossed by shear bands (<5mm, NH-60°) spaced <100mm apart below 52.3m. Occasional voids (<20 by 5mm) along veins 52.4-53.75m.
		93	58		- less weathered [FW <95%] below 57.6m.	RSWg		- finer greywacke from 53m. 60° white to light grey vein to vein network (<15mm, quartz) and intersecting 45° joint at 53.15m. Irregular NV white veins (<8mm, calcite) 53.2-54.55m.
		92	59					- discontinuous 55°-NV band (<20mm) of dark grey, S-VS, greywacke siltstone 53.5-53.65m. Veins mostly dip 20°-NV below 53.85m.
		91			- irregular seam (<80mm, NV) of brown, mostly MS, partly weathered rock near 59.3-59.85m.			- irregular bedding dips 60° at 54.2m. 60° white to pale grey vein to vein network (<20mm,

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 18m.	123mm to 18m. 96mm to EOH.

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BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/3**

LOCATION: HUNUA QUARRY **GRID REF:** 421160.82E 777009.13N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.30m **SHEET** 4 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 10-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 17-4-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		90			60.5m - becoming as below. Veins (<1mm) spaced 50-100mm apart below 59.85m.	RSWg		quartz) at 54.4m. Box 18: 54.9-57.6m. Medium grained greywacke from 55.45m. Defects have variable dip. Voids (<50 by 5mm) along some veins. No obvious shear defects. - intersecting 15-55° & NV joints (coated by orange-brown, non-plastic silt <3mm) and associated 30° network (<20mm, above) of weathered veins with some voids (<15 by 3mm) spaced <5mm apart. - discontinuous band (<30 by 10mm, NV) of dark grey-black, S, argillite near 56m. Box 19: 57.6-60.2m. 55° joint (coated by orange-brown, non-plastic silt <2mm) partly weathered <10mm into the adjacent rock at 57.6m. Crisscrossed by shear bands (<5mm, 20-50°) spaced <100mm apart below 57.6m. - splaying 35-20° white composite vein(s) (<15mm, quartz) with minor voids (<5mm). Core run 59.2-59.9m has 0.2m of uphole rock (<100mm) at top. Disturbed 35° joint coated by orange-brown, non-plastic silt (<2mm) at 59.85m. Box 20: 60.2-62.85m. 60° joint partly weathered <10mm into the adjacent rock at 60.5m. - maximum depth of contact. Joints (minimal silt) mostly dip 30°-NV by 60.5m. Veins mostly dip 20°-NV. Shear bands (<3mm, 20-45°) spaced 5-200mm apart. - bedding dips 70° at 61.1m. Medium-coarse grained greywacke below 61.1m. Missing block at 61.4m. Some voids (<20 by 10mm) along former veins near 61.8m. Box 21: 62.85-65.8m. Some voids (<15 by 5mm) near 63.6m. 16/4/15. - 70° joint partly weathered <5mm into the adjacent rock. Occasional dark grey-black, S, argillite clasts (<10mm). Defects have variable dip from 64.3m. Occasional shear bands (<3mm, 30-60°). 55° vein (<6mm, quartz) with some voids (<10 by 5mm) at 64.4m. - finer greywacke below 65.5m. Box 22: 65.8-68.3m. Indistinctly banded (<15mm, NV) near 66.6-67.3m. - 20° joint with associated pale grey vein (<15mm, quartz) with voids (<5mm along top) above. Medium grained greywacke by 67.45m. 50° joint partly weathered <10mm into the adjacent rock at 67.45m. - three intersecting 50°-NV joints partly weathered <10mm into the adjacent rock. Core run 67.8-69.2m has excessive length (0.2m assumed recovered from previous run). Box 23: 68.3-71.1m. 45° joint coated by light brown to orange-brown, plastic clay (<5mm) at 68.45m. Four parallel 75° discontinuous bands (<5mm) of dark grey, S-VS, greywacke siltstone 68.35-68.4m. - joints mostly dip 30°-NV below 69.25m. - coarser greywacke near 70.05-72.35m. Box 24: 71.1-73.8m. - irregular bands (<15mm, 45°-NV) of dark grey, VS, greywacke siltstone in patches 71.15-71.35m. Shear bands (<5mm, NH-60°) spaced <150mm apart below 71.15m. - 30° joint(s) coated by orange-brown, non-plastic silt (<2mm) and partly weathered <15mm into the adjacent rock near 71.7m. - 70° joint partly coated by dark green-black, chloritic material (<1mm) and partly altered (discoloured grey, MS-S) <15mm into the adjacent rock. Defects have variable dip. Shear bands (<3mm, as above) from 72.35m. - irregular 75-50° composite vein(s) (<20mm, calcite) 72.8-73.05m. Pyrite specks on broken vein surface near 72.85m. Veins mostly dip NH-70° below 73.05m. No obvious joints. Box 25: 73.8-76.55m. Core run 73.8-75.4m has excessive length (0.1m assumed recovered from previous run). Splaying 70-55° vein (<10mm, calcite) partly altered <20mm into the adjacent rock at 74.2m.
		89	61					
		88	62			RFW		
		87	63		- minor argillite clasts (<15mm) by 62.85m.			
		86	64		64.3m GREYWACKE SANDSTONE [SW/FW]; grey with minor irregular brown seams, VS, partly weathered (<15mm along joints) to fresh (95%). Limonite-stained joints spaced 30-300mm apart. Crisscrossed by white veins (<3mm, calcite & quartz) with occasional voids (<20 by 3mm) spaced 5-100mm apart.			
		85	65					
		84	66		- irregular seam (<0.1m) of brown, MS-S, partly weathered rock along irregular (40-50°) joints near 65.7-65.85m.			
		83	67		- fresh (>95%) between 66.55-68.25m. Few joints. Irregular seam (<50mm, NV) of dark grey, S-VS, sandstone-siltstone between 66.6-67.3m. - some patches (<20mm, angular) of dark grey-black, S-VS, argillite between 67.3-67.45 & 67.9-68m.			
		82	68		- more weathered [FW <90%] between 68.25-69.25m. Joints spaced 30-300mm apart and partly weathered <15mm into the adjacent rock. Irregular (25°-NV) limonite-stained to white veins (<3mm, quartz & weathered) spaced 5-100mm apart. - partly weathered <10mm into the adjacent rock along joints below 69.25m.	RSWg		
		81	69					
		80	70		- some irregular patches (<60mm, some clasts) of dark grey, S-VS, greywacke siltstone below 70.05m.			
		79	71		- verging on fresh below 70.65m. Few limonite-stained joints below 70.8m. Minor argillite clasts (<20 by 7mm, NV). - some finer grained patches (<100mm, indistinct) between 71.15-71.35m. More patches (<35 by 20mm, some clasts) of dark grey to black, S to VS, siltstone to argillite between 71.35-71.5m.			
		78	72		72.35m GREYWACKE SANDSTONE [SA/FW]; grey, VS, fresh (95%). Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced <30mm apart. - veins spaced 10-150mm apart below 73.05m.	RFW		
		77	73					
		76	74		- minor irregular seams (<30mm) of grey (discoloured), MS-S, partly altered rock along some veins below 74m.			
		75	75		74.45m GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, MS to VS, partly weathered (<25mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 20-200mm apart and limonite-stained to white veins (<5mm, calcite & quartz) spaced <5-50mm apart.			
		74	76					
		73	77		- less weathered [FW 95%] by 76.7m. Irregular white veins (<3mm, calcite) spaced 5-200mm apart.	RSWg		
		72	78		- irregular joints spaced 50-500mm apart and partly weathered <10mm into the adjacent rock below 77.55m.			
		71	79		79.35m - irregular seam (<50mm, 60°) of brown, MS to S, partly weathered rock along several parallel joints spaced <25mm apart below 79.25m.	RFW		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 18m.	123mm to 18m. 96mm to EOH.

BOREHOLE No. HUN15/3

LOCATION: HUNUA QUARRY **GRID REF:** 421160.82E 777009.13N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.30m **SHEET** 5 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 10-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 17-4-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		70	81		GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 10-200mm apart. Some patchy bands (<10mm, 55º-NV) of grey, S, siltstone between 79.45-79.85m.			- some joints coated by orange-brown silt (<1mm) from 74.45m. No obvious shear bands. Veins mostly dip 25º-NV near 74.45-76.7m. - intersecting 60º & NH joints locally coated by light brown, plastic clay (<10mm) and partly weathered <15mm into the adjacent rock. Associated 60º vein (<15mm, calcite) with some rock fragments (<10 by 5mm) along upper joint. - irregular 65º seam (<50mm) of brecciated rock (<30mm) to light grey vein material (<15mm, quartz) 75-75.25m. Irregular 55º network (<15mm) of white to light grey veins (<5mm, quartz) with voids (<50 by 5mm) along top spaced <5mm apart at 75.25m. Box 26: 76.55-79.5m. Veins have variable dip by 76.7m. 50º joint and associated limonite-stained to transparent vein (<4mm, weathered/zeolite?) at 77.35m. Occasional shear bands (<3mm, 30-60º) below 77.55m. - irregular 60º contact. Occasional shear bands (<3mm, 45º-NV) from 79.35m. No obvious joints. Box 26: 79.5-82.05m. Core run 79.7-81.0m has excessive length (0.2m assumed recovered from previous run). Core run 81-81.9m has 0.25m of excessive length (suspect depth). Defects have variable dip. Several intersecting irregular 25º-NV limonite-stained joints near 81m. Irregular 45º limonite-stained joint near 81.3m. Box 28: 82.05-85.0m. 10º limonite-stained joint near 82.05m. - intersecting irregular 60º & 40º joints partly weathered (indistinct) <25mm into the adjacent rock near 83m. 75º limonite-stained joint at 83.2m. Broken NV vein (<1mm, calcite) to joint with some pyrite patches 83.25-84m. - 35º limonite-stained joints at 84.7 & 84.85m. Box 29: 85.0-87.7m. Broken 45º limonite-stained to white vein (<1mm, calcite) at 85m. Irregular 50-40º network (<50mm) of veins (<20mm, calcite & quartz) with some voids (<20 by 6mm) spaced <20mm apart 85-85.1m. - irregular NV-55º limonite-stained joint. Disturbed seam (<70mm, 40-50º) of shattered partly weathered rock (<30mm, silty) 85.65-85.75m [Minor Fault]. - coarser greywacke by 86.3m. Broken veins spaced 50-600mm apart. - crisscrossed by shear bands (<3mm, 30-60º) spaced 5-50mm apart near 87.25-87.5m. Box 30: 87.7-90.0m. - 50º vein (<3mm, calcite) partly altered (discoloured grey, S) <10mm into the adjacent rock (above only). 30º shear band(s)(<5mm) at 88.63m. Veins mostly dip 30-80º below 88.8m. No obvious joints. - 40º vein (<2mm, calcite) partly altered <10mm into the adjacent rock. 17/4/15. Box 31: 90.0-93.25m. 30º vein (<10mm, calcite) at 90m. Dark grey, S, siltstone clast (<35 by 20mm, 55º) at 90.25m. Core sample taken by K Barber. Irregular 50º-NV network (<30mm) of pale grey with black specks, veins (<10mm, calcite) spaced <15mm apart at 91.3m. Core run 91.5-92.6m dropped from barrel (partly recovered in 50-140mm sections). Core sample taken by K Barber. Crisscrossed by shear bands (<4mm, 40º-NV) spaced <200mm by 92.75m. Box 32: 93.25-96.0m. - broken 55º transparent-white to grey vein (<7mm, calcite) partly altered <20mm into the adjacent rock. Becoming finer greywacke below 93.25m. Irregular NV vein(s) (<10mm, calcite) with some rock fragments (<20 by 5mm) 93.7-94.2m. Core sample taken by K Barber. Irregular 40º network (<25mm) of white to light grey veins (<4mm, calcite & quartz) spaced <5mm at 94.6m.
		69	82		- some irregular black flecks to patches (<25 by 10mm) near 81.9-82.25m. Coarser grained seam (<65mm, NV) with minor dark grey, S, greywacke siltstone clasts (<20 by 6mm) near 82.35-83.2m.			
		68	83					
		67	84					
		66	85					
		65	86		- irregular limonite-stained joints spaced 15-100mm apart below 85.4m. Limonite-stained to white veins (<3mm, quartz & weathered) spaced 5-50mm apart. - slightly weathered [FW >50%] between 85.6-86m. Intersecting joints spaced <50mm apart and partly weathered <20mm into the adjacent rock. - white veins (<3mm, calcite) spaced 50-300mm apart by 86.3m. Some coarse grained seams (<0.2m, 55º) with some dark grey-black, S, argillite clasts (<25 by 15mm) near 86.5-88.8m.			
		64	87					
		63	88			RFW		
		62	89		- veins (<4mm, calcite) spaced 20-400mm apart below 88.8m.			
		61	90					
		60	91		- occasional dark grey to black, S, argillaceous clasts (mostly <8mm) between 90.25-92m. - some irregular patches (<70 by 30mm, 30º) of greywacke siltstone to argillite between 90.75-91.1m.			
		59	92		- irregular (30º-NV) white veins (<10mm, calcite & quartz) spaced 10-50mm apart between 91.5-93m. Black, MS to S, argillite clast (<15 by 10mm, 70º) near 92m.			
		58	93					
		57	94					
		56	95					
		55	96		96m			
		54	97		EOH @ 96m			
		53	98					
		52	99					
		51						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 18m.	123mm to 18m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/4

LOCATION: HUNUA QUARRY **GRID REF:** 421260.16E 776909.57N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 194.43m **SHEET** 1 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		194	0		0.2m Aggregate FILL; moderately weathered, greywacke fragments (<65mm) with minor to some light brown, silty sand.	QF		NZTM location (GPS within 3m) of 1778051mE & 5893536mN. RQD entered into penetration field in database from 11.5m. Core boxes photographed. Box 1: 0-4.4m. Disturbed core (wet).
					0.65m SILT with some to minor sand; brown (organic), disturbed (very soft), non-plastic, minor rootlets. [Top Soil]	O		- measured depth of contact. Half core lost above 0.2m. Intact core (moist) from 0.45m.
		193	1		- light brown with orangish brown mottles, stiff to very stiff and minor sand below 0.45m. Less rootlets. Clayey SILT; pale brown (grey-tint) with orange mottles to streaks, very stiff to hard, slightly plastic to plastic. [Residual Soil].			- minimum depth of contact. - softer (disturbed core) from 1.7m.
		192	2		- minimal (<0.115m) core recovery between 1.4-3.2m.	O		
		191	3		- light brown (orange-tint), plastic mud from 3.2m.			10/3/15. Disturbed core (very soft, wet) from 3.2m. Core run 3.2-4.5m has up to 0.15m of uphole material at top.
		190	4		4.15m Silty SAND; grey, loosely packed (disturbed core). [MW/SW Waitemata Group].		S.W.L 4.61m (17/03/15).	- maximum depth of contact. Slightly more intact core from 4.15m. Box 2: 4.4-7.0m. Core run 4.4-6.0m has 0.42m of probable uphole material at top.
		189	5		- some intervals (<0.1m, indistinct) of darker grey, plastic to slightly plastic mud below 4.9m.	OWT		
		188	6		- disturbed (stiff) to tightly packed (hard), medium-fine sand by 6.35m.			Core run 6.0-7.0m has 0.15m of uphole material at top and excessive length (0.4m assumed recovered from previous run). Some intact core from 6.35m.
		187	7		6.82m SILTSTONE [SW to FW]; dark grey (brown-tint), EWK (hard) to VWK. Some mudstone bands (<20mm, indistinct NH) above 7.6m. [Waitemata Group].			- bedding contact dips 10° near 6.82m. Box 3: 7.0-9.6m. Mostly intact core (moist) from 7m. Core run 7.0-8.5m has 0.3m of uphole material at top.
		186	8		- calcareous by 8m. Muddy below 9.3m.	OWT		
		185	9		9.4m Silty SANDSTONE (Fine) [SA to MW]; mostly grey, VWK. Calcareous near 9.6-10.5m. [Waitemata Group].			Broken core (<100mm pieces) from 8.5m. - maximum depth of contact. NV seam (<20mm, disturbed) of grey (green-tint), slightly altered rock near top (above 9.55m). Box 4: 9.6-11.95m. Intact core 9.6-9.95m.
		184	10		- light brown to light orangish brown and softer (EWK to VWK) from 10.5m. Crisscrossed by irregular NH & NV limonite-stained to black defects spaced <15mm apart.	OWT		- limonite-cemented band(s) (<30mm, disturbed) near 10.5m. Then band (<50mm) of light grey-brown with black flecks, VWK, mudstone. Intact core 10.6-11.2m.
		183	11		11.35m - irregular 60° to NV limonite-stained joints spaced <50mm apart below 11.2m. GREYWACKE SANDSTONE [MW-SW]; brown to grey, MS to VS, partly weathered (<20mm along joints) to fresh (>50%). Crisscrossed by irregular limonite-stained joints (often coated by orange-brown, non-plastic silt <2mm) spaced 10-100mm apart.			- irregular 15° limonite-stained joint. - approximate depth of irregular contact. Medium grained greywacke. Joints mostly dip 15°-NV. Core run 11.8-12.7m has 0.1m of uphole material at top. Box 5: 11.95-14.4m. Mostly intact core from 11.95m.
		182	12		- less weathered [FW <75%] below 11.8m.			
		181	13		- crisscrossed by irregular (60°-NV) light grey veins (<3mm, weathered) spaced <20mm apart between 13.4-13.6m.	RSWb		
		180	14					Box 6: 14.4-17.4m.
		179	15					
		178	16		16.1m GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, MS to VS, partly weathered (<10mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 15-150mm apart. Irregular limonite-stained to white veins (<3mm, weathered) spaced 5-200mm apart.			- minimum depth of contact. Defects mostly dip 25°-NV. Some joints coated by light brown to orange-brown, non-plastic silt (<2mm).
		177	17		- less weathered [FW <95%] by 17.45m. Joints spaced 10-300mm. Veins (<2mm) spaced 20-200mm apart.			Box 7: 17.4-20.1m.
		176	18			RSWg		
		175	19					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/4

LOCATION: HUNUA QUARRY **GRID REF:** 421260.16E 776909.57N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 194.43m **SHEET** 2 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		174	21		- joints spaced 20-250mm apart below 21.15m.	RSWg		Box 8: 20.1-22.95m. 11/3/15. SWL 0.0m. 50° joint partly weathered <7mm into the adjacent rock and associated seam (<50mm, below) of light brown (orange-tint), fractured (<10mm) weathered rock at 20.5m. - 55° limonite stained to off-white vein (<5mm, weathered) with associated network (<50mm either side) of veins (<2mm) spaced <20mm apart. - joints often coated by silt (<4mm, as above) below 21.15m. 45° joint (coated by orange-brown, non-plastic silt <2mm) partly weathered <10mm into the adjacent rock and associated patchy seam (<30mm, above) of light brown, weathered rock.
		173	22					
		172	23					
		171	24		- indistinct interval (60mm, 50°) with some black, MS-S, argillite clasts (<10mm) between 23.4-23.5m. Irregular limonite-stained to black joints spaced 15-100mm apart and partly altered (darker grey, MS) <10mm into the adjacent rock below 23.6m.			
		170	25		24.2m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Crisscrossed by irregular white veins (<3mm, quartz) spaced 5-200mm apart.			Box 9: 22.95-25.6m. Fine grained greywacke near 23-23.15m. 45° joint with associated off-white vein (<7mm, weathered) near 23m. - 30° band (<25mm) of black, MS-S, argillite. Broken core (<75mm pieces) 23.15-23.4m. - coarser greywacke near 23.9-24.2m. - maximum depth of contact. Veins mostly dip 30°-NV. No obvious joints. Fine grained greywacke below 24.8m. - black flecked horizons to bands (<5mm, 55°) spaced <25mm apart between 25-25.2m.
		169	26		- fractured to brecciated (<15mm, muddy) altered rock between 25.6-25.9m (40°) [Fault]. Crisscrossed by limonite-stained to black joints spaced 10-150mm apart and partly weathered <3mm into the adjacent rock by 25.9m. Veins (<3mm) spaced <100mm apart.			
		168	27		- some black, MS-S, argillite clasts (<50 by 10mm) near 26.7-26.8m			Box 10: 25.6-28.35m. 40° defect with common pyrite specks and associated band (<10mm) of black to dark grey, WK to MS, argillite at 25.6m. - coarser greywacke by 25.9m. Defects mostly dip 20°-NV. Some joints coated by orange-brown, non-plastic silt (<2mm). Discontinuous seam (<25mm, 50°) of dark grey, MS-S argillaceous rock at 26.25m. Core broken (<75mm pieces) along irregular NV joint(s) 27.05-27.25m. Partly weathered <15mm into the adjacent rock.
		167	28		- no obvious joints between 27.7-28.6m.	RFW		
		166	29		- limonite-stained joints spaced 40-400mm apart below 28.6m. Veins (<2mm) spaced 10-200mm apart.			Box 11: 28.35-31.1m. - defects have variable dip below 28.6m. Minimal silt on joints. Occasional indistinct irregular (45°-NV) defects ("shear bands")(<3mm) near 28.6-32.4m. - 60° defect coated by black, non-plastic silt (<3mm). - 35° composite vein (<5mm, quartz & weathered). Box 12: 31.1-33.7m.
		165	30					
		164	31					
		163	32					
		162	33		32.4m GREYWACKE SANDSTONE [MW/SW]; brown to grey (<100mm), MS to VS, partly weathered (<50mm along joints) to fresh (50%). Crisscrossed by irregular limonite-stained joints spaced 10-100mm apart and limonite-stained to white veins (<3mm, weathered) spaced <5-100mm apart.			- veins mostly dip 20-60° between 32.4-33.7m. Some joints coated by orange-brown, non-plastic silt (<2mm) by 32.4m. - 20° band (<20mm) of light orangish brown with white mottles, disturbed (soft), plastic to slightly plastic mud with associated seam (<50mm, below) of light brown, weathered-partly weathered, fractured (<15mm) rock at 32.45m.[Fault].
		161	34		- brown with some grey patches (<50mm, discoloured), MS to S, moderately weathered [MW] between 33.7-34.2m. Joints spaced 10-50mm apart. Veins spaced 5-50mm apart by 33.7m. - less weathered [FW <75%] between 34.2-35.7m. Partly weathered <15mm into the adjacent rock along joints. Some quartz veins by 34.2m.			Box 13: 33.7-36.1m. 55° off-white vein (<5mm, weathered) near 33.7m. Broken core with some intact intervals (<200mm) from 33.7m. Seam (<50mm, disturbed) of finer greywacke near 34m. - block incorrectly placed at 35.1m (moved down row).
		160	35					
		159	36		- moderately weathered [MW] between 35.7-36.25m. Veins (<5mm) spaced 10-50mm apart below 35.7m.	RSWb		
		158	37		- joints (some coated by light brown to orange-brown, non-plastic silt <2mm) spaced 10-50mm apart and partly weathered <30mm into the adjacent rock by 36.25m. Narrower veins (<3mm).			- interval (disturbed) of darker brown, WK-MS, greywacke sandstone-siltstone 36-36.1m. Box 14: 36.1-38.7m. More intact core from 36.25m. SWL 19.17m after drilling at 37.7m.
		157	38					12/3/15. SWL 18.9m. Cased to 12m. Core run 37.7-38.5m has 0.05m of uphole material at top.
		156	39					- mostly intact core from 38.5m. Box 15: 38.7-41.3m.
		155						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BOREHOLE No. **HUN15/4**

LOCATION: HUNUA QUARRY **GRID REF:** 421260.16E 776909.57N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 194.43m **SHEET** 3 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		154			40.5m - brown (darker) to dark grey, MS, argillaceous rock below 40.25m. Veins spaced <20mm apart.	RSWb		
			41		Veined GREYWACKE SANDSTONE [MW]; brown with occasional grey patches (<50mm, discoloured), MS to S, mostly partly weathered. Crisscrossed by irregular limonite-stained joints spaced 20-200mm apart and limonite-stained to white veins (<3mm, weathered) spaced 5-25mm apart.			- 30° joint and associated white composite vein (<4mm, weathered). Defects have variable dip. Some joints coated by orange-brown, non-plastic silt (<2mm). Irregular 55° seam (<50mm) of dark brown, WK-MS, argillaceous rock 40.7-40.9m.
		153						
			42		- more grey (discoloured), less weathered patches (<100mm) below 41.6m.	RMW		- 30° off-white to light grey composite vein (<25mm, quartz) and band (<15mm, below) of argillaceous rock (as above). Box 16: 41.3-44.0m.
		152						
			43		- common grey patches between 42.55-42.9m.			
		151			- some grey patches below 43.2m. Veins spaced 5-50mm apart.			
			44		- verging on slightly weathered [FW <50%] below 43.95m. Joints (some coated by light brown to orange-brown, non-plastic silt <2mm) spaced 15-150mm apart and partly weathered <50mm into the adjacent rock. Off-white veins (<5mm) spaced 5-30mm apart.			Box 17: 44.0-46.7m.
		150						
			45					
		149						
			46		- more weathered [FW <25%] between 45.9-47.6m.			
		148						
			47					Box 18: 46.7-49.15m.
		147						
			48					
		146						
			49		- slightly weathered [FW <75%] near 48.95-49.7m.			
		145						Box 19: 49.15-52.0m.
			50		- more weathered below 49.7m. Joints spaced 15-150mm apart. White veins (<3mm, weathered) spaced 5-35mm apart. Some grey (often discoloured), less weathered patches (<100mm) below 50.2m.			- 65° joint. Joints often coated by pale brown to orange-brown, slightly plastic to non-plastic silt (<2mm) below 49.7m. Core broken (<50mm pieces) along intersecting limonite-stained to black joints spaced <30mm apart 49.85-50.2m.
		144						
			51					
		143						
			52					Box 20: 52.0-54.6m.
		142			- grey (discoloured) with some irregular brown seams (<100mm) between 52.4-53.05m.			
			53		- no grey patches between 53.05-54.4m. Discontinuous limonite-stained to off-white veins spaced <15mm apart near 53.05-53.7m.			
		141						
			54					
		140			- grey (discoloured) with some irregular light brown-brown seams, partly weathered (<50mm along joints) to slightly altered (<75%, pervasive) near 54.6-55.7m. Joints spaced 10-100mm apart. Limonite-stained to white veins (<3mm) spaced 5-35mm apart.			- some joints coated by orange-brown, non-plastic silt (<1mm) by 54.6m. Box 21: 54.6-57.25m.
		139						
			56		- light brown-brown with some grey patches (<75mm, discoloured) from 55.7m. Joints spaced 20-200mm apart. Veins spaced <40mm apart.			
		138						- 70° off-white composite vein (<7mm, weathered). Medium grained greywacke by 56.9m. Box 22: 57.25-59.9m.
			57					
		137						
			58					
		136			58.6m			
			59		GREYWACKE SANDSTONE [MW/SA]; grey with irregular light brown-brown seams (<150mm), MS to S, partly weathered (<50mm along joints) to slightly weathered/altered (>50%, pervasive). Crisscrossed by limonite-stained joints spaced 10-100mm apart. Veins (<5mm) as below.	RSWb		
		135						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BOREHOLE No. HUN15/4

LOCATION: HUNUA QUARRY **GRID REF:** 421260.16E 776909.57N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 194.43m **SHEET** 4 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		134	61					Box 23: 59.9-62.5m.
		133	62					
		132	63		- more weathered [SW/SA 50%] near 62.35-65.2m. Joints spaced 15-150mm apart. Crisscrossed by irregular limonite-stained to white veins (<3mm, weathered) spaced 10-50mm apart.			- joints (some partly coated by orange-brown, non-plastic silt <1mm) have variable dip. Veins mostly dip 30°-NV near 62.35-65.2m. Box 24: 62.5-65.25m.
		131	64					
		130	65		- veins (<3mm) spaced <30mm apart below 64.1m.	RSWb		- 35° joint coated by pale to light brown, slightly plastic to non-plastic silt (<2mm). Finer greywacke near 64.1-65.65m. SWL 5.13m after drilling at 64m. 13/3/15. SWL 17.15m. Irregular void(s) (<50 by 15mm) along former vein near 64.3m.
		129	66		- joints spaced 10-50mm apart from 65.2m. Veins (<3mm) spaced 5-25mm apart with occasional voids (<15 by 5mm).			- irregular voids (<30 by 3mm) along veins near 65.15m. Some joints coated by silt (<2mm, as above) between 65.2-69.45m. Veins have variable dip from 65.2m. Box 25: 65.25-68.05m.
		128	67					- intersecting 70 & 50° joints partly weathered <100mm into the adjacent rock.
		127	68		- more weathered [SW/SA 50%] below 67.25m. Brown to grey (<100mm).			
		126	69					Box 26: 68.05-70.6m.
		125	70		69.45m GREYWACKE SANDSTONE [MW]; brown with some grey patches (<100mm), MS to VS, partly weathered to fresh (<25%). Crisscrossed by irregular limonite-stained joints spaced 10-150mm apart and limonite-stained to white veins (<5mm, weathered) spaced 5-50mm apart.			- 55° limonite-stained joint.
		124	71					Box 27: 70.6-73.2m. Irregular NV joint(s) 70.7-72.75m. Band (<30mm, disturbed) of pale brown (orange-tint) to light brown with black specks, non-plastic silt with some sand near 71.5m. Broken core (<50mm pieces) 71.25-71.5m.
		123	72					
		122	73		- light brown-brown with some grey (<150mm) below 73m.	RMW		- 70° off-white vein (<7mm, quartz). Box 28: 73.2-75.95m.
		121	74					
		120	75					
		119	76		75.8m Veined GREYWACKE SANDSTONE [MW]; as above. Irregular limonite-stained joints (some partly coated by orange-brown, non-plastic silt <1mm) spaced 20-200mm apart. Irregular limonite-stained to transparent-white veins (<15mm, quartz & weathered) spaced <20mm apart.			- veins mostly dip 15°-NV near 75.8-78.0m. Box 29: 75.95-78.6m.
		118	77					
		117	78		- no grey patches below 77.4m.	RMW		
		116	79		- light to pale brown , WK, weathered-partly weathered, fractured (<20mm) greywacke (above 78.2m) to indistinctly banded (<20mm, 30°) off-white to light grey, WK to VS, partly weathered, vein material between 78-78.7m. - occasional grey, S to VS, less weathered patches (<100mm) below 78.7m. Joints spaced 30-300mm apart. Limonite-stained to white veins (<15mm, weathered) spaced 5-25mm apart.			- 40° joint filled by light brown, low plasticity clay (<10mm). 30° limonite-stained polished defect with associated band (<30mm, above) of off-white, silty sand (vein material) to pale brown, plastic clay (<5mm) near 78.2m [Fault]. - irregular 50°-NV joint 78.2-78.35m. 35° joints at 78.35 & 78.6m. Box 30: 78.6-81.3m. - 45° slickensided defect with associated band
		115						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/4

LOCATION: HUNUA QUARRY **GRID REF:** 421260.16E 776909.57N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 194.43m **SHEET** 5 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		114	81					(<20mm) of grey, non-plastic silt. - 45° off-white vein (<30mm, weathered to quartz).
		113				RMW		Box 31: 81.3-83.85m.
		112	82					
			83		83.1m			
		111			Veined GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams (<300mm), S to VS, partly weathered (<50mm along joints) to fresh (>50%). Crisscrossed by limonite-stained joints spaced 20-250mm apart and limonite-stained to white veins (<5mm, weathered) spaced 5-35mm apart.			- defects have variable dip. Some joints partly coated by orange-brown, non-plastic silt (<1mm). Box 32: 83.85-86.5m.
		110	84					- 55° off-white composite vein (<20mm, weathered).
		109	85					- 55° composite vein (<30mm, weathered). Discontinuous 50° pale brown vein (<7mm, weathered) at 85.8m. Box 33: 86.5-89.4m.
		108	86					
		107	87			RSWb		- 10° vein (<10mm, quartz).
		106	88		- more weathered [FW <50%] between 88.65-89.3m.			
		105	89					Box 34: 89.4-92.2m.
		104	90					- irregular NV joint(s) coated by silt (<2mm) and partly weathered <50mm into the adjacent rock 90.05-91.6m.
			91		91.1m			
		103	92		Veined GREYWACKE SANDSTONE [MW]; brown with some grey patches (<100mm), MS to VS, partly weathered to fresh (<25%). Crisscrossed by irregular limonite-stained joints spaced 50-200mm apart and limonite-stained to white veins (<5mm, quartz & weathered) spaced 5-35mm apart.			- 55° joint. Minimum depth of contact at 91.1m. Some joints coated by silt (<2mm, as above).
		102	93					Box 35: 92.2-94.8m. 45° transparent-white vein (<8mm, quartz) with some vuggy voids (<10 by 3mm) at 92.5m.
		101	94			RMW		
		100	95		- darker brown, S, fine grained between 94 (55°) & 94.4m (50°).			Box 36: 94.8-97.4m.
		99	96		- dark brown to dark grey (<200mm), mostly S, partly weathered to fresh (<50%), greywacke sandstone (fine) to argillaceous rock between 95.55-97.2m. Joints spaced 30-300mm apart. Veins (<5mm) spaced 5-35mm apart.			- 50° joint. Indistinctly bedded (<150mm, 55°) 99.55-97.2m. Joints (often coated by orange-brown, non-plastic silt <2mm) mostly dip 40°-NV by 95.55m. Vuggy voids (<20 by 5mm) along 55° vein(s) (<5mm, quartz) near 95.6m.
		98	97		- no fresh patches below 96.6m.			
		97			- joints spaced 15-150mm apart. Veins (<5mm) spaced 5-25mm apart.			- 55° joint with associated band (<15mm) of brecciated rock with some light orangish brown, slightly plastic silt.
			97.65m					
		96	98		GREYWACKE SANDSTONE [SW]; grey with irregular brown seams, S to VS, partly weathered (<30mm along joints) to fresh (>50%). Crisscrossed by limonite-stained joints spaced 15-150mm apart and limonite-stained to white veins (<4mm, weathered) spaced 5-35mm apart.	RSW		- 35° off-white to grey composite vein (<20mm, weathered). Defects mostly dip NH-55° near 97.2-97.65m. Some joints coated by silt (<1mm, as above). Box 37: 97.4-100.15m.
		95	99		- less weathered [FW >75%] from 98.25m. Joints spaced 30-300mm apart and partly weathered <20mm into the adjacent rock. Irregular white veins (<10mm, quartz) spaced 5-50mm apart.			- joints (often coated by silt <2mm) have variable dip from 97.65m. Veins mostly dip NH-70°.
			99.75m		- indistinct fine grained bands (<50mm, 50°) below 99.65m.	RSWb		- NH joint. Defects have variable dip below 98.25m. Some joints partly coated by silt

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

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BOREHOLE No. HUN15/4

LOCATION: HUNUA QUARRY **GRID REF:** 421260.16E 776909.57N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 194.43m **SHEET** 6 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		94			GREYWACKE SANDSTONE (Fine) to ARGILLITE [MW-SW]; dark grey to black with irregular dark brown seams, S to VS, partly weathered (<50mm along joints) to fresh (<75%). Limonite-stained joints spaced 15-150mm apart. Irregular limonite-stained to white veins (<4mm, quartz & weathered) spaced 5-50mm apart.	RSWb		(<1mm, as above). - irregular 50° band (<10mm) of black, MS-S, argillite.
		93	101		101.45m			- 60° joint. Indistinctly banded (<50mm, 50°) from 99.75m. Joints (some coated by light brown to orange-brown, non-plastic silt <2mm) mostly dip 25°-NV
		92	102		Veined GREYWACKE SANDSTONE (Fine) to SILTSTONE [MW]; brown to dark brown with some dark grey patches (<60mm), MS to S, partly weathered to fresh (25%). Crisscrossed by irregular limonite-stained joints spaced 15-150mm apart and limonite-stained to white veins (<4mm, weathered) spaced <30mm apart.	RMW		Box 38: 100.15-102.85m. - 40° joint coated by light orange-brown, non-plastic sand-silt (<3mm) and partly weathered <30mm into the adjacent rock. - maximum depth of contact. Indistinctly banded (<50mm, 45°). Joints (some partly coated by orange-brown, non-plastic silt <1mm) mostly dip NH-70° by 101.45m. Veins have variable dip.
		91	103		- becoming greywacke sandstone (medium) along irregular NV contact below 102.7m.			
		90	104		103.2m Veined GREYWACKE SANDSTONE [MW/SA]; light brown-brown to grey (discoloured), mostly S, partly weathered to slightly weathered/altered (50%, pervasive). Crisscrossed by limonite-stained joints spaced 25-250mm apart and limonite-stained to white veins (<4mm, weathered) spaced 5-35mm apart.			- irregular 45° network of off-white to pale brown veins (<5mm, weathered) spaced <10mm apart 101.55-101.7m. - some irregular patches (<60mm) of mostly grey, S to VS, fresh, greywacke sandstone (medium) near 102.5-102.7m. Box 39: 102.85-105.6m.
		89	105			RSWb		- irregular contact dips 60°. Defects have variable dip. Medium grained greywacke with some patches (<50mm, subangular) of dark grey, MS-S, argillite to 103.35m.
		88	106					- darker brown, greywacke sandstone-siltstone 103.35-103.65m. 60° joint partly weathered <15mm into the adjacent rock at 103.65m.
		87	107		- irregular white veins (<5mm, zeolite?) spaced <20mm apart.			- discontinuous 50° white composite vein (<7mm, calcite). Irregular NH partly limonite-stained joint with some pyrite specks at 103.7m.
		86	108		108.15m			- irregular 40-10° joint(s) coated by light brown, slightly plastic mud (<10mm) at 104.2m. Broken core (<50mm pieces, some silt) 104.2-104.5m.
		85	109		Veined GREYWACKE SANDSTONE [MW]; light brown-brown, MS to S, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 10-300mm apart to white veins (<6mm, weathered) spaced <20mm apart. - less weathered [MW/SA] between 108.75-109.7m.			- indistinct 30° joint with some pyrite specks. Box 40: 105.6-108.4m. SWL 5.21m after drilling at 106m.
		84	110			RMW		16/3/15. SWL 19.91m. Discontinuous 70° white vein (<20mm, calcite) 106.2-106.3m.
		83	111		- limonite-stained joints spaced 15-100mm apart below 110.8m.			- 40° defect coated by light grey, non-plastic silt (<3mm).
		82	112		- occasional irregular patches (<30mm) of grey, VS, fresh rock below 111.3m. 112m - becoming as below.			- irregular NH contact. Box 41: 108.4-111.05m. Some grey, S-VS, almost fresh patches (<30mm) 108.4-108.5m. 55° pale brown vein (<7mm, weathered) at 108.55m.
		81	113		Veined GREYWACKE SANDSTONE [SW/SA]; grey with minor irregular light brown to greyish brown seams, S to VS, partly weathered (<15mm along joints) to slightly altered/fresh (>75%). Irregular white veins (<10mm, calcite & quartz) spaced <20mm apart.	RSW		- 40° defects filled by light grey, hard silt with brecciated rock (<30mm, silty) between 108.78m (<15mm, pyrite specks) & 108.85m (<10mm, pyrite patches) [Fault]. Core broken along intersecting joints (coated by orange-brown, non-plastic silt <2mm) spaced 10-50mm apart 110.1-110.5m.
		80	114		113.85m Veined GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, S to VS, partly weathered (<20mm along joints) to fresh (>50%). Limonite-stained joints spaced 25-250mm apart. Crisscrossed by irregular white to pale brown veins (<10mm, quartz & weathered) spaced <20mm apart.			- irregular patch (<60mm) of grey, S, almost fresh rock. Defects have variable dip. Some joints coated by silt (<1mm, as above). Broken core (<100mm pieces) 110.9-112m. Box 42: 111.05-113.7m. - limonite-stained joints to broken veins spaced 25-250mm (mostly <50mm) apart 112-113.85m.
		79	115			RSWb		Box 43: 113.7-116.5m. Minimal silt on joints by 113.85m. Veins mostly dip 30°-NV near 113.85-116.45m.
		78	116					
		77	117		- less weathered [FW 75%] from 116.45m. Joints spaced 50-150mm apart and partly weathered <50mm into the adjacent rock. Limonite-stained to white veins (<10mm, quartz) spaced <20mm apart. 117.3m Veined GREYWACKE SANDSTONE [MW]; light brown-brown, MS to S, partly weathered. Irregular limonite-stained joints spaced 10-200mm apart. Crisscrossed by irregular off-white veins (<10mm, quartz & weathered) spaced <20mm apart.			- joints mostly dip NH-50° near 116.45-117.3m. Box 44: 116.5-119.35m. - offset 80° pale brown vein (<30mm, weathered).
		76	118			RMW		
		75	119		119.1m FAULTED & ALTERED ROCK [HA-MA]; grey (discoloured), VWK to 119.65m WK, altered-partly altered, sheared & veined (<10mm) greywacke (Sst) with bands (<20mm, 60°) of black argillaceous rock and off-white vein	RW RMW		- irregular 55° contact. Box 45: 119.35-122.25m. 70° defect filled by grey, plastic clay (<15mm) at 119.2m. Shattered

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/4**

LOCATION: HUNUA QUARRY **GRID REF:** 421260.16E 776909.57N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 194.43m **SHEET** 7 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 9-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 16-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		74	121		material (below 119.2mm, zeolite?). [Fault Zone].	RMW		core (<30mm pieces, silty) 119.5-119.6m.
					120.65m Veined GREYWACKE SANDSTONE [MW]; brown with some grey patches (<200 by 50mm, NV), MS to S, partly weathered. Irregular limonite-stained joints spaced 50-300mm apart. Crisscrossed by indistinct white to pale brown veins (<4mm, weathered) spaced <40mm apart.			- irregular 45° contact. Finer greywacke by 119.65m. Joints mostly dip 60°-NV near 119.65-120.65m.
		73	122		Veined GREYWACKE SANDSTONE [SA]; grey, mostly S, slightly altered (pervasive). Crisscrossed by irregular white veins (<3mm, calcite & zeolite?) spaced <20mm apart. Broken veins spaced 20-200mm.			- irregular 60° limonite-stained joint. Defects have variable dip. Irregular 60° to NV seam (<30mm) of light brown-brown, MS, partly weathered rock 120.65-120.8m. Disturbed limonite-stained joint at 121m.
		72	123			RSW		- 40° limonite-stained joint. Box 46: 122.25-125.0m.
		71	124					- 5° limonite-stained joint. Irregular NV limonite-stained joint 122.85-123.2m.
		70	125		124.65m			- irregular 60° seam (<20mm, indistinct) of finer grained rock with black streaks.
		69	126		Veined GREYWACKE SANDSTONE [MW]; brown, S, partly weathered. Crisscrossed by limonite-stained to white veins (<4mm, weathered) spaced <15mm apart.	RMW		- irregular contact dips 70°. Irregular 75° seam (<50mm, indistinct) of brecciated rock (<25mm, some silt) 124.7-125.15m. Shattered core (<30m pieces, some silt) 125-125.1m.
		68	127		125.7m - some irregular patches (<150 by 50mm, NV) of grey, VS, fresh rock below 125.2m.	RSW		- irregular NV joint(s) partly weathered <30mm into the adjacent rock 125.1-125.55m.
		67	128		126.15m Veined GREYWACKE SANDSTONE [SA]; grey, mostly S, slightly altered (pervasive). Crisscrossed by irregular white veins (<3mm, calcite & zeolite?) spaced <15mm apart.	RFW		- irregular contact between 125.6-125.75m. - contact dips 40°. Coarser greywacke 126.15-127.15m. Broken veins spaced 50-550mm from 126.15m.
		66	129		Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. 127.15m Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 5-25mm apart.			- irregular contact dips 60°. Indistinctly banded (<30mm, 30-60°) 127.15-134.15.m. Box 48: 127.55-130.25m.
		65	130		Veined GREYWACKE SANDSTONE to ARGILLITE [FW]; grey with dark grey intervals (<200mm, indistinct), S to VS, fresh. Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced <20mm apart.			
		64	131			RFW		Box 49: 130.25-133.15m.
		63	132		- grey, VS, medium sandstone between 131.3 (55°) & 131.6m (30°). - irregular seam (<65mm, NV) of dark grey, S, siltstone between 131.6-132.3m.			
		62	133					Box 50: 133.15-136m.
		61	134		134.15m			
		60	135		Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced <25mm apart.	RFW		- irregular NV contact. Broken veins spaced 40-400mm from 134.15m. Medium grained greywacke.
		59	136		136m			
		58	137		EOH @ 136m			
		57	138					
		56	139					
		55						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 12m.	123mm to 12m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/5

LOCATION: HUNUA QUARRY **GRID REF:** 421245.40E 776801.61N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 205.25m **SHEET** 1 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 17-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		205			0.2m Aggregate FILL; low recovery of moderately weathered, greywacke fragments (<15mm mixed with below).	QF		NZTM location (GPS within 3m) of 1778034mE & 5893427mN. RQD entered into penetration field in database from 18.6m. Core boxes photographed. Box 1: 0-4.05m. Disturbed core (wet). Measured fill depth 0.15-2m. Low recovery of mostly intact core (moist) from 0.3m.
					0.3m MUD with variable sand; intermixed brown (organic) to light brown with some orange-brown mottles, disturbed (very soft), slightly plastic to plastic, some rootlets. [Top Soil to As Below].	O		
		204	1		CLAY; light brown-brown (patchy orange-tint) with some orange-brown mottles near top, very stiff, plastic, minor rootlets. [Residual Soil].	O		
					1.95m - light to pale brown with light orange to orangish brown streaks below 0.7m.			- minimum depth of contact. Lost core (0.75m) assumed below 1.95m.
		203	2		- streaky pale brown to orange, firm and less plastic by 1.5m. SILT; pale brown with occasional orange streaks to mottles, firm to stiff, slightly plastic. [CW to HW Waitemata Group].			
		202	3		- some sandy intervals (<0.1m, indistinct) by 3.0m.			Core run 3-4m has 0.3m of uphole material at top.
		201	4		- pale brown with some light orange mottles to patches (<20mm), non-plastic below 4m. Some to common fine sand.			Disturbed core (very soft & wet) from 4m. Box 2: 4.05-7.0m.
		200	5		- pale brown, stiff, slightly plastic to non-plastic silt by 4.9m. Some sandy and muddy intervals (<0.1m, indistinct). [MW Waitemata Group].			Core run 5-6m has excessive length (0.1m assumed recovered from previous run) and 0.2m of uphole material at top. Mostly intact core (moist).
		199	6		- orange with some pale brown-grey streaks near 5.9-6.0m.			Core run 6-7m has 0.2m of uphole material at top. Limonite-cemented bands (<50mm, NH) near 6.1-6.22m.
		198	7		- orange laminated intervals (<50mm, NH) near 7.15-7.5m.			Box 3: 7.0-10.25m. Limonite-cemented bands (<15mm, NH) at 7.2, 7.32 & 7.47m.
		197	8		- some light orange to orangish brown, hard, sand-silt near 8-8.55m.	OWT		- irregular 20-30° limonite-cemented band (<5mm). Irregular 60° limonite-cemented band (<5mm) near 7.85m.
		196	9		- dark grey, very stiff to hard, slightly plastic silt between 9.08 (NH) & 10.3m (50°). [MW/SW Waitemata Group].			
		195	10		- sandy band (<5mm, NH) at 9.77m.			- NH muddy bands at 10.07 (<20mm) & 10.12m (<10mm). Box 4: 10.25-13.4m.
		194	11		- light brown with minor orange mottles to patches (<40 by 10mm) and hard from 10.3m. Mottled brown between 10.8-10.85m.			
		193	12		- dark grey between 11.05 (35°) & 11.35m (25°). Some dark brown mottles to patches (<15mm) between 11.4-12.05m.			- NH limonite-cemented band (<15mm) at 11.75m. Irregular 15° dark brown band (<15mm) at 11.83m. Brown to orangish brown band (<25mm, 45°) at 12.2m.
		192	13		- several orange to dark brown, limonite-stained to limonite-cemented bands (<15mm, NH) 12.0-12.15m. No orange between 12.25-13.25m.			Block mislabelled 13.5m. Irregular 65° black joint at 13.1m. NH muddy band (<10mm) at 13.25m. Core broken (mostly <50mm pieces) along irregular NV limonite-stained to black joints 13.25-14.05m. Box 5: 13.4-16.3m.
		191	14		- light brown (generally with orange-tint) with light orange to orangish brown bands (<15mm, 45°-NV) along joints below 13.25m.			Core broken (<100mm pieces) along irregular NV limonite-stained to black joint(s) 14.25-14.5m. Limonite-cemented band (<40mm, NH) at 14.95m.
					14.4m - light brown between 14.05-14.25m. Silty SAND; variable light brown to orangish brown, hard. [MW Waitemata Group].			
		190	15		- dominantly orangish brown between 15.08-15.25m.	OWT		- indistinctly banded (<10mm, NH) 15.08-15.25m. Limonite-cemented band (<10mm, NH) at 15.16m. Disturbed to broken core from 15.8m. 18/3/15.
		189	16		- dominantly pale brown, non-plastic silt near 15.7-15.76m (NH). Variable orangish brown by 15.95m.		S.W.L 17.73m (27/03/15)	
					16.25m Silty SAND; pale brown with irregular light orange to orangish brown seams (<30mm), hard. Crisscrossed by irregular limonite-stained to black (above 16.75m) remnant joints spaced <100mm apart. Harder interval between 16.55-16.75m. [HW/HA Greywacke].			- maximum depth of contact. Core run 16-17.5m has 0.3m of probable uphole material at top. Possible remnant veins (<5mm). Defects have variable dip. Elongated patch (<50 by 10mm, 70°) of light grey-brown, VWK, mudstone 16.25-16.3m. Box 6: 16.3-19m. Intact core 16.75-17.15m. 60° joint filled by pale brown, plastic clay (<5mm) at 17.1m. Mostly intact core from 17.45m. 45° polished defect(s) filled by pale brown, plastic clay (<5mm) at 18.25m. Broken core (<50mm pieces) from 18.4m. - irregular contact dips 45°. Fine-medium grained greywacke by 18.6m. Defects often
		188	17		- paler brown, plastic to slightly plastic, clayey silt with minor sand between 16.75-16.9m (20°).	ORH		
		187	18		- harder by 17.75m [HA-MW].			
					18.3m			
		186	19		18.6m Weathered GREYWACKE (Sst) [HW/MW]; pale brown (grey-tint), VWK to WK, weathered-partly weathered. Crisscrossed by irregular limonite-stained joints spaced <20mm apart.	ORH		
					19m GREYWACKE SANDSTONE [MA]; grey, WK-MS, partly altered. Crisscrossed by irregular joints to remnant veins spaced <40mm apart.	ORM		
					GREYWACKE SANDSTONE [MW]; light brown with irregular orangish	ORM		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 39.7m.	123mm to 39.7m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/5**

LOCATION: HUNUA QUARRY **GRID REF:** 421245.40E 776801.61N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 205.25m **SHEET** 2 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 17-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		185	21		brown seams (<50mm), mostly MS, partly weathered. Limonite-stained joints spaced <50mm apart. Occasional irregular (NH-60°) remnant veins (<5mm). Occasional patches (<50mm) of dark greyish brown, WK, argillite.	ORM		coated by off-white, non-plastic silt to greenish grey, slightly plastic sand-mud (<5mm). Box 7: 19-22m. Intact core 19-19.15m. Some joints coated by pale brown, plastic clay to light brown, non-plastic sand-silt (<10mm) by 19m. More intact core (<100m intervals) from 19.5m.
		184			- patch (<70mm) of grey, VS, fresh rock near 19.5m.			
		183	22		- argillite between 20.5-21.2m. Some dark grey-brown patches (<15mm, above 20.65m). Limonite-stained joints to remnant veins spaced <20mm apart. More weathered (EWK to VWK) near 20.9-21.2m.			- 10° interval (>50mm) of light brown, hard, non-plastic sand-silt with remnant fractured (<10mm) texture near 20.5m [Probable Fault]. Some defects coated by off-white, non-plastic silt (<3mm) by 20.7m.
		182	23		- brown with some grey patches (<0.1m, below 21.6m), MS to VS, partly weathered [FW <25%] from 21.2m. Crisscrossed by limonite-stained joints spaced 5-50mm apart. Slightly weathered [FW <75%] between 21.6-22.05m.			Mostly intact core from 21.2m. Joints (often coated by light brown to orange-brown, slightly plastic to non-plastic silt <3mm) have variable dip.
		181	24		- occasional fresh patches (<50mm) below 24.1m.			Box 8: 22-24.7m. 60° joint filled by orange-brown, non-plastic silt to limonite-cemented material (<5mm) at 22.3m. - 35° joint filled by light brown, non-plastic sand-silt to limonite-cemented material (<5mm).
		180	25					Box 9: 24.7-27.5m.
		179	26			RMW		- 20° joint filled by orange-brown, non-plastic silt to limonite-cemented material (<10mm).
		178	27		- joints spaced 15-150mm apart below 26.3m. Crisscrossed by limonite-stained fractures to off-white remnant veins (<5mm) spaced <20mm apart. Dark brown, MS-S, greywacke siltstone between 26.9-27.15m.			- joints often coated by off-white to orange-brown, non-plastic silt (<3mm) below 26.3m.
		177	28		- no grey fresh patches below 26.95m.			- 55° joint coated by orange-brown, non-plastic silt (<2mm) and associated off-white weathered vein (<15mm, below). Box 10: 27.5-31.2m.
		176	29		- some darker brown (grey-tint), MS to S, argillaceous patches (<0.1m) by 28.5m.			- irregular 70° network (<50mm) of pale brown veins (<10mm, weathered) spaced <10mm apart. Shattered core (<30mm, some silt) 29.7-30.65m.
		175	30					
		174	31		30.75m Veined GREYWACKE SILTSTONE [MW]; brown (darker), MS-S, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 15-150mm apart to off-white weathered veins (<5mm) spaced <20mm apart.			- maximum depth of contact. 40° joint at 30.75m. Box 11: 31.2-34.7m. 19/3/15. SWL 7.95m.
		173	32					
		172	33		- joints spaced 10-100mm apart by 32.5m. Limonite-stained to pale brown, weathered veins (<10mm) spaced <15mm apart.	RMW		- joints often coated by pale brown to orange-brown, non-plastic silt (<3mm) below near 32.5-35.95m. Broken core (<50mm) 33.1-33.7m.
		171	34		- lighter brown by 33.6m. Some irregular patches (<50mm) of brown, S, greywacke sandstone near 33.6-34m.			
		170	35					Box 12: 34.7-37.5m. Disturbed band (<10mm, 10°) of light brown, slightly plastic mud with some sand at 35.13m.
		169	36		35.95m Veined GREYWACKE SANDSTONE [MW]; brown, MS to S, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 10-100mm apart to white veins (<10mm, weathered) spaced 5-25mm apart.	RMW		- joints mostly dip 25-75° near 35.95-37.77m. 25° joint with associated band (<20mm, below) of light orangish brown, non-plastic silt with some sand at 36.1m.
		168	37		37.77m Veined ARGILLACEOUS ROCK [MW]; dark brown with occasional dark grey patches (<10mm, above 38.35m), mostly MS to S, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 15-50mm apart to white veins (<5mm, weathered) spaced <10mm apart.	RMW		- 35° off-white composite vein (<20mm, quartz & weathered). Box 13: 37.5-40.5m. 40° white vein (<15mm, weathered) at 37.56m. Irregular (sheared?) 40° limonite-stained to white composite vein (<40mm, weathered) 37.72-37.77m.
		167	38		38.65m	RFW		- elongated patch (<120 by 60mm, NV) of dark grey, MS, partly altered rock 37.9-38.02m. Shattered core (<40mm, silty) 38.55-38.65m [Fault?]. Mostly broken core (<100mm, some silt) 38.65-39.1m.
		166	39		39.1m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<3mm, zeolite?) spaced <10mm apart. Joints-broken veins (occasionally limonite-stained) spaced <100mm apart. 39.65m	RW / RFW		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 39.7m.	123mm to 39.7m. 96mm to EOH.

BOREHOLE No. **HUN15/5**

LOCATION: HUNUA QUARRY **GRID REF:** 421245.40E 776801.61N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 205.25m **SHEET** 3 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 17-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		165			FAULT ZONE [FW]; grey, slightly plastic, sandy mud with common to some dark grey, S, greywacke fragments (<10mm).	RFW		- minimum depth of contact. Lost core (0.45m) assumed below 39.1m. 20/3/15. Cased to 39.7m.
					- crisscrossed by irregular (45°-NV) seams of white, low-plasticity clay below 39.55m.			- 60° polished defect with associated band (<25mm, below) of grey, plastic clay. Piece (<40 by 15mm) of limonite-stained to mottled grey & white, MS, partly weathered to partly altered rock above defect.
		164	41		40.85m Veined ARGILLITE [FW]; dark grey, S, fresh. Crisscrossed by irregular (disrupted) white veins (<4mm, zeolite?) spaced <10mm apart. Broken fractures-veins spaced 10-150mm apart.			- irregular 55° polished defect. 60° polished defect with associated band (<5mm, below) of grey, plastic clay at 39.65m.
		163	42		Veined GREYWACKE SANDSTONE and ARGILLITE [FW]; grey to black, S to VS, fresh (>95%). Crisscrossed by irregular (disrupted) white veins (<5mm, quartz & zeolite?) spaced <15mm apart. Broken veins spaced 50-300mm apart. Pyrite patches on defects surfaces by 41.15m			Core run 40-40.7m has excessive length (0.1m assumed recovered from previous run). Box 14: 40.5-43.1m.
		162	43		- slightly weathered [SW-FW] between 42.75-43.75m. Crisscrossed by irregular (30°-NV) limonite-stained joints spaced 20-200mm apart and some partly weathered (indistinct) <10mm into the adjacent rock. Veins (<10mm) spaced <20mm apart below 43.2m.	RFW		- irregular bedding contact dips 50°. Fine-medium grained greywacke. Veins have variable dip. Dark grey-black, S, argillite 41.15 (50°)-41.9m (60°).
		161	44		- irregular limonite-stained (indistinct) to green joints spaced 50-500mm apart below 43.75m.			- 40° joint coated by pale grey, non-plastic silt (<2mm).
		160	45					- argillite 42.45 (NH)-43.05m (40°). 35° defect with associated band (<6mm) of dark green, slightly plastic mud at 42.75m.
					- occasional irregular patches (mostly <40mm) of dark grey to black,			Box 15: 43.1-45.75m. 50° off-white composite vein (<15mm, zeolite?) at 43.15m. 45° composite vein (<10mm, zeolite?) at 43.25m.
		159	46		45.95m MS-S argillite from 45.4m. Veined ARGILLITE [FW]; dark grey-black, S, fresh (>95%). Limonite-stained (indistinct) joints spaced 50-300mm. Crisscrossed by irregular white veins (<10mm, quartz & zeolite?) spaced <40mm apart.			- patchy 60° band (<10mm) of slightly softer (MS-S) argillite. 55° joint and associated pale grey vein (<25mm below, quartz) at 43.65m.
		158	47			RFW		Joints have variable dip by 43.75m.
		157	48		48m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Crisscrossed by irregular white veins (<10mm, quartz & zeolite?) spaced 5-35mm apart. Broken veins spaced 20-200mm apart.			- 60° light grey composite vein (<70mm, quartz). Argillite 44.95 (60°)-45.4m (40°). 50° white to light grey vein (<20mm, quartz) 45.35-45.45m. Box 16: 45.75-48.5m. Common argillite patches (<50 by 15mm, mostly 50°) near 45.75-45.95m.
		156	49					- disturbed 50° composite vein (<25mm, quartz). 50° composite vein (<20mm, quartz) at 47.25m.
		155	50		- some irregular black, argillaceous laminations (40°) between 49.5-49.65m. Band (<30mm, 40°) of dark grey, S, greywacke siltstone near 49.6m.			- irregular contact dips 50°. Composite veins (<10mm, quartz) at 48 (60°), 48.2 (40°) & 48.3m (55°). Irregular patches of black, S, argillite near 48.25 (<50mm) & 48.35m (<70 by 20mm, 45°).
		154	51		- some patchy seams (<50mm, 60°) of black, MS-S argillite between 50-50.5m.	RFW		Box 17: 48.5-51.1m. Irregular 25° limonite-stained to green joint at 48.85m.
		153	52		- irregular (25°-NV) limonite-stained to dark green joints spaced 20-200mm apart and partly weathered (indistinct) <10mm into the adjacent rock between 51.1-51.95m.			- 40° transparent-white composite vein (60mm, quartz) with associated central defect coated by pale green, non-plastic silt (<3mm).
		152	53		- band (<20mm, 60°) of argillite between 52.65-52.7m. Patchy seam (<100mm, 60°, below vein) of dark grey, S argillite between			- 55° transparent-white composite vein (<30mm, quartz).
					53.35m 52.9-53.05m. GREYWACKE SANDSTONE (Fine) to ARGILLITE [FW]; grey to black, S to VS, fresh (>95%). Crisscrossed by irregular white veins (<4mm, quartz) spaced 5-35mm apart. Broken veins spaced 30-350mm apart.			- irregular limonite-stained to dark green joints at 50 (40°) & 50.1m (60°). Intersecting 40° & 50° indistinct limonite-stained joints coated by light greenish brown, non-plastic silt (<2mm) at 50.3m.
		151	54		- veins spaced 5-50mm apart by 53.8m. Irregular (20°-NV) mostly limonite-stained joints spaced 10-350mm apart below 54.1m.			Box 18: 51.1-53.65m. 40° limonite-stained joint at 51.1m. Core broken (<65mm pieces) along intersecting joints spaced <50mm apart 51.2-51.4m.
		150	55					- dark grey (black flecks below 51.6m), fine grained greywacke sandstone between 51.4 (45°) to 51.7m (65°).
		149	56		- irregular seam (<50mm) of dark brown, mostly S, partly weathered rock along joints between 55.7-56.1m. Limonite-stained joints spaced 20-250mm apart and partly weathered <3mm into the adjacent rock below 56.4m.	RFW		- crisscrossed by irregular (30°-NV) indistinct defects ("shear bands") (<5mm) spaced 5-50mm apart 52.3-52.55m.
		148	57					- irregular 55° limonite-stained joint coated by light brown (green to orange-tint), non-plastic silt-sand (<2mm). Dark grey, greywacke sandstone-siltstone near 52.7-52.8m. Indistinctly banded (<10mm, 55°).
		147	58					- 40° composite vein (<25mm, quartz). Irregular 65° partly limonite-stained joint coated by dark green material (<2mm) at 53.05m.
		146	59		- grey to dark grey, greywacke sandstone with some irregular siltstone bands (<20mm, 55°) between 58.95-59.25m. Joints spaced 50-100mm apart.			- irregular bedding contact dips 55°. Indistinctly banded (<50mm, 55°) from 53.35m. Box 19: 53.65-56.5m.
								- two intersecting 60° & 40° white to dark grey, composite veins (<10mm, quartz) with vuggy voids (<20 by 10mm). Box 19: 53.65-56.5m. Bedding dips 55° at 53.95 & 56.2m.
								- irregular 55° band (<5mm) of coarse grained

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 39.7m.	123mm to 39.7m. 96mm to EOH.

BOREHOLE No. HUN15/5

LOCATION: HUNUA QUARRY **GRID REF:** 421245.40E 776801.61N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 205.25m **SHEET** 4 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 17-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		145	61		- more weathered [FW 95%] by 60.7m. Limonite-stained joints spaced 10-150mm apart and partly weathered (indistinct) mostly <5mm into the adjacent rock. White veins (<4mm, quartz) spaced <15mm apart between 60.7-61m.	RFW		greywacke sandstone. Some joints coated by orange-brown, non-plastic silt to dark brownish green, slightly plastic material (<2mm) below 54.1m.
		144						- irregular (30-65°) joints spaced 50-100mm apart between 55.7-56.1m. Mostly grey, VS, coarser greywacke sandstone 56-56.15 (55°) & 57.65-57.9m (55°).
		143	62		62.45m			- joints (some coated by orange-brown, non-plastic silt <1mm) have variable dip below 56.4m. Box 20: 56.5-59.1m. 40° white to pale grey composite vein (<15mm, quartz) at 56.75m.
		142	63		GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, mostly VS, partly weathered (<20mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 20-200mm apart and white veins (<5mm, calcite & quartz) spaced 10-100mm apart.			- irregular 45° broken defect with some pyrite patches. Bedding dips 55° at 58.95m. Box 21: 59.1-61.95m. Bedding dips 65° at 59.7m.
		141	64					Core broken (<50mm pieces) along joints coated by light brown to orange-brown, non-plastic silt (<2mm) and partly weathered <20mm into the adjacent rock 60.7-60.8m.
		140	65			RSWg		- 60° joint partly weathered (indistinct) <10mm into the adjacent rock. Box 22: 61.95-64.5m.
		139	66					- irregular 45° joint. Fine-medium grained greywacke. Defects have variable dip. Some joints coated by orange-brown, non-plastic silt (<1mm). Irregular NV joints partly weathered <20mm into the adjacent rock between 62.65-63.2m.
		138	67		- more weathered [FW >50%] below 66.65m. Joints spaced 10-50mm apart and partly weathered <25mm into the adjacent rock.			Box 23: 64.5-67.3m.
		137	68		67.4m GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Irregular limonite-stained joints spaced 25-400mm apart. Crisscrossed by irregular (NH-65°) white veins (<5mm, quartz) spaced 5-100mm apart.			- fine grained greywacke near 65.9-66m (55°). Indistinct irregular 55° seam (<30mm) of brecciated rock (<20mm) in light grey, VS, vein material (quartz) 66.2-66.35m. Core broken (<100mm pieces) along NV joint(s) 66.65-67.45m.
		136	69			RFW		Box 24: 67.3-69.9m. Some joints coated by light brown to orange-brown, non-plastic silt (<2mm) below 67.4m. Fine grained greywacke 67.5-67.6m (60°).
		135	70		69.85m GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, S to VS, partly weathered (<10mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 15-200mm apart and limonite-stained to white veins (<5mm, quartz & weathered) spaced <50mm apart.			- coarser greywacke by 69.85m. Defects have variable dip. Minimal silt along joints. Box 25: 69.9-72.65m.
		134	71					
		133	72		- more weathered [FW >75%] by 71.4m. Partly weathered <50mm into the adjacent rock along joints.			- 55° composite vein (<10mm, calcite).
		132	73					- 50° white vein (<15mm, calcite). Box 26: 72.65-75.25m.
		131	74		- some dark grey, S, argillite clasts (<10mm) between 74.05-74.95m.	RSWg		- 65° joint coated by light orangish brown, non-plastic silt (<2mm) and partly weathered <20mm into the adjacent rock.
		130	75					- crisscrossed by indistinct shear bands (<5mm) spaced <100mm apart near 74.05-74.95m.
		129	76		- joints spaced 15-300mm apart and partly weathered <30mm into the adjacent rock below 75.5m. Irregular white veins (<5mm, quartz) spaced 10-100mm apart.			- two irregular NV joints to fractures spaced 30-40mm apart and partly weathered <20mm into the adjacent rock.
		128	77					- 40° white vein (<6mm, calcite & quartz) with some rock fragments (<3mm) to joint partly weathered <20mm into the adjacent rock.
		127	78		78.65m			- 40° joint coated by orange-brown, non-plastic silt (<1mm) and partly weathered <20mm into the adjacent rock. Box 27: 75.25-77.85m. 23/3/15.
		126	79		GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, S to VS, partly weathered (<50mm along joints) to fresh (<75%). Crisscrossed by limonite-stained joints spaced 15-100mm apart and limonite-stained to white veins (<3mm, quartz & weathered) spaced <40mm apart.	RSWb		- occasional indistinct shear bands (<3mm) by 75.8m. 55° vein (<6mm, calcite). Box 28: 77.85-80.3m.
								- irregular 45° joint. Some joints coated by orange-brown, non-plastic silt (<1mm) below 78.65m. 55° limonite-stained vein (<6mm, calcite & weathered) partly weathered <50mm into the adjacent rock at 78.75m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 39.7m.	123mm to 39.7m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/5**

LOCATION: HUNUA QUARRY **GRID REF:** 421245.40E 776801.61N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 205.25m **SHEET** 5 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 17-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		125			80.15m - seam (<30mm, 60°) of patchy light orangish brown to brown, WK, weathered-partly weathered, fractured (<10mm) rock between joints at 79.3 & 79.33m. GREYWACKE SANDSTONE [SW-FW]; grey (darker above 81.3m) with minor irregular brown seams, mostly VS, partly weathered (<20mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 20-400mm apart and white veins (<3mm, calcite & quartz) spaced 20-200mm apart.	RSWg		- two subparallel 60° joints coated by light orangish brown, non-plastic sand-silt (<2mm) and partly weathered <50mm into the adjacent rock at 79.3 & 79.33m. Associated patchy white vein (<10mm, calcite & quartz) at 79.33m.
		124	81					- irregular 10° joint. Finer greywacke from 80.15m. Defects mostly dip 25°-NV. Some joints coated by orange-brown, non-plastic silt (<1mm). Occasional indistinct shear bands (<5mm, mostly 55°). Box 29: 80.3-83.0m.
		123	82		82.75m GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, S to VS, partly weathered (<50mm along joints) to fresh (<75%). Crisscrossed by limonite-stained joints spaced 20-150mm apart and limonite-stained to white veins (<3mm, calcite & quartz) spaced 10-100mm apart.			- no obvious shear bands below 82.75m. Joints (often coated by <1mm) have variable dip. Veins mostly dip 35°-NV. Interval (<0.3m, 60°) of brown, S, partly weathered rock 82.8-83.1m. Box 30: 83.0-85.6m.
		122	83					
		121	84			RSWb		- 60° vein (<7mm, calcite). 55° limonite-stained vein (<4mm, calcite) partly weathered <50mm into the adjacent rock at 84.22m. Box 31: 85.6-88.0m. 24/3/15.
		120	85		- moderately weathered [FW <50%] between 85.15-85.6m. 85.6m			
		119	86		GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, mostly VS, partly weathered (<30mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 15-300mm apart and limonite-stained to white veins (<3mm, calcite & quartz) spaced 10-200mm apart.			- irregular 55° joint coated by orange-brown, non-plastic silt (<2mm). Defects have variable dip from 85.6m. Fewer joints coated by silt (<1mm, as above) 85.6-88.65m. Coarser greywacke 85.6-86.35m (50°).
		118	87			RSWg		- some irregular black flecks 86.2-86.35m. Fine grained greywacke 86.35-87.3m. Core broken (<100mm pieces) along irregular NV joints (coated by light brown to orange-brown, non-plastic silt <2mm) spaced <40mm apart and partly weathered <30mm into the adjacent rock near 87.05-87.55m. Box 32: 88.0-90.6m.
		117	88		88.65m GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, S to VS, partly weathered (<30mm along joints) to fresh (75%). Crisscrossed by limonite-stained joints spaced 15-200mm apart and limonite-stained to white veins (<3mm, calcite & quartz) spaced 10-100mm apart.			- 55° limonite-stained broken vein (<3mm, calcite) partly weathered <30mm into the adjacent rock. Occasional indistinct shear bands (<3mm, mostly 60°) by 88.65m. Discontinuous 75° white vein (<5mm, calcite) at 88.8m.
		116	89			RSWb		
		115	90		90.5m GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, S to VS, partly weathered (<10mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 30-300mm apart and limonite-stained to white veins (<3mm, calcite & quartz) spaced 10-250mm apart. - more weathered [FW 75%] below 91.6m. Irregular NV joints (some coated by orange-brown, non-plastic silt <1mm) spaced 20-50mm apart and partly weathered <20mm into the adjacent rock between 91.6-93.2m.			- darker grey, greywacke sandstone-siltstone 88.85-88.95m. 65° limonite-stained to white composite vein (<7mm, calcite) at 89.15m. Core split along irregular NV joints coated by orange-brown, non-plastic silt (<1mm) and partly weathered <30mm into the adjacent rock 89.6-90 & 90.2-90.8m.
		114	91					- coarser greywacke from 90.5m. Joints (minimal silt) mostly dip 45°-NV. No obvious shear bands. Box 33: 90.6-93.4m.
		113	92					- irregular 35° transparent-white vein (<7mm, calcite).
		112	93		- less weathered [FW <95%] between 93.2-94m (10°).			Box 34: 93.4-96.35m. No obvious joints 93.55-94m.
		111	94		- joints spaced 30-200mm apart and partly weathered <30mm into the adjacent rock from 94m. Irregular veins (<6mm, calcite & quartz) spaced <100mm apart.			- defects have variable dip from 94m. Some joints partly coated by orange-brown, non-plastic silt (<1mm). Occasional indistinct shear bands (<5mm, 20-55°) by 94.15m.
		110	95		- verging on moderately weathered [FW 50%] between 95-95.85m.	RSWg		- irregular NV joint(s) partly weathered <50mm into the adjacent rock 95-95.85m.
		109	96					
		108	97		- less weathered [FW >75%] by 96.5m. Joints spaced 30-300mm apart. Veins (<3mm, calcite) spaced 5-100mm apart.			Box 35: 96.35-99.1m.
		107	98		- irregular seam (<0.15m) of brown, MS to S partly weathered rock along joints between 97.9-98.1m. Mostly lighter grey, S-VS, almost fresh rock between 98.1-99.1m. White veins (<5mm, calcite) spaced <40mm apart.			- intersecting irregular (25-60°) joints spaced 10-50mm apart 97.9-98.1m.
		106	99		99.4m GREYWACKE SANDSTONE [MW/SW]; dark brown to grey (<0.15m), S to VS, partly weathered (<50mm along joints) to fresh (50%).	RMW		- irregular 40° dark green defect with minor pyrite specks. Discontinuous 45° fracture partly weathered <2mm into the adjacent rock at 98.6m. 25° fracture partly weathered <5mm into the adjacent rock at 98.65m. - 30° fracture partly weathered <2mm into the

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 39.7m.	123mm to 39.7m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/5**

LOCATION: HUNUA QUARRY **GRID REF:** 421245.40E 776801.61N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 205.25m **SHEET** 6 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 17-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		105			Crisscrossed by irregular limonite-stained joints spaced 20-200mm apart and limonite-stained to white veins (<5mm, calcite & quartz) spaced 10-50mm apart.			adjacent rock. 40° joint partly weathered <4mm into the adjacent rock at 98.95m. Box 36: 99.1-101.9m.
		104	101			RMW		- irregular 55° contact. Finer greywacke from 99.4m. Some joints coated by pale brown to orange-brown, non-plastic silt (<3mm). Occasional indistinct shear bands (<3mm, NH-60°).
					101.95m			
		103	102		GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown (darker) seams, S to VS, partly weathered (<20mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 20-200mm apart and limonite-stained to white veins (<4mm, as above) spaced <100mm apart.			- 20° off-white composite vein (<15mm, calcite). Box 37: 101.9-104.8m.
		102	103					- irregular 50° joint. Joints (some coated by orange-brown, non-plastic silt <2mm) mostly dip 20°-NV from 101.95m. No obvious shear bands.
			104		- irregular bands (<20mm, 25-60°) of lighter grey, VS, fine-grained (sheared) rock spaced <50mm apart near 103.6-104.1m. Disrupted white veins (<4mm, calcite) spaced <30mm apart.			- 25° transparent-white vein (<6mm, calcite).
		101			- grey, VS, fresh rock between 104.2-105.05m. Irregular white veins (<3mm, calcite) spaced 10-100mm apart.			- 30° joint. 25° off-white composite vein (<15mm, calcite) at 104.37m. Box 38: 104.8-107.4m.
		100	105		- less weathered [FW <90%] below 105.05m (65°). Limonite-stained joints spaced 15-300mm apart. Irregular white veins (<3mm, calcite & quartz) spaced 10-100mm apart.	RSWg		- defects have variable dip by 105.05m. Some joints coated by silt (<1mm, as above). Occasional indistinct shear bands (<4mm).
		99	106					
		98	107					- 35° off-white vein (<20mm, calcite).
		97	108					Box 39: 107.4-110.0m. Core split along irregular NV joint(s) partly weathered <20mm into the adjacent rock 107.4-108.2m.
			109		- transparent-white veins (<4mm) spaced <20mm apart below 108.5m.			Core split along irregular NV joint partly weathered <10mm into the adjacent rock 108.3-108.85m.
		96			- verging on fresh rock by 108.85m (NV). Joints spaced 40-400mm apart and partly weathered <10mm from the adjacent rock. White veins (<3mm, calcite & quartz) spaced 5-200mm apart.			- minimal silt along joints by 108.85m. Occasional shear bands (<3mm) mostly dip NH-60°.
		95	110					Box 40: 110.0-112.85m.
		94	111					25/3/15.
		93	112					
					112.7m - moderately weathered below 112.45m (70°).			- irregular 70°-NV joint(s) coated by orange-brown, non-plastic silt (<1mm) and partly weathered <30mm into the adjacent rock 112.25-112.7m.
		92	113		GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Crisscrossed by irregular white veins (<5mm, calcite) spaced <50mm apart.			- irregular limonite-stained 70° joint. Minimum depth of contact. Occasional shear bands (<10mm) mostly dip 15-75° below 112.7m.
		91	114			RFW		Irregular NV limonite-stained joint (above 112.85m) to broken vein (<1mm, calcite) 112.8-113m. Box 41: 112.85-115.6m.
		90	115					- irregular 30° joint partly weathered <5mm into the adjacent rock. Two irregular 80° joints partly weathered <5mm into the adjacent rock 113.35-113.65m.
					115.75m			
		89	116		GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, S to VS, partly weathered (<20mm along joints) to fresh (<95%). Limonite-stained joints spaced 30-500mm apart. Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced 5-50mm apart.			- irregular NV joint partly weathered <10mm into the adjacent rock 114.2-114.8m. 30° joint partly weathered <3mm into the adjacent rock at 114.85m.
		88	117			RSWg		- 30° joint partly weathered <3mm into the adjacent rock. Discontinuous 65° seam (<20mm) of brecciated rock (<30 by 10mm) in transparent-white, MS, vein material (<10mm, calcite) 115-115.1m. Box 42: 115.6-118.3m.
		87	118					- irregular 20° contact. Joints (some partly coated by orange-brown, non-plastic silt <1mm) mostly dip 20°-NV from 115.75m. Occasional shear bands (<3mm) with variable dip.
					119.1m			
		86	119		GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 5-100mm apart.	RFW		Box 43: 118.3-121.1m. Irregular NV joint(s) partly coated by light brown to orange-brown, non-plastic silt (<1mm) and partly weathered <10mm into the adjacent rock 118.5-119.1m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 39.7m.	123mm to 39.7m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/5

LOCATION: HUNUA QUARRY **GRID REF:** 421245.40E 776801.61N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 205.25m **SHEET** 7 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 17-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		85	121		- white veins (<7mm, calcite & quartz) spaced 5-35mm apart below 120.25m.	RFW		- irregular NV contact. Occasional shear bands (<10mm) mostly dip 30-55º from 119.1m. 20º joint partly weathered <1mm into the adjacent rock at 119.3m.
		84			121.35m Veined GREYWACKE SANDSTONE [MW]; brown with some grey patches (<150mm, above 121.55m), MS to VS, mostly partly weathered. Crisscrossed by irregular limonite-stained joints to white veins (<6mm, calcite & weathered) spaced <30mm apart.	RMW		- irregular 25º joint partly weathered <4mm into the adjacent rock. 20º joint partly weathered <2mm into the adjacent rock at 119.95m. Box 44: 121.1-123.85m. 50º joint partly weathered <3mm into the adjacent rock at 121.25m.
		83	122		122.5m GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, S to VS, partly weathered (<20mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 30-300mm apart and white veins (<4mm, calcite & quartz) spaced 5-50mm apart.			- irregular NV to 45º contact. Defects mostly dip 15º-NV from 121.35m. Some joints coated by light brown to orange-brown, non-plastic silt (<3mm). No obvious shear bands.
		82	123					- 55º joint with associated seam (<20mm, below) of brecciated rock (<50mm) in light orangish brown, silty sand 121.5-121.65m [Minor Fault].
		81	124		- grey with some irregular light brown-brown (grey-tint) seams by 123.85m.	RSWg		Shattered core (<50mm pieces, some silt) 122.1-122.4m.
		80	125					- irregular NV contact. Joints (some coated by orange-brown, non-plastic silt <2mm) mostly dip 20º-NV from 122.5m. Veins have variable dip. Occasional shear bands (<5mm) mostly dip 40-70º.
		79	126					Box 45: 123.85-126.4m.
		78	127		- grey, VS, fresh (>95%) rock between 126.65 (60º) & 128.4m (75º). Few joints. Wider veins (<5mm, as above).			- 60º joint coated by silt (<1mm, as above) and partly weathered <20mm into the adjacent rock.
		77	128					Box 46: 126.4-129.2m. Occasional shear bands (<10mm) mostly dip 45-60º from 126.65m.
		76	129		- more weathered [FW 75%] from 128.4m. Joints spaced 50-200mm apart and partly weathered <40mm into the adjacent rock. Irregular limonite-stained to white veins (<3mm, calcite & quartz) spaced 5-50mm apart.			- limonite-stained joints partly weathered <1mm into the adjacent rock at 126.9 (30º) & 127m (35º).
		75	130		129.3m GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<4mm, calcite & quartz) spaced 10-100mm apart. Broken veins spaced 50-900mm.			- joints (minimal silt) mostly dip 15º-NV from 128.4m. Veins mostly dip 30º-NV. Occasional shear bands (<5mm, 30-60º).
		74	131					- irregular 70º white vein (<7mm, calcite) and associated joint partly weathered <20mm into the adjacent rock. 40º off-white composite vein (<20mm, calcite & quartz) at 129.2m. Box 47: 129.2-131.95m.
		73	132					- irregular 50º contact. Veins have variable dip from 129.3m. Occasional shear bands (<5mm) mostly dip 30-60º.
		72	133					- irregular 15º limonite-stained joint.
		71	134					- 75º limonite-stained to white vein (<2mm, calcite) partly weathered (indistinct) <30mm into the adjacent rock.
		70	135			RFW		Box 48: 131.95-134.6m. Irregular NV transparent-white broken vein (<1mm, calcite) to limonite-stained and green joint 132.3-132.75m.
		69	136					- irregular 30º joint partly weathered <2mm into the adjacent rock.
		68	137					26/3/15. Splaying 40º & 15º limonite-stained joints at 134.5m. Box 49: 134.6-137.5m.
		67	138		135.5m GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, mostly VS, partly weathered (<10mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 30-300mm apart and limonite-stained to white veins (<3mm, calcite & quartz) spaced 10-50mm apart.	RSWg		- irregular NV contact. Joints (often coated by orange-brown, non-plastic silt <2mm) mostly dip 40º-NV from 135.5m. Veins mostly dip 25º-NV.
		66	139		137.55m - more weathered [FW 75%] below 137.2m. GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<4mm, calcite & quartz) spaced 5-50mm apart. No obvious joints below 138.3m.	RFW		- crisscrossed by shear bands (<5mm, NH-60º) spaced <30mm apart below 136.95m. - 70º white vein (<5mm, calcite). Box 50: 137.5-140.3m. - irregular NV contact. Defects have variable dip from 137.55m. Crisscrossed by shear bands (<4mm) spaced <100mm apart. - 60º vein (<15mm, calcite) and associated (below) joint partly weathered <10mm into the adjacent rock.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 39.7m.	123mm to 39.7m. 96mm to EOH.

BOREHOLE No. HUN15/5

LOCATION: HUNUA QUARRY **GRID REF:** 421245.40E 776801.61N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 205.25m **SHEET** 8 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 17-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-3-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		65	141					- occasional shear bands (<5mm) mostly dip 35-65° below 140.1m. Box 51: 140.3-143.15m.
		64						
			142		- white veins (<7mm, calcite) spaced 10-100mm apart below 141.5m. Broken veins spaced 150-400mm apart.			- pyrite specks to patches on some broken defect surfaces below 141.5m.
		63						
			143					- 25° limonite-stained joint. Box 51: 143.15-145.9m.
		62						
			144			RFW		
		61						
			145		- veins (<5mm, calcite & quartz) spaced 5-35mm apart between 144.9-145.25m.			
		60			- veins (<3mm, calcite & quartz) spaced 20-300mm apart below 145.25m.			- veins mostly dip 30°-NV below 145.25m. Occasional shear bands (<5mm) mostly dip 15-65°. Box 52: 145.9-148.0m.
			146					
		59						Core sample taken by K Barber.
			147					
		58						
			148		148m			
		57			EOH @ 148m			
			149					
		56						
			150					
		55						
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		54						
			152					
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			153					
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			159					
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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 39.7m.	123mm to 39.7m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/6**

LOCATION: HUNUA QUARRY **GRID REF:** 421051.68E 776798.88N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 168.51m **SHEET** 1 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 20-4-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		168	0		0.4m SILT; light orangish brown, disturbed (very soft), slightly plastic to non-plastic, minor sand (fine). Minor rootlets. [CW Greywacke]. - intermixed light orangish brown, stiff, plastic clay and silt (as below) by 0.3m. SILT with some to common sand; patchy pale brown to orangish brown with some irregular black streaks, stiff to very stiff, non-plastic. Remnant fractured texture. [HW Greywacke]. - patch (>50mm corestone) of surface weathered (<15mm) greywacke sandstone between 0.9-1m.	ORC	NZTM location (GPS within 3m) of 1777840mE & 5893434mN. Adjacent batter exposes top soil (0.2m), colluvium-residual soils (0.5m) to weathered greywacke (<1.2m). RQD entered into penetration field in database from 11.3m. Core boxes photographed. Box 1: 0-3.05m. Disturbed core (wet). Occasional limonite-cemented lumps near top. Natural ground by 0.2m.
		167	1				
		166	2			ORH	
		165	3		- dominantly patchy light brown (orange-tint) to orangish brown by 2.5m.		- maximum depth of contact. Lost core (0.2m) assumed above 0.4m. Mostly intact core (moist). - indistinct clayey band (<20mm, 10°) near 2.95m (Drilling induced?). Box 2: 3.05-7.0m. Mostly disturbed core below 3.4m.
					3.55m Sandy SILT with some gravel; patchy light brown to orangish brown with some black mottles to streaks, disturbed (very soft to firm), non-plastic. Remnant fractured texture. Gravel is limonite-cemented material (<50mm). [HW Greywacke]. - gravelly near 4.5-5m. Some corestones (<120mm) of surface weathered (<15mm) greywacke sandstone.		- minimum depth of contact.
		164	4				
		163	5				
		162	6		- mostly patchy lighter brown to orangish brown by 5.5m.		Core run 5.5-7.0m has 0.1m of probable uphole rock (<60mm) at top.
		161	7		- occasional corestones (as above) below 6.5m.	ORH	Box 3: 7.0-10.7m. Mostly intact core from 7.0m.
		160	8				
		159	9		9.25m Weathered GREYWACKE (Sst) [HW-MW]; patchy light brown to orangish brown with some grey, EWK (disturbed to hard) to VS, dominantly weathered to limonite-cement [FW <25%]. Some corestones (<250mm, as above). Irregular limonite-stained remnant joints spaced 10-200mm apart.	ORH	- maximum depth of contact. Fine-medium grained greywacke. Joints have variable dip. Irregular (NH-55°) white veins (<1mm) spaced 10-100mm apart in corestones. Box 4: 10.7-13.5m.
		158	10		10.7m GREYWACKE SANDSTONE [MW]; patchy light brown to orangish brown and grey (<75mm, some discoloured), EWK (hard) to VS, variably weathered [FW <50%]. Crisscrossed by irregular limonite-stained joints spaced <50mm apart.	ORM	- maximum depth of contact. Joints have variable dip. Veins as above. Broken core (<100mm pieces) 10.9-11.4m. Core run 11.3-12.2m has 0.1m of probable uphole material (rock <75mm) at top.
		157	11		11.4m GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular light orangish brown to dark brown seams, mostly VS, partly weathered (<10mm along joints) to fresh (<95%). Limonite-stained joints spaced 20-300mm apart and white veins (<3mm, quartz & weathered) spaced 10-150mm apart. - minor light orangish brown to brown seams below 12.65m.		- maximum depth of contact. Fine grained greywacke near 11.4-12.8m. Joints often coated by light brown, slightly plastic mud to orange-brown, non-plastic sand-silt (<5mm) by 11.4m. Veins mostly dip NH-40°. - broken 60° off-white vein (<3mm, weathered) and associated band (<15mm, below) of dark grey, S, greywacke siltstone.
		156	12				
		155	13				
		154	14			RSWg	- irregular bedding contact with coarser rock dips 80° between 12.65-13m. Veins have variable dip below 12.65m. Box 5: 13.5-16.2m.
		153	15				
		152	16				- irregular NV joint filled by light orangish brown, non-plastic silt (<10mm) and partly weathered <15mm into the adjacent rock. Box 6: 16.2-18.6m.
		151	17		16.65m GREYWACKE SANDSTONE [MW]; patchy light brown to brown with minor grey (<100mm), WK to S, mostly partly weathered [FW <15%]. Crisscrossed by irregular limonite-stained fractures to joints spaced 10-100mm apart. Occasional irregular (40-60°) remnant veins (<3mm, weathered).	RW	Broken core (<100mm pieces) 17.25-18.15m.
		150	18		17.9m GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, S to VS, partly weathered (<10mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 30-400mm apart and white veins (<2mm, quartz) spaced 10-150mm apart.		- irregular 60° seam (<150mm) of brown to dark grey, MS to S, moderately to slightly weathered, argillaceous rock 17.8-18m. Some joints coated by light brown to orange-brown, non-plastic silt (<3mm) from 17.9m.
		149	19			RSWg	Box 7: 18.6-21.4m.

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

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BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/6**

LOCATION: HUNUA QUARRY **GRID REF:** 421051.68E 776798.88N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 168.51m **SHEET** 2 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 20-4-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		148	21		20.2m GREYWACKE SANDSTONE [MW to SW]; grey (some discoloured) with irregular light brown to brown seams (<0.2m), MS to VS, partly weathered (<20mm along joints) to fresh (50%). Crisscrossed by limonite-stained joints spaced 10-100mm apart. Occasional white remnant veins (<2mm, quartz). - light brown with orange-brown seams (<20mm), WK to MS, moderately weathered between 21.4 (NV) & 22.15m. Joints spaced 10-50mm apart. No obvious veins. - less weathered [FW <75%] from 22.15m. Crisscrossed by irregular white veins (<2mm, quartz) spaced <100mm apart with occasional voids (<10mm). - more weathered [FW <50%] below 22.8m.	RSWb	- 80° joint partly weathered <10mm into the adjacent rock. Joints often coated by orange-brown, non-plastic silt (<3mm). Veins mostly dip 45°. - crisscrossed by irregular indistinct defects ("shear bands") (<5mm) spaced <80mm apart with variable dip near 20.8-21.1m. Broken core (<100mm pieces) 21.1-22.15m. Box 8: 21.4-24.3m. - some joints coated by light brown to orange-brown, non-plastic sand-silt (<3mm) 21.4-22.15m. - irregular NV joint(s) coated by orange-brown, non-plastic silt (<2mm) and partly weathered <20mm into the adjacent rock 21.9-23.5m. Veins have variable dip by 22.15m.
		147	22				
		146	23				
		145	24		23.4m GREYWACKE SANDSTONE [SW-FW]; grey with some irregular orangish brown seams , MS to VS, partly weathered (<10mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 10-200mm apart and white veins (<2mm, quartz) spaced 10-150mm apart. - partly weathered seam (<150mm) between 24.7 (55°) & 24.9m (25°). Joints spaced 10-100m apart between 25.3-26.7m.		- disturbed seam (<50mm) of light brown to orangish brown, silty sand with white, low-plasticity clay band (<10mm) near base. - irregular NV contact. Joints often coated by orange-brown, non-plastic silt (<3mm). Veins mostly dip 30-75°. Box 9: 24.3-26.9m.
		144	25			RSWg	- joints often coated by light brown to orange-brown, non-plastic sand-silt (<5mm) from 25.3m.
		143	26				
		142	27		- irregular (25-70°) veins (<5mm, quartz) spaced 5-50mm apart below 26.7m.		30/3/15. Some joints coated by orange-brown, non-plastic silt (<3mm) near 26.7-29.4m. Box 10: 26.9-29.4m.
		141	28		27.3m GREYWACKE SANDSTONE [MW to SW]; patchy light brown, light orangish brown to brown with some grey (<0.1m, some discoloured), WK to VS, partly weathered to fresh (<50%). Irregular limonite-stained joints spaced 10-100mm apart to white veins (<3mm, quartz & weathered) spaced <40mm apart.	RMW	- veins have variable dip from 27.3m. Irregular 50° seam (<0.1m) of light orangish brown, more weathered rock 27.6-27.7m. 20° weathered vein (<20mm) at 27.8m.
		140	29		- less weathered [FW >50%] below 28.8m.		Broken core (<75mm pieces) 29-30.15m.
		139	30		- mostly MS, partly weathered rock from 29.4m. No grey. Joints spaced <50mm apart. Occasional irregular limonite-stained to white remnant veins (<3mm, weathered). - grey (discoloured), intensely veined rock near 30.05-30.2m.		Box 11: 29.4-32.1m. Irregular patch (<50mm) of grey, VS, fresh rock at 29.5m. Light brown to light orangish brown, slightly plastic sandy silt to weathered rock between 29.75 (15°) & 29.85m (20°) [Fault].
		138	31		30.55m GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular light brown to brown seams, mostly VS, partly weathered (<15mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 15-150mm apart to white veins (<5mm, quartz & weathered) spaced 5-50mm apart. - verging on fresh by 31.1m.	RSWg	- irregular 20° band (<15mm) of light orangish brown with black streaks near base, non-plastic silt. - irregular NH band (<50mm) of light brown to light orangish brown (black band <5mm near base), non-plastic sandy silt to weathered rock 30.35-30.4m.
		137	32				- irregular 50° contact. Defects have variable dip. Some joints coated by light brown to orange-brown, non-plastic silt (<3mm) from 30.55m.
		136	33		32.5m - grey (discoloured) to light brown with irregular brown seams (<20mm), MS to S, partly weathered below 32.3m. GREYWACKE SANDSTONE [FW]; grey, VS, fresh (>95%). Crisscrossed by irregular limonite-stained joints spaced 50-500mm apart and partly weathered <3mm into the adjacent rock. Crisscrossed by irregular limonite-stained to white veins (<5mm, quartz & weathered) spaced 5-50mm apart. - occasional black, S, argillite clasts (<7mm) by 33.6m.	RFW	Box 12: 32.1-35.0m. Indistinct 55° seam (<50mm) of fine-grained (sheared) rock at 32.25m. Irregular 50° to NV joint filled by silt (<10mm) 32.3-32.4m. - disturbed NH band (<30mm) of light brown to light orangish brown, non-plastic sand-silt to weathered greywacke near 32.5m. 15° joint. Medium grained greywacke 32.5-35.75m. Some joints coated by silt (<2mm, as above) from 32.5m. - disrupted NV band(s) (<20mm) of dark grey to black, S to VS, greywacke siltstone to argillite 32.55-32.7m (and fine grained greywacke up to 50mm below). - occasional shear bands (<5mm, 30-60°) by 33m. Disrupted (sheared) 65° band (<15mm) of black, S, argillite at 33m.
		135	34				
		134	35				
		133	36		- dark grey to black, S to VS, greywacke sandstone (finer grained) to argillite below 35.75m. Joints spaced 50-200mm. White veins (<3mm, quartz) spaced 100mm apart.		
		132	37		36.5m Veined GREYWACKE SANDSTONE [SA/FW]; grey, S-VS, slightly altered-fresh (95%). Irregular limonite-stained joints spaced 50-600mm apart and partly weathered/altered <5mm into the adjacent rock. Crisscrossed by irregular white veins (<10mm, quartz) spaced <40mm apart.		Box 13: 35.0-37.6m. - some voids (<20 by 10mm) along bedding contact (55°). Indistinctly banded (<50mm, 55°-NV) 35.75-36.5m. No obvious shear bands. Minimal silt along joints by 35.75m. Mostly greywacke siltstone to argillite 36.1-36.5m. - irregular 55°-NH contact. - 60° composite vein (<15mm, quartz). Box 14: 37.6-40.4m. 60° limonite-stained to transparent-white composite vein (<40mm, quartz) at 37.55m. - finer greywacke 38.05 (55°) & 39.45 (45°). Indistinctly banded (<15mm). - medium grained greywacke below 39.45m.
		131	38				
		130	39		- some irregular seams (<50mm, 50-60°) of dark grey to black, MS to S, greywacke siltstone to argillite between 38.05-39.45m.	RFW	
		129					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN15/6**

LOCATION: HUNUA QUARRY **GRID REF:** 421051.68E 776798.88N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 168.51m **SHEET** 3 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 20-4-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		128	41		- irregular seam (<60mm, 60-45°) of fine grained greywacke sandstone with some dark grey-black, S, argillaceous laminations (<5mm) between 41.25-41.4m.	RFW	Intersecting 40° & 10° joint-vein coated by off-white to orange-brown, non-plastic silt (<3mm) and partly weathered 5mm into the adjacent rock at 39.55m. - occasional shear bands (<5mm, 30-50°) by 39.8m. Box 15: 40.4-43.2m. Irregular NH-40° laminae (<3mm) of dark grey, S, argillaceous rock 40.55-40.6m. Disrupted 70° band (<10mm) of dark grey-black, S, argillaceous rock at 40.8m. - 50° joint partly weathered 5mm into the adjacent rock. 60° joint filled by light brown to orange-brown, slightly plastic mud (<15mm) and partly weathered <10mm into the adjacent rock 41.4-41.6m. - intersecting 30° & 40° joints filled by light brown to orange, non-plastic sand-silt (<10mm) and partly weathered <10mm into the adjacent rock at 41.6m (and fine grained greywacke up to 60mm below). - 60° transparent-white composite vein (<40mm, quartz) 41.95-42.1m. - irregular 60° contact. Veins have variable dip. No obvious joints (or shear bands) by 42m. Box 16: 43.2-45.8m. - 30° band (<15mm, indistinct) of shattered rock (<10mm, some silt). Some pyrite specks to patches on broken defect surfaces near 43.65-45.5m. Irregular 30° band (<15mm) of brecciated rock (<10mm, silty) at 44m. - limonite-stained to dark green joints with associated seam (<30mm) of fine grained greywacke with disrupted black, S, argillite bands (<10mm) between 44.4 (25°) & 44.44m (40°). - irregular 50°-NV contact 45.25-45.75m. Box 17: 45.8-48.6m. - 75° bedding contact 46.6-46.8m. Medium grained greywacke. Veins mostly dip NH-70°. Occasional shear bands (<3mm, 10-70°). - irregular 30° defect partly coated by dark green material (<1mm). Irregular 60° limonite-stained to dark green-black joint(s) at 48.15m. Box 18: 48.6-51.35m. - becoming coarser greywacke below 49.7m.
		127	42		42m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<5mm, quartz) spaced <40mm apart. Broken veins spaced 20-200mm apart.		
		126	43				
		125	44		- becoming coarse grained below 43.65m. Crisscrossed by irregular (mostly 30-45°) defects some partly coated by dark green-black, chloritic material (<1mm) spaced 20-200mm apart.	RFW	
		124	45				
		123	46		45.5m Veined GREYWACKE SILTSTONE with some sandstone seams (<30mm, NV) [FW]; mostly dark grey, S to VS, fresh. Crisscrossed by irregular white veins (<5mm, quartz) spaced <30mm apart. Broken veins spaced 50-200mm apart.	RFW	
		122	47		46.7m GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<5mm, quartz) spaced <75mm apart. Broken veins spaced 25-250mm apart.		
		121	48				
		120	49		- some irregular patches (<30 by 15mm, some clasts) of black, S, argillite near 48.4-48.45m. Occasional argillite clasts (<20mm) by 48.7m.	RFW	
		119	50		- broken irregular (10-55°) defects partly coated by dark green-black, chloritic material (<1mm) spaced 50-300mm apart below 49.6m.		
		118	51		50.8m GREYWACKE SANDSTONE [MA/SA]; grey (common discoloured), MS to VS, moderate-slightly altered (pervasive) to fresh (<50%). Crisscrossed by irregular white veins (<5mm, quartz) spaced 5-100mm apart. Broken irregular defects (some slickensided) spaced 50-100mm apart.	RSWb	- occasional black, S, argillite clasts (<6mm) below 50.8m. Veins (some with voids <20 by 3mm) have variable dip. Broken defects (often coated by dark green-black, chloritic material <1mm) have variable dip. No obvious shear bands. Box 19: 51.35-53.95m. Broken core (<100mm pieces) 51.35-51.8m. Some limonite-stained joint-defects near 51.55m. - maximum depth of contact. Broken defects (often partly coated by chloritic material <1mm) mostly dip 20°-NV by 51.7m. Occasional shear bands (<5mm, 20-60°). Occasional argillite clasts (<20 by 10mm). Few voids. Box 20: 53.95-56.6m. Irregular 40° broken defect (indistinct) with pyrite specks at 54.45m.
		117	52		51.7m GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 10-100mm apart. Broken irregular defects spaced 20-200mm.		
		116	53				
		115	54				
		114	55		- broken irregular (30°-NV) slickensided defects spaced 15-100mm apart. Veins (<10mm, quartz) spaced <40mm apart below 54.75m.		- defects often coated by chloritic material (<1mm, as above) 54.6-55.5m.
		113	56		- some black streaks (40-60°) between 55.75-56.3m.	RFW	- irregular 60°-20° broken defect with pyrite patches. Irregular 10° band (<20mm) of fine-grained (sheared) rock at 55.75m. Irregular 50° white-transparent vein (<15mm, quartz) with some voids (<5 by 2mm) at 56.2m. 31/3/15. Box 21: 56.6-59.0m. - pyrite specks on some defect surfaces below 56.7m. Indistinct 40° interval of streaky white-transparent to grey, VS, vein material to siliceous rock 56.85-56.95m. Broken core (<50mm pieces) 56.9-57.05m. - indistinct 40° band (<20mm, as above).
		112	57		- broken irregular defects spaced 15-150mm apart.		
		111	58				
		110	59		- veins (<5mm, quartz) spaced 5-35mm apart below 58.5m. Broken defects spaced 100-300mm apart.		Box 22: 59.0-61.7m. Irregular 40°-NV joint(s) coated by dark green-black material (1mm) 59.3-59.55m.
		109					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/6**

LOCATION: HUNUA QUARRY **GRID REF:** 421051.68E 776798.88N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 168.51m **SHEET** 4 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 20-4-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		108	61		- white veins (<3mm, calcite & quartz) spaced 5-50mm apart below 60.35m. Broken veins spaced 50-400mm apart.		- no obvious joints (& defects) 60.35-64.6m. Veins have variable dip.
		107	62				Box 23: 61.7-64.6m.
		106	63				- 20° slickensided defect coated by dark green-black, chloritic material (<1mm).
		105	64			RFW	- intersecting 50° & 25° polished defects with pyrite specks and partly coated by chloritic material (<1mm). 25° polished defect (partly coated as above) at 63.6m. 45° slickensided defect (coated as above) at 63.8m.
		104	65		- wider veins (<4mm, calcite) by 64.6m. Broken irregular (NH-40°) slickensided defects spaced 20-450mm apart.		- 35° defect (coated as above). 15° slickensided defect (coated as above) at 64.1m. Box 24: 64.6-67.45m. Broken defects often coated by dark green-black, chloritic material (<1mm) by 64.6m. Slickensided defects coated by chloritic material (<1mm) at 64.55 (10°) & 64.6m (25°).
		103	66				
		102	67				1-9/4/15 (Breakdown).
		101	68		67.9m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white to light grey veins (<5mm, calcite & quartz) spaced <30mm apart. Broken irregular (NH-50°) slickensided defects spaced 50-500mm apart.		Box 25: 67.45-70.1m. 10° defect with some pyrite specks and partly coated by chloritic material (<1mm) at 67.6m. - maximum depth of contact. Occasional black, MS-S, argillite clasts (<15 by 6mm) by 67.9m.
		100	69				
		99	70				- 50° slickensided defect with minor pyrite specks and coated by chloritic material (<1mm, as above). Box 26: 70.1-72.8m.
		98	71		- disrupted white to light grey veins (<10mm, calcite & quartz) spaced <20mm apart. Broken veins spaced 30-300mm apart.		- veins have variable dip. No obvious broken defects below 71.05m.
		97	72				10-20/4/15 (Breakdown).
		96	73				- 75° white to light grey (green-tint), composite vein (<20mm, quartz) to vein network (<10mm spacing) 72.6-73.05mm. Box 27: 72.8-75.8m.
		95	74		- wider veins (mostly <20mm) below 73.2m.	RFW	- 30° slickensided defect.
		94	75				- 50° composite vein (<30mm, quartz).
		93	76				- irregular 60° network (<50mm) of indistinct light grey veins (<30mm, quartz) spaced <15mm apart. Offset 75° composite vein (<20mm, quartz) 75.25-75.5m. Box 28: 75.8-78.35m.
		92	77				Core sample taken by K Barber. Broken veins spaced 100-600mm apart from 77.15m.
		91	78		- variable pale grey (transparent) to dark grey, VS, vein material (quartz) between 77.15 (20°) & 77.43m. Minor black, MS-S, argillite clasts (<12mm) below 77.43m. - irregular veins (<10mm, quartz) spaced <40mm apart by 77.8m.		- 20° slickensided defect along base of vein material.
		90	79				Core sample taken by K Barber. Box 29: 78.35-80.2m. 60°, white to pale grey, composite vein (<30mm, quartz) at 78.65m. 45° vein (<40mm, as above) at 79m. 40° vein (<15mm, as above) at 79.2m.
		89			- occasional argillite clasts (<7mm) below 79.35m.		- crisscrossed by shear bands (<4mm, 30-60°) spaced <150mm apart below 79.35m. Network

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/6**

LOCATION: HUNUA QUARRY **GRID REF:** 421051.68E 776798.88N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 168.51m **SHEET** 5 **OF** 5

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-3-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 20-4-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
					80.2m		(<120mm, 50°) of mostly subparallel veins (<20mm, calcite & quartz) spaced <10mm apart 79.6-79.85m.
		88	81		EOH @ 80.2m		
		87	82				
		86	83				
		85	84				
		84	85				
		83	86				
		82	87				
		81	88				
		80	89				
		79	90				
		78	91				
		77	92				
		76	93				
		75	94				
		74	95				
		73	96				
		72	97				
		71	98				
		70	99				
		69					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/7**

LOCATION: HUNUA QUARRY **GRID REF:** 421078.17E 777160.44N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.81m **SHEET** 1 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 21-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 1-5-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		150	1		0.2m FILL (Surficial materials); dark brown (organic) to light brown with orange streaks, disturbed, plastic to non-plastic, silt with some sand and mud patches (<40mm, above 0.1m). Rootlets. Moderately weathered argillaceous rock fragment (<75mm) 0.15-0.2m.	OF O		NZTM location (GPS within 3m) of 1777877mE & 5893792mN. RQD entered into penetration field in database from 28.1m. Core boxes photographed. Box 1: 0-5.4m. Disturbed core (very soft & wet).
		149	2		0.9m SILT; dark brown (organic) with light brown streaks (increasing down, NH), disturbed (soft), non-plastic to slightly plastic, minor sand. Some rootlets. [Top Soil to Residual Soil]. - low recovery of light brown with light orangish brown mottles, disturbed (very soft), more plastic silt below 0.5m.	O		- maximum depth of contact. More intact core 0.2-0.45m. - maximum depth of contact. More intact core (moist) from 1m.
		148	3		2.65m CLAY; streaky light orangish brown, disturbed (very soft) to stiff, plastic. Minor rootlets. Low core recovery. [Residual Soil]. - light brown with orange streaks and less plastic by 2.5m [CW Waitemata Group].			- minimum depth of contact. Bedding is NH. Limonite-cemented lump (<20mm) near 2.7m.
		147	4		SILT with variable sand; pale brown with minor light orangish brown streaks to bands (<50mm), disturbed (soft), slightly plastic to non-plastic, some sand (fine). [HW to MW Waitemata Group]. - light brown with orange bands (<75mm), non-plastic sandy silt with some muddy bands (<30mm, more plastic) below 3.1m.	OWT		
		146	5		4.7m MUD to SAND-MUD; dark grey (brown-tint), disturbed (firm) to hard, plastic to slightly plastic. [MW to SW Waitemata Group].	OWT		- maximum depth of contact. Indistinct NH-55° defects spaced 25-200mm apart 4.7-5.25m. Mostly intact core by 4.85m. Box 2: 5.4-8.4m.
		145	6		- dark grey, tightly packed (stiff), sand with some silt between 5.25-5.45m (15°). Interbanded (<50mm, NH-15°) fine sand to mud below 5.45m.			
		144	7		6.5m Fine-medium SANDSTONE with mudstone bands [SW]; variable dark grey (brown-tint), mostly VWK. [Waitemata Group].			- maximum depth of contact. Mudstone bands (<50mm) mostly dip 15° by 6.5m.
		143	8					- several irregular (mostly 15°) limonite-cemented fractures spaced 100mm apart 7.4-7.55m. Irregular 20°-NV limonite-cemented fracture at 7.8m. Box 3: 8.4-11.8m.
		142	9		- mudstone between 8.18 (30°) & 8.33m (15°). - mudstone between 8.9 & 9m (30°). Fewer mudstone bands below 9m.	OWT		
		141	10					- irregular 25-60° joint coated by dark green-grey material (<2mm). 30° limonite-stained joint at 9.7m. Broken core (<100mm pieces) 10.2-11.5m.
		140	11		10.9m Fine SANDSTONE to SILTSTONE with some mudstone bands [FW]; dark grey, VWK, calcareous, bioturbated. [Waitemata Group].			- minimum depth of contact. Indistinctly banded (<30mm, 15°).
		139	12					Box 4: 11.8-15.1m.
		138	13					- indistinct 45° joint near 13m.
		137	14				S.W.L 15.4m (4/05/15).	
		136	15					Cased to 6m. 22/4/15.
		135	16			OWT		Box 5: 15.1-17.7m. 15° band (<10mm) of pale brown, sandstone-siltstone at 15.65m.
		134	17		- mudstone between 16.5 (20°) & 16.62m (20°).			Broken core (<100mm pieces) 16.5-17.7m. 20° off-white vein (<2mm, calcite) along mudstone at 16.62m.
		133	18					- 30° light grey vein (<2mm, calcite). Box 6: 17.7-20.8m. Indistinct 30° joint at 17.9m.
		132	19					
		131						

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 30m.	123mm to 30m. 96mm to EOH.

BOREHOLE No. HUN15/7

LOCATION: HUNUA QUARRY **GRID REF:** 421078.17E 777160.44N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.81m **SHEET** 2 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 21-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 1-5-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		130	21					- disturbed 20° muddy band (<15mm) near 20.3m (Drilling induced?). 45° white vein (<2mm, calcite) at 20.65m. Box 7: 20.8-23.9m.
		129	22			OWT		- 45° white vein (<3mm, calcite).
		128	23		23.35m			
		127	24		Silty SANDSTONE (Fine) with some mudstone bands [FW]; grey to dark grey, VWK, calcareous. [Waitemata Group]. - fewer mudstone bands (<15mm) between 23.95-24.9m.	OWT		- maximum depth of contact (20°). Indistinctly banded (<50mm, 20°). Core run 23.9-26.6m has excessive length (0.3m assumed recovered from previous run). Box 8: 23.9-26.6m. - irregular 60° pale grey vein (<1mm, calcite).
		126	25		25.3m			
		125	26		Silty SANDSTONE (Fine) [FW]; dark grey (lighter), VWK, calcareous. [Waitemata Group].	OWT		- 20° band (<25mm) of dark grey, coarser sandstone along bedding contact. Few obvious bands from 25.3m. 65° joint with minor white vein material (<1mm, calcite) at 25.55m. Core split along NV fracture(s) near 25.85-26.55m.
		124	27		26.6m 26.7m CONGLOMERATE [MW]; patchy light brown, greyish brown to mottled black & white, VWK, calcareous. Variably sized clasts (<75mm) of mostly calcareous siltstone. Some irregular seams (<30mm) of sandy matrix material with fossil fragments (<5mm). 27.45m	OWT ~~OWT~~ OWT		- 25° band (<40mm) of grey, fractured rock (<15mm, indistinct) to light brown (orange-tint), very stiff to hard (lumps <15mm), slightly plastic to non-plastic, sand-silt [Possible Fault]. Box 9: 26.6-30.3m. - 25° slickensided defect. Curved NV polished surface along clast 26.65-26.7m. - minimum depth of contact. Splaying 20° & 50° partly limonite-stained joints 26.7-26.75m. 50° limonite-stained slickensided defects at 27 & 27.1m. Broken core (<60mm pieces) 27-27.2m.
		123	28		MUDSTONE [MW to SW]; light brown (orange-tint), VWK, calcareous. [Waitemata Group]. Dark grey 27.1-27.3m. Light brown to orange-brown, hard, non-plastic sand-silt with some moderately weathered to fresh greywacke clasts (<25mm, mostly Sst) from 27.35m.	O		- 20° band (<20mm, above) of light brown, slightly plastic sandy mud along contact. Shattered (<50mm pieces, some silt) 27.45-28.1m. - defects mostly dip 20-40° near 28.1-28.55m. Core run 28.1-29.2m has 0.05m of uphole rock (<30mm, rounded) at top.
		122	29		29m FAULT ZONE [MW to HW]; limonite-stained to grey-brown, WK to S, moderately weathered, fractured (<20mm) argillaceous rock. - light brown (pale) with some brown patches, EWK-VWK, plastic claystone with rock fragments (<50mm) by 28.1m. Broken defects spaced 10-70mm apart. - light brown (orange-tint), VWK-WK, weathered, fractured (<20mm) argillaceous rock [HW-MW]. Brecciated (<50mm, silty) below 28.8m.			- 40° slickensided defect [Fault]. Shattered core (<60mm pieces, silty) 28.55-30m. - irregular 55° contact. Finer grained rock by 29m. Joints (often coated by light orange-brown, slightly plastic to non-plastic, silt to silty sand <5mm) have variable dip. Core run 29.2-29.9m has uphole rock (<50mm, Waitemata Group) at top. 23/4/15. Casing to 29m.
		121	30		ARGILLITE [MW]; dark brown, WK-MS, mostly partly weathered. Crisscrossed by irregular limonite-stained fractures to joints spaced <20mm apart. - fractures to joints spaced 5-30mm apart by 30m. Occasional irregular remnant veins (<3mm). Irregular seams (<50mm, indistinct) of brown (orange-tint), WK, more weathered rock between 30-31.75m. - crisscrossed by remnant veins (<4mm) spaced <50mm apart by 31.8m.			- joints often coated by light brown to orange-brown, non-plastic silt (<3mm) by 30m. Veins have variable dip. Broken core (<100mm pieces, some silt) 30-31m. Box 10: 30.3-33.3m.
		120	31					
		119	32					
		118	33		- light orangish brown, more weathered rock between 33.25-34.3m.			
		117	34					
		116	35		- slightly harder by 34.3m. Occasional patches (<30mm) of dark grey (discoloured), S, less weathered rock. Fractures to joints spaced 10-30mm apart. Remnant limonite-stained to white veins (3mm, weathered) spaced <50mm apart.	ORM		Core run 30.6-33.7m has 0.1m of uphole rock (<50mm) at top. - indistinctly banded (<50mm, 40-55°) by 31m. Broken joints spaced 10-300mm. - veins mostly dip 30°-NV by 31.8m.
		115	36					- disturbed band (<50mm) of shattered rock (<20mm, silty). Box 11: 33.3-36.0m.
		114	37		- some irregular patches (<50mm) of darker brown to black, S, partly weathered to almost fresh rock near 36.2-36.4m. Joints spaced 10-100mm apart below 36.2m. Veins (<4mm) spaced <30mm apart.			- indistinctly banded (<50mm, 55°). Broken joints (some coated by silt <3mm) spaced 10-200mm apart by 34.3m. Veins mostly dip 25°-NV. Box 12: 36.0-38.9m. 24/4/15. SWL 16.5m. Casing to 30m.
		113	38		- brown (orange-tint) and softer near 37.9-39.2m. Joints spaced 5-35mm apart from 37.9m. Weathered veins (<15mm) spaced <20mm apart.			- joints (some coated by silt <2mm) mostly dip 20-70° below 36.2m. Veins have variable dip. Core run 37.3-37.9m has excessive length (0.1m assumed recovered from previous run). No grey patches below 36.4m.
		112	39		- irregular (20-70°) veins (<5mm, weathered) spaced <50mm apart below 38.7m. - variable brown (orange-tint) to dark brown by 39.2m. Occasional patches (<20mm) of dark grey, VS, fresh rock. Fractures to joints spaced 10-200mm apart.			Broken core (<120mm pieces) 37.9-39.2m. Joints (often coated by silt <3mm) have variable dip 37.9-39.2m. Veins mostly dip 50-70°. Box 13: 38.9-41.7m. - indistinctly banded (<50mm, 50°) by 39.2m. Defects have variable dip.
		111						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 30m.	123mm to 30m. 96mm to EOH.

BOREHOLE No. HUN15/7

LOCATION: HUNUA QUARRY **GRID REF:** 421078.17E 777160.44N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.81m **SHEET** 3 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 21-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 1-5-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		110	41					- disturbed 45° weathered vein (<15mm). Shattered core (<40mm pieces, muddy) 41-41.1m.
		109	42		- brown to dark brown from 41.5m. Limonite-stained joints spaced 15-150mm apart. Weathered veins (3mm) spaced <50mm apart. Some light brown patches (<20mm) between 41.5-41.65m.			- 40° joint. Coarser grained rock (Zst?) from 41.5m. Indistinctly banded (<50mm, 40-55°). Defects have variable dip. Some joints coated by orange-brown, non-plastic silt (<1mm). No fresh patches. Box 14: 41.7-44.4m.
		108	43		- veins spaced 5-35mm apart below 42.6m. Occasional patches (<30mm) of dark grey, S to VS, almost fresh rock by 42.9m.	ORM		
		107	44		- irregular (25°-NV) weathered veins (<10mm) spaced <20mm apart between 43.95-44.25m.			Box 15: 44.4-47.1m.
		106	45		- brown (orange-tint) to dark brown from 44.75m (50°). Joints spaced 10-100mm apart. Limonite-stained to white veins (5mm, weathered) spaced <20mm apart.			- joints often coated by off-white to orange-brown, non-plastic silt (<3mm) from 44.75m. Indistinctly banded (<50mm, 50°). No fresh patches. Mostly broken core (<150mm pieces) from 44.85m.
		105	46					- 45° joint coated by light orangish brown, non-plastic silt (<2mm) and associated band (<25mm) of light orangish brown with off-white mottles, VWK, weathered, veined rock. 35° weathered composite vein (<15mm) at 46.73m.
		104	47		46.75m Veined ARGILLITE [MW]; dark brown with minor dark grey patches (<50 by 25mm), mostly MS, partly weathered to fresh (<15%). Crisscrossed by irregular limonite-stained joints spaced 15-150mm apart and limonite-stained to white veins (<3mm, weathered) spaced 5-30mm apart.			- 40° joint coated by light orangish brown, non-plastic silt (<3mm). No obvious bands from 46.75m. Box 16: 47.1-49.85m. - irregular 40° network (<50mm) of veins (<10mm, weathered) spaced <20mm apart.
		103	48					
		102	49		- irregular patch (<50mm wide) of dark grey, MS-S, fresh rock between 49.1-49.25m. Veins (<4mm) spaced <20mm apart below 49.05m.	RMW		- indistinctly banded (<30mm, 50°) 49.1-49.25m. Veins mostly dip 30°-NV below 49.1m. Box 17: 49.85-52.3m.
		101	50					28/4/15. SWL 16.5m. Indistinctly banded (<50mm, 50°) by 50m.
		100	51		- lighter brown (grey-tint) and softer (WK-MS) between 51 (55°) & 51.2m (45°). Off-white veins (<10mm, weathered) spaced <15mm apart.			Broken core (<50mm pieces) 50.7-51m. Greywacke sandstone 51.15-51.2m.
		99	52		51.7m Veined ARGILLITE [MW-SW]; dark grey-black with irregular dark brown seams (<75mm), MS to S, partly weathered (<50mm along joints) to fresh (<75%). Crisscrossed by limonite-stained joints spaced 15-150mm apart to white veins (<3mm, weathered/zeolite?) spaced <20mm apart.	RSWb		- finer grained rock from 51.7m. Defects mostly dip 30°-NV. Some joints coated by orange-brown, non-plastic silt (<2mm). No obvious bands 51.7-52.8m. Box 18: 52.3-55.0m.
		98	53		52.8m Veined ARGILLITE [MW]; dark brown with minor dark grey patches (<50mm, discoloured), MS, mostly partly weathered. Crisscrossed by irregular limonite-stained joints spaced 15-150mm apart and weathered veins (<3mm) spaced <40mm apart.			- defects have variable dip from 52.8m. Minimal silt on joints. Irregular 60° network (<50mm) of off-white veins (<10mm, weathered) spaced <15mm apart 52.8-52.85. Intersecting 35° & 20° weathered composite vein (<10mm) at 53m. - disturbed 15° band (<30mm) of shattered rock (<30mm, some mud).
		97	54					
		96	55			RMW		- irregular 50°-NV joint 54.85-55.2m. Broken core (<60mm pieces, minor silt) 54.95-55.2m. Box 19: 55.0-57.9m.
		95	56		- less weathered [FW 50%] between 56.2-56.7m. Common patches (<50mm) of dark grey, MS to S, mostly fresh rock.			- irregular 55° network (<25mm) of weathered veins (<7mm) spaced <10mm apart. Irregular 40° network (<60mm) of weathered veins (<5mm) spaced <10mm apart 55.95-56m.
		94	57					
		93	58		57.6m - irregular patch (<20mm wide) of dark grey, less weathered rock between 57.35-57.45m. Veined ARGILLITE [SW to MW]; dark grey-black with some irregular dark brown seams, MS to S, partly weathered (<40mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 15-150mm apart to white veins (<3mm, quartz & weathered) spaced <30mm apart. - joints spaced <50mm apart between 58.85-59.2m.			- 75° joint and associated disturbed shattered rock (<30mm pieces, silty) 57.35-57.7m. Broken core (<100mm pieces, some silt) 57.3-57.6.
		92	59			RSW		- joints often coated by orange-brown, non-plastic silt (<2mm) from 57.6m. No obvious bands. Box 20: 57.9-60.6mm. - irregular NV seam (<100mm) of dark brown, MS, partly weathered rock along intersecting joints 58.3-58.6m. Core broken (<50mm
		91			- moderately weathered [FW 25%] between 59.7 (50°) & 60.1m.			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 30m.	123mm to 30m. 96mm to EOH.

BOREHOLE No. **HUN15/7**

LOCATION: HUNUA QUARRY **GRID REF:** 421078.17E 777160.44N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.81m **SHEET** 4 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 21-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 1-5-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		90	61		- limonite-stained to clean joints spaced 10-50mm apart between 60.1-60.7m. Limonite-stained to white veins (<2mm, quartz & weathered) spaced <30mm apart. Pyrite specks to patches on some broken defect surfaces near 60.45-60.7m.	RSW		pieces) along intersecting joints 58.85-59.2m. Broken core (<75mm pieces) 60-60.6m. Coarser grained rock (Zst?) near 60.1-64.9m. Less silt (<1mm) on joints from 60.1m. 60° clean joint with pyrite specks at 60.45m. Box 21: 60.6-63.4m.
					61.7m			
		89	62		Veined ARGILLITE [MW]; dark brown, MS, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 15-150mm apart and weathered veins (<3mm) spaced <20mm apart.			- some joints coated by off-white to orange-brown, non-plastic silt (<3mm) from 60.7m. Defects have variable dip. - joints often coated by light brown to orange-brown, non-plastic silt (<2mm) from 61.7m.
		88	63					
						RMW		
		87	64		- disrupted veins (<3mm) spaced <10mm apart below 63.9m.			Broken core (<100mm pieces) 62.4-63.4m. Irregular NV seam(s) (<15mm) of pale brown, low-plasticity clay along joints 62.9-63.3m. Box 22: 63.4-66.1m. - veins mostly dip NH-60° below 63.9m. Intersecting 35° & 30-50° limonite-stained slickensided defects and associated seam (<50mm, between) of fractured (<20mm) rock to light brown, slightly plastic mud at 64.15m. Shattered core (<15mm pieces, silty >64.55m) 64.45-64.6m. 60° limonite-stained polished defect coated by pale brown, low-plasticity clay (<2mm). - irregular 60° contact. Joints often coated by orange-brown, non-plastic silt (<2mm) from 64.9m. Disrupted veins have variable dip. Indistinctly banded (<50mm, 45°) near 64.9-65.25m. Box 23: 66.1-69.65m. Mostly broken core (<150mm pieces) from 66.25m. Shattered core (<50mm pieces, some silt) 66.55-66.75m. - maximum depth of contact. Fine grained rock by 66.8m. Joints often coated by light brown, low plasticity clay (<5mm) from 67m. - 65° joint coated by light brown, slightly plastic silt (<3mm). Irregular 40° limonite-stained joint filled by light brown, slightly plastic sandy silt (<10mm) at 67.35m. - 70° joint coated by pale to light brown, non-plastic silt to sandy silt (<3mm) 67.35-67.45m. - minimum depth of contact (45°). Shattered core (<50mm pieces, silty) 67.6-68.5m. Disturbed 30° band (<20mm) of grey, muddy sand to plastic mud near 67.7m [Fault]. - maximum depth of contact. Joints often coated by pale brown, low plasticity clay to orange-brown, non-plastic silt (<3mm) by 68.5m. Red seams (<50mm) mostly dip 55°-NV. - 70° joint coated by pale brown, low-plasticity clay (<5mm) and partly altered (red, MS) <25mm into the adjacent rock. Shattered core (<75mm pieces, some silt <69.65m) 69.5-69.8m. Box 24: 69.65-72.5m. 29/4/15. SWL 16.5m. - maximum depth of contact. Mostly intact core from 69.8m. Joints often coated by orange-brown, non-plastic silt (<2mm). Green seams (<50mm) associated with joints mostly dip 60°-NV. - irregular NV joint coated by light brown to orange-brown, slightly plastic to non-plastic silt (<3mm). Shattered core (<50mm pieces, some silt) 70.3-70.5m. - irregular NV joint coated by pale brown with variable orange-brown patches, low-plasticity clay (<3mm) and partly altered (dominantly green, WK-MS) <30mm into the adjacent rock 71.8-72.5m. Box 25: 72.5-75.4m. 35° joint at 72.5m. - subparallel 55° & 50° polished defects coated by pale brown, low-plasticity clay (<5mm) [Fault]. Green & red seams (<100mm) mostly dip 55°-NV from 73m. Defects have variable dip. Joints often coated by orange-brown, non-plastic silt (<2mm). - no broken joints 73.25-73.65m. Mostly broken
		86	65		64.9m			
		85	66		Veined ARGILLITE [MW-SW]; dark grey to black with irregular dark brown seams, MS to S, partly weathered (<50mm along joints) to fresh (<75%). Crisscrossed by limonite-stained joints spaced 15-150mm apart to white veins (<4mm, weathered/zeolite) spaced <10mm apart.	RSWb		
		84	67		66.8m	RMW		
					Veined ARGILLITE [MA to MW]; dark grey to black, WK to MS, moderately altered (pervasive). Crisscrossed by disrupted limonite-stained (mostly below 67m) to white veins (<2mm, weathered/zeolite) spaced <5mm apart.			
					67.6m			
		83	68		- dark grey-brown, moderately weathered below 67m. Limonite-stained fractures to joints spaced <40mm apart.	R		
					68.5m FAULT ZONE [SA]; disturbed dark grey-black, S, almost fresh, intensely veined (<2mm, zeolite?), brecciated (<40mm) argillite with some grey (brown-green tint), silty sand. Becoming fractured limonite-stained rock (as below) from 67.7m.			
		82	69		- no core recovery below 67.9m.	RSW		
					69.8m Veined ARGILLITE [MA/SA]; dark greyish green (brown-tint) with irregular brownish red to red seams, MS to S, partly altered to slightly altered (>50%, pervasive). Limonite-stained joints spaced <100mm apart and off-white veins (<5mm, quartz & zeolite?) spaced <15mm apart.			
		81	70		Veined ARGILLITE [MA]; dark greyish green with irregular green (brown-tint, minor red) seams, mostly MS, partly altered. Crisscrossed by irregular limonite-stained joints spaced 20-200mm apart to off-white veins (<4mm, zeolite?) spaced <15mm apart.	RMW		
		80	71					
		79	72					
		78	73		- patchy dark greyish green, WK to MS, brecciated to fractured (<20mm) rock with silty sand seams (<10mm, indistinct) from 72.5m. Several irregular (55°) limonite-stained to white veins (<2mm, zeolite) spaced <20mm apart.			
					73m			
		77	74		Veined ARGILLITE [SW/SA]; greyish green with irregular green (brown-tint) to red and dark brownish red seams, MS to S, partly weathered/altered to slightly altered (<75%). Limonite-stained joints spaced 15-150mm apart to off-white veins (<3mm, zeolite?) spaced <20mm apart.			
		76	75					
		75	76					
						RSW		
		74	77		- disturbed light orangish brown with grey-green to dark greyish green patches, moderately weathered/altered, brecciated rock (<20mm, silty) between 76.6-77.1m [Fault Zone]. Disturbed off-white veins (<5mm, quartz & weathered) spaced <20mm apart. - dark greyish green with brown-green to brownish red seams (<50mm) and WK to S by 77.1m. Crisscrossed by irregular limonite-stained fractures to remnant off-white veins (<3mm, weathered/zeolite) spaced <20mm apart. - harder (MS to S) below 78.5m.			
		73	78					
		72	79					
		71						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 30m.	123mm to 30m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/7

LOCATION: HUNUA QUARRY **GRID REF:** 421078.17E 777160.44N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.81m **SHEET** 5 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 21-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 1-5-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		70	81		- limonite-stained fractures to off-white veins (<4mm, weathered) spaced <15mm apart between 81.6-83m.			core (<150mm pieces) from 73.6m. Box 26: 75.4-78.3m. Shattered core (<50mm pieces, silty) from 76.5m. - NV joint 76.5-76.7m. - disturbed band (<10mm) of light brown, low-plasticity clay [Fault]. Mostly intact core from 77.1m. Broken joints (often coated by silt <2mm) spaced 10-400mm apart. Box 27: 78.3-80.9m. Irregular NV seam (<50mm) of brecciated rock (<40mm, silty) 78.3-78.5m. Mostly broken core (<150mm pieces) 80.75-81.9m. Box 28: 80.9-83.8m. Core run 81.8-82.8m has excessive length (0.1m assumed recovered from previous run). - seam (<100mm) of brecciated rock (<15mm, silty) near 82.25 (55°) & 82.4m (70°) [Minor Fault]. Disturbed NV seam (<50mm) of brecciated rock (<20mm, silty) 82.65-82.8m. Box 29: 83.8-86.9m. Mostly broken core (<200mm pieces) 84.5-85.7m.
		69	82					
		68	83		- minor patches (<80mm) of dark grey-green, VS, almost fresh rock between 83.1-86m.	RSW		
		67	84					
		66	85		- irregular (60-75°) veins (<5mm weathered/zeolite) spaced <15mm apart near 84.3-85.4m. Brown-green with some brown to red bands (<20mm), WK to S, moderately weathered/altered [MW/MA] between 84.4 (70°) & 84.95m (60°).			
		65	86					- seam (<0.1m) of brown-green with reddish band (<10mm along base), WK-MS, partly weathered/altered rock between 85.45 (NV) & 85.6m (60°). Shattered core (<50mm pieces) 85.6-85.7m.
		64	87		86.9m - irregular seam (>0.1m) of light brown to light grey, slightly plastic, sandy mud with rock fragments (<40mm) below 86.45m [Fault]. Low core recovery.			- 60° transparent-white composite vein (<40mm, quartz) and associated seam (<30mm, above) of brown-green to red, WK-MS, partly weathered/altered rock with irregular void (<25mm) 85.9-86.05m. - pyrite specks to patches on some broken defect surfaces by 86.05m. Broken defects partly coated by dark green-black, chloritic material (<1mm) near 86.05m. Box 30: 86.9-89.7m. - 55° slickensided defect partly altered <40mm into the adjacent rock (below). Green & red seams (generally <100mm) mostly dip 55°-NV. Defects have variable dip. Broken veins-fractures (minimal silt) spaced 50-500mm apart from 86.9m. - irregular 40° limonite-stained joint. 65° seam (<60mm) of green (brown-tint, variable) with red flecks (along fractures spaced <20mm apart), MS, partly altered rock 87.65-87.85m. - broken 40° partly limonite-stained joint-fracture with pyrite patches. 10° vein (<7mm, calcite) at 88.15m. - indistinctly banded (<20mm, 20-30°) 88.4-88.55m. Broken 70° vein (4mm, calcite) with some limonite-stained patches and pyrite laminae (<2mm) at 88.47m. Broken NH fracture(s) with pyrite patches at 88.8m. Box 31: 89.7-92.45m. - irregular 65° contact. Green seams (<200mm) mostly dip 60°-NV from 89.85m. Red and/or dark green flecks along defects. Less obvious pyrite. No obvious joints. 30/4/15. SWL 16.5m. - 65° seam (<50mm) of variable green to red (<30mm), WK to MS, partly altered rock 90.6-90.8m. - broken 20° fracture(s) with pyrite specks. - maximum depth of contact. Patchy green & red seams (<100mm) mostly dip 55°-NV by 92.3m. Defects have variable dip. Red and/or dark green flecks along defects. Broken 10° fracture(s) with pyrite specks at 92.45m. Box 32: 92.45-95.1m. - broken 10° defect(s) with pyrite specks. Broken 70° vein (<1mm, calcite) at 93.25m. 70° joint with pyrite specks at 93.35m. - broken intersecting NH & NV defects with pyrite patches. Irregular NV limonite-stained to transparent-white vein (<5mm, zeolite?) 93.75-93.9m. Joints (often coated by orange-brown, non-plastic silt <1mm) mostly dip 20°-NV below 93.7m. Core broken (<150mm pieces) along irregular NV limonite-stained joint(s) coated by silt
		63	88			RSW		
		62	89		- mostly grey (green-tint) with some red-brown specks to patchy bands (<20mm), VS, vein material between 88.4 (25°) & 88.55m (20°). Crisscrossed by disrupted veins (<3mm) spaced <15mm apart. - veins (<3mm) spaced <50mm apart below 88.6m. Seam(s) (<60mm,			
		61	90		89.85m NV) of variable green (brown-tint) and red, MS, partly altered rock between 88.9-89.2m. - dark greenish grey & harder (MS to VS) below 89.2m. ARGILLITE [SA]; dark greenish grey with irregular green seams (variable with minor red streaks to bands <30mm), MS to VS, partly altered to almost fresh (50%). Crisscrossed by defects (indistinct) spaced <30mm apart and white veins (<2mm, calcite) spaced <50mm apart.			
		60	91					
		59	92					
		58	93		- less altered [SA/FW 75%]. Dark greenish grey with some green (variable), red and dark red-brown seams. Irregular white veins (<4mm, zeolite?) spaced <50mm apart.	RSW		
		57	94		- irregular limonite-stained joints spaced 50-500mm apart.			
		56	95		- softer (WK to VS) and more altered [SA 50%] between 94.8-95.5m.			
		55	96		- mostly dark green-grey with some green (variable) seams (<50mm), MS-S, partly altered to slightly altered (75%, pervasive) below 95.5m. Joints spaced 20-200mm apart. Fractures to veins (<3mm, quartz & zeolite?) spaced <40mm apart.			
		54	97		96.9m - veins spaced <10mm apart by 96.7m. Fractured ARGILLITE [SA to FW]; dark grey with minor irregular green seams (<50mm, variable), mostly S-VS, almost fresh (<95%). Crisscrossed by fractures spaced <30mm apart. Occasional irregular white veins (<2mm, zeolite?). Broken fractures to clean joints spaced 15-250mm apart.			
		53	98			RSW		
		52	99		- fresh rock between 98.9-100.55mm.			
		51						

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 30m.	123mm to 30m. 96mm to EOH.

BOREHOLE No. HUN15/7

LOCATION: HUNUA QUARRY **GRID REF:** 421078.17E 777160.44N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.81m **SHEET** 6 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 21-4-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 1-5-15 **TYPE OF DRILLING RIG:** Veradrill, V-100NG

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		50	101		101.1m	RSW		(<2mm) 94.8-95.5m. Box 33: 95.1-97.6m. - joints have variable dip below 95.5m. Core split along irregular NV limonite-stained (<96.9m) fracture (<97.4m) to joint(s) 96-97.1m. - 50° limonite-stained joint. Pyrite specks to patches on many broken defect surfaces (minimal silt) below 96.9m. Box 34: 97.6-100.5m. Irregular NV seam (<40mm) of variable green (brown-tint), MS, partly altered rock 97.7-97.8m. Irregular NV seam (<20mm) of green (brown-tint) with some red flecks, WK-MS, partly altered rock 98-98.2m. - 55° network (<40mm) of off-white veins (<3mm, zeolite?) spaced <10mm apart and associated interval (between) of light grey, S, slightly altered rock 98.8-98.9m. Mostly broken core (<200mm pieces) 98.9-99.9m. - irregular NV joint coated by pale grey-brown, non-plastic sand-silt (<2mm) 99.2-99.3m. Box 35: 100.5-103.8m. Irregular NV seam (<50mm) of variable green-grey with minor red-brown flecks, MS, partly altered rock 100.55-100.8m. Broken core (<80mm pieces). - 60° band (<30mm) of brecciated rock (<15mm, silty) [Minor Fault]. Defects have variable dip. Pyrite specks to patches on many broken defect surfaces. - black streaks (<3mm) along defects by 103.25m. Box 36: 103.25-105.8m. Broken core (<120mm pieces) 103.25-104m. - indistinct black mottled (<20 by 3mm) interval (<100mm, 65°) 104.5-104.7m. Broken core (<150mm pieces) 105.7-106.4m. Box 37: 105.8-108.2m. - some joints coated by orange-brown, non-plastic silt (<2mm) 105.8-106.5m. 60°-NV band (<15mm, disturbed) of dark green-grey, MS, partly altered rock at 105.9m. - 30° black band (<15mm). 55° band (<15mm, disturbed) of grey (green-tint), VS, greywacke sandstone 107.3-107.4m. 1/5/15. SWL 16.5m. - 25° limonite-stained joint(s) coated by orange-brown, non-plastic silt (<2mm) near 107.5m. Broken core (<150mm pieces) from 107.5m. - irregular NV-50° limonite-stained joint(s) coated by silt (<1mm) 107.7-107.85m. Associated indistinct 50° seam (<40mm, below) of intact (WK to S), brecciated rock (<15mm, silty) 107.8-107.9m. Shattered core (<50mm pieces) 107.85-108m. - disturbed seam (<50mm, NV) of greyish green with minor brown-red flecks, S, slightly altered (pervasive) rock 108-108.2m. Core broken (<200mm pieces) along irregular NV joints partly weathered (indistinct) <15mm into the adjacent rock from 108m. - broken joints (minimal silt) spaced <100mm apart and mostly dip 30°-NV by 108.15m. Indistinct defects with black streaks (<2mm) spaced <20mm apart and mostly dip 30-60°. Less pyrite. Box 38: 108.2-108.8m. Hole terminated after bit worn-out.
		49	102		ARGILLITE [FW]; dark grey to black, S-VS, fresh (>95%). Crisscrossed by irregular fractures spaced <40mm apart. Occasional irregular white veins (<2mm, zeolite?). Broken fractures to clean joints spaced 15-200mm apart.			
		48	103		- irregular seam (<25mm, NV) of grey (discoloured) to grey-green, MS, partly altered rock between 102.3-102.4m. Dark grey, S, greywacke siltstone near 102.4-103.25m.			
		47	104		- crisscrossed by irregular defects (indistinct) spaced <50mm apart and veins spaced 5-100mm apart by 103.25m. Broken veins to joints spaced 15-100mm apart. - broken veins to joints spaced 20-250mm apart between 104-105.7m.			
		46	105			RFW		
		45	106		- irregular limonite-stained joints spaced 10-50mm apart between 105.8-106.5m.			
		44	107		- fractures to veins (<3mm) spaced <20mm (and broken 10-250mm) apart by 106.5m. Fractured rock (<15mm) between 107.8-108m.			
		43	108		- slightly weathered/altered [FW >75%] near 108-108.75m. Limonite-stained (108.15-108.75m) fractures to joints spaced <20mm apart by 108.15m. Occasional distinguishable veins (<3mm).			
		42	109		108.8m EOH @ 108.8m			
		41	110					
		40	111					
		39	112					
		38	113					
		37	114					
		36	115					
		35	116					
		34	117					
		33	118					
		32	119					
		31						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 30m.	123mm to 30m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/8**

LOCATION: HUNUA QUARRY **GRID REF:** 421495.45E 776821.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 180.95m **SHEET** 1 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 11-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		180	1		0.15m Aggregate FILL; moderately weathered, greywacke fragments (<40mm, mostly Zst) with minor light brown, silty sand. 0.4m	OF		NZTM location (GPS within 3m) of 1778286mE & 5893445mN. RQD entered into penetration field in database from 8.5m. Core boxes photographed. Box 1: 0-3.2m. Disturbed core (wet). Measured fill depth 0.15m.
					Clayey SILT; brown (organic) with light brown to orange-brown mottles (increasing down), stiff to very stiff, slightly plastic to plastic, minor sand (fine). Common rootlets. [Top Soil].	O		
					CLAY; mottled light brown to light orange, very stiff, plastic. Minor rootlets. [Residual Soil].	O		Intact core (moist) from 0.15m.
		179	2		- patchy (<50mm) pale to light brown & orange and stiff by 0.9m.			- 35° band (<10mm) of pale brown, plastic clay near 1.25m.
					- becoming light brown with orange streaks to bands (<15mm, NH-20°), 2.25m firm and less plastic near 1.25m. Fissile. [Weathered Te Kuiti Group].			- irregular 55° limonite-stained joint at 2.1m. Indistinct 15° contact at 2.25m.
		178	3		- becoming as below. MUD; dark brown (organic), stiff to very stiff, plastic to slightly plastic. [MW Te Kuiti Group].			- 20° limonite-stained joint. Disturbed limonite-stained joints near 2.6m.
					- lighter brown and disturbed (firm to stiff) by 3m. Harder (very stiff) by 3.2m.	OTK		Box 2: 3.2-7.0m.
		177	4		- hard near 3.75-3.9m. Dark brown (carbonaceous) near 3.9-4.1m (40°).			
					- hard below 4.1m. Becoming light to dark brown mud with some sandy bands and carbonaceous horizons below 4.35m. 4.7m			- dark brown to black coaly band (10mm, 40°) 4.11-4.12m. Banded (<20mm, NH-20°) below 4.35m.
		176	5		- patchy (<20mm) near base. SILT; laminated (<5mm, NH) light brown to orange, very stiff to hard, slightly plastic, minor sand. Some orangish brown, limonite-cemented band(s) (<15mm, disturbed). No core recovery below 4.85m. [Ancient Soil to As Below]. 5.5m	O		- minimum depth of contact (NH).
		175	6		SILT with some sand; light orangish brown (speckled) with occasional black mottles to streaks, hard, slightly to non-plastic. [CW Greywacke]	ORC		- maximum depth of contact.
		174	7		- irregular dark orangish brown, limonite-cemented streaks to bands (<10mm, variable dip) spaced <100mm apart below 6.5m.			- irregular 55° black remnant joint. Box 3: 7.0-9.8m.
					7.35m			
		173	8		Weathered GREYWACKE (Sst to Arg) [HW]; light orangish brown (some grey-tinted patches), EWK (hard) to VWK, weathered. Crisscrossed by irregular limonite-stained to black remnant joints spaced <20mm apart.			- minimum depth of contact. Fine grained greywacke (Sst) from 7.35m. Joints have variable dip.
					- becoming light orangish brown (grey-tint) below 8.15. Harder (VWK) by 8.5m [HW-MW].			Fine grained rock (Zst/Arg) near 8.15-9.55m.
		172	9					
		171	10		- slightly softer 9.55-11m.			- coarser greywacke below 9.55m. No grey-tint 9.55-9.9m. Box 4: 9.8-12.65m. Mostly broken core (<100mm pieces) 9.8-11m.
								- finer grained rock (Sst/Zst) near 9.9-10.65m.
		170	11					- no grey-tint 10.65-12.45m. Fine grained rock (Zst/Arg) below 12.45m (60°).
		169	12					
		168	13					Box 5: 12.65-15.45m.
						ORH		
		167	14		- becoming harder (VWK to WK) by 14m. Joints spaced <30mm apart.			Shattered core (<30mm pieces, silty >13.8m) 13.5-13.9m [Possible Fault].
								- irregular 60-30° limonite-stained joint(s). Fine-medium grained greywacke by 14m. Broken joints spaced <200mm apart. No grey-tint 14-19.1m.
		166	15					Broken core (<75mm pieces) 14.9-15.3m. Box 6: 15.45-18.3m.
		165	16					Broken core (<100mm pieces) 15.95-16.5m.
		164	17					Mostly broken core (<180mm pieces) 17-18.3m.
		163	18					Box 7: 18.3-21.2m.
		162	19		- becoming less weathered below 19.1m.			- fine grained rock (Zst/Arg) near 19.1-19.4m.
					19.4m GREYWACKE (Sst) [HW/MW]; variable light orangish brown (darker) to brown, VWK to MS, weathered-partly weathered. Crisscrossed by	ORH		- coarser greywacke from 19.4m. Occasional pale brown patches (<30mm). Broken joints

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. HUN15/8

LOCATION: HUNUA QUARRY **GRID REF:** 421495.45E 776821.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 180.95m **SHEET** 2 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 11-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		160	21		irregular limonite-stained to black fractures to joints spaced <40mm apart.			spaced 10-150mm apart. Box 8: 21.2-24m.
		159	22					
		158	23		- interval (disturbed) of light orangish brown, gravelly (<20mm) silt-sand near 22.6-22.7m.	ORH		Shattered core (<40mm pieces, silty) 22.45-22.7m [Possible Fault].
		157	24		- mostly brown and pale brown (<100mm patches) below 23.5m.			- 55° joint filled by light brown (orange-tint), non-plastic, sandy silt (<5mm). Box 9: 24-26.9m. Broken core (<150mm pieces) 24.15-24.95m.
		156	25		25.1m Weathered GREYWACKE (Sst) [HW-MW]; light orangish brown, VWK to WK, weathered. Crisscrossed by irregular limonite-stained to black joints spaced <40mm apart.		S.W.L. 27.15m (24/06/15)	5/6/15. SWL 18.9m. - broken joints spaced 10-200mm apart from 25.1m. Defects have variable dip. Broken core (<75mm pieces) 25.3-25.7m.
		155	26					
		154	27		- some brown (<10mm, limonite-cemented) to light brown patches (<40mm) between 27.15-27.3m.			Broken core (<40mm pieces, some silt) 26.65-26.9m. Box 10: 26.9-29.7m. Broken joints spaced 10-400mm apart from 27m.
		153	28			ORH		
		152	29					
		151	30					Box 11: 29.7-32.4m.
		150	31					
		149	32		31.8m ARGILLITE with sandstone interval [HW/MW]; brown (grey-tint) with irregular light orangish brown seams (<50mm), WK to MS, weathered to partly weathered (>50%). Crisscrossed by limonite-stained to black fractures to joints spaced <20mm apart.			Mostly broken core (<120mm pieces) 31.75-32.3m. - 60° joint. Relatively coarse grained rock (Zst?). Defects have variable dip. Broken joints spaced <200mm apart from 31.8m.
		148	33			ORM		Box 12: 32.4-35.2m. Core split along irregular NV joint(s) 32.4-32.9m. Mostly broken core (<150mm pieces) 33.3-34.6m.
		147	34		- more weathered [HW-MW] between 34.3-35.1m. Joints spaced <40mm apart.			- medium to fine (>35.1m) greywacke sandstone 34.3-35.75m. Broken joints spaced 10-150mm apart 34.3-35.1m.
		146	35		- moderately weathered [MW] between 35.1-35.75m. Brown with some pale brown patches (<60mm) below 35.4m. Joints spaced <50mm apart.			Mostly broken core (<100mm pieces) 35.05-35.7m. Box 13: 35.2-37.9m.
		145	36		- some pale brown-grey patches (<50mm) between 35.75-36m. Fractures to joints spaced <20mm apart from 35.75m. Occasional remnant veins (<5mm).			- broken joints spaced 10-300mm apart from 35.75m.
		144	37					Mostly broken core (<100mm pieces) 37.05-37.7m.
		143	38		- moderately weathered [MW] near 37.2-38m. Dominantly dark brown and MS.			Box 14: 37.9-40.8m.
		142	39					

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

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BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/8

LOCATION: HUNUA QUARRY **GRID REF:** 421495.45E 776821.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 180.95m **SHEET** 3 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 11-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		140	41		40.85m Weathered GREYWACKE (Sst) [HW-MW]; light orangish brown, WK, weathered. Crisscrossed by irregular limonite-stained to black joints spaced <30mm apart.			8/6/15. SWL 28.5m. Box 15: 40.8-43.7m. Irregular 20° contact at 40.85m. Defects have variable dip. Broken joints spaced 250mm apart from 40.85m.
		139	42			ORH		Shattered core (<100mm pieces, some silt) 42.4-43m.
		138	43					
		137	44					Box 16: 43.7-46.5m.
		136	45		44.4m - some irregular patches (<50mm, indistinct) of brown (grey-tint), argillite below 44.2m. GREYWACKE SANDSTONE [MW]; brown (orange-tint), WK-MS, mostly partly weathered. Crisscrossed by irregular limonite-stained to black fractures to joints spaced <30mm apart.			- occasional light brown patches (<40mm) 44.4-45.3m. Broken joints (occasionally coated by off-white, non-plastic silt <2mm) spaced 10-200mm apart.
		135	46					- 60° light brown vein (<4mm, weathered). Box 17: 46.5-49.2m.
		134	47					
		133	48		- some elongated patches (<80 by 25mm, NV) of darker brown (grey-tint), WK, argillaceous rock below 47.1m. More weathered between 47.3-50m. Dominantly light orangish brown. Some patchy intervals (<100mm) of argillaceous rock.	ORM		- irregular 55° network (<50mm) of limonite-stained fractures to remnant veins (<10mm) spaced <10mm apart 47.3-47.45m. Broken core (<75mm pieces, some silt >47.6m) 47.5-47.7m.
		132	49					Mostly broken core (<75mm pieces, some silt >49.25m) 48.55-49.45m.
		131	50					Box 18: 49.2-51.95m. Broken core (<150mm pieces, some silt <49.8m) 49.7-50.2m.
		130	51		- brown with minor pale to light brown patches (<60mm) by 50m. Fractures to joints spaced <40mm apart. - more weathered [HW/MW] below 50.7m. Light orangish brown. Occasional irregular (mostly NV) remnant veins (<5mm).			- broken joints spaced 10-200mm apart by 50m. Defects have variable dip. No argillite. Broken core (<100mm pieces) 50.7-51.6m.
		129	52		- patch (<80 by 50mm) of light grey, less weathered rock near 51.4m.			Box 19: 51.95-55.2m. Broken core (<60mm pieces) 52.1-52.5m. Void (<25 by 5mm, 70°) at 52.6m.
		128	53		52.65m - becoming weathered rock [HW-MW] below 52.4m. Brecciated GREYWACKE (Sst) [HW-MW]; patchy (<60mm, indistinct) light orangish brown, VWK to WK, weathered. Mottled light orangish brown, disturbed, silty sand to slightly plastic, sandy mud with rock fragments (<40mm) below 53.1m. Remnant fractured to brecciated texture. [Fault Zone].	O		- indistinct 75° contact 52.5-52.8m.
		127	54		- no core recovery between 53.45-54m. 54.35m - light orangish brown, WK, fractured (<20mm) rock from 54.1m (65°). GREYWACKE SANDSTONE [MW]; mostly brown, MS, partly weathered. Crisscrossed by irregular limonite-stained to black fractures to joints spaced <50mm apart and light brown remnant veins (<5mm) spaced <100mm apart. Some grey (discoloured) patches between 54.7-55.1m.			- 55° joint. Defects have variable dip. Broken joints (some coated by light orangish brown, non-plastic silt <3mm) spaced 15-300mm apart from 54.35m. - patchy interval (<70mm, 25-45°) of dark brown (grey-tint), WK-MS, argillite 54.5-54.6m. Disturbed 45° light brown (limonite-stained) composite vein (<15mm, weathered) at 54.65m.
		126	55					
		125	56		- fractures to joints spaced 10-200mm apart below 55.95m. Veins (<10mm) spaced <40mm apart.	ORM		Box 20: 55.2-58.05m. - 60° composite vein (<30mm, weathered). Becoming fine grained greywacke below 55.95m. Some joints coated by off-white to light orangish brown, non-plastic silt (<3mm).
		124	57		- more weathered [HW/MW] between 57.1-57.6m. Patchy (<40mm) light orangish brown to orangish brown and softer (WK-MS).			- 55° composite vein (<15mm, weathered). - two light grey patches (<25mm) between 57.95-58m. Box 21: 58.05-60.7m. - some joints coated by light orangish brown, non-plastic silt (<5mm) from 58.2m.
		123	58		58.2m Veined GREYWACKE SILTSTONE [MW]; patchy (<50mm) light orangish brown to brown (grey-tint), WK to MS, mostly partly weathered. Crisscrossed by irregular limonite-stained to black joints spaced 10-200mm apart and fractures (some indistinct) to remnant veins (<5mm) spaced <20mm apart.	ORM		9/6/15. SWL 28.7m.
		122	59					

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN15/8**

LOCATION: HUNUA QUARRY **GRID REF:** 421495.45E 776821.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 180.95m **SHEET** 4 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 11-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
						ORM		
		120	61		60.45m - becoming as below. Weathered GREYWACKE (Sst to Arg) [HW-MW]; patchy (<40mm) light orangish brown, VWK to WK, weathered. Crisscrossed by irregular limonite-stained to black joints spaced <30mm apart.			- maximum depth of contact. Fine grained greywacke by 60.45m. Defects have variable dip. Broken joints spaced <300mm apart. Box 22: 60.7-63.8m. Mostly broken core (<50mm pieces, some silt 61.8-62.1m) 61.7-62.9m.
		119	62		- less weathered [PW <50%] between 61.9-64m. Patchy (<40mm) light orangish brown to brown and harder (VWK-WK). Joints spaced <20mm apart. Occasional irregular (45°-NV) remnant veins (<3mm).			- finer grained rock (Zst?) 61.9-64m. Broken joints spaced <200mm apart.
		118	63			ORH		
		117	64		- some dark greyish brown patches (<20mm) near 63.6-63.8m. - occasional limonite-stained to pale brown remnant veins (<10mm) from 64m.			- irregular 65°-NV black flecked band(s) (<20mm) 63.6-63.8m. Box 23: 63.8-66.8m. Irregular NV limonite-stained to pale brown vein (<10mm, weathered) 63.95-64.35m. - broken joints spaced <500mm apart from 64m.
		116	65		- more weathered between 65-65.45m. Patchy (<20mm) light orangish brown with black streaks and softer (Disturbed EWK to WK).			
		115	66		65.6m GREYWACKE (Sst) [HW/MW]; variable light orangish brown-brown, WK to MS, weathered-partly weathered. Crisscrossed by irregular limonite-stained fractures to joints spaced <40mm apart.	ORM		Broken core (<50mm pieces, some silt) 65.35-65.65m. - maximum depth of contact. Coarser greywacke by 65.6m. Broken joints spaced 20-250mm apart and mostly dip 20°-NV. - irregular NV, limonite-stained to pale brown, composite vein (<15mm, weathered) 66.1-66.55m. Box 24: 66.8-69.6m. - fine grained rock (Arg) near 67.1 (55°) & 68.95m. Joints often coated by light orangish brown, non-plastic silt (<3mm). Defects have variable dip from 67.1m.
		114	67		- moderately weathered [MW] between 67.1-68.95m. Brown to dark brown (grey-tint). Joints spaced 15-300mm apart. Crisscrossed by irregular weathered veins (<4mm) spaced <20mm apart.			
		113	68					
		112	69		- brown (orange-tint) from 68.95m. Fractures to joints spaced <20mm apart. Occasional irregular (45°-NV) remnant veins (<3mm).			- broken joints spaced 30-400mm apart from 68.95m.
		111	70		- crisscrossed by veins (<4mm) spaced <40mm apart by 69.6m.			Box 25: 69.6-72.5m.
		110	71		- patchy (<40mm, indistinct) light orangish brown to brown and WK-MS by 71.2m. Irregular seam (<50mm, NV) of dark grey-brown, S to VS, veined (<10mm spacing), greywacke siltstone between 71.5-71.95m.			Core broken along intersecting joints (coated by light orangish brown, non-plastic silt <3mm) spaced <100mm apart 70.9-71.2m.
		109	72					Box 26: 72.5-75.3m.
		108	73		73.5m Weathered GREYWACKE (Sst) [HW-MW]; light orangish brown (patchy <40mm), VWK to WK, weathered. Crisscrossed by irregular limonite-stained fractures to joints spaced <30mm apart.			10/6/15. SWL 20m. - minimum depth of contact. Fine grained greywacke below 73.5m. Broken joints spaced <200mm apart. Broken core (<50mm pieces) 73.65-74m. - no obvious patches 74.3-75.6m. Core broken (<150mm pieces) along irregular NV joint(s) 74.6-75m.
		107	74					
		106	75		- crisscrossed by irregular (70°-NV) limonite-stained remnant veins spaced <40mm apart by 75m.			Box 27: 75.3-78.25m.
		105	76		- few distinguishable veins by 75.9m. More weathered near 76.4-76.8m.	ORH		
		104	77					Shattered core (<20mm pieces) with soft lumps (<40 by 20mm) of mottled light orangish brown, slightly to non-plastic, gravelly (<20mm) sand-silt 76.55-76.8m [Possible Fault].
		103	78					Core split along irregular NV joint(s) coated by light orangish brown, non-plastic silt (<2mm) 77.7-78.4m. Box 28: 78.25-81.45m.
		102	79		79.1m Weathered BRECCIA [HW-MW]; light orangish brown to dark brown, VWK to MS, weathered to partly weathered, greywacke fragments (<30mm, Sst to Arg) in light orangish brown, EWK-VWK, silty sand.	O		- 55° limonite-stained to black joint. 60° limonite-stained joint coated by off-white to light orange, slightly plastic mud (<3mm) at 79.6m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN15/8**

LOCATION: HUNUA QUARRY **GRID REF:** 421495.45E 776821.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 180.95m **SHEET** 5 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 11-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		100	81		80.2m [Fault Zone].	RMW		- 65° limonite-stained to black joint with associated disturbed band (<30mm, above) of mottled light orangish brown, plastic to non-plastic mud with rock fragments (<10mm) [Fault].
					80.35m Veined ARGILLITE [MW]; dark brown with some light brown to grey patches (<20mm), MS, partly weathered. Crisscrossed by irregular (30-75°) weathered veins (<3mm) spaced <15mm apart. Veined GREYWACKE SILTSTONE to ARGILLITE [SW/SA]; mostly grey to black, MS to VS, slightly altered (pervasive) to fresh (<95%). Crisscrossed by disrupted white veins (<3mm, zeolite?) spaced <10mm apart.			- 70° limonite-stained to black joint. Relatively coarse grained (Zst?).
		99	82		- moderately weathered [MW] from 81.65m. Dark brown with irregular light brown to grey patches (<60mm) and softer (WK to S). Crisscrossed by irregular limonite-stained to black fractures to joints spaced <150mm apart. Greywacke sandstone between 82-82.4m.	RSW		- irregular 55-75° contact. Partly weathered <20mm along 75° fracture to 80.7m. Some discoloured grey 80.35-80.55m. Indistinctly banded (<50mm, 60°) from 80.35m. Defects have variable dip. Broken core (<130mm pieces) 80.7-81.8m.
		98	83		- grey (discoloured) patches (<200 by 50mm) below 82.05m. Becoming less weathered below 82.4m.			- disturbed intersecting joints coated by orange-brown, non-plastic silt (<3mm) and partly weathered <15mm into the adjacent rock near 81-81.2m. Box 29: 81.45-84.2m. Shattered core (<50mm pieces, muddy) 81.6-81.8m [Fault].
		97	84		- slightly weathered [FW> 50%] from 82.5m (65°-NV). Dark grey to black with irregular dark brown seams (<80mm) and MS to S. Limonite-stained joints spaced 50-200mm apart and partly weathered <20mm into the adjacent rock. Veins (<3mm) spaced <15mm apart.			- joints often coated by light brown to orange-brown, non-plastic silt (<3mm) from 81.65m. No obvious veins 81.65- 82.05m.
					84.45m - grey with irregular greyish brown seams, partly weathered (<10mm along joints) to slightly altered (<75%, pervasive), greywacke sandstone from 83.7m. Limonite-stained fractures to white veins spaced <15mm apart.	RFW		- crisscrossed by white veins (<1mm, weathered) spaced <20mm apart within less weathered patches below 82.05m. Shattered core (<30mm pieces, silty) 82.35-82.4m.
		96	85		85.4m - black with some irregular dark greyish brown seams, mostly S, less weathered [FW >75%] argillite below 84.1m. Veined ARGILLITE [FW]; dark grey to black, S to VS, fresh. Crisscrossed by disrupted white veins (<5mm, quartz & zeolite?) spaced <15mm apart. Broken veins to limonite-stained joints spaced 50-200mm apart.			- argillite with some siltstone bands (<40mm, 55°) by 82.5m. Some joints coated by off-white to orange-brown, non-plastic silt (<2mm) from 82.5m. Core broken along irregular 65°-NV joint(s) 82.75-83.75m.
		95	86		Veined GREYWACKE SILTSTONE with some argillite [FW]; grey to black, S to VS, fresh (>95%). Crisscrossed by disrupted white veins (<5mm, quartz & zeolite?) spaced <15mm apart. Broken veins spaced 15-300mm apart.			- 55° limonite-stained joint. Irregular 65° joint partly weathered <10mm into the adjacent rock at 83.9m.
		94	87		- mostly grey to dark grey, VS, siltstone between 86.9-88.1m. Crisscrossed by irregular limonite-stained joints spaced 100-700mm apart and partly weathered (indistinct) <5mm into the adjacent rock below 87.2m.			- bedding dips 50° at 84.1m. Box 30: 84.2-86.9m.
		93	88					- NH Limonite-stained joint. Some siltstone bands (<50mm, 40-50°) by 84.45m. Joints (some coated by light green-brown to dark green-black, non-plastic silt <3mm) mostly dip NH-70°. Pyrite specks to patches on some broken defect surfaces 84.45-85.4m.
		92	89		- disrupted patchy bands (<50mm, 55-70°) of argillaceous rock below 88.95m. Veins (<5mm, quartz & calcite) spaced <15mm apart.	RFW		- 50° defect coated by grey, plastic clay (<2mm).
		91	90					- 50° bedding contact. Indistinctly banded (<50mm, 40-60°) from 85.4m. Defects have variable dip. No obvious joints 85.4-87.2m. Box 31: 86.9-89.8m.
		90	91		- broken veins spaced 100-300mm apart below 90.5m. Grey, VS, sandstone-siltstone between 91 (75°) & 91.7m (NV).			- minimal silt on joints by 87.2m.
		89	92		- dominantly black, S, argillite from 91.7m.			- 50°, white to light grey, composite vein (<10mm, quartz). Box 32: 89.8-92.7m. 11/6/15. SWL 28.2m.
		88	93		92.2m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<5mm, quartz & calcite) spaced <15mm apart. Broken veins spaced 100-350mm apart.	RFW		- no obvious joints 90.5-93.7m.
		87	94		93.7m Veined GREYWACKE SILTSTONE [FW]; grey to dark grey, VS, fresh. Crisscrossed by irregular white veins (<5mm, quartz & zeolite?) spaced <10mm apart. Broken veins to clean joints spaced <150mm apart.			- bedding contact dips 65-75°. Fine grained greywacke 92.2-93.7m. Defects have variable dip. No obvious banding. Discontinuous 75° black flecked band(s) (<10mm) 92.35-92.45 & 92.55-92.65m.
		86	95		- dominantly black, S, argillite between 94.3-94.8m. Grey by 94.8m. Veins (<7mm, quartz & zeolite?) spaced <10mm apart.	RFW		Box 33: 92.7-95.8m. Some irregular NV black flecked bands (<10mm) 92.9-93.4m
					- dark grey, S, argillaceous rock between 95.55-95.75m.			- maximum depth of contact. Pyrite specks to patches on many broken defect surfaces 93.7-96m. Mostly broken core (<150mm pieces) 93.7-97.7m. Indistinctly banded (<20mm, 65°) 94.3-94.8m.
		85	96		96m Veined GREYWACKE SILTSTONE and ARGILLITE [SW/FW]; grey to black, S to VS, fresh (95%). Crisscrossed by irregular limonite-stained joints spaced 10-100mm apart and partly weathered (indistinct) <3mm into the adjacent rock. Crisscrossed by disrupted white veins (<5mm, zeolite?) spaced <10mm apart.			- 65° band (<20mm) of grey, silty sand with some rock fragments (<5mm) 94.55-94.8m [Fault]. Coarser grained rock by 94.8m. Box 34: 95.8-98.5m.
		84	97		- fresh rock by 96.95m. Few limonite-stained joints.			- maximum depth of contact. Joints often coated by light brown to orange-brown, non-plastic silt (<3mm) by 96m. Indistinctly banded (<20mm, 65°) above 96.3m.
		83	98		- mostly grey, VS, greywacke sandstone between 97.6 (40°) & 97.85m (65°).	RFW		- irregular NV seam(s) (<50mm) of brecciated rock (<20mm, some silt) to light grey, muddy gravel-sand (<97.2m) and white non-plastic silt (<15mm) 96.8-97.7m. Disturbed limonite-stained joint(s) partly weathered <2mm into the adjacent rock at 97.25m.
		82	99		- crisscrossed by irregular (60°-NV) limonite-stained to clean joints spaced <100mm apart below 98.4m.			- indistinctly banded (<50mm, 55-70°) from 97.85m
					99.35m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular white veins (<5mm, quartz & zeolite?) spaced	RFW		- joints often coated by light greenish brown to

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/8

LOCATION: HUNUA QUARRY **GRID REF:** 421495.45E 776821.30N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 180.95m **SHEET** 6 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 4-6-15
DATE FINISHED: 11-6-15
LOGGED BY: GDF

DRILLER: Drill Force LTD
TYPE OF DRILLING RIG: Coretech Drilling Equipment LTD, YDX-3L

STAND PIPE: G.L.

ORIENTATION: **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		80	101		<15mm apart. Broken veins spaced 50-250mm apart. - dark grey, S, argillaceous rock between 100.9-101.2m.			dark green, non-plastic silt (<2mm) below 98.4m. Box 35: 98.5-101.2m. - veins have variable dip from 99.35m. Fine-medium grained greywacke 99.35-103.95m. No obvious joints. Box 36: 101.2-104.1m.
		79	102		- dark grey with some irregular black streaks to patchy bands (<50mm, 70°-NV), S to VS, siltstone with some argillite between 102 (20°) & 102.4m (30°).	RFW		
		78	103		- occasional black, S, argillaceous streaks to patches (<30mm) from 102.4m. - dark grey with some irregular black bands (<20mm, 40-60°), S to VS, siltstone with some argillite between 103.25 (30°-NV) & 103.55m (50°).			- broken 70° vein-joint coated by white, non-plastic silt (<3mm). Irregular 65°-NV limonite-stained joint(s) coated by light brown-green, non-plastic silt (<3mm) at 102.6m. Core split along above joint to broken NV vein (<3mm, zeolite?) 102.5-103.25m.
		77	104		103.95m Veined GREYWACKE SANDSTONE (Fine) to ARGILLITE [FW]; grey to dark grey, MS to VS, fresh. Crisscrossed by irregular white veins (<5mm, quartz & zeolite?) spaced <15mm apart. Broken veins spaced <400mm apart.			- irregular NV-30° limonite-stained joint. Core split along broken NV vein-joint coated by pale grey, non-plastic silt (<2mm) 103.9-104.6m. - broken NV-70° vein-joint coated by light green to pale grey, non-plastic silt (<3mm). Indistinctly bedded (<800mm, 70°-NV) from 103.95m. Veins have variable dip. Box 37: 104.1-107m.
		76	105			RFW		
		75	106		- dominantly grey, VS, greywacke sandstone below 106.25m (70°).			Core split along broken NV vein-joint(s) coated by pale grey, non-plastic silt (<1mm) 105.7-106.4m. Core split along broken 75° vein-joint coated by silt (<1mm) below 106.7m.
		74	107		107m			
		73	108		EOH @ 107m			SWL >14.3m on 12/6/15.
		72	109					
		71	110					
		70	111					
		69	112					
		68	113					
		67	114					
		66	115					
		65	116					
		64	117					
		63	118					
		62	119					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/9**

LOCATION: HUNUA QUARRY **GRID REF:** 421294.46E 777256.55N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 189.93m **SHEET** 1 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Depth (m)	Reduced Level (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
			Recovery (%) 25 50 75 / Sample		
0.3m			Aggregate FILL; moderately weathered, greywacke fragments (<65mm, Zst & Sst) with minor light brown, silty sand.	OF	NZTM location (GPS within 3m) of 1778093mE & 5893884mN. RQD entered into penetration field in database from 38.5m. Core boxes photographed. Box 1: 0-3.0m. Disturbed core (wet). Measured fill depth 0.3m.
1	189		CLAY; light brown (orange-tint) with orange-brown mottles, stiff, plastic. [Residual Soil].	O	
1.2m			- light orangish brown with orange mottles to streaks (NH-30°) by 0.65m. Some pale brown patches (<30mm, indistinct) and slightly softer below 0.8m.		Intact core (moist) by 0.3m. Some irregular brown patches (<30mm) 0.3-0.4m. NH band (<7mm, disturbed) of pale brown, plastic clay at 1.2m.
2	188		Sandy SILT; light orangish brown with orange mottles, very stiff to hard, non-plastic. [CW to HW Waitemata Group].	OWT	
2.35m			- becoming variable pale brown to light orangish brown with some dark orange mottles to streaks and softer (stiff) below 1.45m.	OWT	- indistinct band of variable pale brown to orangish brown with light red mottles (lower half), disturbed (firm), plastic to slightly plastic, clayey silt 2-2.05m (20°). Limonite-stained patch (<70 by 40mm) 2.2-2.27m.
2.5m			- light brown (grey-tint) with some orange-brown mottles by 2.05m. Minor brown mottles (<20mm) below 2.15m.	OWT	
3	187				
3.4m			Clayey SILT; pale brown with some light red to orange-brown mottles, disturbed (firm) to stiff, plastic to slightly plastic.		- 40° contact. Some intact lumps (<30mm) of silt (as below) 2.35-2.5m.
4	186		SILT; light brown, hard, slightly plastic. Crisscrossed by limonite-stained joints spaced 40-100mm apart. [HW to MW Waitemata Group].	OWT	- maximum depth of contact (10°). Some light orange streaks to bands (<10mm, NH-15°) 2.5-2.75m. Joints mostly dip NH-75° by 2.5m.
4.3m			- becoming as below.		Box 2: 3.0-6.1m. 10° limonite-stained band (<15mm) at 3.12m. Light brown to orange, silty sand 3.13-3.18m (10°).
5	185		Silty SAND; light brown, tightly packed (hard). Limonite-stained joints spaced 50-150mm apart. [MW Waitemata Group].		- joints mostly dip NH-45° from 3.4m. Intervals of slightly plastic silt 3.93-4.02 (NH-15°) & 4.22-4.3m (10°).
			- light brown (darker) with irregular orangish brown mottles to streaks (NV) and slightly harder below 4.02m.		
6	184		Silty SANDSTONE (Fine to Medium) [MW]; light brown with some light orange to orangish brown mottles to bands (<5mm, NH), VWK. [Waitemata Group].	OWT	- NH bedding contact. Irregular NV limonite-stained joint(s) 4.65-5m. No obvious joints from 5m.
			- mostly light brown below 5m. Irregular brown seam(s) (<15mm, NV) near 5-5.45m.		- light brown to orange-brown bands (<10mm, 40°-NH) 5.45-5.55m. Box 3: 6.1-9.0m.
7	183		- grey between 5.75 (NH) & 6.5m (25°).		- 25° limonite-cemented band (<12mm). Indistinctly banded (<10mm, 10°) 6.5-6.65m. Variable orange bands (<10mm, 30°-NH) 6.5-6.53, 6.6-6.75 & 6.75-7.1m.
			- light orangish brown near 6.75-7.1m. Coarse grained intervals between 7.1-7.2m (15°) & below 7.45m.		
7.65m					
8	182		MUDSTONE [MW to SW]; interbanded light brown-grey to orange with some off-white and dark orangish brown (limonite-cemented) horizons, EWK (hard).	OWT	- irregular 15° limonite-stained contact. Banded (<20mm, NH-10°) 7.65-7.85m. Occasional black flecked horizons (<3mm, 10°) from 8.15m.
8.15m				OWT	
8.55m			- grey (brown-tint) and harder below 7.85m.		
9	181		SANDSTONE-SILTSTONE [SW]; grey, VWK. Common black flecked horizons to bands (<20mm, 10°) below 8.35m. Carbonaceous below 8.48m.	OWT	- NH contact. NH band (<20mm) of grey (brown-tint) mudstone 8.61-8.63m. Indistinctly laminated (<5mm, NH-10°) below 8.63m.
			Fine SANDSTONE [SW]; grey to dark grey, VWK. Silty above 8.63m.		Box 4: 9.0-12.0m. Laminae (<3mm, 20°) of lighter grey mudstone at 9.15m.
9.7m			- occasional light orangish brown to dark brown streaks to patches (<30 by 10mm) between 9.15-9.3m.		- 50° polished defect. Banded (<50mm, NH) 9.7-10.4m. 65° polished defect at 10m.
10	180		Interbedded SANDSTONE (Fine) to MUDSTONE [SW]; grey to dark grey (brown-tint), EWK (hard) to VWK. [Waitemata Group].		- irregular NV-60° joint(s) 10.3-10.4m. Bedding dips 15° at 10.4m. 55° slickensided defect at 10.9m.
			- silty sandstone between 10.4-10.8m. Crisscrossed by irregular (55-75°) indistinct defects spaced <150mm apart. Dark grey (brown-tint) mudstone between 10.8 (NH?) & 11.1m (15°).		
11	179		- harder (VWK) siltstone to sandstone between 11.1-11.75m. Some mudstone bands (<50mm, 15°) below 11.4m.	OWT	- indistinctly banded (<20mm, 15°) 11.1-11.75 & 12.05-12.25m. Some black flecked horizons (<3mm, 15°) 11.25-11.4m.
			- mudstone between 11.75 (20°) & 12.05m (15°).		Box 5: 12.0-15.0m. Bedding dips 15° at 12.25m. Defects have variable dip 12.95-13.6m.
12	178		- mostly dark grey (green-tint), silty sandstone between 12.25-12.95 & 13.4-13.53m.		- dark grey (brown-tint) mudstone to siltstone (>12.55m) near 12.5 (15°) & 12.6m. 55° slickensided defect at 12.55m. 70° defect (indistinct) at 12.75m.
13	177		- crisscrossed by polished defects spaced <50mm apart near 12.95-13.4m. Dark grey (green-tint), VWK, fractured (<10mm) mudstone below 13.53m.		
13.6m					- bedding dips 20° at 13.4m. Indistinctly laminated (<5mm, 20°) 13.4-13.6m. 25° slickensided defect at 13.6m.
14	176		Silty SANDSTONE (Fine) [SW to FW]; dark grey (green-tint above 14.6m), mostly VWK. [Waitemata Group].		- indistinct 65° joint. Irregular 75° joint (indistinct) 14.05-14.25m. Irregular indistinct NV joint(s) 14.35-14.9m.
			- grey, siltstone between 14.6 (25°) & 14.7m (55°). Calcareous by 15m.		
15	175			OWT	Box 6: 15.0-17.75m. Irregular NV dark green joint(s) 15-15.3m. Irregular 15° dark green band 15.27-15.3m.
			- harder (WK) and medium grained near 15.3-15.6m.		- indistinct 60° defect with associated muddy band (<20mm). Indistinct 65° joint at 15.75m.
16	174		- fine to medium grained below 15.8m. Dark grey (lighter), EWK to VWK, fractured (<10mm) sandstone-siltstone by 16.45m.		- indistinctly banded (<20mm, 15°) near 15.8-16.25m. Indistinct 70° joint at 15.9m. Shattered core (<50mm pieces, some mud) 16.25-16.5m. Disturbed 65° defect with associated white vein (<10mm, calcite) and band (<30mm) of grey, slightly plastic mud at 16.25m [Fault].
16.6m					
16.85m			MUDSTONE [FW]; dark grey, EWK (hard), calcareous.	OWT	
17	173		Silty SANDSTONE (Fine) to MUDSTONE [FW]; grey to dark grey, disturbed (above 17.25m) to VWK, calcareous.	OWT	
17.55m					
18	172		MUDSTONE [FW]; dark grey, VWK, calcareous. [Waitemata Group].		- 65° polished defect. Broken core (<75mm pieces) 16.8-17m. Indistinctly banded (<50mm, 15°) 16.85-17.55m.
			- crisscrossed by indistinct joints to polished defects spaced <50mm apart by 18.4m.	OWT	- 40° polished defect. 45° polished defect at 17.2m. Possible 45° joints at 17.3, 17.45 & 17.65m.
19	171				- 50° defect. Box 7: 17.75-20.75m. Two parallel 60° polished defects near 18m.
					- defects mostly dip 45°-NV by 18.4m. Core run 19-20.5m has excessive length (0.1m

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

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BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/9

LOCATION: HUNUA QUARRY **GRID REF:** 421294.46E 777256.55N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 189.93m **SHEET** 2 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
				= =	20.25m - becoming grey to dark grey, silty sandstone (fine) to mudstone by 20.05m.	OWT	assumed recovered from previous run).
		169	21		Silty SANDSTONE (Fine to Medium) [FW]; grey to dark grey, VWK, calcareous. [Waitemata Group]. Lighter grey, WK, calcite-cemented intervals (indistinct) near 20.85-22.4m.		- probable fault 19.9-20.05m (40°-NV). Indistinctly banded (<20mm, 15°) below 19.9m. 65° slickensided defect at 20.1m. - NH bedding contact. Softer (EWK) and less silt 20.25-20.5m. Indistinctly banded (<20mm, NH) from 20.25m. - broken NV transparent-white vein (1mm, calcite) 20.7-20.75m. Box 8: 20.75-24.35m. Few obvious bands 20.75-22m.
		168	22				
		167	23		- fine grained below 22.8m. Some mudstone bands (<50mm, NH).		Common disturbed bands (<50mm, NH) below 22.8m [Drilling induced].
		166	24				
		165	25				- irregular 35° white vein (<3mm, calcite). Box 9: 24.35-27.55m.
		164	26				- NH band of dark grey, disturbed to hard, slightly plastic mud near 26.05-26.13m. Irregular 40° white vein (<3mm, calcite) near 26.15m. 28/5/15. SWL 14.1m.
		163	27				
		162	28		- dominantly dark grey, very stiff, slightly plastic mud near 27.65-27.75m.		Box 10: 27.55-30.6m. Disturbed core 27.55-27.85m.
		161	29			OWT	Mostly intact core by 29.2m.
		160	30				
		159	31		- disturbed NV white veins (<5mm, calcite) spaced <50mm apart between 30.6-31.1m.		Broken to shattered core (<75mm pieces, some mud) 30.5-31m. Box 11: 30.6-33.8m. Irregular 65° white vein (<15mm, calcite) and associated band (<15mm) of grey, plastic to slightly plastic mud at 30.6m [Fault].
		158	32		- crisscrossed by irregular (65°-NH) white veins (<3mm, calcite) spaced <50mm apart between 31.95-32.1m. Dark grey mudstone between 32.3-32.4m (NH).		- 65° slickensided defect. Broken core (<50mm pieces) 32.3-32.6m.
		157	33				- NH white vein (<2mm, calcite).
		156	34		- crisscrossed by irregular white veins (<3mm, calcite) spaced <200mm apart between 33.86-34.6m.		Box 12: 33.8-36.65m. NH band (20mm, disturbed) of slightly plastic mud 33.84-33.86m [Drilling induced?]. Veins have variable dip 33.86-34.6m.
		155	35				- NH band (<20mm, disturbed) of grey, slightly plastic mud [Drilling induced?].
		154	36				
		153	37		- crisscrossed by irregular (45-70°) slickensided defects to white veins (<2mm, calcite) spaced <50mm apart between 36.65-37.05m.		Box 13: 36.65-39.65m.
		152	38		38.25m - brown patch (<40mm along side) between 37.9-38.1m.		- crossbanded (<50mm, NH-25°) below 37.8m. 15° limonite-stained joint at 38m.
		151	39		38.65m Silty SANDSTONE (Fine) [MW]; light brown with some orange mottles to streaks, VWK, calcareous. Minor mudstone bands (<10mm, 20°). Crisscrossed by irregular limonite-stained joints spaced <100mm apart. Veined GREYWACKE SANDSTONE [MW]; brown, S, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 15-200mm apart to white veins (<3mm, weathered) spaced <20mm apart.	OWT RMW	- 25° bedding contact. Defects have variable dip from 38.25m. 55° limonite-stained slickensided defect with associated limonite-stained to white vein (<3mm, calcite) at 38.6m. - jagged 15° contact. Fine-medium grained greywacke. Joints often coated by orange-brown,

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN15/9**

LOCATION: HUNUA QUARRY **GRID REF:** 421294.46E 777256.55N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 189.93m **SHEET** 3 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		149	41		40.2m - some patches (<150mm) of grey, less weathered rock [FW 25%] below 39m. Common argillaceous patches between 39.05-39.3m. Veined GREYWACKE SANDSTONE [SW to MW]; grey with irregular brown seams, S to VS, partly weathered (<50mm along joints) to fresh (75%). Crisscrossed by limonite-stained joints spaced 20-300mm apart to white veins (<3mm, quartz & weathered) spaced <40mm apart.		non-plastic silt (<1mm) from 38.65m. Minor irregular patches (<50mm, some clasts) of dark brown to dark grey, argillaceous rock.
		148	42		- moderately weathered [FW <25%] between 41.2 (35°) & 41.7m (45°). Brown with some grey patches (<100mm) and mostly S. Joints spaced 20-50mm apart.	RSW	- 50° pale brown with black streaks, composite vein (10mm, weathered). Becoming coarser greywacke below 39m. Box 14: 39.65-42.2m.
		147	43		- less weathered [FW <95%] by 42.2m. Elongated patch (<100 by 30mm, 55°) of black, S, argillite near 42.8m.		- irregular 50° contact. Defects have variable dip. Joints often coated by light brown to orange-brown, non-plastic silt (<2mm) from 40.2m.
		146	44		- moderately weathered [FW <25%] from 42.85 (30°). Mostly brown and softer (MS to S). Some dark brown to black, S, argillite clasts (<10mm) near 43-43.45m.		- 25° limonite-stained composite vein (<10mm, weathered). Box 15: 42.2-44.85m. Several subparallel indistinct defects ("shear bands") (<5mm, 65-55°) 42.2-42.4m.
		145	45		43.8m - irregular patch (<120 by 20mm) of grey (discoloured) with some black mottles, S, almost fresh, conglomeratic sandstone 43.2-43.3m. - becoming as below [FW <75%]. Veined GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams (<100mm, 60°-NV), S to VS, partly weathered (<30mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 30-350mm apart to white veins (<5mm, quartz & weathered) spaced <40mm apart.		- two parallel 25° joints weathered (light brown, WK) to partly weathered <50mm into the adjacent rock at 42.9 & 42.92m. Coarse grained greywacke near 43-43.45m.
		144	46		- irregular seam(s) (<60mm, NV) of brown, S, partly weathered rock between 44.55-45m.	RSWg	- disturbed 30° band (<10mm) of white, non-plastic silt to orange-brown, silty sand and associated joint(s).
		143	47		- dominantly dark grey, VS, fresh siltstone between 45.75 (65°) & 46.1m (65°). Some black argillaceous streaks.		- maximum depth of contact (NV). Some joints coated by light brown to light orange-brown, non-plastic silt (<1mm). Crisscrossed by shear bands (<5mm, 30-70°) spaced <100mm apart by 43.8m.
		142	48		47m Veined GREYWACKE SANDSTONE [MW]; brown, mostly S, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 30-150mm apart to off-white veins (<6mm, quartz & weathered) spaced <30mm apart.		- 60° off-white composite vein (<15mm, quartz & weathered). Box 16: 44.85-47.7m.
		141	49		- some patches (<50mm) of grey, VS, fresh rock below 48.1m.	RMW	- few obvious shear bands (<3mm) below 45.2m.
		140	50		49.1m Veined GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, S to VS, partly weathered (<50mm along joints) to fresh (<75%). Crisscrossed by limonite-stained joints spaced 50-350mm apart to white veins (<6mm, quartz) spaced <30mm apart.		- finer greywacke 46.1-47m. 55° joint partly weathered <15mm into the adjacent rock and associated (above) pale brown vein(s) (<7mm, quartz) at 46.2m.
		139	51		50.7m - moderately weathered [MW] below 50.35m (45°). Veined GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, mostly VS, partly weathered (<20mm along joints) to fresh (<95%). Limonite-stained joints spaced 50-500mm apart. Crisscrossed by limonite-stained to transparent-white veins (<5mm, quartz) spaced <40mm apart.	RSWb	- 70° joint (coated by light orangish brown, non-plastic silt <3mm) partly weathered <30mm into the adjacent rock and associated network (<30mm either side) of limonite-stained to transparent-white veins (<7mm) spaced <15mm apart at 46.4m.
		138	52				- irregular 35° contact. Disturbed 30° off-white vein (<10mm, quartz) at 47m. Joints often coated by light orangish brown, non-plastic silt (<5mm) from 47m. Box 17: 47.7-50.4m.
		137	53				- 75° joint filled by sand-silt (<20mm) and weathered-partly weathered <30mm into the adjacent rock.
		136	54		- irregular 65° seam (<40mm) of dark brown to dark grey, S, dominantly partly weathered, siltstone between 53.4-56.75m.		- 40° joint. Some joints coated by orange-brown, non-plastic silt (<2mm) from 49.1m. Finer greywacke by 49.4m. 55° off-white composite vein (<25mm, quartz) partly weathered <50mm into the adjacent rock at 49.4m.
		135	55				Box 18: 50.4-53.25m.
		134	56		- verging on fresh by 55.75m. Crisscrossed by limonite-stained to dark green-black (chloritic material <1mm) joints spaced 100-400mm apart. Narrower white veins (<3mm, quartz). Minor patches (<20mm, NV) of dark grey, VS, siltstone near 55.75m.		- defects have variable dip. Minimal silt on joints from 50.7m. Crisscrossed by shear bands (<5mm, 30-60°) spaced <200mm apart.
		133	57		- aligned (65°) patches (<35 by 10mm, some clasts) of dark grey, S, argillaceous rock between 56.35-56.6m.		- 40°, light grey, composite vein (<20mm, quartz). 29/5/15. SWL 21.1m. Core run 52.1-53.6m has excessive length (0.1m assumed recovered from previous run).
		132	58		- irregular limonite-stained to white veins (<5mm, calcite & quartz) spaced 5-100mm apart by 56.8m. Few dark green-black joints.		Box 19: 53.25-56.05m. Irregular NV seam (<50mm) of coarse grained greywacke with some dark grey, siltstone clasts (<40 by 20mm, <53.4m) 53.25-53.6m. 65° joint along siltstone at 53.6m. Fine grained greywacke from siltstone seam.
		131	59		- more weathered [FW >75%] below 58.55m. Joints spaced 15-350mm apart and partly weathered <20mm into the adjacent rock. Veins (<5mm, quartz & weathered) spaced <50mm apart.	RSWg	- elongated patch (<70 by 20mm, 55°) of dark grey-black, S-VS, argillaceous rock. Irregular 30° band (<10mm) of argillaceous rock at 54m. 50°, white, composite vein (<10mm, quartz) at 54.1m.
							- coarse grained greywacke below 54.5m (55°).
							- irregular NV seam (<40mm along side) of fine-medium grained greywacke 55.65-56.05m. Joints mostly dip 20°-NV by 55.75m. Box 20: 56.05-58.85m. Occasional shear bands (<5mm, 15-70°) by 56.05m.
							- indistinct seam (<300mm) of fine-medium grained greywacke near 56.35 (40°) & 57m (NV). 60° joint coated by dark green-black, chloritic material (<1mm) at 56.85m.
							- 50° white vein(s) (<10mm, calcite) with some rock fragments (<15 by 4mm).
							- defects have variable dip below 58.55m. Some joints coated by orange-brown, non-plastic silt (<1mm). Box 21: 58.85-61.6m.
							- 45° joint coated by chloritic material (<1mm).

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/9**

LOCATION: HUNUA QUARRY **GRID REF:** 421294.46E 777256.55N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 189.93m **SHEET** 4 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		129	61		- black, S, argillite clast (<30mm, NH) at 61.4m.		- 45°, white to light grey, composite vein (<15mm, quartz).
		128	62		- argillite clast (<5mm) at 61.8m.		- NH transparent-white vein(s) (<10mm, quartz). Core split along irregular NV joint(s) 61.1-61.8m. Box 22: 61.6-64.3m.
		127	63				- 40° to 55° network (<80mm) of white to light grey veins (<10mm, quartz) spaced <20mm apart 62-62.15m.
		126	64		- interbanded (<15mm, 65°) with dark grey to black, S, argillaceous rock between 63.35-63.45m. Minor argillaceous rock clasts (<10mm) below 64m.	RSWg	- 20° limonite-stained to dark green-black (chloritic material <1mm) joint. - minor argillaceous streaks to disrupted bands (<10mm, 65°) by 63.45m. - coarser greywacke below 64m (65°). Box 23: 64.3-67.0m.
		125	65		- some disrupted bands (<30mm, 50-70°) of finer grained rock between 64.65-65.85m. Argillite clast (<50mm) at 66.1m.		
		124	66				Core run 65.5-67.0m has excessive length (0.1m assumed recovered from previous run). 50°, transparent-white, composite vein (<30mm, quartz) at 65.8m.
		123	67		- moderately weathered [MW] between 66.7 (NV) & 67.1m (NV). Mostly brown and softer (MS-S). Irregular (15-75°) limonite-stained veins (<5mm, quartz) spaced <20mm apart 66.85-67.05m. Sandy conglomerate between 66.9-67.55m.		- mostly dark brown (<67.1m) and dark grey to black, MS to S, argillaceous rock clasts (<40mm, 65°) 66.9-67.55m. Box 24: 67.0-69.8m. 65° white vein (<10mm, calcite) at 67.75m.
		122	68		67.95m - becoming as below. GREYWACKE SANDSTONE [FW]; mostly grey, VS, fresh (>95%). Limonite-stained joints spaced 75-500mm apart and partly weathered <15mm into the adjacent rock. Crisscrossed by irregular white veins (<5mm, quartz) spaced <50mm apart. Occasional black, S, argillite clasts (<5mm).		- maximum depth of contact (NH). Variable (coarse to fine) greywacke by 67.95m. Bedding dips 60-70°. Joints (minimal silt) mostly dip 20-70°. Veins mostly dip 45-75°. Crisscrossed by shear bands (<5mm, NH-55°) spaced <200mm apart.
		121	69			RFW	- 60° joint coated by orange-brown, non-plastic, sandy silt (<3mm) and partly weathered <15mm into the adjacent rock. Box 25: 69.8-72.43m.
		120	70		- several aligned (40°) patches (<30 by 10mm, indistinct) of dark grey, S-VS, siltstone near 69.65m.		
		119	71		70.1m GREYWACKE SANDSTONE [MW-SW]; grey and brown intervals (<200mm), MS to VS, partly weathered (<50mm along joints) to fresh (>50%). Crisscrossed by irregular limonite-stained joints spaced 15-150mm apart to white veins (<4mm, calcite & quartz) spaced <100mm apart. - some dark grey to black, S to VS, argillaceous rock clasts (<5mm) near 70.95m. Less weathered [FW 75%] below 71m.	RSWb	- 65° joint. Bedding dips 50-70°. Defects have variable dip from 70.1m. No obvious shear bands. 75° joint coated by orange-brown, non-plastic silt (<4mm) and partly weathered <20mm into the adjacent rock at 70.5m. - 35° off-white vein (<4mm, quartz) with void (<15 by 3mm). Irregular 30° network of limonite-stained to off-white veins (<10mm, quartz) spaced <15mm apart 70.85-70.9m. - patchy bands (<20mm, 55°) of dark grey, S, greywacke siltstone 70.95-71.1m. - indistinctly banded (<50mm, 65°) near 71.5-72.1. Occasional shear bands (<5mm, 25-75°) by 71.6m. - 25° white vein (<7mm, calcite). Box 26: 72.43-75.3m. Irregular 75° network (<60mm) of white veins (<5mm, calcite) spaced <30mm apart 72.45-72.85m. - maximum depth of contact. Coarse grained greywacke by 72.65m. Some joints coated by orange-brown, non-plastic silt (<2mm). Occasional shear bands (<5mm, 15-65°). Minor dark grey to black, argillaceous rock clasts (<20mm). Box 27: 75.3-78.15m.
		118	72				
		117	73		72.65m GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown seams, S to VS, partly weathered (<30mm along joints) to fresh (<95%). Crisscrossed by limonite-stained joints spaced 50-400mm apart to white veins (<4mm, calcite & quartz) spaced <100mm apart.		
		116	74				
		115	75				
		114	76		- more weathered [FW 75%] below 75.85m. Partly weathered <50mm into the adjacent rock along joints.	RSWg	2/6/15. SWL 31.1m.
		113	77				
		112	78		- disrupted (45°-NV) white veins (<15mm) spaced <30mm apart between 77.3-77.6m. - moderately weathered [MW] between 77.85 (55°) & 78.2m (70°). Off-white to transparent-white veins (<10mm) spaced <30mm apart between 78-78.6m. - less weathered [FW >75%] by 78.5m. Partly weathered <20mm into the adjacent rock along joints.		Box 28: 78.15-80.75m. 65° joint and associated band (<15mm) of light orangish brown, VWK, weathered rock at 78.15m. 70° off-white composite vein(s) (<15mm, calcite) at 78.2m. - 45° limonite-stained to dark green-black (chloritic material <1mm) joint. 45° joint coated by chloritic material (<1mm) at 78.95m. Broken 55° white vein
		111	79				

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. HUN15/9

LOCATION: HUNUA QUARRY **GRID REF:** 421294.46E 777256.55N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 189.93m **SHEET** 5 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		109	81		- indistinct seam (<100mm, 55º) of conglomeratic sandstone between 79.75-80m. Common dark grey, S, siltstone clasts (<10mm). - indistinct seam (<100mm, 55º) of conglomeratic sandstone between 80.25-80.4m. Common dark grey to black, S, argillaceous clasts (<10mm). - moderately weathered [MW] between 80.85 (NV-55º) & 81.1m (55º). Less weathered [FW <95%] from 81.1m. Conglomeratic sandstone near 82.3 (65º) & 82.4 (NV). Common argillaceous clasts (<40mm).	RSWg	(<2mm, calcite) to slickensided defect at 79.05m. Box 29: 80.75-83.6m. Irregular NV-55º joint(s) filled by light orangish brown, low plasticity clay (<5mm) and partly weathered 10mm into the adjacent rock 80.55-81.1m.
		108	82				
		107	83		- fresh rock from 82.4m. Minor to some dark grey to black, MS to S, siltstone to argillite clasts (<10mm). Irregular white veins (<5mm) spaced <150mm apart. Sandy conglomerate between 82.7 (55º) & 82.85m (55º). Conglomeratic sandstone from 82.85m.		- veins mostly dip 40º-NV from 82.4m. Occasional shear bands (<5mm, 30-55º). No obvious joints 82.4-83.1m.
		106	84		83.3m - more weathered [FW 95%] below 83.1m. GREYWACKE CONGLOMERATE (Argillaceous) [SW to FW]; patchy grey to black, mostly S to VS, almost fresh. Variably sized clasts (<100 by 60mm) of siltstone to argillite. Sandstone matrix. Limonite-stained joints spaced 20-350mm apart and partly weathered <5mm into the adjacent rock. Veins as above.	RSWg	- larger clasts (<70mm argillaceous rock) from 82.7m. No obvious shear bands. Broken 55º white vein (<1mm, calcite) with pyrite specks at 82.85m. - intersecting 60º fracture and 10º joint partly weathered <3mm into the adjacent rock 83.1-83.15m. 25º & NH joints partly weathered <3mm into the adjacent rock at 83.25 & 83.3m. - minimum depth of contact (55º). Joints (minimal silt) have variable dip.
		105	85		- more weathered [FW <95%] below 83.5m. Partly weathered <30mm into the adjacent rock along joints. - some indistinct intervals (<100mm, 60º) of mostly grey, S, sandstone below 84.9m. - fresh rock (>95%) below 85.3m. Partly weathered <10mm into the adjacent rock along joints.		- 65º joint partly weathered <10mm into the adjacent rock. Box 30: 83.6-87.0m. Some irregular patches (<30 by 15mm) of white vein material (quartz) near 83.75m.
		104	86			RFW	Mostly broken core (<120mm, drilling induced) 85.1-86.2m.
		103	87		- irregular seam (<30mm, 75º) of dark grey-black, S, argillite between 86.4-86.7m. 87.25m		Box 31: 87.0-90.0m
		102	88		GREYWACKE SANDSTONE [SW to FW]; grey, VS, fresh. Irregular dark green-black fractures to joints spaced 40-400mm apart from 87.25m. Crisscrossed by irregular white veins (<5mm, calcite & quartz) spaced <100mm apart.	RFW	- veins mostly dip 20º-NV from 87.25m. Occasional shear bands (<3mm, 30-60º) from 87.25m. Pyrite specks to patches on many broken defect surfaces near 87.25-88.25m.
		101	89		- interval (<200mm, indistinct) of patchy grey to black, S to VS, sandstone-conglomerate between 87.55-87.9m (60º). Mostly argillaceous clasts (<100mm). - indistinct seam (<50mm, 45º) of conglomeratic sandstone below 88.15m. Mostly argillaceous clasts (<25mm).	RSWg	- irregular 40º network (<20mm) of white to grey veins (<10mm, quartz) spaced <10mm apart. - joints often coated by orange-brown, non-plastic silt (<3mm) 88.25-89.6m. 20º composite vein(s) (<7mm, calcite) at 89.5m.
		100	90		- slightly weathered [FW <95%] below 88.25m. Crisscrossed by limonite-stained fractures to joints spaced 20-250mm apart and partly weathered (brown, S) <20mm into the adjacent rock along joints near 88.25-89.6m. - fresh rock (>95%) by 89.6m (65º). Veins (<3mm, calcite & quartz) spaced <500mm apart. Minor dark grey to black, argillaceous rock clasts (<10mm) below 89.85m.		- veins mostly dip 20-70º from 89.6m. Occasional shear bands (<5mm, NH-55º). Few obvious joints. - two 20º joints partly weathered <3mm into the adjacent rock at 89.8 & 90m.
		99	91			RFW	Lost drilling circulation from 90m. Box 32: 90.0-92.5m.
		98	92		91.6m GREYWACKE SANDSTONE to CONGLOMERATE (Argillaceous) [SW to FW]; grey with variable dark grey to black patches, mostly S to VS, almost fresh. Variably sized clasts (<60mm) of siltstone to argillite. Occasional irregular white veins (<4mm, quartz). - fresh rock (>95%) by 92.55m.	RSWg	- 15º joint partly weathered <2mm into the adjacent rock. 45º joint partly weathered <2mm into the adjacent rock at 91.2m. - 55º bedding contact. Veins mostly dip 45º-NV from 91.6m. No obvious shear bands. Fresh rock 91.6-91.75m. Irregular 10º joint partly weathered <20mm into the adjacent rock at 91.75m.
		97	93			RFW	- irregular 20º joint partly weathered <10mm into the adjacent rock. Broken NV joint(s) with pyrite patches near 91.8-91.95m. Irregular NV joint-vein (<1mm, calcite) partly weathered <15mm into the adjacent rock 92.15-92.55m.
		96	94		93.7m GREYWACKE SANDSTONE [SW/FW]; grey, VS, fresh (>95%). Occasional irregular white veins (<3mm, calcite & quartz). Slightly weathered [FW >75%] between 93.9 (75º) & 94.35m (25º). - some dark grey to black, S to VS, argillaceous rock clasts (<40mm) between 94.25-94.5m.		- irregular 10º joint partly weathered <2mm into the adjacent rock. Box 33: 92.5-95.5m. - broken 70º vein (<1mm, calcite) to limonite-stained joint with occasional pyrite patches. 30º joint partly weathered <10mm into the adjacent rock at 93.25m. Intersecting NV joint partly weathered <10mm into the adjacent rock 93.25-93.35m.
		95	95		- some argillaceous rock clasts (<15 by 5mm) near 94.75m.	RFW	- irregular 30º limonite-stained to dark green-black joint. Irregular NH joint partly weathered <5mm into the adjacent rock at 93.45m.
		94	96		95.95m GREYWACKE SANDSTONE to CONGLOMERATE (Argillaceous) [FW]; grey with variable dark grey to black patches, mostly S to VS, fresh (>95%). Variably sized clasts (<100 by 60mm, 60º) of siltstone to argillite. Crisscrossed by irregular white veins (<5mm, quartz) spaced 5-200mm apart.		- maximum depth of contact (NV). Veins mostly dip 45-75º from 93.7m. Irregular 15º fracture partly weathered <5mm into the adjacent rock at 93.77m. - intersecting irregular NV-NH joints partly weathered <15mm into the adjacent rock and spaced <100mm apart 93.9-94.35m. Irregular 10º joint partly weathered <3mm into the adjacent rock at 94.65m.
		93	97			RFW	- occasional shear bands (<5mm, 10-75º) by 94.7m. Intersecting irregular 15-65º fractures to joints partly weathered <5mm into the adjacent rock near 95.2m. - 75º joint partly weathered <5mm into the adjacent rock. Box 34: 95.5-98.45m.
		92	98				- indistinct 70º bedding contact. Indistinctly bedded (<0.6m, 50-70º) from 95.95m. Veins have variable
		91	99		99m GREYWACKE SANDSTONE [SW/FW]; grey, VS, fresh (95%). Crisscrossed by irregular white veins (<4mm, quartz) spaced <150mm apart. Crisscrossed by irregular limonite-stained joints spaced	RFW	

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

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BOREHOLE No. HUN15/9

LOCATION: HUNUA QUARRY **GRID REF:** 421294.46E 777256.55N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 189.93m **SHEET** 6 **OF** 6

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 27-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 3-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Comments
		89	101		20-200mm apart and partly weathered (brown, S) <10mm into the adjacent rock between 99.2-100.55m. - indistinct seam (<50mm, 70°-NV) with common patches (<50mm, some clasts) of dark grey to black, S, argillaceous rock between 100.5-100.85m. Fresh rock [FW >95%] by 100.55m. - irregular (30°-NV) white veins (<5mm, calcite & quartz) spaced <50mm apart between 101.05-101.7m. Some patches (<30mm) of argillaceous rock between 101.2-101.45m. - common patches (<60mm) of argillaceous rock between 101.75 (55°) & 102.1m (70°).	RFW	dip. Occasional shear bands (<5mm, 20-70°). - two irregular 20° & 10° joints partly weathered <3mm into the adjacent rock at 96.4 & 96.43m. Broken 75° white vein (<1mm, calcite) to limonite-stained joint partly weathered <3mm into the adjacent rock 96.43-96.75m. - 55° vein (<7mm, calcite). 3/6/15. Dry hole. - irregular 25° partly limonite-stained joint with pyrite patches and partly weathered <2mm into the adjacent rock. - several intersecting NH-55° joints (some coated by orange-brown, non-plastic silt <2mm) and partly weathered <5mm into the adjacent rock. 25° joint partly weathered <2mm into the adjacent rock at 97.6m. - several intersecting NV-30° joints partly weathered <5mm into the adjacent rock. Irregular 35° joint partly weathered <2mm into the adjacent rock at 98.45m. Box 35: 98.45-101.4m. - two irregular 15° & 35° joints partly weathered <2mm into the adjacent rock at 98.8 & 98.9m. - maximum depth of contact (60°). Veins mostly dip 30°-NV by 99m. Crisscrossed by shear bands (<5mm, variable dip) spaced <200mm apart. - joints (minimal silt) have variable dip from 99.2m. 80° joint partly weathered <10mm into the adjacent rock 99.2-99.5m. - irregular patch (50 by 10mm, NV) of brown, S, partly weathered rock along intersecting irregular NV & 25° limonite-stained vein (<2mm, calcite) and joint 100.75-100.8m. Box 36: 101.4-103.0m. - 25° joint partly weathered <2mm into the adjacent rock. - indistinct patch (<60mm) of greyish brown, S, partly weathered rock. Associated irregular 75° limonite-stained to white vein (<3mm, calcite) partly weathered <5mm into the adjacent rock 101.8-101.95m. - two intersecting irregular 40° joints partly weathered <2mm into the adjacent rock. - defects have variable dip. Joints (some coated by orange-brown, non-plastic silt <2mm) partly weathered <10mm into the adjacent rock from 102.5m. Some to minor patches (<70 by 25mm, 65°) of argillaceous rock. Hole terminated after bit worn-out. Hole blocked at approximately 5m.
		88	102				
		87	103		103m - grey with some irregular brown seams (<50mm), S to VS, slightly weathered [FW >75%] from 102.5 (NV). Limonite-stained joints to white veins (<3mm, quartz & weathered) spaced <50mm apart. EOH @ 103m		
		86	104				
		85	105				
		84	106				
		83	107				
		82	108				
		81	109				
		80	110				
		79	111				
		78	112				
		77	113				
		76	114				
		75	115				
		74	116				
		73	117				
		72	118				
		71	119				

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/10**

LOCATION: HUNUA QUARRY **GRID REF:** 421173.44E 777293.86N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 179.83m **SHEET** 1 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 19-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Diameters in mm / S.W.L. 8/6/2015	Comments
								← Piezometer Diameters in mm
		179	1		0.32m MUD; brown (organic), disturbed (very soft to firm), slightly plastic, minor sand. Some clay patches (<10mm, as below). Some rootlets. [Top Soil]. CLAY; light brown with orange to brown mottles, very stiff, plastic. Minor rootlets above 0.85m. [Residual Soil]. - becoming light orangish brown with orange mottles to streaks (NH) and stiff below 0.55m.	O		NZTM location (GPS within 3m) of 1777971mE & 5893924mN. RQD entered into penetration field in database from 59.6m. Core boxes photographed. Box 1: 0-3.8m. Disturbed core (wet). - measured depth. Intact core (moist) from 0.32m.
		178	2		1.85m - variable pale brown to light orangish brown with irregular orange streaks, disturbed (soft) to firm and less plastic by 1m. - some lumps (<30mm, indistinct) of harder, non-plastic silt below 1.65m. Sandy SILT; light orangish brown (variable), disturbed (very soft) to hard (lumps <30mm), non-plastic. [HW to MW Waitemata Group]. - light brown (orange-tint) below 2.5m. Intact lumps (<40mm) of grey (brown-tint) with orange streaks, hard, slightly plastic mud.	O / OWT		- partially disturbed core (<50mm intact) from 1m. Disturbed core (wet) from 2m. Core run 3.5-5.0m has 0.1m of probable uphole material at top.
		177	3					
		176	4		3.6m - grey with minor orange-brown, lumpy (<30mm), slightly plastic mud by 3.5m. Silty SAND (Fine); grey (brown-tint) and light brown to orange-brown, disturbed (loose with hard lumps <40mm). [MW Waitemata Group].	OWT		- minimum depth of contact. Box 2: 3.8-7.55m. More intact core (moist) by 4.2m.
		175	5		- mostly grey (brown-tint), disturbed (loose) to tightly packed (very stiff) by 4.2m. - darker grey, slightly coarser sand with some silt below 4.7m. - dominantly dark grey (brown-tint), stiff to very stiff, slightly plastic mud near 5.1-5.6m.			
		174	6		- becoming as below. Low core recovery of mixed material (intact lumps <50mm). 6.45m			
		173	7		SILTSTONE to MUDSTONE [SW]; grey to dark grey, VWK. [Waitemata Group]. 7.1m - dominantly mudstone by 6.9m.	OWT		- maximum depth of contact. Grey, EWK (hard) silty sandstone (fine) 6.45-6.55m. Indistinctly laminated (<5mm, NH) near 6.45-7.15m. Mostly intact core from 6.5m.
		172	8		SANDSTONE (Fine-medium) [SW/FW]; dark grey, VWK. [Waitemata Group]. Minor mudstone laminae (<5mm, NH) by 8m.			- disturbed NH bedding contact. Black flecked laminae (<3mm, 15°) at 7.15m. Box 3: 7.55-10.9m.
		171	9		- occasional indistinct joints by 8.2m. Laminated siltstone-mudstone between 8.25 (10°) & 8.4m.			- joints have variable dip. Indistinctly laminated (<5mm, NH) near 8.25-9.15m.
		170	10		- softer (EWK) between 9.25-10m. Dark grey (brown-tint), disturbed (firm), plastic mud interval (>100mm) between 9.6-10m.	OWT		
		169	11		- black flecked bands (<50mm, NH) between 10-10.25m. Crisscrossed by black joints spaced <100mm apart.			Broken core (<100mm pieces) 10-11.8m.
		168	12		11.6m MUDSTONE [SW/FW]; dark grey, VWK. [Waitemata Group].	OWT		Box 4: 10.9-14m.
		167	13		12.65m Silty SANDSTONE (Fine) with some mudstone [SW to FW]; grey to dark grey, VWK. [Waitemata Group]. Mudstone (disturbed) between 12.98-13.08m. - coarser sandstone near 13.2-13.45m (NH). Mudstone between 13.45-13.8m.	OWT		Disturbed (EWK) core 12.35-12.45m. Indistinct 60° joint at 12.45m. Laminated (<5mm, NH) by 12.5m. - NH bedding contact. Broken core (<70mm pieces) 12.75-13.1m. - indistinctly laminated (<5mm, NH) near 13.2-13.45m.
		166	14		- mudstone between 14.1-14.15m. Calcareous by 14.1m. Coarser sandstone below 14.15m. Harder (VWK to WK). 14.52m			- indistinctly banded (<30mm, NH) 13.8-14.15m. Indistinct 60° joint with subparallel fracture(s) within 30mm (below) 13.9m. Box 5: 14.0-16.7m. Some black flecked laminations (<5mm, NH) 14-14.1m.
		165	15		Interbedded SANDSTONE (Fine) to MUDSTONE [FW]; grey to dark grey, VWK, calcareous. [Waitemata Group]. - coarser sandstone between 15.05 (NH) & 15.3m. 15.65m	OWT		- NH beds (<150mm). Occasional irregular black flecked streaks (<3mm, 15°) 14.52-15.65m.
		164	16		SANDSTONE (Fine-medium) [FW]; grey to dark grey, VWK, calcareous. [Waitemata Group]. - dark grey (brown-tint), silty sandstone (fine) near 16.35-16.65 (60°). Some mudstone bands (<50mm, NH) between 16.35-16.55m.			- laminated (<5mm, NH) 15.05-15.3m. 70° slickensided defect at 15.4m. Broken core (<150mm pieces) 16.3-17.5m. Crisscrossed by indistinct 20-60° fractures spaced <50mm apart between 16.35-16.7m. Indistinctly banded (<10mm, NH) below 16.65m. Box 6: 16.7-19.6m.
		163	17		- becoming medium grained.	OWT		
		162	18		18.85m			- irregular patches (<50 by 15mm) of white material (calcite) 17.25-17.3m. - no obvious bands below 17.9m.
		161	19		MUDSTONE with some silty sandstone bands [FW]; dark grey, VWK, calcareous. [Waitemata Group].	OWT		- irregular 30° contact. Banded (<30mm, NH) from 18.85m. Some irregular seams (<15mm) of mottled white to black, conglomeratic sandstone (clasts <5mm) 18.85-18.95m. Box
		160						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN15/10**

LOCATION: HUNUA QUARRY **GRID REF:** 421173.44E 777293.86N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 179.83m **SHEET** 2 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 19-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		159	21		- no sandstone bands between 20.45-22.95m.			7: 19.6-22.5m. - two subparallel 20° white veins (<1mm, calcite) 20.15-20.16m.
		158	22			OWT		- crisscrossed by indistinct NH-45° defects spaced <60mm apart between 21.7-22m. - 70° joint. Box 8: 22.5-25.65m.
		157	23					- interbanded (<50mm, NH) by 22.95m.
					23.6m			
		156	24		SANDSTONE (Fine-medium) [FW]; grey to dark grey, VWK to WK, calcareous. [Waitemata Group]. - becoming medium grained below 24.1m.			- indistinctly banded (<15mm, NH) 23.6-24.1m. - no obvious bands from 24.1m.
		155	25			OWT		- some laminae (<5mm, NH) near 25.05m. Box 9: 25.65-28.75m.
		154	26					
					26.65m			
		153	27		Interbanded Silty SANDSTONE (Fine) to MUDSTONE [FW]; grey to dark grey, VWK, calcareous. [Waitemata Group].			- bands (<100mm) mostly dip NH-10° from 26.65m.
		152	28					- NH bands (<15mm) of grey, plastic mud at 27.72, 27.76, 27.79 & 27.85m [Drilling induced?]. Occasional black flecked bands (<5mm, NH) by 27.9m.
		151	29					Box 10: 28.75-31.5m.
		150	30					- indistinct 70° joint. Indistinct NV joint(s) 29.6-30.25m.
		149	31					Broken core (<60mm pieces) 30.85-31.1m. Several disturbed NH bands (<20mm) of grey, plastic mud [Drilling induced?].
		148	32					- indistinct 50° defect. Box 11: 31.5-34.4m. Indistinct 55° defect at 31.65m. Band (<20mm, NH) of grey with minor red specks, coarse sandstone near 31.7m.
		147	33					- two indistinct 15° & 20° defects at 32.58 & 32.63m.
						OWT		- indistinct NH defect. 25° fracture at 33.04m.
		146	34					- three intersecting irregular 35-15° white veins (<1mm) 33.6-33.7m.
		145	35					Box 12: 34.4-37.35m.
		144	36					
		143	37					Box 13: 37.35-40.25m.
		142	38					- NH band (<7mm) of light grey siltstone near 37.75m. Core broken (<60mm pieces) along several NH bands (<15mm) of grey, plastic mud 37.85-38.5m [Drilling induced?].
		141	39		- dark grey, sandstone (fine to medium) between 38.4-38.75m. Black flecked band (<50mm, NH) between 38.6-38.65m. Occasional irregular (NH-30°) fractures to white veins (1mm, calcite) between 39.15-39.9m.			- irregular NH network of white veins (<2mm,
		140						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. HUN15/10

LOCATION: HUNUA QUARRY **GRID REF:** 421173.44E 777293.86N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 179.83m **SHEET** 3 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 19-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		139	41		40.25m - dark grey, mudstone from 39.97m (NH). Silty SANDSTONE (Fine) with some mudstone bands [FW]; grey to dark grey, VWK, calcareous. Occasional irregular (NH-60°) white veins (<2mm, calcite) above 43.22m. [Waitemata Group].			calcite) spaced <20mm apart 39.52-39.57m. - NH, grey, calcite-cemented band (<6mm) at 39.6m. Crisscrossed by white veins (<1mm, indistinct) spaced <3mm apart. - 10° bedding contact. NH mudstone bands (<50mm). Box 14: 40.25-43.4m.
		138	42					
		137	43			OWT		- irregular NV-70° white vein (<3mm, calcite) to lighter grey rock (<10mm, VWK-WK) near 42.2-42.45m. Core run 43-44.5m has excessive length (0.1m assumed recovered from previous run). - NH band (<20mm) of white with dark grey streaks, vein material (calcite) and disturbed band (50mm, below) of dark grey mudstone. Broken core (<60mm pieces) 43.22-43.4m. Box 15: 43.4-46.5m.
		136	44					
		135	45					
		134	46		46m Interbedded Silty SANDSTONE (Fine) to MUDSTONE [FW]; grey to dark grey, VWK, calcareous. [Waitemata Group].	OWT		20/5/15. SWL 4.1m. Irregular 15° bedding contact. Most beds (<200mm) dip 10° from 46m. Occasional black flecked horizons 46-47.15m. Core run 46-47.5m has excessive length (0.1m assumed recovered from previous run). Box 16: 46.5-49.7m. Disturbed white vein (<2mm, calcite) and indistinct 20-35° joint(s) at 46.8m. 40° white vein (<2mm, calcite) at 46.9m. - several black flecked horizons 47.35-47.4m. - interbedded (<150mm, NH). Irregular NV-30° white vein(s) (<1mm, calcite) at 48.1m. NH white composite vein(s) (<5mm, calcite) at 48.17m. Core run 49-50.3m has excessive length (0.2m assumed recovered from previous run). Indistinctly banded (<50mm, NH°) below 49m. Box 17: 49.7-52.55m. Irregular 70°-NV white veins (<2mm, calcite) 49.7-50m. Crisscrossed by irregular white veins (<2mm, calcite) spaced <20mm apart 49.95-50m. Disturbed NH white composite vein (<10mm, calcite) at 50m. - NH white vein (<2mm, calcite). Driller's log records core runs 0.1m shallower than marked on labels 50.3-55.1m. - NH off-white composite vein (<7mm, calcite). 50° pale brown vein (<2mm, calcite) 50.7-50.8m. - indistinctly banded (<50mm, NH) from 51.4m. - irregular 20° white veins (<2mm, calcite). NH white veins (<2mm, calcite) at 51.9m. 60° white veins (<2mm, calcite) at 52.25m. - discontinuous NH band (<10mm) of pale brown, sandstone-siltstone. Box 18: 52.55-55.6m. - intersecting 55° & 60° white veins (<2mm, calcite). 60° slickensided defect at 53m. - 60° white veins (<3mm, calcite). - 10° bedding contact. Beds (<100mm) mostly dip NH (<10°) from 54.25m. - 55° joint (indistinct). Irregular NV seam (<30mm) of fractured (<15mm) rock 55.6-55.9m. Box 19: 55.6-58.3m. Veins have variable dip from 55.65m. - joints mostly dip NH-30° from 55.9m. Interbedded (<100mm, <30°). 65° limonite-stained joint 55.9-56.05m. - maximum depth of contact (15°). Joints have variable dip by 56.65m. Veins mostly dip 30-75°. No obvious bands. - 70° polished defect. Some irregular patches (<30 by 15mm) of white vein material (calcite) with occasional vuggy voids (<40 by 20mm) 57.25-57.6m. - 70° limonite-stained slickensided defect coated by light brown, slightly plastic mud (<5mm) 57.75-58m. Box 20: 58.3-62.1m.
		133	47					
		132	48		- silty sandstone near 47.15-48.0 (NH). Black flecked band (<15mm, NH) at 47.25m.			
		131	49					
		130	50		- black flecked band (<20mm, NH) near 49.07m. Bioturbated between 49.75-50m.			
		129	51					
		128	52		- black flecked band (<10mm, NH) at 50.46m. Bioturbated below 50.5m. 51.4m Silty SANDSTONE (Fine) with some mudstone bands [FW]; grey to dark grey, VWK, calcareous. [Waitemata Group].	OWT		
		127	53		- band (<60mm, 10°) of greyish brown, laminated sandstone-siltstone between 52.45-52.52m. More mudstone (<100mm, NH) from 52.9m.			
		126	54		- silty sandstone from 53.4m (NH). Minor black flecked horizons to band (<10mm, <25°). 54.25m Interbedded Silty SANDSTONE (Fine) to MUDSTONE [FW]; grey to dark grey, VWK, calcareous. Some bioturbated intervals. [Waitemata Group].			
		125	55			OWT		
		124	56		- crisscrossed by irregular white veins (<3mm, calcite) spaced <30mm apart below 55.65m. - light brown to brown, moderately weathered [MW] from 55.9m (40°). 56.65m Irregular limonite-stained joints to slickensided defects spaced <100mm apart. Crisscrossed by limonite-stained to off-white veins (<3mm, calcite) spaced <50mm apart. SANDSTONE (Fine-medium) [MW]; light brown, VWK to WK, calcareous. Irregular limonite-stained joints spaced 30-150mm apart. Crisscrossed by irregular limonite-stained to white veins (<5mm, calcite) spaced <300mm apart. [Waitemata Group]. - some EWK (hard) seams (<100mm, indistinct) below 57.25m.			
		123	57					
		122	58			OWT		
		121	59		58.45m Crisscrossed by fractures (indistinct) to limonite-stained joints spaced <40mm apart. FAULT ZONE [MW]; mostly dark grey-brown (green-tint), WK-MS, partly weathered, brecciated (<50mm, some silt) to fractured (<5mm) argillite. Crisscrossed by irregular limonite-stained to white remnant veins (<3mm, calcite) spaced <100mm apart. 59.3m	ORM		
		120				RMW		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/10**

LOCATION: HUNUA QUARRY **GRID REF:** 421173.44E 777293.86N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 179.83m **SHEET** 4 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 19-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		119	61		Fractured & Veined ARGILLITE [MW/MA]; dark brownish to greenish grey with some irregular light brown to green seams (<30mm), WK to MS, partly weathered/altered. Crisscrossed by limonite-stained joints spaced <50mm apart to white veins (<3mm, calcite) spaced <20mm apart. - remnant veins spaced <100mm apart below 59.6m.			- 65° limonite-stained polished defect. Light brown (pale), soft to hard, plastic clay with rock fragments (>58.5m) 58.45-58.6m [Fault Gouge]. 55° polished defect at 58.5m. Irregular 55° seam (<40mm) of brecciated/fractured rock 58.5-58.55m.
		118	62		- broken joints spaced <200mm apart below 61.7m. Common patches (<100mm) of dark grey to black, mostly S, almost fresh rock between 62.2-62.65m. Joints spaced 20-150mm apart.			- 55° polished defect. Broken limonite-stained fractures to joints spaced 100-200mm apart from 58.6m. Veins mostly dip NH-75°.
		117	63		- mostly dark brownish grey (green-tint) and harder (MS-S) by 63.1m. Joints spaced 20-150mm apart. Occasional limonite-stained to white remnant veins (<3mm, quartz & weathered).	RMW		- maximum depth of contact. Fractured (<20mm, some indistinct). Defects have variable dip from 59.3m. Joints often coated by orange-brown, non-plastic silt (<2mm). Broken core (<100mm pieces) 59.3-61.6m.
		116	64		- irregular seam (<50mm, NV) of brecciated rock (<15mm, some clay) between 64-64.7m. Crisscrossed by veins (<3mm, weathered) spaced <50mm apart below 64.7m.			- some lumps (<50mm, soft) of light brown, muddy sand with some rock fragments (<40mm) [Uphole material?].
		115	65					- 75° off-white vein(s) (<5mm, calcite). Box 21: 62.1-64.7m.
		114	65.9m					- fractured <15mm by 63.1m. Defects have variable dip. Joints often coated by light brown to orange-brown, non-plastic silt (<2mm). Broken core (<150mm pieces) 64-65.4m.
		113	66		Altered ARGILLITE [HA]; light green, VWK, altered. Crisscrossed by irregular limonite-stained joints spaced <100mm apart.	RW		- lumps (<40mm, soft) of light brown to light orangish brown, muddy sand with some rock fragments (<10mm) 64.65-64.7m [Fault]. Box 22: 64.7-67.5m. Broken core (<120mm pieces) 65.85-66.25m.
		112	67					- 70° limonite-stained polished defect. Joints often coated by orange, non-plastic silt to pale brown, plastic clay (<3mm).
		111	67.15m		Veined ARGILLITE [MW to MA]; dark brown, mostly MS, partly weathered. Crisscrossed by irregular limonite-stained joints spaced <200mm apart and fractures to off-white veins (<3mm, quartz & weathered) spaced <40mm apart. - mostly variable dark greyish brown-green with some green (brown-tint) seams (<100mm, 70°-NV) and altered to partly weathered/altered rock from 67.55m.	RMW		- some lumps (<40mm, very soft) of pale brown, slightly plastic, mud-sand with some rock fragments (<15mm) 66.15-66.2m [Uphole material?]. Broken core (<150mm pieces, some silt <67.2m) 66.9-67.5m.
		110	68					- irregular NV contact. Joints often coated by light brown to orange-brown, non-plastic silt (<3mm) from 67.15m. Box 23: 67.5-70.5m.
		109	69					- irregular 65° seam (<100mm) of brown-green, VWK, altered rock 67.75-68.1m. Intact core (no joints) 68.2-68.65m.
		108	70					Broken core (<100mm pieces) 68.7-69.3m.
		107	70.5m		- irregular seam (<200mm, 70°-NV) of green (variable with red streaks to bands <7mm) , VWK to WK, altered rock between 70-70.5m.			- 70° defect filled by light brown (pale), gravelly (<10mm) mud-sand (<10mm). Broken core (<70mm pieces) 70.2-70.5m. 75° defect filled by light brown, slightly plastic mud (<10mm) with some rock fragments (<5mm) at 70.4m. Box 24: 70.5-73.35m.
		106	71		Veined ARGILLITE [SW/SA to MA/SA]; dark greyish green with some irregular green (variable with minor red streaks) seams, WK to S, partly weathered to variably altered (SA <75%). Limonite-stained joints spaced 15-300mm apart to white veins (<4mm, calcite & quartz) spaced <40mm apart.	RSW		- maximum depth of contact. Pervasively altered rock (some with brown-tint) by 70.5m. Joints (some coated by light brown to orange-brown, non-plastic silt <2mm) mostly dip 30°-NV. Veins have variable dip.
		105	72					- green to red seams (<200mm) associated with joints mostly dip 55°-NV below 72.9m. Joints (often coated by silt <2mm) mostly dip 20°-NV. Fractures to veins (<4mm, calcite & zeolite?) mostly dip 50°-NV.
		104	73		- dark greyish green and dark brownish red with irregular variable green to red seams, variably altered (SA >50%) below 72.9m (NV). [MA/SA].			- 60° seam (<100mm) of dominantly dark brownish red, MS, partly altered rock 73-73.2m. Box 25: 73.35-76.0m. Dark brownish red, MS-S, cherty rock between 73.45 (65°) & 73.65m (55°).
		103	74					- less dark brownish red intervals 73.7-75.5m.
		102	75					- elongated patch (<80 by 20mm, 45°) of transparent-white to green with red streaks, vein material (quartz). Box 26: 76.0-78.8m.
		101	76					
		100	77		- joints spaced 10-100mm apart below 76.9m. Irregular (45°-NV) off-white veins (<3mm, zeolite?) spaced <20mm apart between 78.2-78.5m.			- joints (some coated by pale brown to orange-brown, slightly plastic to non-plastic silt <2mm) have variable dip below 76.9m.
			78					Broken core (<100mm pieces) 78-78.8m. 35° joint filled by pale brown, slightly plastic mud to orange-brown, silty sand (<15mm) with some rock fragments (<5mm) at 78.3m.
			79		- harder (dominantly MS to S) and less altered (SA 75%) below 78.8m. Joints spaced 25-250mm apart. Limonite-stained to white veins (<4mm, calcite & zeolite?) to fractures spaced <20mm apart below 79.3m.			- 60° slickensided defect coated by pale brown, slightly plastic mud (<3mm). Disturbed band (<5mm) of light brown, slightly plastic, sand-mud at 38.55m. Box 27: 78.8-81.6m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN15/10**

LOCATION: HUNUA QUARRY **GRID REF:** 421173.44E 777293.86N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 179.83m **SHEET** 5 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 19-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		99	81					21/5/15. SWL 9.1m. Joints often coated by orange-brown, non-plastic silt (<2mm) below 78.8m.
		98	82					- 60° joint coated by pale brown, slightly plastic mud (<5mm). Shattered rock (<50mm pieces, silty) 79.3-79.4m [Fault]. Fractures to veins mostly dip 30°-NV below 79.3m.
		97	83		- limonite-stained joints spaced <150mm apart below 82.3m.			- irregular 45° band (<20mm) of transparent-white to green with red streaks, vein material (quartz). Box 28: 81.6-84.55m. 50° polished defect coated by pale brown, plastic clay (<5mm) at 81.75m.
		96	84					Shattered core (<25mm pieces, some silt) 81.85-81.9m. Irregular 70°-NV joint with associated seam (<30mm, disturbed) of pale brown to light orangish brown, plastic to slightly plastic mud to muddy sand 82.3-82.75m.
		95	85		- dark greyish green with minor irregular green seams, mostly MS to S, slightly altered (SA>75%) by 84.25m. Joints spaced 15-250mm apart. White veins (<3mm, zeolite?) spaced <20mm apart.			- joints (often coated by pale brown to orange-brown, slightly plastic to non-plastic silt <3mm) have variable dip below 82.3m. Mostly broken core (<20mm pieces) 82.4-84.4m.
					85.75m			- 50° polished defect coated by pale brown, plastic clay (<4mm).
		94	86		GREYWACKE SILTSTONE [MW]; dark greyish brown with some dark grey patches (<60mm), mostly S, partly weathered (indistinct) to fresh (25%). Limonite-stained joints spaced 20-200mm apart. White veins (<4mm, calcite) to fractures spaced <50mm apart.	RMW		- coarser grained rock (Zst?) by 84.25m. Green seams (<25mm, WK to MS) associated with joints mostly dip 40-60°. Some joints coated by orange-brown, non-plastic silt (<1mm). Veins mostly dip 30°-NV.
		93	87		86.9m			- 30° polished defect filled by pale brown, plastic clay (<10mm). Box 29: 84.55-87.55m. Broken core (<100mm pieces, minor silt) 84.8-85.4m.
		92	88		GREYWACKE SILTSTONE [SA]; dark greyish green (brown-tint) and dark grey, mostly MS-S, partly altered to almost fresh (50%). Limonite-stained joints spaced 50-250mm apart. White veins (<2mm, calcite) spaced <50mm apart. Dark brownish red seam (<100mm, 55 °-NV) near 87.25-87.55m.	RSW		- 45° joint. Joints (minimal silt) mostly dip NH-45° from 85.75m. Fractures to veins have variable dip. Broken core (<60mm pieces) 86.7-87.05m.
					88.2m			- joints mostly dip 15-70° from 86.9m. Veins mostly dip 30°-NV. 55° joint and associated seam (<15mm, below) of green (variable), WK-MS, partly altered rock at 87.1m. 55° seam (<30mm) of partly altered rock at 87.1m. Box 30: 87.55-90.4m.
		91	89		GREYWACKE SILTSTONE [MW]; dark greyish brown, MS-S, partly weathered (indistinct). Crisscrossed by irregular limonite-stained joints spaced 10-200mm apart to white veins (<2mm, calcite) spaced 5-100mm apart.			- maximum depth of contact (65°-NV). Defects have variable dip by 88.2m. Some joints coated by orange-brown, non-plastic silt (<1mm).
		90	90		- less weathered below 89.35m. Some patches (<100mm) of dark grey, S-VS, fresh rock (<25%).			Box 31: 90.4-93.0m. Core broken (<150mm pieces) along intersecting 15°-NV joints 90.6-91.5m.
		89	91		- limonite-stained joints spaced 10-150mm apart between 90.6-91.5m.			- minimal silt on joints 91.7-95.6m.
		88	92		- more fresh patches (<150mm, 50%) between 91.6-92.3m. Joints spaced 30-500mm apart below 91.7m.			Core broken along several irregular NV limonite-stained to dark green-black (chloritic material <1mm) joints with some pyrite specks 92-92.3m. Irregular 70° band (<20mm) of green-brown (red-tint), WK, altered rock at 92.3m. Minor red streaks 92.3-92.7m.
		87	93		- more weathered between 92.3-93.45m. No fresh patches.	RMW		Box 32: 93.0-95.5m. Irregular 70° seam(s) (<20mm) of light brown (red to green tint), WK, altered rock at 93.1m. 20° joint and associated band (<5mm) of light brown, WK, altered rock at 93.35m.
		86	94		- dark grey, S, fresh rock between 93.6-93.95m.			- partly weathered/altered seams (<20mm) mostly dip 55-65° near 94.6-95.6m.
		85	95		- becoming less weathered. - slightly weathered [FW 75%] near 94.6-95.6m. Dark grey with some irregular dark brown to dark green seams and mostly S. Partly weathered/altered <20mm into the adjacent rock along joints.			- irregular NH-35° dark green-black (chloritic material <1mm) joint. Broken core (<80mm pieces) 95.25-95.6m. Box 33: 95.5-98.5m.
		84	96		- more weathered by 95.6m. No fresh patches. Joints spaced 30-200mm apart. Limonite-stained to white veins (<4mm, calcite) spaced 5-100mm apart.			
					96.7m			
		83	97		GREYWACKE SILTSTONE [MW to SW]; dark brown and dark grey (<150mm patches), S to VS, partly weathered (<50mm along joints) to fresh (50%). Crisscrossed by irregular limonite-stained joints spaced 20-200mm apart to white veins (<3mm, calcite) spaced <100mm apart.			- minimum depth of contact. Some joints coated by silt (<1mm).
		82	98		- less weathered [FW >50%] by 98m.	RSW		22/5/15. SWL 9.1m. Box 34: 98.5-101.95m.
		81	99					
		80						

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

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BOREHOLE No. **HUN15/10**

LOCATION: HUNUA QUARRY **GRID REF:** 421173.44E 777293.86N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 179.83m **SHEET** 6 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 19-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		79	101		- less weathered [FW <80%] between 99.8-100.8m. Dark grey with some irregular dark brown seams (<50mm).			
					- moderately weathered [FW <25%] by 100.8m. Limonite-stained to white veins (<3mm, calcite) spaced <30mm apart.	RSW		Core run 101.1-101.3m has excessive length (0.65m assumed recovered from previous run). Light brown, disturbed (loose), silty sand near 101.5-101.55m [Uphole material].
		78	102		101.8m Veined GREYWACKE SILTSTONE [MW-SW]; dark grey with irregular dark brown seams, S to VS, partly weathered (<25mm along joints) to fresh (<75%). Limonite-stained joints spaced 100-450mm apart. Crisscrossed by white veins (<5mm, calcite) spaced <40mm apart.			- maximum depth of contact. Partly weathered seams dominantly dip NH & NV by 101.8m. Defects have variable dip. Minimal silt on joints. Box 35: 101.95-104.9m.
		77	103		- more weathered [FW >50%] near 102.35-103.3m. Some dark grey-black, argillaceous streaks to bands (<10mm, 45-70°) by 102.4m.	RSWb		
		76	104		- becoming as below [FW 50%]. 104.2m Veined GREYWACKE SILTSTONE [MW]; dark brown with some dark grey patches (<60mm), mostly S, partly weathered to fresh (25%). Crisscrossed by irregular limonite-stained joints spaced 10-100mm apart to white veins (<3mm, calcite) spaced <40mm apart.			- maximum depth of contact. Some joints coated by orange-brown, non-plastic silt (<1mm) by 104.2m. Broken core (<130mm pieces) 104.35-106m. Box 36: 104.9-107.75m.
		75	105					- disturbed vuggy void(s) near 105.2m.
		74	106		- less weathered [FW <50%] below 106.25m. Joints spaced 15-200mm apart.	RMW		- joints often coated by silt (<2mm) below 106.05m.
		73	107					
		72	108		107.95m GREYWACKE SILTSTONE [MW-SW]; dark grey with irregular dark brown seams (<100mm), S to VS, partly weathered (<30mm along joints) to fresh (<75%). Crisscrossed by limonite-stained joints spaced 20-200mm apart and white veins (<5mm, calcite & quartz) spaced <50mm apart.			Box 37: 107.75-110.6m. - some dark grey-black, argillaceous streaks (<5mm, 30-60°) by 107.95. Joints often coated by silt (mostly <1mm). Veins mostly dip NH-65°.
		71	109					Core split along joint(s) coated by silt (<2mm) and partly weathered <30mm into the adjacent rock 109.35-111.05m.
		70	110					
		69	111					Box 38: 110.6-113.5m.
		68	112		- less weathered [FW 75%] between 111.2-112.55m. Joints spaced 10-200mm apart and partly weathered <15mm into the adjacent rock below 111.2m. Narrower veins (<3mm, quartz).	RSWb		- defects mostly dip NH-65° below 111.2m. Some dark grey-black argillaceous streaks (<5mm, mostly 55°) below 111.2m.
		67	113		- joints spaced 10-150mm apart by 112.55m. Limonite-stained to white veins (<3mm, calcite & quartz) spaced <50mm apart.			- joints (some coated by silt <1mm) have variable dip by 112.55m. Some argillaceous streaks (<5mm, 40°-NV).
		66	114					Broken core (<150mm pieces) 113.4-114.55m. Box 39: 113.5-116.2m.
		65	115		114.55m GREYWACKE SILTSTONE [SW to FW]; dark grey with irregular dark brown seams, S to VS, partly weathered (<10mm along joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 10-200mm apart and white veins (<3mm, calcite & quartz) spaced <50mm apart.	RSWg		- disturbed NH joint. Some joints coated by silt <1mm). Some argillaceous streaks (<5mm, 40°-NV).
		64	116		- mostly grey, fresh rock [>95%] from 115.5m (NV). Joints spaced 30-400mm apart and partly weathered <5mm into the adjacent rock. Wider veins (<4mm).			- veins mostly dip 30-NV° from 115.5m. Box 40: 116.2-119.15m. 25/5/15. SWL 9.2m.
		63	117					
		62	118		- moderately weathered [FW <50%] from 117.7m. Dark brown with dark grey patches (<30mm) and mostly S. Joints spaced <30mm apart. 118.1m GREYWACKE SILTSTONE [FW]; dark grey, S-VS, fresh (>95%). Crisscrossed by irregular white veins (<3mm, calcite & quartz) spaced 5-100mm apart.			- 40° joint partly weathered <5mm into the adjacent rock. Joints (some coated by sand-silt <3mm) mostly dip 40°-NV from 117.7m. No obvious veins 117.7-118.1m.
		61	119			RFW		- maximum depth of contact (NV). Veins have variable dip by 118.1m. Few obvious joints. Minor argillaceous streaks (<5mm, mostly 55°). Irregular 55° band (<20mm) of argillaceous rock at 118.3m.
		60			- more weathered [FW 95%] between 119.6-122.3m. Crisscrossed by			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/10**

LOCATION: HUNUA QUARRY **GRID REF:** 421173.44E 777293.86N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 179.83m **SHEET** 7 **OF** 7

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 19-5-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 26-5-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
		59	121		irregular limonite-stained joints spaced 15-250mm apart and partly weathered (indistinct) <5mm into the adjacent rock below 119.6m. Limonite-stained to white veins spaced 10-200mm apart.			- irregular 35° joint coated by silt (<1mm) and partly weathered (indistinct) <5mm into the adjacent rock. Pyrite specks to patches on occasional broken defect surfaces by 119.15m. Box 41: 119.15-121.7m.
		58	122					- 35° joint partly weathered <2mm into the adjacent rock. Joints (often coated by silt <2mm) mostly dip 20°-NV below 119.6m. Core run 120.9-122.1m has up to 0.2m of excessive length. Box 42: 121.7-124.3m. Broken core (<150mm pieces) 121.7-122m.
		57	123		- limonite-stained joints spaced 20-500mm apart and partly weathered <5mm into the adjacent rock below 122.3m. White veins (<2mm, calcite & quartz) spaced <200mm apart.			- defects have variable dip below 122.3m. Joints often coated by orange-brown, non-plastic silt (<1mm). Pyrite specks to patches on some broken vein surfaces. Some dark grey-black argillaceous streaks (<5mm, mostly 55°). Box 43: 124.3-127.1m. Some joints coated by silt (<1mm) below 124.5m. Pyrite specks to patches on some defect surfaces. 26/5/15. SWL 9.1m.
		56	124					
		55	125		- joints spaced 20-300mm apart and partly weathered <3mm into the adjacent rock below 124.5m. Occasional veins (<3mm).	RFW		
		54	126					
		53	127					Box 44: 127.1-130.0m.
		52	128					
		51	129		- joints spaced 15-200mm apart and partly weathered <2mm into the adjacent rock by 128.4m. Limonite-stained to white veins (<2mm, calcite & quartz) spaced <100mm apart.			
		50	130		130m			
		49	131		EOH @ 130m			
		48	132					
		47	133					
		46	134					
		45	135					
		44	136					
		43	137					
		42	138					
		41	139					
		40						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/11**

LOCATION: HUNUA QUARRY **GRID REF:** 421552.00E 777122.40N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 224.06m **SHEET** 1 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
					← Piezometer Diameters in mm			
		223	1		0.7m CLAY; light brown with orange-brown mottles, stiff, plastic. Some rootlets above 0.1m. [Residual Soil to CW Waitemata Group].	O		NZTM location (GPS within 3m) of 1778348mE & 5893745mN. RQD entered into penetration field in database from 61.6m. Core boxes photographed. Box 1: 0-3.0m. Intact core (moist). Some brown (organic) patches (<30mm) above 0.2m.
					- lighter brown with orange mottles to bands (<10mm, <10°) and less plastic below 0.3m. Very stiff to hard below 0.55m.	OWT		- 45° limonite-stained slickensided defect. 10° bedding contact near 1.05m. Joints limonite-stained <10mm into the adjacent rock and mostly dip 45°-NV near 1.05-2.7m.
		222	2		1.05m SILT; light brown, hard, slightly plastic to non-plastic, minor to some sand (fine). [HW Waitemata Group]. Sandy SILT; light brown, hard, non-plastic. Crisscrossed by irregular limonite-stained joints spaced <200mm apart [HW to MW Waitemata Group].	OWT		
					2.7m			
		221	3		Silty SAND (Fine-medium); light brown, tightly packed (hard). [MW Waitemata Group].	OWT		- maximum depth of contact. Box 2: 3.0-6.0m.
					3.45m			
		220	4		MUDSTONE with minor sandstone [MW]; pale brown, EWK (hard) to VWK. [Waitemata Group].	OWT		- NH (<10°) bedding contact. Indistinctly banded (<20mm, NH-15°) from 3.45m.
					- pale to light brown by 4.35m. Crisscrossed by indistinct joints spaced <100mm apart below 4.6m.			- laminated (<5mm, NH-20°) near 4.35-5.15m. Defects mostly dip 30-60° by 4.6m. Brecciated rock (<40mm, muddy) 4.6-4.65m [Uphole material?].
		219	5		5.15m			
		218	6		SANDSTONE (Fine-medium) [MW]; light brown, EWK (hard) to VWK, silty. Crisscrossed by indistinct fractures spaced <50mm apart above 5.35m. [Waitemata Group]. - dominantly mudstone between 5.4 (10°) & 5.5m (20°). Light orange to orangish brown (limonite-cemented) near 5.75-6m. - minor irregular orange-brown bands to seams (<50mm, variable dip), EWK (hard) and less silt below 6m. Crisscrossed by irregular limonite-stained joints spaced 30-300mm apart near 6-8m.	OWT		- two 45° polished defects at 5.15 & 5.2m. No obvious bands. - indistinct 60° joint. Banded (<50mm, NH) below 5.75m. Box 3: 6.0-9.0m. Minor black mottles 6-7.4m. Joints limonite-stained <10mm into the adjacent rock and mostly dip 40°-NV near 6-8m.
		217	7					
		216	8		- more light orange to orange-brown bands (<10mm, NH-30°) below 8m. - light brown, disturbed, coarser sandstone near 8.4-9.55m. Minor to some off-white mudstone clasts (<5mm). Variable light orangish brown to orangish brown and black (limonite-cemented) below 8.65m. No core recovery between 8.8-9.4m.			
		215	9		9.7m - becoming harder (VWK) below 9.55m.			Box 4: 9.0-12.35m.
		214	10		MUDSTONE to SILTSTONE [MW]; laminated orange-brown and off-white to light brown, EWK (hard) to VWK (limonite-cemented).	OWT		- NH (5°) bedding contact. Indistinctly banded (<20mm, NH) by 10m.
					10.45m - light brown (pale) to light orange, siltstone from 10m (5°).	OWT		- black carbonaceous flecks to bands (<15mm, NH) 10.45-10.85m. NH (5°) coal horizon at 10.55m. NH coal band (<10mm) at 10.82m. Disturbed core 10.82-11m.
		213	11		10.85m Silty SANDSTONE (Fine) [SW]; grey to black, EWK (hard) to VWK. Carbonaceous below 10.7m.	OWT		- NH bedding contact. Light orangish brown, silty sand (fine) 10.85-11m. NH band (<7mm) of light brown, hard mud at 10.92m. Reddish brown, VS, fresh, chert clast (<25mm) at 11.25m.
					11.5m Silty SAND/GRAVEL; mostly mottled light brown to orangish brown (variable), disturbed. Common distinguishable pale brown to light greyish brown, EWK (hard), mudstone clasts (<50 by 25mm). [HW/MW Conglomerate].	OWT		- irregular limonite-cemented band(s) (<10mm, 10°). Disturbed NH-30° band (<30mm) of light orangish brown, silty sand with associated dark brown, limonite-cemented band (<5mm, below). Indistinctly laminated (<5mm, NH) near 12.1-12.25m.
		212	12		12.25m MUDSTONE [SW]; dark grey, mostly VWK. Banded (<20mm, NH) light brown to grey and orange 11.5-11.7m. [Waitemata Group].			- NH (<10°) mudstone bands (<50mm) from 12.25m. Box 5: 12.35-15.4m.
		211	13		Silty SANDSTONE (Fine) with some mudstone bands [SW]; grey to dark grey, VWK. [Waitemata Group]. Dark grey, coarser sandstone between 12.75 (20°) & 13.4m. - dark grey, mudstone between 13.4 (10°) & 13.53m.	OWT		- 20° black flecked band (<7mm). - minor black flecked horizons to bands (<7mm, NH-20°) 13.53-15.35m.
		210	14		- coarser sandstone between 13.9 (10°) & 14.2m (NH).			
		209	15		- coarser sandstone between 14.65 (NH) & 14.95m (20°).			
					15.35m			
		208	16		SANDSTONE (Fine to Medium) [SW]; grey to dark grey, VWK. Some light orangish brown bands (<20mm, NH & NV) above 15.5m. [Waitemata Group].			- irregular 15° limonite-cemented band (<10mm). Box 6: 15.4-18.4m. Irregular NV limonite-cemented band (<10mm) 15.35-15.5m.
					- grey, WK-VWK, coarser sandstone between 16.33-16.35m. Interbedded (<100mm, NH-20°) sandstone to mudstone between 16.35 (NH) & 16.85 (20°).			- dark grey, finer grained bands 15.67-15.72 (<10°) & 15.77-15.8m (NH).
		207	17		- band (<7mm, NH) of dark grey, mudstone at 17.2m.			- 50° slickensided defect. Indistinctly banded (<30mm, NH) near 17.2-17.55m.
		206	18			OWT		- few obvious bands from 17.55m.
		205	19		- indistinct band (<30mm, NH) of coarse sandstone near 19.05m.			Box 7: 18.4-21.2m. Indistinct 55° joint at 18.65m. 55° band (<10mm, indistinct) of dark grey (green-tint), muddy sand (fine) at 18.95m.
					- moderately weathered [MW] between 19.5 (<10°) & 20.53 (5°). Light			- indistinctly banded (<30mm, 5-15°) near

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN15/11**

LOCATION: HUNUA QUARRY **GRID REF:** 421552.00E 777122.40N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 224.06m **SHEET** 2 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							← Piezometer Diameters in mm	
					brown to orangish brown and softer.			19.5-20.53m. NH-20° limonite-cemented band(s) 19.53-19.6m. Broken core (<100mm pieces) 19.75-19.95m.
		203	21			OWT		
					- coarser sandstone near 20.95-21.05m. Interbanded (<30mm, 5-20°) silty sandstone and mudstone below 21.2m.			Box 8: 21.2-24.1m.
					21.5m MUDSTONE [SW to FW]; dark grey, VWK. Calcareous by 22.3m. [Waitemata Group].			- 10° bedding contact.
		202	22					- possible indistinct joints at 22.05 (40°), 22.1 (55°) & 22.25m (45°).
						OWT		- indistinct band (<50mm, <15°) of disturbed muddy rock 22.65-22.7m [Drilling induced?].
		201	23					- several 40° subparallel polished defects 23.15-23.25m. Irregular 60-30° polished defect at 23.35m.
					23.9m - becoming as below.			- bands (<50mm) mostly dip NH-20° by 23.9m. Box 9: 24.1-26.95m.
		200	24		Interbanded SANDSTONE (Fine) to MUDSTONE [FW]; grey to dark grey, VWK, calcareous. [Waitemata Group].			
					- dominantly silty sandstone with some mudstone bands below 24.25m. Crisscrossed by irregular white veins (<3mm, calcite) spaced <100mm apart between 24.7-25.05m.			- 55° vein (<30mm, calcite) with associated polished defect coated by grey, plastic mud (<3mm) near base [Fault]. Veins have variable dip 24.7-25.05m.
		199	25					
		198	26					
								- irregular 15° white vein (<5mm, calcite). Box 10: 26.95-29.8m.
		197	27					- intersecting irregular 15° & NV white veins (<2mm, calcite) 27.2-27.25m.
		196	28					
		195	29					
		194	30					Box 11: 29.8-32.75m.
								- broken 40° grey vein (<1mm, calcite) to joint.
		193	31		- band (<15mm, 15°) of light grey to pale brown (red-tint), coarser sandstone at 31.1m. Dark grey, mudstone between 31.17-31.3m.			- laminated (<5mm, 15°) 31.17-31.3m.
		192	32			OWT		
		191	33					- irregular 75° white vein (1mm, calcite) 32.6-32.85m. Box 12: 32.75-35.7m. Irregular 15° white vein(s) (<1mm, calcite) at 32.92m.
		190	34					- several 50° subparallel white vein (<1mm, calcite) near 33m. 10° white vein (<10mm, calcite) at 33.07m.
					- crisscrossed by irregular (40°-NV) white veins (mostly <5mm, calcite) spaced <60mm apart between 34.5-35.65m.			
		189	35					- 55° vein (<15mm, calcite). Irregular NH band (<30mm) of shattered rock (<15mm pieces, muddy) at 34.9m [Drilling induced?].
		188	36					Box 13: 35.7-38.6m. Broken 65° white vein (<12mm, calcite) at 36.2m.
		187	37					
		186	38					- 15° laminae (<5mm) of pale brown-grey, coarser sandstone. Box 14: 38.6-41.7m. 16/6/15. SWL 11.5m.
		185	39					- some black flecked laminations (<5mm,

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN15/11**

LOCATION: HUNUA QUARRY **GRID REF:** 421552.00E 777122.40N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 224.06m **SHEET** 3 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction S.W.L. 41.17m	Comments
								← Piezometer Diameters in mm
		183	41		- crisscrossed by indistinct polished defects spaced <100mm apart near 41-41.4m.	OWT		5-20°) 39.6-39.8m. - discontinuous 10° pale brown band (<7mm). - 50° polished defect coated by grey, plastic mud (<4mm) and associated (mostly below) irregular white vein (<25mm, calcite) [Fault]. Two indistinct 60-65° splaying defects at 40.7m. Defects mostly dip NH-60° near 41-41.4m.
		182	42		- crisscrossed by irregular (65°-NV) white veins (<1mm, calcite) to indistinct defects spaced <100mm below 41.8m.			Broken (<41.4m) NV white vein(s) (<20mm, calcite) 41.35-41.8m. Box 15: 41.7-44.4m. - black flecked band(s) (<15mm, 20°). - NH (<10°) bedding contact. Indistinctly banded (<10mm, 5-20°). Irregular NV white vein (1mm, calcite) 42.65-42.7m.
		181	43		42.35m SANDSTONE (Fine-medium) [FW]; grey to dark grey, mostly VWK, calcareous. [Waitemata Group]. Lighter grey, harder (VWK-WK), calcite-cemented bands between 42.5-42.57 & 42.64-42.73m. - silty sandstone with some dark grey, mudstone bands (<50mm, 15-25°) between 43.25 (20°) & 43.7m (<25°).	OWT		- less obvious bands (<20mm, 10°) below 43m. Irregular NV seam (<30mm) of weakened rock to grey (green-tint), plastic mud (<5mm either side) 43.15-43.5m. Irregular 60° slickensided defect at 43.45m. Associated NV white vein (<10mm, calcite) 43.6-44.2m.
		180	44		- becoming dark grey, coarse sandstone.			- no obvious bands below 43.8m.
					44.3m CONGLOMERATE [FW]; patchy grey with some off-white mottles, VWK, calcareous. Variably sized clasts (<150mm) of mostly mudstone (<150mm, some noncalcareous) and some greywacke (<10mm, Sst & Arg). Some sandy matrix material with fossil fragments (<10mm).	OWT		Broken core (<100mm pieces) 44.2-44.55m. Minor dark brown, carbonaceous mudstone clasts (<30mm) in conglomerate 44.3-44.9m. Dark grey (brown-tint), noncalcareous mudstone crisscrossed by slickensided defects spaced <20mm apart 44.35-44.5m [Large clast?].
		179	45		44.9m 45.3m MUDSTONE [FW]; dark grey, VWK, calcareous. [Waitemata Group].	OWT		
		178	46		SANDSTONE (Fine to Medium) [FW]; grey to dark grey, VWK, calcareous. Silty above 45.45m. [Waitemata Group].	OWT		Box 16: 44.4-47.25m. Dark grey, calcareous mudstone clast 44.65-44.73m. - 20° bedding contact. Several irregular NV slickensided defects to white veins (<10mm, calcite) spaced <100mm apart 45.1-46.25m. Broken core (<100mm pieces) 45.2-46m.
		177	47		46.75m SANDSTONE with some conglomeratic intervals [MW]; light brown with some to minor orange (<5mm laminations), VWK, calcareous. Fine to medium grained. [Waitemata Group]. Light grey, WK, calcite-cemented interval between 46.9-47m. - coarse grained sandstone below 47.1m. Mottled grey to dark grey with some white, fresh, conglomeratic (<10mm clasts) sandstone between 47.25 (65°) & 47.7m. Some fossil fragments (<3mm).	OWT		- bedding contact (<20°). Indistinctly laminated (<5mm, 10-15°) below 46.7m. - 55° joint. 65° joint at 46.6m.
		176	48		48.7m - mostly light brown, medium to fine grained sandstone from 47.7m. - grey (discoloured) below 48.35m. Dark grey, less weathered sandstone by 48.55m. Mottled white to black, harder (VWK-WK), conglomeratic sandstone below 48.6m.			- 10° bedding contact. Indistinctly banded (<10mm, 10-15°). Discontinuous 55° limonite-stained joint at 46.85m. Irregular 55° limonite-stained joint at 47.1m.
		175	49		Interbanded SANDSTONE (Fine) to MUDSTONE [FW]; grey to dark grey, VWK, calcareous. [Waitemata Group].	OWT		- no obvious bands by 47.25m. Box 17: 47.25-50.1m. Indistinctly banded (<10mm, NH-15°) near 47.9-48.05m.
		174	50		50.15m SANDSTONE (Medium to Coarse) [FW]; grey to dark grey, VWK to WK, calcareous. Some calcite-cemented intervals (<200mm). [Waitemata Group].			60° limonite-stained joint and associated off-white vein (<8mm, calcite) at 48.2m. Irregular NV limonite-stained (<48.4m) joint coated by grey (green-tint), plastic mud (<4mm) to white vein (<7mm, calcite) and slickensided defect 48.2-49.05m. - disturbed bedding contact (NH). Bands (<50mm) mostly dip NH-15° near 48.7-50.15m. Box 18: 50.1-53.0m. Bedding contact dips 10° at 50.15m.
		173	51			OWT		
		172	52		- mottled white to black, VWK, sandy conglomerate (mostly <10mm clasts) between 51.55 & 51.8m (25°). Common fossil fragments (<5mm). Band (<40mm) of grey, VWK, silty sandstone (fine) between 51.93 (15°) & 51.97 (25°).			- dark greyish brown, mudstone clast 51.67-51.75m. Irregular 75-55° limonite-stained joint with associated light brown seam (<50mm either side) at 52.25m. Irregular 75-60° limonite-stained joint 52.4-52.55m.
		171	53		52.8m - sandy conglomerate with dark greyish brown, mudstone clasts (<60mm) below 52.73m.			- 15° bedding contact. Beds (<100mm) mostly dip 10-15° from 52.8m. Box 19: 53.0-56.0m.
		170	54		Interbedded Silty SANDSTONE (Fine) to MUDSTONE [FW]; grey to dark grey, VWK, calcareous. [Waitemata Group]. Some grey, WK, calcite-cemented bands (<25mm, 10-20°) between 53.5-53.75m.	OWT		- 20° pale brown vein (<2mm, calcite) and intersecting 30° slickensided defect. - disturbed NH contact. Minor black carbonaceous flecks (NH-30°, fossil plant material) from 55m. Indistinct 60° polished defect at 55.05m. Defects mostly dip 30-60° by 55.25m.
		169	55		55m - grey, coarser sandstone below 54.85m (<15°).			Box 20: 56.0-58.75m. Broken to shattered core (<70mm pieces) 56-56.25m. Indistinctly fractured (<20mm) 56-56.55m.
		168	56		Carbonaceous MUDSTONE [FW]; dark brown, VWK. [Te Kuiti Group]. Crisscrossed by polished to slickensided defects spaced <100mm apart by 55.25m.	OTK		- disturbed bedding contact (20°). Defects have variable dip by 56.25m. - black, WK to MS, fractured coal 57.35-57.45m (45°). - occasional coal streaks to bands (<10mm, 20°) 57.95-58.5m. Broken core (<70mm pieces) 58.3-58.55m. Box 21: 58.75-61.85m. - disturbed bedding contact (NH).
		167	57		56.25m MUDSTONE [FW]; brown (grey-tint), disturbed to VWK. Broken fractures (indistinct) spaced <70mm apart. [Te Kuiti Group].	OTK		
		166	58		57.35m Carbonaceous MUDSTONE with some coal [FW]; dark brown to light brown, VWK. Black coal streaks to intervals (<100mm, 45°-NH). [Te Kuiti Group]. - paler brown, mudstone to siltstone between 57.95 (20°) & 58.5m.	OTK		- irregular 30° contact.
		165	59		58.75m Carbonaceous SANDSTONE (Fine-medium) [FW]; dark brown to brown with black streaks (<5mm, NH-20°), VWK, silty. [Te Kuiti Group]. 59.25m - becoming pale brown, sandstone-siltstone by 59.15m (NV).	OTK		
					CLAYSTONE; pale grey (brown-tint), VWK. [Ancient Residual Soil].	O		

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/11**

LOCATION: HUNUA QUARRY **GRID REF:** 421552.00E 777122.40N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 224.06m **SHEET** 4 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
					Disturbed below 59.6m. Indistinct fractured texture by 59.95m.	O		Mostly broken core (<170mm pieces) from 60.25m.
					60.45m - becoming as below. Altered GREYWACKE [CA to HA]; dark greenish grey, EWK-VWK. Indistinct brecciated/fractured texture. Some irregular off-white mottles to streaks (<5mm, remnant veins?) above 61.3m.			- maximum depth of contact. Greywacke sandstone/siltstone.
		163	61		- lighter greenish grey near 61.3-62.3m. Some pale brown patches (<60mm, indistinct) near 61.5-61.8m.			- finer grained rock (Arg?) near 61.3-62.3m. Box 22: 61.85-64.8m. Mostly intact core 64.3-65.4m. Very sticky drilling near 61.6m (Driller's comment).
		162	62					
					- harder (mostly VWK) below 62.3m. No obvious fractures.	O		
		161	63					
					- irregular band (<25mm, NH) of pale brown-grey, EWK (hard), sandy silt between 63.37-63.4m.			
		160	64		64.3m			
					Weathered GREYWACKE (Sst) [HW-MW]; mostly light brown with irregular orange streaks, VWK to WK, weathered. Crisscrossed by remnant limonite-stained fractures to joints spaced <30mm (broken <100mm) apart by 64.6m.			- fine grained greywacke from 64.3m. Light orangish brown (variable), EWK (hard) to WK, more weathered [HW] near 64.3-64.6m. Remnant fractured texture. Defects have variable dip.
		159	65					Box 23: 64.8-67.8m. Mostly shattered core (<65mm pieces, silty) from 65.65m [Fault?]. 17/6/15. SWL 10.1m.
		158	66		- some disturbed seams (<100mm) of mottled light brown and orange, plastic to slightly plastic, sand-mud with variable rock fragments (mostly <20mm) below 65.65m.			
		157	67		- less weathered [PW <50%] near 66.6-67.7m. Light brown to dark greyish brown and VWK to MS. Remnant fractures to joints spaced <20mm (broken <150mm) apart. Occasional distinguishable remnant veins (<5mm) by 66.6m.	ORH		- finer grained rock (Zst?) near 66.6-67.7m.
					- more weathered [HW] between 67.7 (NV) & 68.05m.			Mostly intact core from 67.2m. Box 24: 67.8-70.55m.
		156	68					
		155	69		- mostly light brown to brown, WK to MS, moderately weathered [MW] between 68.45 & 69m. Occasional grey patches (<50mm, discoloured). Fractures to joints spaced <20mm (broken <100mm) apart.			- coarser greywacke near 68.45-69m.
					69.45m - more weathered [HW] below 69.2m. More remnant veins (<4mm). GREYWACKE SANDSTONE [MW]; light brown to brown, WK to S, mostly partly weathered. Crisscrossed by irregular limonite-stained fractures to joints spaced <20mm (broken <250mm) apart. Occasional remnant veins (<3mm).	ORM		- medium grained greywacke from 69.45m. Joints often coated by orange-brown, non-plastic silt (<2mm). Broken core (<50mm pieces) from 69.45-69.7m.
		154	70		- slightly weathered [SW] between 70.45-70.7m. Grey with minor	RMW		
					70.9m irregular brown seams (<30mm) and harder (MS to S). Joints to white			Box 25: 70.55-73.3m. Minimal silt on joints by 70.9m. Defects have variable dip.
		153	71		71.2m veins (<4mm, calcite & weathered) spaced <20mm apart. - becoming as below.	RSWg		
					Veined GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brown seams, MS to VS, partly weathered (<10mm along joints) to fresh (>75%). Crisscrossed by limonite-stained fractures to white veins (<1mm, calcite) spaced <30mm apart.			
		152	72			RSW		
					Veined GREYWACKE SANDSTONE [SA/FW]; grey, S-VS, almost fresh. Crisscrossed by irregular white veins (<3mm, calcite) spaced <20mm apart. Broken veins spaced 50-250mm apart.			- irregular 25° seam (<7mm) of brown, MS to S, partly weathered rock along intersecting fractures-veins at 72.4m.
		151	73		73.3m			- irregular 10° joint partly weathered <10mm into the adjacent rock (and <3mm along some intersecting fractures-veins <73.05m).
					Veined GREYWACKE SANDSTONE [SA to SW]; grey (darker) with minor irregular brown seams (below 73.45m), S to VS, partly weathered (<50mm along joints) to fresh (<95%). Crisscrossed by limonite-stained to white veins (<3mm, calcite) spaced <20mm apart.			Broken core (<100mm pieces) 72.95-73.3m. Box 26: 73.3-76.05m. Finer greywacke by 73.3m. Grey (green-tint), WK-MS, partly altered rock 73.3-73.35m.
		150	74			RSWg		- crisscrossed by irregular dark green-black fractures (indistinct) to limonite-stained joints spaced <100mm apart from 73.3m. Broken veins to joints with some pyrite specks to patches spaced 20-500mm apart.
		149	75		- irregular seam (<300mm) of brown, MS to S, moderately weathered rock between 74.7-75.3m.			- some irregular patches (<30mm) of black, MS-S, argillite near 73.4m.
					- fresh rock [FW] by 75.3m. Crisscrossed by fractures coated by dark			- pyrite specks to patches on many broken defect surfaces by 75.3m. Broken core (<100mm pieces) 75.3-75.8m.
					75.85m green-black, chloritic material (<1mm).			- joints often coated by orange-brown, non-plastic silt (<3mm) from 75.85m. Box 27: 76.05-78.8m.
		148	76		Veined GREYWACKE SANDSTONE [MW]; brown, mostly S, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 15-250mm apart to fractures and remnant veins (<4mm) spaced <20mm apart.			- 70° limonite-stained to transparent-white vein (<10mm, quartz & weathered).
		147	77		- seam (<300mm) of dark brown to dark grey-black, mostly S, less weathered [FW 50%], argillaceous rock between 76.35 (70°) & 76.85m (>40°). Occasional patches (<30mm) of grey, VS, fresh rock near 76.85-77.65m.			- 60° limonite-stained to pale brown composite vein (<10mm, quartz & weathered).
						RMW		Box 28: 78.8-81.65m.
		146	78					
		145	79		- some disrupted bands (<10mm, 60°-NV) to patches (<20mm, subangular) of dark greyish brown, argillaceous rock between			

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. HUN15/11

LOCATION: HUNUA QUARRY **GRID REF:** 421552.00E 777122.40N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 224.06m **SHEET** 5 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		143	81		79.4-80m. - limonite-stained joints spaced 50-500mm apart by 80m. More distinct remnant veins (<4mm, calcite & weathered) spaced <10mm apart.	RMW		- joints often coated by light brown to orange-brown, non-plastic silt (<2mm) by 80m. Defects have variable dip.
		142	82		81.75m VEIN MATERIAL with some rock seams [MW/SA]; variable off-white to dark grey and greyish brown, WK to VS, variably weathered/altered to fresh (<50%). Some calcite. Crisscrossed by irregular limonite-stained fractures (some indistinct) spaced <20mm (broken <250mm) apart.	RMW		Box 29: 81.65-84.5m. - irregular NV contact. Some NV seams (<50mm) of weathered to altered rock 81.75-83.8m. Indistinctly banded (<20mm, NV-65°). - irregular seam (<100mm, NV) of light brown, disturbed (firm), plastic to slightly plastic, mud to brecciated vein material (<30mm, EWK-VWK, muddy) between 82.5-83.45m [Fault].
		141	83		83.8m			
		140	84		Veined GREYWACKE SANDSTONE [MW to MA]; brown (grey-tint), MS to S, partly weathered. Crisscrossed by irregular fractures (indistinct) to remnant veins (<5mm, calcite & weathered) spaced <20mm apart. Broken veins to limonite-stained joints spaced 20-450mm apart. - some patches (<50 by 20mm, NH) of variable grey, VS, fresh, veined rock near 84.7m.			- contact dips 65°. Coarser greywacke from 83.8m. Minimal silt on joints. Irregular 60°-NV joint (coated by light brown to orange-brown, plastic to slightly plastic, mud <2mm) to off-white vein (<6mm, calcite) 84.2-85m. Box 30: 84.5-87.5m.
		139	85					
		138	86		- irregular grey (discoloured) and brown intervals (<600mm) from 85.6m (45°). Limonite-stained to white veins (<5mm) spaced <20mm apart. Patchy seam (<50mm, NV) of dark brown to dark grey-black, less weathered, argillaceous rock between 85.9-86.3m.	RMW		
		137	87		- grey between 87.2 (35°) & 87.95m (NV).			Box 31: 87.5-90.35m.
		136	88		- brown with some grey patches (<180 by 60mm, NV) and mostly S by 87.95m. Limonite-stained joints spaced 50-250mm apart.			
		135	89		89.75m			
		134	90		Veined GREYWACKE SANDSTONE [SW/FW]; grey with occasional irregular brown seams (<40mm, NV), S to VS, almost fresh (95%). Crisscrossed by limonite-stained to white veins (<3mm, calcite) spaced <20mm apart. - fresh rock between 90.6-91.5m	RSWg		- irregular NV contact. - irregular NV joint(s) 90.2-90.4m. Box 32: 90.35-93.35m. - 65° limonite-stained to green (variable) joint to broken vein (<1mm, calcite).
		133	91		91.8m - becoming more weathered below 91.5m.			18/6/15. SWL 12.5m.
		132	92		Veined GREYWACKE SANDSTONE [MW]; brown, S, partly weathered. Crisscrossed by irregular limonite-stained joints spaced 30-300mm apart and off-white to pale brown veins (<3mm, calcite & weathered) spaced <20mm apart.			- 55° limonite-stained joint. Brecciated rock (<30mm) in light brown, VWK, matrix material (silty sand) between 91.8 (NV-55°) & 91.9m (35°) [Fault]. Defects have variable dip.
		131	93					Box 33: 93.35-96.25m.
		130	94		- joints spaced <60mm apart between 94.35-95.4m.	RMW		- indistinct seam (<50mm, 75°) of brecciated rock (<15mm) 94.05-94.4m. Broken core (<100mm pieces, some light brown sandy silt) 94.35-95.4m. Joints often coated by light orangish brown, non-plastic silt (<1mm) 94.35-95.4m.
		129	95		95.85m			- 60° polished defect with associated seam (<100mm) of indistinct brecciated rock (<40mm above) to disturbed light brown, slightly plastic, sandy silt (<60mm below) with rock fragments (<30mm) [Fault].
		128	96		Veined GREYWACKE SANDSTONE [MW-SW]; grey with irregular greyish brown seams, S to VS, partly weathered (<15mm along defects) to fresh (<75%). Limonite-stained joints spaced 75-300mm apart. Crisscrossed by off-white to white veins (<4mm, calcite) spaced <20mm apart.			- irregular 60° contact. Joints mostly dip NH-65° from 95.85m. Some indistinct patches (<100mm) of lighter grey, finer grained rock (sheared) 95.85-97.15m. Crisscrossed by irregular indistinct defects ("shear bands") (<15mm) spaced <30mm apart by 95.85m. Box 34: 96.25-99.1m. - medium grained greywacke by 97.25m.
		127	97		- brown and moderately weathered [MW] between 97.15 (NV) & 97.55m. - less weathered [FW <95%] from 97.55m. Broken veins to dark green-black joints spaced 15-150mm apart.	RSWb		
		126	98					- joints mostly dip NH-25° from 98.8m.
		125	99		- more weathered [FW 50%] from 98.8m. Brown with grey patches (<100mm). Limonite-stained joints spaced 50-300mm apart. White to light brown veins (<5mm, calcite & weathered) spaced <20mm apart.			Box 35: 99.1-102.05m.
					99.6m Veined GREYWACKE SANDSTONE [MW]; brown, mostly S, partly	RMW		- irregular 50° contact. Defects have variable

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. HUN15/11

LOCATION: HUNUA QUARRY **GRID REF:** 421552.00E 777122.40N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 224.06m **SHEET** 6 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments ← Piezometer Diameters in mm
		123	101		weathered. Crisscrossed by irregular limonite-stained joints spaced 50-300mm apart and off-white to light brown veins (<5mm, calcite & weathered) spaced <20mm apart.			dip from 99.6m. Shear bands (<10mm) spaced <40mm apart.
		122	102					Broken core (<90mm pieces) 101-101.2m.
		121	103					Box 36: 102.05-104.8m.
		120	104					- indistinct 70° seam (<30mm) of brecciated rock (<20mm) with some irregular patches (<30mm) of white vein material (calcite) 104-104.2m. Box 37: 104.8-107.9m.
		119	105					
		118	106			RMW		Broken core (<100mm pieces) 106.05-106.3m.
		117	107		- limonite-stained joints spaced <150mm apart below 107m.			Broken core (<120mm pieces) 107.4-107.9m. Box 38: 107.9-110.7m.
		116	108		- patch (<40mm) of grey, VS, fresh, veined rock near 108.15m.			Mostly broken core (<200mm pieces) from 108.35m.
		115	109		- lighter brown and harder (S-VS) below 109.1m.			
		114	110					Box 39: 110.7-113.4m.
		113	111					
		112	112		- joints spaced <50mm apart below 112.3m.			- some joints coated by light brown to orange-brown, non-plastic silt (<1mm) below 112.3m. Defects have variable dip.
		111	113		112.8m Veined ARGILLITE [MW]; dark greyish brown to dark grey, mostly S, partly weathered to fresh (<50%). Crisscrossed by irregular limonite-stained joints spaced 20-300mm apart and disrupted off-white veins (<5mm, quartz & weathered) spaced <20mm apart. - mostly dark greyish brown by 113.6m.	RMW		- 30° joint. Some joints coated by silt (<2mm). No obvious shear bands by 112.8m. Mostly intact core from 113m. Box 40: 113.4-116.25m.
		110	114					- indistinctly banded (<50mm, 40-60°) near 114.5-115.15m.
		109	115		115.15m Veined GREYWACKE SANDSTONE with some argillaceous rock [MW]; brown with decreasing dark greyish brown patches (<50 by 20mm, 45°-NV), S to VS, mostly partly weathered. Crisscrossed by irregular limonite-stained joints spaced 30-300mm apart and off-white veins (<5mm, calcite & quartz) spaced <30mm apart. - occasional patches (<20mm, some clasts) of dark greyish brown, S, argillaceous rock below 115.9m. Minor patches (<150 by 50mm) of grey, VS, fresh rock by 116.25m.			- irregular 75° contact. Fine-medium grained greywacke from 115.15m. Minimal silt on joints. Crisscrossed by shear bands (<10mm) spaced <100mm apart.
		108	116					- coarser greywacke by 116.25m. Box 41: 116.25-119.1m.
		107	117					
		106	118			RMW		
		105	119		- occasional fresh patches (<30mm) below 118.1m. Irregular patch (<150 by 50mm) of dark grey-brown, S, argillaceous rock between 118.6-118.75m. Veins (<3mm) spaced <10mm apart.			Box 42: 119.1-121.75m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BOREHOLE No. **HUN15/11**

LOCATION: HUNUA QUARRY **GRID REF:** 421552.00E 777122.40N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 224.06m **SHEET** 7 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
					120.5m - becoming as below. Veined GREYWACKE SANDSTONE [MW]; brown with grey patches (<150mm), S to VS, partly weathered (indistinct) to fresh (<50%). Crisscrossed by irregular limonite-stained joints spaced 50-250mm apart to white veins (<5mm, quartz) spaced <20mm apart.	RMW		- irregular patches (<60mm) of dark brown to grey-black, greywacke siltstone to argillite 120.4-120.65m. - occasional shear bands (<10mm) by 120.5m. Defects have variable dip. Box 43: 121.75-124.6m.
		103	121					
		102	122		- mostly brown and S between 122.35-123.25. Joints spaced 15-250mm apart.	RMW		- joints (some coated by light brown to orange-brown, non-plastic silt <1mm) mostly dip NH-75° near 122.35-123.25m. 19/6/15. SWL 18.5m. - 60° dark green-black, polished defect coated by light orangish brown, slightly plastic to non-plastic silt (<1mm).
		101	123					
		100	124		124.05m 124.5m Veined GREYWACKE SANDSTONE [MW-SW]; grey with irregular brown seams, S to VS, partly weathered (<30mm along joints) to fresh (>50%). Crisscrossed by limonite-stained to dark green-black joints spaced 20-200mm apart and limonite-stained to white veins (<5mm, quartz) spaced <20mm apart.	RSWb		- some joints partly coated by orange-brown, non-plastic silt and/or chloritic material (<1mm) from 124.05m. Crisscrossed by irregular shear bands (mostly <5mm) spaced <100mm apart. - maximum depth of contact (75°). Joints partly coated by silt (<1mm) and/or chloritic material (<1mm). Box 44: 124.6-127.6m.
		99	125		Veined GREYWACKE SANDSTONE [SW-FW]; grey with minor irregular brown (grey-tint) seams, mostly VS, partly weathered (<15mm along joints) to fresh (<95%). Limonite-stained to dark green-black joints spaced 30-400mm apart. White to light grey veins (<10mm, quartz) spaced <20mm apart.			
		98	126		- more weathered [FW >75%] below 125.8m.	RSWg		
		97	127		- more weathered [FW <75%] near 126.8-127.4m.			
		96	128					Box 45: 127.6-130.5m. Core broken (<100mm pieces) along intersecting joints spaced <50mm apart and partly weathered <10mm into the adjacent rock 127.8-128m.
		95	129		128.55m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular limonite-stained joints to dark green-black polished defects spaced 20-250mm apart and disrupted white to light grey veins (<5mm, quartz) spaced <20mm apart. - minor patches (<20 by 5mm, some clasts) of dark grey to black, S to VS, argillaceous rock by 129.5m.	RFW		- irregular NV-55° seam (<40mm) of light grey with grey patches, MS to VS, brecciated rock (<10mm) 128.15-128.3m. Associated 55° pale to light grey vein (<7mm, calcite) along base. - irregular NV contact. Joints-defects (minimal silt) mostly dip NH-65° from 128.55m. Shear bands (mostly <5mm) spaced <50mm apart. - 25° white to grey, composite vein (<8mm, quartz).
		94	130					
		93	131		131.05m - more patches (<60mm) of argillaceous rock below 130.7m. Veined ARGILLACEOUS ROCK with some sandstone [FW]; patchy (<200mm, indistinct) grey to black, S to VS, fresh. Irregular limonite-stained joints to dark green-black polished defects spaced 20-400mm apart. Crisscrossed by disrupted white veins (<5mm, quartz) spaced <20mm apart.			- patch (<50mm, angular) of dark grey to black, S to VS, argillaceous rock near 130.3m. Box 46: 130.5-133.5m. - irregular NV contact (131-131.1m). Defects have variable dip from 131.05m. No obvious shear bands. 20° slickensided defect with occasional pyrite specks and coated by dark green-black, chloritic material (<1mm) at 131.1m.
		92	132					
		91	133		- mostly grey, VS, sandstone (fine-medium) between 133 & 133.25m (40°).	RFW		- pyrite specks to patches on some broken defect surfaces by 132.8m. Box 47: 133.5-136.2m.
		90	134		- seam (<0.1m, disturbed) of sandstone between 133.9 (45°) & 134.2m (NV).			
		89	135		- becoming as below. 135.45m Veined GREYWACKE SANDSTONE [FW]; grey, VS, fresh. Crisscrossed by irregular dark green-black (chloritic material <1mm) joints spaced 25-250mm apart and white veins (<3mm, calcite & quartz) spaced <40mm apart. - minor patches (<15mm, some clasts) of dark grey to black, S to VS, argillaceous rock below 136.4m.			- maximum depth of contact. Medium grained greywacke by 135.45m. Crisscrossed by irregular shear bands (<10mm) spaced <50mm apart. Box 48: 136.2-139.2m. - patch (<50mm, angular) of variable dark grey to black, S to VS, argillaceous rock near 135.9m.
		88	136					
		87	137		- more patches (<15 by 15mm, mostly 55°-NV) of argillaceous rock between 136.95-137.7m.	RFW		
		86	138		- irregular seam (<50mm, 55°) of variable grey to black, S to VS, sandstone to argillite between 138.15-138.25m. Disrupted white to grey veins (<5mm) spaced <10mm apart.			
		85	139		- more patches (<60mm) of argillaceous rock between 138.9-139.1m.			- occasional pyrite patches on broken defect surfaces (mostly veins) by 138.95m. Box 49: 139.2-142.0m.

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN15/11**

LOCATION: HUNUA QUARRY **GRID REF:** 421552.00E 777122.40N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 224.06m **SHEET** 8 **OF** 8

JOB No. WAL15/4 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 15-6-15 **DRILLER:** Drill Force LTD **STAND PIPE:** G.L.

DATE FINISHED: 19-6-15 **TYPE OF DRILLING RIG:** Coretech Drilling Equipment LTD, YDX-3L **ORIENTATION:** **PLUNGE:** 90°

LOGGED BY: GDF

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
								← Piezometer Diameters in mm
		83	141		- more patches (<60mm, some clasts, mostly 55°-NV) of dark grey to black, S to VS, argillaceous rock between 140.15-140.55m. Few argillaceous rock clasts (<3mm) below 140.55m. White to light grey veins (<5mm, calcite & quartz) spaced <30mm apart.			- defects have variable dip. Indistinct 50° limonite-stained joint at 140.85m.
		82	142					- disturbed 70° joint coated by light greenish brown, non-plastic, sand-silt (<2mm). Box 50: 142.0-144.95m.
		81	143					
		80	144					
		79	145		- broken veins to joints spaced 30-350mm apart from 144.5m.	RFW		Core samples taken by K Barber at 144.5-144.8, 147.1-147.45 & 148.25-148.6m. Box 51: 144.95-147.6m.
		78	146					
		77	147					
		76	148					Box 52: 147.6-149.4m. Irregular NV-75°, white-transparent, composite vein (<7mm, calcite & quartz) 147.85-148.2m. 15° band (<20mm) crisscrossed by indistinct grey to greyish green, shear bands (<5mm) spaced <10mm apart at 149.1m.
		75	149		149.4m			
		74	150		EOH @ 149.4m			
		73	151					
		72	152					
		71	153					
		70	154					
		69	155					
		68	156					
		67	157					
		66	158					
		65	159					

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Open hole to EOH.	96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 19/11/15

BOREHOLE No. **HUN18/2**

LOCATION: HUNUA QUARRY **GRID REF:** 421404.90E 776755.09N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.50m **SHEET** 1 **OF** 7

JOB No. WAL18/6 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-11-18 **DRILLER:** Drill Force LTD **STAND PIPE:** 1.407m

DATE FINISHED: 6-12-18 **TYPE OF DRILLING RIG:** Rig 5 Cortex

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction (32 20 Piezometer Diameters in mm)	Comments
		150	0		0.4m Aggregate FILL; mostly moderately weathered to slightly weathered/altered greywacke fragments (<40mm) partly coated by light brown (orange-tint), non-plastic, sand-silt. UNCERTAIN [Track Fill to As Below]; no core recovery by 0.4m.	OF O		NZTM location (GPS within 3m) of 1778194mE & 5893378mN. Adjacent batter exposes top soil (<0.3m), residual soils (0.7-1.2m) to weathered greywacke (<4.5m). RQD entered into penetration field in database from 10.5m. Core boxes photographed. Box 1: 0-5.6m.
		149	1		1.8m SILT with some to common sand; patchy pale brown to orangish brown with some irregular black mottles to streaks, very soft (disturbed) to stiff, non-plastic. Remnant fractured texture (<50mm, indistinct). [CW Greywacke].			- maximum depth of natural ground. Mostly intact core.
		148	2					
		147	3			ORC		
		146	4		- becoming as below. Hard by 5.63m [HW].			
		145	5		5.7m Silty SAND with some gravel; light brown with some orange-brown streaks, disturbed to tightly packed (stiff). Irregular limonite-stained remnant joints spaced 10-50mm apart. Gravel (mostly <50mm) is variably weathered greywacke (Sst) from corestones. [HW Greywacke]. - minimal core recovery (mostly gravel <65mm) between 6.75-9m.			Box 2: 5.6-10.5m. Joints have variable dip. Shattered core (<25mm, mixed) 5.7-6m. 14-15/11/18 (breakdown). Cased to 6m. Core run 6-7.5m has 70mm of probable uphole rock (<30mm, some sandy mud) at top.
		144	6					
		143	7			ORH		
		142	8					
		141	9		- more gravel by 9m.			
		140	10		9.9m Weathered GREYWACKE (Sst) [HW-MW]; patchy light brown to orangish brown, VWK to MS, weathered to limonite-cement. Occasional discoloured grey, less weathered patches (<60mm). Crisscrossed by irregular limonite-stained to black joints spaced 10-50mm apart. Occasional remnant veins (<1mm). - more weathered between 10.47-10.6m (55°). Crisscrossed by irregular remnant veins (<5mm) spaced 10-100mm apart by 10.6m.	ORH		- 45° contact along joint. Fine-medium grained greywacke. Veins mostly dip 50°-NV. - no grey patches 10.4-12m. Disturbed band (<60mm) of light orangish brown, silty sand near 10.47m. Box 3: 10.5-13.3m. Veins have variable dip by 10.6m. Band (<50mm) of gravelly (<10mm) sand with some silt between 12.4 (15°)-12.45m (30°) [Minor Fault?].
		139	11					
		138	12		- becoming harder by 12m. Common less weathered/altered to fresh patches (some >65mm) between 12-12.4m.			
		137	13		12.7m GREYWACKE SANDSTONE [MW]; patchy brown to light brown and grey (<65mm, some discoloured), WK to VS, variably weathered [FW <25%]. Crisscrossed by irregular limonite-stained to black mottled joints spaced 10-50mm apart and irregular remnant veins (<2mm) spaced 20-100mm. - fewer grey patches below 13.3m.	ORM	SWL 14.35m (17/11/18)	- irregular contact. Some joints coated by light brown to orange-brown, non-plastic silt (<2mm). Veins mostly dip 45°-NV near 12.7-15.25m. Box 4: 13.3-16.1m. Broken core with some intact intervals (<200mm) from 13.9m. 60° white vein (<4mm, weathered) at 14.35m. Becoming finer greywacke. SWL 2.4m on morning 16/11/18.
		136	14					
		135	15		- harder by 14.35m.			
		134	16		15.25m GREYWACKE SILTSTONE with some argillite [MW]; patchy brown to light brown with some dark grey-brown intervals (<200mm), WK to MS, partly weathered. Crisscrossed by irregular limonite-stained joints to remnant veins spaced 5-35mm apart.	ORM		- 45° contact along joint-vein coated by off-white, non-plastic silt (<2mm). Indistinctly banded (<20mm, 40°-NH). Broken joints often coated by off-white to orange-brown, non-plastic silt (<3mm) 15.25-17.7 & 18.75-20.9m. Box 5: 16.1-18.85m. Mostly intact core from 16.1m.
		133	17		- some disrupted bands to patches (<65mm, 40-50°) of greywacke sandstone between 16.8-17.4m.			
		132	18		17.7m - dark grey to black with some dark brown seams (<50mm), MS to S, slightly weathered [FW <65%], argillaceous rock below 17.4m.	RSWb RSW		- 45° band (<10mm) of off-white, non-plastic silt (vein material) at 16.8m. Broken core (<100mm pieces) 17.55-18.25m. - medium grained greywacke. - 60° contact. Indistinctly banded (<20mm, 60°) 18.25-18.35m. Broken joints spaced 50-150mm apart. Veins mostly dip 45°-NV near 18.25-18.75m. - contact along 50° joint-vein (<1mm). Indistinctly banded (<30mm, 60-80°).
		131	19		18.25m Fractured GREYWACKE SANDSTONE [SW/SA]; grey, S, slightly weathered/altered (pervasive). Crisscrossed by irregular (<70°) limonite-stained, dark green to clean joints spaced 10-30mm apart. Irregular white veins (<1mm, weathered/zeolite) spaced 10-50mm apart. 18.75m Veined ARGILLACEOUS ROCK [MW-SW]; dark grey with irregular variable brown seams, MS to S, partly weathered (<30mm from joints) to fresh (50%). Crisscrossed by limonite-stained joint-fractures spaced	RSWb RMW		

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

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BOREHOLE No. **HUN18/2**

LOCATION: HUNUA QUARRY **GRID REF:** 421404.90E 776755.09N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.50m **SHEET** 2 **OF** 7

JOB No. WAL18/6 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-11-18 **DRILLER:** Drill Force LTD **STAND PIPE:** 1.407m

DATE FINISHED: 6-12-18 **TYPE OF DRILLING RIG:** Rig 5 Cortex

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction (32 20 Piezometer Diameters in mm)	Comments
		130	21		10-50mm apart to white veins (<3mm, weathered) spaced <40mm apart.	RMW		Irregular NV seam (<65mm) of brown to light brown, greywacke sandstone between 18.8-20m.
					20.9m Veined GREYWACKE SILTSTONE with some argillite [MW]; mostly dark brown to brown with some dark grey to black patches (<100mm), WK to S, partly weathered to fresh (<25%). Crisscrossed by irregular limonite-stained joints spaced <100mm apart to white veins (<3mm, weathered) spaced <40mm apart.			Box 6: 18.85-21.5m. Irregular NV joint(s) filled by light orangish brown, non-plastic silt (<4mm) 18.85-19.8m.
		129	22		- becoming less weathered [FW <50%].			- irregular 70° band (<10mm) of black argillaceous material.
		128	23		Veined GREYWACKE SILTSTONE with some argillite [MW-SW]; dark grey to black with irregular dark brown seams (<65mm), MS to S, partly weathered (<20mm from joints) to fresh (>50%). Crisscrossed by limonite-stained joint-fractures spaced <50mm apart to white veins (<2mm, weathered/zeolite) spaced <20mm apart.			- NH contact along joint. Indistinctly banded (<30mm, 50-70°). Defects have variable dip. Broken joints (often coated by orange-brown, non-plastic silt <1mm) spaced 10-200mm apart.
		127	24		- less weathered [FW 75%] near 22.75-24.6m. Fractures to joints spaced 5-75mm apart and partly weathered <10mm into the adjacent rock. Veins (<3mm, quartz & weathered) spaced <30mm apart.	RSWb		Box 7: 21.5-24.4m. Intact core 22.2-22.6m.
		126	25					- fewer joints coated by silt (<1mm) by 22.75m.
		125	26		- veins (<3mm, weathered/zeolite) spaced <30mm apart below 24.6m.			Broken core (<150mm pieces) 23.25-24.8m.
					26m			Box 8: 24.4-26.9m. Broken joints spaced 25-300mm apart below 24.6m.
		124	27		Veined GREYWACKE SILTSTONE with some argillite [SW-FW]; dark grey to black with some irregular brown seams, MS to S, partly weathered (<10mm from joints) to fresh (>75%). Crisscrossed by limonite-stained joint-fractures spaced 10-75mm apart to white veins (<3mm, weathered/zeolite) spaced <30mm apart.			- 50° vein (<10mm, weathered/zeolite) to vein network (<15mm) partly weathered <30mm into the adjacent rock. Associated 55° band (<5mm) of black, WK, argillaceous rock.
		123	28			RSWg		SWL 6.62m on morning 19/11/18.
		122	29		- more irregular bands to seams (<50mm, 70-NV°) of argillaceous rock below 29m.			- contact along irregular NV joint partly weathered <20mm into the adjacent rock. Indistinctly banded (mostly <30mm, 55°). Broken joints (some coated by silt <1mm) spaced 10-350mm apart. Veins mostly dip 45°-NV.
		121	30		29.9m			Box 9: 26.9-29.85m.
		120	31		Veined GREYWACKE SANDSTONE with some argillaceous rock [MW-SA]; mostly grey with some irregular brown seams, MS to S, partly weathered (<10mm from joints) to slightly altered (<75%, pervasive). Crisscrossed by limonite-stained joints spaced 10-75mm apart to white veins (<2mm, weathered/zeolite) spaced <40mm apart.			Box 10: 29.85-32.6m. Contact along 50° joint-vein (<5mm, weathered) at 29.9m. Medium grained greywacke. Some dark grey-black patches to 30.3m. Defects have variable dip. Joints often coated by orange-brown, non-plastic silt (<3mm).
		119	32		- no argillaceous rock below 30.3m.			- irregular NV joint-vein (<3mm, weathered) and associated seam (<65mm) of partly weathered rock. Fewer joints coated by silt (<1mm) from 30.9m.
		118	33		- less weathered/altered [FW >75%] between 30.9-32.54m. Harder (mostly VS). Joints spaced 20-100mm apart and partly weathered <5mm into the adjacent rock. Veins (<3mm, quartz & weathered) spaced 10-40mm apart.			- 30° joint (coated by silt <1mm) and partly weathered <5mm into the adjacent rock. Associated white-transparent to mottled dark grey vein (<10mm, quartz) with minor voids (5 by 2mm).
		117	34		- some irregular bands to patches (<20mm, 70°-NV) of black argillite between 32.54-33.8m. Joints spaced 5-50mm apart and partly weathered <20mm into the adjacent rock from 32.54m. Veins (<3mm, quartz & weathered with some narrow voids) spaced <20mm apart.			- 30° network of off-white veins (<5mm, quartz & weathered) spaced 5mm apart and associated partly weathered rock 32.54-32.57m. Joint coated by silt (<1mm) along bottom. Fine grained greywacke near 32.54-33.8m. Box 11: 32.6-35.45m.
		116	35		- less weathered [SA >75%] between 33.85-34.5m. Joints spaced 20-100mm apart and partly weathered <10mm into the adjacent rock. Fractures to veins (<3mm) spaced 10-40mm apart.	RSWb		Core broken (<75mm pieces) along 70°-NV joint(s) coated by pale brown, low-plasticity clay to orange-brown, non-plastic sand-silt (<4mm) 33.3-33.85m. Associated seam (<65mm) of partly weathered rock
		115	36		- more weathered [SA >50%] below 34.9m.			- some joints coated by light brown to orange-brown, non-plastic silt (<2mm) below 33.85m. Broken 35° orangish green joint at 33.95m.
		114	37		- verging on moderately weathered [MW] below 36.9m. Veins spaced <40mm apart. Light brown-brown, partly weathered seam (<160mm, 65°) between 36.9-37.4m.			Core broken (<100mm pieces) along irregular NV joint(s) partly coated by orange-brown, non-plastic silt (<1mm) 34.5-35m.
		113	38		- some irregular bands to patches (<40mm, 45°-NV) of dark grey to black, argillaceous rock below 38m.			Box 12: 35.45-38.0m. Irregular seam (<160mm, 65°) of partly weathered rock associated with joints between 36.9-37.4m.
		112	39		- brown with some discoloured grey and partly weathered between 38.95-39.1m.			- 65° joint filled by orange-brown, silty
		111			39.4m Veined GREYWACKE SANDSTONE (Fine) to ARGILLACEOUS ROCK [SW-FW]; grey to black with some irregular brown to dark brown	RSWg		

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

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BHFORM3 HUN.GPJ G_FISHER.GDT 29/1/19

BOREHOLE No. **HUN18/2**

LOCATION: HUNUA QUARRY **GRID REF:** 421404.90E 776755.09N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.50m **SHEET** 3 **OF** 7

JOB No. WAL18/6 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-11-18 **DRILLER:** Drill Force LTD **STAND PIPE:** 1.407m

DATE FINISHED: 6-12-18 **TYPE OF DRILLING RIG:** Rig 5 Cortex

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							32 20 ← Piezometer Diameters in mm	
		110	41		seams, MS to VS, partly weathered (<10mm from joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 10-100mm apart to white veins (<3mm, quartz & weathered) spaced <40mm apart.			sand (<10mm). Broken parallel joint coated by silt (<3mm, as above) at 37.1m. Box 13: 38-40.9m. Shattered core (<50mm pieces) 39-39.1m. SWL 7.48m on morning 20/11/18. Irregular NV seam (<50mm) of dark grey-black, S, argillaceous rock near 39.1-39.35m. - irregular 50° bedding contact. Indistinctly banded (<50mm, 40-70°). Defects have variable dip. Broken joints (some coated by orange-brown, non-plastic silt <1mm) spaced 30-300mm apart. Box 14: 40.9-43.5m. - intersecting 70° off-white veins (<5mm, quartz & weathered). Box 15: 43.5-46.3m. - disrupted band (<30mm, 50°) of greywacke sandstone. Core split along irregular NV joint(s) coated by light brown to orange-brown, non-plastic silt (<2mm) 44.4-46.4m.
		109	42		- irregular seam (<50mm, 60°-NV) of coarser greywacke sandstone between 41.45-41.7m.			
		108	43		- dominantly dark grey to black with dark brown seams (<30mm), MS to S, argillaceous rock below 42.35m (50°). Veins (<3mm) spaced <20mm apart.			
		107	44					
		106	45		- more weathered [FW <75%] between 44.4 (NV) & 46.2m (NV-55°).	RSWg		
		105	46		- interval (<100mm) of discoloured grey with light brown-brown seams, MS to S, slightly weathered/altered, greywacke sandstone between 45.8 (60°) & 46.0m.			Box 16: 46.3-49.0m. Minimal silt on joints by 46.6m.
		104	47					
		103	48		- partly weathered seam (<100mm) along subparallel 55° joints spaced <20mm apart between 47.5-47.7m.			
		102	49					- 55° argillaceous band (<20mm). Box 17: 49.0-51.45m.
			49.25m					
		101	50		Veined GREYWACKE SANDSTONE [MW-SW]: grey with brown intervals (<200mm), MS to VS, partly weathered (<30mm from defects) to fresh (>50%). Crisscrossed by irregular limonite-stained joints spaced 10-100mm apart to mostly white veins (<3mm, quartz & weathered) spaced 5-50mm apart.			Medium grained greywacke. Defects have variable dip. Some joints partly coated by orange-brown, non-plastic silt (<1mm).
		100	51					Core broken (<125mm pieces) along intersecting joints 50.8-51.45m. Box 18: 51.45-54.2m.
		99	52		- less weathered [FW >75%] between 51.55-52.2m. Partly weathered <10mm from joints. Veins (<10mm, quartz) spaced <30mm apart.			- fine grained greywacke 51.55 (50°)-52.2m. Minor irregular black flecked bands (<20mm, 50°).
		98	53		- veins (<3mm, quartz & weathered) spaced <40mm apart by 52.2m.			
		97	54					SWL 8.35m on morning 21/11/18.
		96	55		- verging on moderately weathered below 54.2m.	RSWb		Box 19: 54.2-57.3m. Irregular 60° network (<20mm) of off-white veins (<5mm, quartz with voids <60 by 10mm) spaced <10mm apart at 54.4m. Core broken (<100mm pieces) along mostly 45°-NV joints some coated by light brown, low-plasticity clay to non-plastic sandy silt (<3mm) 55.1-56.3m.
		95	56					
		94	57					Core dropped from run 55.3-56.3m. New drilling bit. Casing deepened to 9m. - discontinuous 40° vein (<7mm, quartz). Splaying 40° white-transparent vein (<12mm, quartz) with some rock fragments (<15 by 3mm) at 57.1m. Box 20: 57.3-59.9m.
		93	58					
		92	59		- moderately weathered [MW] between 58.75 (60°) & 59.05m. Brown with some grey patches (<40mm).			- broken 75° vein (<4mm, quartz). 60° joint coated by light brown, non-plastic, sandy silt (<3mm) at 58.45m. 60° joint coated by light brown, low-plasticity clay (<2mm) at 58.75m. - indistinct patch (>60 by 20mm, 50°) of conglomeratic greywacke near 59m. Core
		91						

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Drilling Methods	Casing Depths	Hole Diameters
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BOREHOLE No. **HUN18/2**

LOCATION: HUNUA QUARRY **GRID REF:** 421404.90E 776755.09N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.50m **SHEET** 4 **OF** 7

JOB No. WAL18/6 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-11-18 **DRILLER:** Drill Force LTD **STAND PIPE:** 1.407m

DATE FINISHED: 6-12-18 **TYPE OF DRILLING RIG:** Rig 5 Cortex

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction 32 20 ← Piezometer Diameters in mm	Comments
		90	61		- moderately weathered [MW] between 60.35 & 60.6m (NV). Brown with minor grey patches (<25mm). - less weathered [FW <75%] by 61.2m. Partly weathered <15mm from defects.	RSWb		broken (<100mm pieces) along irregular (mostly 45°-NV) joints 59-60.6m. Intersecting 60° joints coated by clay (<3mm, as above) at 59.05m. Minimal silt on joints below 59.05m. Core disturbed by drillers between 59.3-59.9m. Box 21: 59.9-62.65m.
		89	62		62.25m			
		88	63		Veined ARGILLACEOUS ROCK [SW-FW]; dark grey to black with some irregular dark brown seams, MS to S, partly weathered (<10mm from joints) to fresh (75%). Crisscrossed by limonite-stained joints spaced 10-100mm apart to mostly white veins (<3mm, quartz & weathered) spaced <40mm apart. - irregular seam (<40mm, NV) of grey with some brown seams (<30mm), more weathered [FW >50%], greywacke sandstone between 63.0-63.6m.	RSWg		- 40° off-white vein (<7mm, quartz) with some voids (<5 by 3mm). 55° joint coated by light brown, non-plastic sandy silt (<2mm) at 60.9m. SWL 7.82m on morning 22/11/18. 70° joint-vein (<1mm, weathered) at 61.2m. - 65° joint coated by vein material (<2mm, weathered). Associated white-transparent vein (<10mm, quartz) with grey flecks to mottles.
		87	64		63.9m			
		86	65		Veined GREYWACKE SANDSTONE with some argillaceous rock [Variable SW]; mostly grey with some irregular brown seams, S to VS, partly weathered (<10mm from joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 10-150mm apart to white veins (<3mm, quartz & weathered) spaced <40mm apart. - more weathered/altered [SA >50%] below 64.8m. Softer (MS to S). Partly weathered <40mm from defects.	RSW		- irregular 40° bedding contact. Indistinctly banded (<50mm, 55°). Defects have variable dip. Broken joints (some partly coated by pale brown to off-white, non-plastic silt <1mm) spaced 50-200mm apart. Box 22: 62.65-65.35m.
		85	66		- less weathered [FW >75%] between 66.1 (55°) & 67.0m. Common indistinct argillaceous patches (<50mm) near 66.1-66.8m.			- 55° contact along joint-vein (<2mm, weathered). Fine-medium grained greywacke. Some indistinct dark grey to black bands (<40mm, 55°). Some joints coated by pale brown to orange-brown, non-plastic silt (<2mm). Occasional voids after veins (<40 by 4mm).
		84	67		- verging on moderately weathered below 67.0m.			Core broken (<100mm pieces) along irregular NV joints 64.8-65.35m. Disturbed vein(s) (<10mm, weathered) near 65.1m. Box 23: 65.35-68.15m.
		83	68		67.8m Veined ARGILLACEOUS ROCK with some greywacke sandstone [MW-SW]; grey to black with irregular dark brown seams, mostly S, partly weathered (<15mm from joints) to fresh (<75%). Crisscrossed by limonite-stained joint-fractures spaced 10-50mm apart to white veins (<3mm, quartz & weathered) spaced <40mm apart.	RSWb		- irregular NV joint-veins (<2mm, weathered) 66.1-67.35m (Core split 66.3-67.2m).
		82	69		68.7m Veined GREYWACKE SANDSTONE to SILTSTONE [SW-FW]; grey to dark grey with some irregular brown seams (<50mm), S to VS, partly weathered (<20mm from joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 10-100mm apart to white veins (<3mm, quartz & weathered) spaced <50mm apart.	RSWg		- coarser greywacke below 67m. Minimal silt on joints. Broken 30° white vein (<5mm, quartz) at 67.35m. - irregular 80° bedding contact. Indistinctly banded (<50mm, 55-80°). Broken joints (minimal silt) spaced 30-280mm apart. Box 24: 68.15-71.0m.
		81	70		- veins spaced <40mm apart by 70.5m.			- irregular 80° bedding contact below 68.7m. Minor indistinct bands to patches (<50mm, 55°) of dark grey to black, argillaceous rock. Defects have variable dip. Occasional voids after veins (<10 by 5mm).
		80	71		71.5m			- irregular 55° network (<10mm) of white veins (<3mm, quartz) spaced <5mm apart. Box 25: 71.0-73.8m.
		79	72		Veined ARGILLACEOUS ROCK [SW-FW]; dark grey to black with some irregular brown to dark brown seams (<50mm), MS-S, partly weathered (<20mm from joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 20-200mm apart to white veins (<3mm, quartz) spaced <40mm apart.	RSWg		- irregular 50° bedding contact. Indistinctly banded (<100mm, 30-60°). Defects have variable dip. SWL 9.75m on morning 23/11/18. Box 26: 73.8-76.55m.
		78	73					
		77	74					
		76	75		- partly weathered rock seam (<100mm) associated with subparallel 60-50° joints (<4) between 75.0-75.2m.			- indistinct band (<30mm) of mottled (<5mm, brecciated?) rock below 50° joint. 55° off-white composite vein (<10mm, quartz) with some voids (<15 by 5mm) at 75.25m.
		75	76		75.5m GREYWACKE SANDSTONE [SW-FW]; grey with some irregular brownish grey (indistinct) to brown seams, S to VS, partly weathered (<10mm from joints) to fresh (>75%). Crisscrossed by limonite-stained joints spaced 10-300mm apart to white veins (<4mm, quartz) spaced <5-75mm apart. - dark grey to black with some dark brown seams, mostly S, argillaceous rock between 76.4 (65°) & 77.15m (35°). - occasional bands to patches (<10mm, 50-60°) of argillaceous rock near 77.15-78.7m. Veins (<4mm, occasional voids) spaced <40mm by 77.15m.	RSWg		- medium grained greywacke. Vuggy void (50 by 30mm) at 75.8m. Core split along NV joint(s) 76.4-77.2m. Box 27: 76.55-79.2m. - pyrite patches on broken defect surfaces near 76.7m.
		74	77					
		73	78		- minor black, S, argillite clasts (mostly <5mm) by 78.1m.			
		72	79		- less weathered [FW <90%] by 79.2m. Partly weathered <5mm from joints. Few argillite clasts between 79.2-79.8m.			- 50° white-transparent composite vein (<7mm, quartz) with some voids (<7 by 2mm). Box 28: 79.2-81.8m.
		71						

Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

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BHFORM3 HUN.GPJ G_FISHER.GDT 29/1/19

BOREHOLE No. **HUN18/2**

LOCATION: HUNUA QUARRY **GRID REF:** 421404.90E 776755.09N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.50m **SHEET** 5 **OF** 7

JOB No. WAL18/6 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-11-18 **DRILLER:** Drill Force LTD **STAND PIPE:** 1.407m

DATE FINISHED: 6-12-18 **TYPE OF DRILLING RIG:** Rig 5 Cortex

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							32 20 ← Piezometer Diameters in mm	
		70	81		- larger argillite clasts (<10mm) below 79.8m.			Core split to broken (>80.7m, <150mm) along irregular NV joint(s) partly coated by off-white vein material to orange-brown, non-plastic silt (<2mm) 80.2-81.8m.
		69	82					Box 29: 81.8-84.6m. Defects have variable dip.
		68	83		- few argillite clasts (<5mm) below 82.4m.			Core split to broken (<150mm) along irregular 70°-NV joints some coated by vein material (<2mm, weathered) to light brown, non-plastic silt (<2mm) 82.3-84.05m.
		67	84					
		66	85			RSWg		Core split along irregular 45°-NV intersecting joints coated by off-white vein material to orange-brown, non-plastic silt (<2mm) 84.4-85.2m. Box 30: 84.6-87.45m.
		65	86		- more argillite clasts (<7mm) near 85.95-86.7m.			- crisscrossed by irregular indistinct defects ("shear bands") (<10mm, mostly 20-60°) spaced <50mm apart near 85.75-87.3m.
		64	87		- partly weathered seam (<50mm) along NV joints between 86.4-86.75m.			
		63	88		- more weathered [FW 75%] below 87.3m. Grey with some light brown-brown seams. Limonite-stained joints spaced 10-75mm apart to white veins (<4mm, quartz & weathered) spaced <40mm apart. Partly weathered <15mm from defects.			- 25° shear band (<15mm). Indistinctly banded (<50mm, 55°) finer greywacke 87.3-87.55m. Core split along irregular NV joint(s) coated by vein material (<2mm, weathered) and partly weathered <15mm into the adjacent rock 87.3-88.95m. Box 31: 87.45-90.0m.
		62	89		- dark brown with some grey patches (<30mm), mostly S, moderately weathered [FW <35%], argillaceous rock between 88.65 (55°) & 88.95m (30°). Partly weathered [FW <50%] by 90.05m.			SWL 10.5m on morning 26/11/18.
		61	90					- 30° white composite vein (<5mm, quartz) offset 10mm.
					90.1m			- 25° white-transparent composite vein (<12mm, quartz).
		60	91		Veined ARGILLACEOUS ROCK [FW]; dark grey to black, mostly S, fresh (>95%). Crisscrossed by irregular mostly white veins (<4mm, quartz) spaced <30mm apart and limonite-stained joints to broken veins spaced 10-300mm apart. Some joints partly weathered <3mm into the adjacent rock.			- 20° white composite vein (<5mm, quartz). Box 32: 90.0-92.6m.
		59	92					- broken white to light grey-transparent composite vein (<10mm, quartz) near 90.1m. Associated broken 60° band (<10mm) of light brown, muddy sand with some rock fragments (<5mm) [Minor Fault]. Indistinctly banded (<100mm, 45°-NV).
		58	93					- pyrite specks to patches on some defect surfaces by 90.9m. Joints mostly dip 45°-NV.
		57	94					Box 33: 92.6-95.4m.
		56	95		- slightly weathered [FW <95%] along NV joint-veins partly weathered <5mm into the adjacent rock between 94.7-95.4m.	RFW		Core split along irregular 70°-NV joints to broken limonite-stained (<98.6m) to white veins (<3mm, weathered/zeolite) 94.55-99.1m.
		55	96					Box 34: 95.4-98.2m.
		54	97		- more weathered [FW 95%] along NV joint(s) partly weathered <5mm into the adjacent rock near 97.1-98.4m. Irregular patch (<50mm) of grey, VS, greywacke sandstone between 97.45-97.5m.			- minor loss of drilling circulation near 97-113.3m (Driller's comment).
		53	98		- grey with minor brown seams (<20mm), mostly VS, slightly weathered [FW 95%], greywacke sandstone between 97.7 (55°) & 98.4m (45°).			Broken core (<50mm pieces, some light brown silty sand near 98.1m) 98.05-98.25m. Box 35: 98.2-100.95m.
		52	99		- unweathered below 98.4m. Greywacke sandstone between 98.45 (55°) & 98.7m (55°). Irregular patch (<100 by 20mm, NV) near 99-99.1m. Veins (<4mm, quartz) spaced <40mm apart. Clean joints to broken veins spaced 40-400mm apart.			- generally coarser below 98.4m. Defects have variable dip. Pyrite specks to patches on many broken defect surfaces.
		51						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 29/1/19

BOREHOLE No. **HUN18/2**

LOCATION: HUNUA QUARRY **GRID REF:** 421404.90E 776755.09N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.50m **SHEET** 6 **OF** 7

JOB No. WAL18/6 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-11-18 **DRILLER:** Drill Force LTD **STAND PIPE:** 1.407m

DATE FINISHED: 6-12-18 **TYPE OF DRILLING RIG:** Rig 5 Cortex

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							32 20 ← Piezometer Diameters in mm	
		50	101		- no limonite-stained joints below 102.1m.	RFW		Core split along irregular NV clean (<100.5m, some pyrite) to limonite-stained joint(s) coated by light brown, non-plastic silt (<1mm) 100.3-101.25m. Box 36: 100.95-103.8m.
		49	102					Core split along irregular NV limonite-stained (<102.1m) joint-vein (<2mm, weathered/zeolite) with occasional pyrite patches 101.6-102.7m. SWL 24.1m on morning 27/11/18.
		48	103					
		47	104					Box 37: 103.8-106.5m.
		46	105					
		45	106		106.05m			Core split along irregular NV joint (clean) to white vein (<1mm, zeolite) with some pyrite as above 105.5-107.25m. Irregular 60° joint coated by pale grey, non-plastic silt to white vein material (<5mm, zeolite) with some pyrite specks at 105.65m.
		44	107		Veined GREYWACKE SILTSTONE with some argillite [FW]; dark grey with some black, S to VS, fresh. Crisscrossed by irregular mostly white veins (<4mm, quartz) spaced <40mm apart. Irregular clean joints to broken veins spaced 25-250mm apart.	RFW		- 55° contact along indistinct defect. Indistinct irregular argillite patches to bands (<50mm, 45°-NV). Defects have variable dip. Pyrite specks to patches on many broken defect surfaces. Box 38: 106.5-109.25m.
		43	108					
		42	109		108.55m			- broken 60° white vein (<2mm, calcite).
		41	110		Veined GREYWACKE SANDSTONE with some argillaceous rock [FW]; grey with some dark grey to black, S to VS, fresh. Crisscrossed by irregular mostly white veins (<4mm, calcite & quartz) spaced <40mm apart. Irregular clean joints to broken veins spaced 10-300mm apart.	RFW		- irregular 30° contact. Fine to medium grained greywacke. Irregular argillaceous patches to bands (<100mm, 45°-NV). Box 39: 109.25-111.8m.
		40	111					- broken 75° white to light grey vein(s) (<5mm, calcite).
		39	112		112.2m			Box 40: 111.8-114.45m.
		38	113		Veined ARGILLACEOUS ROCK [FW]; dark grey to black, mostly S, fresh. Crisscrossed by irregular mostly white veins (<4mm, calcite & quartz) spaced <40mm apart. Broken veins spaced 40-400mm apart.	RFW		- irregular 25° contact. Indistinctly banded (<50mm, 45°-NV). Defects have variable dip. Pyrite specks to patches on many broken defect surfaces. Core bound run 112.6-113.3m.
		37	114		- veins (<4mm) spaced <20mm apart between 113.3-114.2m.			SWL 18.6m on morning 28/11/18. 10° white-transparent composite vein (<10mm, calcite & quartz) at 113.4m.
		36	115					Box 41: 114.45-117.05m.
		35	116		- grey, VS, greywacke sandstone between 114.95 (55°) & 115.1m (40°)			Core broken (<150mm) along intersecting white-transparent veins (<4mm, calcite & quartz) spaced <20mm apart 115.4-116.1m. Broken 40° white-transparent to light grey composite vein (<15mm, quartz) with common rock fragments (mostly <5mm) at 115.85m. Box 42: 117.05-120.0m.
		34	117					
		33	118					
		32	119		- dominantly argillite between 118.75 (60°) & 120.35m (75°). Softer (MS-S). Veins (<5mm, quartz) spaced <20mm apart. Broken veins spaced 50-400mm apart.			- indistinctly banded (<100mm, 40°-NV) below 118.75m.
		31						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

BOREHOLE No. **HUN18/2**

LOCATION: HUNUA QUARRY **GRID REF:** 421404.90E 776755.09N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 150.50m **SHEET** 7 **OF** 7

JOB No. WAL18/6 **DATUM:** Mean Sea Level. Mt Eden 2000 Circuit.

DATE STARTED: 13-11-18 **DRILLER:** Drill Force LTD **STAND PIPE:** 1.407m

DATE FINISHED: 6-12-18 **TYPE OF DRILLING RIG:** Rig 5 Cortex

LOGGED BY: GDF **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction (32 20 ← Piezometer Diameters in mm)	Comments
		30	121		- mostly white veins (<4mm, calcite & quartz) spaced <40mm apart by 120m. Broken veins spaced 20-400mm apart from 120.35m.			Box 43: 120.0-123.05m. Indistinctly banded (<100mm, 60°-NV) below 120.35m. Defects have variable dip. Pyrite specks on many broken defect surfaces. Core split along irregular NV joint-vein (<1mm, zeolite) 120.7-122.2m.
		29	122					
		28	123		- narrower veins (<3mm) by 122.45m. Broken veins spaced 20-500mm apart.	RFW		- broken 75° vein (<2mm, zeolite). Generally finer below 122.45m (20°). Indistinctly banded (<100mm, 55°-NV). Box 44: 123.05-125.55m. 70° pyritized streak (<3mm with specks within 20mm) along bedding lamination at 123.65m.
		27	124					
		26	125					Core from run 122.0-124.3m stuck in barrel. New drilling bit. 60° white-transparent composite vein network (<5mm, calcite & quartz) at 125.25m. Core split along irregular NV limonite-stained joint(s) below 125.25m. Box 45: 125.55-126.0m.
		25	126		126m			
		24	127		EOH @ 126m			- broken 70° limonite-stained to white vein (<3mm, calcite) at 125.8m. Stuck in hole 29-30/11/18. Lost 3.23m of drilling rods in hole. Installed piezometers 1-6/12/18.
		23	128					
		22	129					
		21	130					
		20	131					
		19	132					
		18	133					
		17	134					
		16	135					
		15	136					
		14	137					
		13	138					
		12	139					
		11						

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Drilling Methods	Casing Depths	Hole Diameters
HQ Core to EOH.	Temporary HW casing to 9m.	123mm to 9m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 29/1/19

BOREHOLE No. **HUN25/1**

LOCATION: HUNUA QUARRY **GRID REF:** 420862.29E 776908.68N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 108.58m **SHEET** 1 **OF** 6

JOB No. WAL25/3 **DATUM:** Mean Sea Level (AVD 1946). Mt Eden 2000 Circuit.

DATE STARTED: 16-5-25
DATE FINISHED: 19-6-25
LOGGED BY: GDF/DRILLER

DRILLER: Drill Force Ltd
TYPE OF DRILLING RIG: Rig 2: Cortech Drilling Equipment LTD, YDX-3L

STAND PIPE: 0.977m
ORIENTATION: **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction (32 / 25 — Piezometer Diameters in mm)	Comments
		108	0		OVERBURDEN MATERIALS; yellow/pink "clay". [Soils to HW Argillaceous Rock].			Adjacent batter exposes mostly residual soils (<1.25m) to CW argillaceous rock (<2.75m). Logged by drillers to 28.85m (No retained samples). RQD entered into penetration field in database from 28.85m. Core boxes photographed. Cased hole at 28.85m.
		107	2					
		106	3					
		105	4					
		104	5		- light brown/yellow from 4.7m.	O		
		103	6					
		102	7					
		101	8		- becoming as below?			
		100	9					
		99	10					
		98	11		- light grey, "weathered siltstone" by 10.7m. [HW/MW Argillaceous Rock].			
		97	12			ORH		
		96	13					
		95	14		- brown, "extremely weathered sandstone" between 13.7 & 16.7m.			
		94	15			ORH		
		93	16					
		92	17		- grey from 16.7m. [Probably MW Greywacke Siltstone].			
		91	18			ORM		
		90	19					
		89	19.7m		GREYWACKE SILTSTONE [Uncertain Below]; dark grey, "fractured	RSW		

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Drilling Methods	Casing Depths	Hole Diameters
Wash drill (blade) to 28.85m. HQ Core 28.85m to EOH.	Temporary HWT casing to <28.85m.	121mm to <28.85m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 13/10/25

BOREHOLE No. **HUN25/1**

LOCATION: HUNUA QUARRY **GRID REF:** 420862.29E 776908.68N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 108.58m **SHEET** 2 **OF** 6

JOB No. WAL25/3 **DATUM:** Mean Sea Level (AVD 1946). Mt Eden 2000 Circuit.

DATE STARTED: 16-5-25 **DRILLER:** Drill Force Ltd **STAND PIPE:** 0.977m

DATE FINISHED: 19-6-25 **TYPE OF DRILLING RIG:** Rig 2: Cortech Drilling Equipment LTD, YDX-3L

LOGGED BY: GDF/DRILLER **ORIENTATION:** **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction (32 / 25 ← Piezometer Diameters in mm)	Comments
					siltstone".			
		88	21					
		87	22					
		86	23					
		85	24					
		84	25			RSW		
		83	26					
		82	27					
		81	28					
		80			28.85m			
		79	29		GREYWACKE SILTSTONE [SW/FW to MW]; mostly dark grey, S, fresh (95%). Crisscrossed by irregular limonite-stained joints spaced <100mm apart. Occasional white veins (<2mm, WK to MS).	RSW		17/05/25. Box 1: 28.85-31.49m. Full recovery of broken core (<150mm pieces). Greywacke siltstone-argillite. Defects mostly dip 45°-NV. Some joints coated by light brown to orange-brown, non-plastic silt (<2mm). Pyrite specks on some joint surfaces.
		78	30		- variable light greyish brown, WK to MS, moderately weathered, argillaceous rock [MW] below 30.15m (70°).			Irregular 65° seam (<20mm) of dark greyish brown, MS, partly weathered rock along joint(s) to 29.0m. Lowered casing at 29.5m. Core run 29.5-30.29m has 0.1m of probable uphole material (rock gravel <60mm, some twice cored) at top.
					30.75m			
		77	31		GREYWACKE SILTSTONE [SW-FW]; dark grey with occasional irregular brownish grey seams (<20mm along joints), S, fresh (95%). Crisscrossed by limonite-stained to dark green-black joints spaced <100mm apart. Occasional white veins (<2mm, WK to MS).			- joints often coated by orange-brown, non-plastic silt (<3mm) below 30.15m. Pyrite specks on occasional joint surfaces.
		76	32		- fractures to veins spaced <40mm apart by 31.6m.			- 70° contact along joint(s). Defects have variable dip. Joints often coated by silt (<3mm, as above). Pyrite specks on some joint surfaces. Box 2: 31.49-33.75m.
		75	33		- few limonite-stained joints by 33.25m.	RSWg		- irregular 70° seam (<20mm) of brownish grey, WK-MS, partly weathered/altered rock 32.15-32.35m.
		74	34		- variable light grey to greyish brown, disturbed, sandy gravel consisting of moderated altered/weathered rock fragments (<40mm, limonite-stained) near 34.5 (70°)-34.8m [Minor Fault?]. Joint-fractures spaced <65mm apart below 34.8m. Few obvious veins.			More broken core (<100mm pieces) 32.7-36.15m. Core run 32.93-33.75m stuck in barrel.
		73	35					- minimal silt on joints by 33.25m. Pyrite specks on many joint surfaces. Broken NV seam (<20mm) of discoloured grey, WK-MS, partly altered rock 33.4-33.6m. SWL 23m on morning 18/05/24. Box 3: 33.75-36.5m. Broken 60°-NV joint filled by light grey, disturbed, non-plastic, gravelly silt-sand (<10mm). Shattered core (<40mm, variable silt) 34.5-34.8m.
			36		- light brownish grey, WK to MS, moderately weathered/altered, argillaceous rock below 35.7m. Joint-fractures spaced <40mm apart.			
		72			36.2m GREYWACKE SILTSTONE [FW]; dark grey, S, mostly fresh (>95%). Crisscrossed by irregular fractures to joints spaced <65mm apart. Occasional white veins (<2mm, WK to MS).			
		71	37			RFW		Core run depth incorrectly recorded in drillers log (not 34.7m, block 34.8m).
		70	38		- occasional limonite-stained joints below 38.25m.			- broken 70°-NV contact. Pyrite specks on many joint surfaces. Box 4: 36.5-39.11m. Irregular 70° seam (<15mm) of brownish grey, MS, partly weathered/altered rock 36.75-36.9m. Box 5: 39.11-41.4m.
			39		39.3m			
		69			GREYWACKE SILTSTONE [SW]; dark grey with some irregular dark greyish brown seams, MS to S, partly weathered/altered to fresh	RSWb		- irregular NV contact. Defects mostly dip 60°-NV. Pyrite specks on many joint

BHFORM3 HUN GPJ G_FISHER.GDT 13/10/25

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Drilling Methods	Casing Depths	Hole Diameters
Wash drill (blade) to 28.85m. HQ Core 28.85m to EOH.	Temporary HWT casing to <28.85m.	121mm to <28.85m. 96mm to EOH.

BOREHOLE No. HUN25/1

LOCATION: HUNUA QUARRY **GRID REF:** 420862.29E 776908.68N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 108.58m **SHEET** 3 **OF** 6

JOB No. WAL25/3 **DATUM:** Mean Sea Level (AVD 1946). Mt Eden 2000 Circuit.

DATE STARTED: 16-5-25
DATE FINISHED: 19-6-25
LOGGED BY: GDF/DRILLER

DRILLER: Drill Force Ltd
TYPE OF DRILLING RIG: Rig 2: Cortech Drilling Equipment LTD, YDX-3L

STAND PIPE: 0.977m
ORIENTATION: **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							32 25 Piezometer Diameters in mm	
		68	41		(>50%). Crisscrossed by joint-fractures spaced <50mm apart.	RSWb		surfaces. Irregular NV seam(s) (<40mm) of dark greyish brown, MS, partly weathered, coarser rock (<20mm wide) to siltstone near top (39.3->40.0m).
					- less weathered/altered rock [FW >75%] below 40.4m.			- irregular NV limonite-stained joint(s) 40.0-41.0m. Defects mostly dip 45°-NV below 40.4m.
		67	42		- occasional white veins (<2mm, MS) by 41.75m.		SWL 6.42m 19/07/25	- irregular 60° seam (<25mm) of dark grey-brown, MS, partly weathered/altered rock 40.9-41.05m. Box 6: 41.4-43.8m.
		66	43			RSWg		Broken 70°-NV seam(s) (<50mm) of partly weathered/altered rock 41.4-42.2m. Core run 41.98-42.82m has excessive length (0.08m assumed from previous run).
		65	44					Broken 30° band (<50mm) of partly weathered/altered rock 43.6-43.65m. Box 7: 43.8-46.4m. Broken 60° seam (<25mm along joint) of partly weathered/altered rock 43.8-44.0m. Broken 60° seam (<20mm) of partly weathered/altered rock 44.0-44.15m.
		64	45		45.2m			- broken 75°-NV seam (<20mm along joints) of partly weathered/altered rock 44.4-45.0m.
		63	46		GREYWACKE SILTSTONE [FW]; dark grey, S, mostly fresh (>95%). Crisscrossed by irregular fractures to joints spaced <100mm apart.			- broken 60° contact along joint. Longer lengths of intact core (<250mm) from 45.2m. Defects have variable dip. Some joints coated by pale brown, non-plastic silt (<1mm). Pyrite specks on many joint surfaces.
		62	47		- occasional white veins (<3mm, WK to MS) below 46.55m. Broken interval of brown-grey, WK, altered rock between 46.7 (60°) & 46.8m (25°).			Box 8: 46.4-48.97m. Irregular 60° seam (<30mm) of dark greyish brown, MS, partly weathered/altered rock 46.5-46.65m.
		61	48					- broken 60° seam (<50mm) of partly weathered/altered rock with grey, WK, altered fine sandstone (<15mm along top) 47.2-47.4m.
		60	49					Incorrect details on block. 70° transparent light brown to limonite-stained vein (<3mm, MS) 48.2-48.4m.
		59	50			RFW	SWL 50.35m (19/07/25)	- irregular seam (<15mm, 70°) of partly weathered/altered, sandstone-siltstone 48.8-48.9m. Box 9: 48.97-51.33m.
		58	51		- crisscrossed by veins (mostly <3mm) spaced <150mm apart between 50.75 & 51.3m. Joints spaced <200mm apart by 50.75m.			- 60° vein (<7mm, MS) at 50.75. Veins mostly dip 45°-NV 50.75-51.3m. Minimal silt on joint surfaces by 50.75m. Fewer pyrite specks. Box 10: 51.33-53.85m.
		57	52					Two parallel 65° seams (<10mm along joints 25mm apart) of partly weathered/altered rock 51.33-51.5m.
		56	53					- broken NV, transparent to light grey, vein (<5mm, WK) near 53.0-53.3m. Core run 53.35-54.49m has excessive length (0.07m assumed from previous run). 75° limonite-stained joint(s) 53.6-53.85m. Box 11: 53.85-56.9m.
		55	54					- broken NV contact. Some joints coated by pale brown to light orange, non-plastic silt (<2mm). Pyrite specks on some joint surfaces. Irregular NV transparent dark grey vein (<3mm, MS) to fracture partly weathered <35mm into the adjacent rock to 56.35m.
		54	54.45m		GREYWACKE SILTSTONE [MW-SW]; dark grey with irregular dark grey-brown seam(s) (<65mm, NV), MS to S, partly weathered/altered to fresh (>50%). Crisscrossed by fractures to joints spaced <100mm apart. Occasional mostly white veins (<2mm, WK to MS).			Core run 54.49-56.35m has twice cored rock (<60mm piece) at top (Probable uphole material) and unrecorded core loss (<0.46m). Broken core (<100mm pieces) near 56.1-57.05m.
		53	55					SWL 23.5m on morning 19/05/25. Rod count. Box 12: 56.9-59.68m.
		52	56		- mostly fresh rock between 56.35 & 57.0m.	RSWb		- 65° white to light grey vein (<2mm, MS) with associated seam (<65mm) of partly weathered siltstone to fine sandstone (<25mm below) 57.0-57.25m. Broken 70° vein (<10mm, as above) with associated seam (<30mm) of partly weathered rock 57.4-57.55m.
		51	57					- broken 70° contact along fracture-vein.
		50	57.55m		GREYWACKE SILTSTONE [FW]; dark grey, S, mostly fresh (>95%). Crisscrossed by irregular joints spaced <200mm apart. Occasional white veins (<2mm, MS to S).			
		49	58		- irregular seam (<15mm, 50°) of brown (oxidized) to grey, WK, weathered/altered rock at 58.7m. Irregular band (<20mm, 35°) of dark grey-brown, MS, partly weathered rock at 59.05m.	RFW		
			59					

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Drilling Methods	Casing Depths	Hole Diameters
Wash drill (blade) to 28.85m. HQ Core 28.85m to EOH.	Temporary HWT casing to <28.85m.	121mm to <28.85m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 13/10/25

BOREHOLE No. HUN25/1

LOCATION: HUNUA QUARRY **GRID REF:** 420862.29E 776908.68N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 108.58m **SHEET** 4 **OF** 6

JOB No. WAL25/3 **DATUM:** Mean Sea Level (AVD 1946). Mt Eden 2000 Circuit.

DATE STARTED: 16-5-25
DATE FINISHED: 19-6-25
LOGGED BY: GDF/DRILLER
DRILLER: Drill Force Ltd
TYPE OF DRILLING RIG: Rig 2: Cortech Drilling Equipment LTD, YDX-3L
STAND PIPE: 0.977m
ORIENTATION: **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction (32 25 ← Piezometer Diameters in mm)	Comments
		48	61		- crisscrossed by veins (<2mm) spaced <100mm apart below 60.0m.			Veins mostly dip 45°-NV 57.55-60.0m. Pyrite specks on many joint surfaces. Box 13: 59.68-62.38m.
		47	62		- irregular seam (<10mm, 65°) of greyish brown, WK-MS, partly weathered/altered rock at 61.2m. Joint-fractures spaced <100mm apart below 61.2m. Irregular seam (<30mm, 65°) of brown to dark greyish brown, MS, partly weathered rock at 61.7m.	RFW		Broken core (<100mm pieces) 61.3-62.4m. Shattered core (mostly <30mm) 61.9-62.05m. SWL 32.7m on morning 20/05/25. Box 14: 62.38-65.1m. Defects mostly dip 60°-NV 62.55-64.1m.
		46	63		- fractures spaced <50mm apart below 62.55m.			
		45	64		63m GREYWACKE SILTSTONE [MW-SW]; dark grey with irregular dark greyish brown seam(s) (<40mm, 70°-NV), MS to S, partly weathered to fresh (>50%). Crisscrossed by fractures spaced <50mm apart and white to transparent grey veins (<3mm, WK to MS) spaced <100mm apart.	RSWb		- irregular 70° contact along joint. Broken joint-fractures spaced <125mm apart. Pyrite specks on many joint surfaces. Elongated patch (<20 by 10mm, 45°) of black, MS-S, argillite near 63.33m.
		44	65		64.1m GREYWACKE SILTSTONE [FW]; dark grey, S, mostly fresh (>95%). Crisscrossed by irregular limonite-stained joints spaced <200mm apart and white veins (<2mm, WK to S) spaced <100mm apart. Occasional seams (<15mm along defects) of dark brownish grey, MS-S, partly weathered rock.			- irregular 80° contact along vein(s) (<2mm). Veins mostly dip 45°-NV 64.1-67.1m. Pyrite specks on some joint surfaces. Box 15: 65.1-68.0m. Broken core (<150mm pieces) from 67.3m.
		43	66			RFW		
		42	67		67.4m - fractures to veins (<3mm) spaced <40mm apart below 67.1m.			
		41	68		67.75m FAULT ZONE [MW/SW]; patchy light greyish brown to dark brownish grey, disturbed (loose), sandy gravel (<30mm fragments as below) with some silt.	RW		- broken contact. Shattered core (<30mm, some silt) 67.4-67.75m. Disturbed (mixed) light brown to light grey, muddy seam (<30mm along base) 67.55-67.75m [Minor Fault].
		40	69		Fractured GREYWACKE SILTSTONE [MW/SW]; dark greyish brown to dark grey, MS to S, pervasive moderately weathered to fresh (50%). Crisscrossed irregular fractures spaced <30mm apart and white to transparent grey veins (<4mm, WK to MS) spaced <100mm apart.	RSWb		- broken 50° contact. Broken fractures to limonite-stained joints spaced <125mm apart. Some joints coated by light orange-brown, non-plastic silt (<1mm). Pyrite specks on many joint surfaces. Box 16: 68.0-70.75m.
		39	70		69.8m GREYWACKE SILTSTONE [SW-FW]; dark grey with minor irregular dark brown-grey seams (<100mm), MS to S, partly weathered to fresh (<95%). Crisscrossed by fractures to dark green-black joints (polished shear defects) spaced <150mm apart.			- broken contact. Pyrite specks on many joint surfaces. Corrected depth from core measurements (not 70.46m). More intact core (<250mm lengths) from 70.0m. Box 17: 70.75-73.35m.
		38	71		- broken seam (<50mm) of light brown to dark brownish grey, WK to MS, weathered to partly weathered rock below associated band (<15mm) of light red-brown, VS, vein material between 71.0 & 71.1m (55°).			- broken 70° seam (<7mm) of light brown to light grey, slightly plastic, sandy mud and partly weathered <20mm into the adjacent rock.
		37	72					- 55° joint coated by pale brown, non-plastic silt (<3mm) and partly weathered <15mm into the adjacent rock.
		36	73		- irregular seam (<20mm, 65°) of black, VS, siliceous argillite at 72.4m. Irregular seam (<50mm, 65°) of light brown (orange-tint), VWK to WK, weathered rock between 72.5 & 72.75m.	RSWg		
		35	74		- fracture-joints spaced <50mm apart below 73.3m.			Box 18: 73.35-75.9m (excluding 0.5m lost). 60° joint partly weathered <20mm into the adjacent rock at 73.5m.
		34	75		75.2m - fracture-joints spaced <30mm apart by 74.8m.			Broken core (<100mm pieces) near 74.2-77.4m. Core run 75.2-77.5 has 0.07m of probable uphole material (rock gravel <50mm) at top and unrecorded core loss (<0.5m).
		33	76		Fractured ARGILLITE [MW-SA]; brown to green-grey, WK to S, weathered to pervasive slightly altered (50%). Crisscrossed by irregular fractures spaced <20mm apart and joints spaced <100mm apart. Occasional white veins (<2mm, WK to MS). - variable greyish brown to greenish grey with occasional brownish red streaks, MS to S, less weathered/altered rock [MW-SA] below 75.85m.	RSWb		- broken contact. Finer argillite. Defects mostly dip 45°-NV. Some joints coated by pale brown to light orange, non-plastic silt (<2mm). Pyrite specks on some joint surfaces. Irregular NV-50° seam (<20mm) of light grey, plastic clay 75.7-75.85m. Box 19: 75.9-79.3m.
		32	77					
		31	78		- occasional irregular red to dark brownish red bands (<15mm, 45-55°) by 77.35m.			
		30	79		78.2m 78.6m Fractured CHERT-ARGILLITE [SA]: dark brownish red, S pervasive slightly altered. Crisscrossed by irregular fractures spaced <40mm apart. Occasional white veins (<2mm, WK to MS). Interbanded (<20mm, 70°) with below argillite along base (<0.1m).	RSW		- 45° band (<15mm) of reddish brown to red, MS, partly altered, greywacke siltstone at 77.55m. 55° band (<20mm) of reddish greywacke siltstone (as above) at 77.6m. Longer lengths of intact core (<350mm) from 78.15m.
		29			ARGILLITE [SW/SA]; variable dark brownish grey to dark greenish grey, mostly S, pervasive slightly weathered/altered to fresh (50%). Crisscrossed by irregular fractures spaced <50mm apart and white	RSW		- irregular 70° contact between 78.1-78.3m. Minimal silt on joint surfaces. Core split along irregular 70°-NV joint(s)

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Drilling Methods	Casing Depths	Hole Diameters
Wash drill (blade) to 28.85m. HQ Core 28.85m to EOH.	Temporary HWT casing to <28.85m.	121mm to <28.85m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 13/10/25

BOREHOLE No. HUN25/1

LOCATION: HUNUA QUARRY | **GRID REF:** 420862.29E 776908.68N

CLIENT: Winstone Aggregates | **COLLAR ALTITUDE:** 108.58m | **SHEET** 5 **OF** 6

JOB No. WAL25/3 | **DATUM:** Mean Sea Level (AVD 1946). Mt Eden 2000 Circuit.

DATE STARTED: 16-5-25
DATE FINISHED: 19-6-25
LOGGED BY: GDF/DRILLER

DRILLER: Drill Force Ltd
TYPE OF DRILLING RIG: Rig 2: Cortech Drilling Equipment LTD, YDX-3L

STAND PIPE: 0.977m
ORIENTATION: **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction (32 25 Piezometer Diameters in mm)	Comments
		28	81		veins (<2mm, WK to MS) spaced <100mm apart. - irregular seam (<30mm, 60°) of dark grey (red-brown tint) with brownish grey streaks to elongated patches (<25 by 3mm) and greywacke siltstone along base (<10mm) between 79.7 & 79.85m.			with pyrite specks 78.5-78.8m. - irregular 70° contact between 78.55-78.7m. Broken fracture-joints spaced <350mm apart. Pyrite specks on many joint surfaces. Box 20: 79.3-81.5m.
		27	82		- mostly variable dark greenish grey (brown-tint) to dark grey, S, pervasive slightly altered rock [SA] below 81.85m.	RSW		- two subparallel 65° limonite-stained joints (<15mm apart) partly weathered <20mm into the adjacent rock near 80.0m. Broken seam (<20mm) of partly weathered rock at 80.45m. Box 21: 81.5-84.2m. Irregular 50° seam (<7mm) of greyish brown, MS, partly altered rock at 81.85m. Aligned irregular patches (<25 by 6mm, 30°) of black, MS-S, argillite near 81.95m.
		26	83		83.35m			- indistinctly banded (<25mm, 30°) 82.7-82.9m.
		25	84		Fractured ARGILLITE [MW-SA]; variable dark greenish grey with some irregular brown to dark brownish grey and greyish green seams (<50mm), MS to S, partly weathered to pervasive slightly altered (<75%). Crisscrossed by fractures to white veins (<3mm, WK to S) spaced <30mm apart.	RSWb		- irregular 30° contact along band (<7mm) of partly altered rock. Occasional irregular reddish brown to red bands (<10mm, mostly 25-60°). Broken fracture-joints spaced <200mm apart. Pyrite specks to patches (<20mm) on many joint surfaces. Box 22: 84.2-86.9m. 50° vein(s) (<10mm) with some red to dark greenish grey, host rock remnants (<15 by 3mm) near 84.9m. Drilling circulation lost by 85.8m. Two 25° bands (<10 & <20mm, 15mm apart) of black, S, argillite 86.0-86.05m.
		24	85					
		23	86		85.8m Fractured ARGILLITE [SA-FW]; dark grey with some irregular dark brownish grey to dark greenish grey seams (<75mm), mostly S, pervasive slightly altered to fresh (>75%). Crisscrossed by fractures spaced <40mm apart and white veins (<3mm, WK to S) spaced <100mm apart. - defects spaced <20mm apart below 87.0m. Irregular NV seam(s) (<65mm) of brecciated rock (<20mm fragments with some light brownish grey, silty sand fines) along core between 87.45 & 88.85m [Minor Fault].	RSWg		- broken contact. Broken fracture-joints spaced <200mm apart. Pyrite specks on many joint surfaces. SWL 57.0m on morning 5/06/25. Change of drilling crew. No block at 86.5m (Drilling marks near 85.9m). Box 23: 86.9-89.9m (excluding 0.25m lost). Defects mostly dip 60°-NV 87.0-88.85m.
		22	87					
		21	88					
		20	89		- shattered to broken patches (<65mm) of dark red-brown, S, cherty argillite near 88.4-88.75m. 88.85m Fractured ARGILLITE [MA-SA]; variable greyish green to dark grey with some irregular brown seams (mostly <100mm), MS to S, partly weathered/altered (25%), pervasive slightly altered to fresh (50%). Crisscrossed by fractures spaced <30mm apart. Red-tint near 89.55-89.9m. - red tinted rock near 89.55-89.9m. - broken interval (<200mm) of light brown, WK-MS partly weathered/altered rock near 90.05-90.25m.			Broken core (<125mm pieces) near 87.6-92.35m. Broken band(s)(<10mm) of red rock near 88.2m. - broken 50° contact. Occasional irregular red to dark reddish brown, streaks to disrupted bands (<15mm). Broken fracture-joints spaced <125mm apart. Pyrite specks on many joint surfaces. Box 24: 89.9-93.0m.
		19	90					
		18	91					
		17	92		- occasional white veins (<3mm, MS to S) by 91.4m. Irregular seam (<50mm, 45°) of dark reddish brown, cherty argillite between 91.45 & 91.50m.			- broken 70° vein(s) (<6mm, S) at 91.8m. Broken 70° seam (<50mm) of brecciated rock (<20mm fragments with some light grey, silty sand fines) 91.85-92.0m. Broken fracture-joints spaced <350mm apart by 92.35m. - coarser texture 92.95 (30°)-96.1m (40°). Box 25: 93.0-95.5m.
		16	93			RSWb		
		15	94		- broken band (<30mm) of dark reddish brown, MS-S, rock at 94.1m. Broken seam (<15mm, 50°) of brownish red, MS-S, partly altered, greywacke siltstone at 94.6m.			
		14	95					
		13	96		- irregular seams (<65mm) of reddish brown to red, WK to MS, partly altered rock between 95.5 (75°) & 95.9m (50°). More altered rock [MA/SA].			SWL 51.0m on morning 6/06/25. Box 26: 95.5-98.1m. Broken core (<150mm pieces) 96.9-99.5m. 45° polished defect with associated seam (<5mm) of light brown to light grey, plastic clay at 97.05m.
		12	97		97.1m - interval (<75mm, 45°) of light grey, tightly packed (hard), silty sand with some rock fragments (<10mm) below 97.0m [Minor Fault].			
		11	98		Fractured ARGILLITE with some chert [SA]; variable dark greenish grey with some irregular greyish brown-green with red streaks to seams (<40mm, 45°-NV), MS to S, partly altered to pervasive slightly altered (>75%). Fractures spaced <30mm and white veins (<3mm, MS to S) spaced <50mm apart.	RSW		- broken 45° contact. Broken fracture-joints spaced <150mm apart. Pyrite specks on many joint surfaces. - broken 30° band (<15mm) of red, MS, partly altered, greywacke siltstone near 98.05m. Box 27: 98.1-101.0m.
		10	99					
		9			- broken interval(s) of dark brownish red, S-VS, argillaceous chert between 99.45 & 99.75m. Some indistinct dark grey-red seams			- coarser argillite near 99.75-102.3m.

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Drilling Methods	Casing Depths	Hole Diameters
Wash drill (blade) to 28.85m. HQ Core 28.85m to EOH.	Temporary HWT casing to <28.85m.	121mm to <28.85m. 96mm to EOH.

BOREHOLE No. **HUN25/1**

LOCATION: HUNUA QUARRY **GRID REF:** 420862.29E 776908.68N

CLIENT: Winstone Aggregates **COLLAR ALTITUDE:** 108.58m **SHEET** 6 **OF** 6

JOB No. WAL25/3 **DATUM:** Mean Sea Level (AVD 1946). Mt Eden 2000 Circuit.

DATE STARTED: 16-5-25
DATE FINISHED: 19-6-25
LOGGED BY: GDF/DRILLER

DRILLER: Drill Force Ltd
TYPE OF DRILLING RIG: Rig 2: Cortech Drilling Equipment LTD, YDX-3L

STAND PIPE: 0.977m
ORIENTATION: **PLUNGE:** 90°

Recovery (%) 25 50 75	Sample	Reduced Level (m)	Depth (m)	Legend	LITHOLOGY DESCRIPTION Name, colour, strength, grain size, (moisture) miscellaneous	Ref. Code	Piezometer Construction	Comments
							32 25	← Piezometer Diameters in mm
		8	101		(<50mm) and occasional disrupted bands (<15mm, mostly 40-60°) of brownish red, MS-S, partly altered rock below 99.75m.	RSW		
		7	102		- dark brownish red with irregular dark reddish grey to dark greenish grey seams (<60mm), S, argillaceous chert with argillite seams between 101.0 & 101.65m. - dark greenish grey with red streaks and minor irregular greyish brown-green seams (<30mm, 40-60°) below 101.65m (20°). Occasional pyrite patches (<5mm) below 102.6m.	RSW RSW		Box 28: 101.0-104.05m (excluding 0.55m lost). Core run 101.3-102.6m has excessive length (0.05m assumed from previous run). Broken core (<100mm pieces) 102.2-103.8m.
		6	102.7m		FAULT ZONE [SA]; dark greenish grey, disturbed (loose) to tightly packed (very stiff), fractured/brecciated rock (<15mm fragments as below). Occasional discernable white veins (<3mm, WK).	RW		- 40° contact along band (<10mm) of light grey, slightly plastic, sandy mud. Pyrite specks on many defect surfaces. 40° polished defect at 103.45m. Shattered to broken core (<65mm pieces) 103.8-105.55m.
		5	103		- interval (<75mm, 45°) of light brownish grey, very stiff to hard, slightly plastic, sandy silt with some rock fragments (<5mm) between <103.3 & 103.45m [Fault].			
		4	103.8m 104		Fractured ARGILLITE [SA]; dark green-grey with some red to dark reddish brown streaks to disrupted bands (<15mm), mostly S, pervasive slightly altered. Crisscrossed by irregular fractures spaced <20mm. Occasional discernable white veins (<2mm, WK).	RSW		- broken contact. Pyrite specks on many joint surfaces. Box 29: 104.05-107.48m.
		3	105 105.55m		Fractured ARGILLITE to Argillaceous CHERT [SA]; variable dark greenish grey to dark grey (green-tint) with irregular red streaks to dark reddish brown seams (<100mm, 45°-NV), S, pervasive slightly altered. Crisscrossed by fractures spaced <30mm. Occasional discontinuous white veins (<2mm, MS to S).	RSW		- broken contact. Broken fracture-joints spaced <300mm apart. Pyrite specks on many joint surfaces. Core run 105.6-107.9m has excessive length (0.05m assumed from previous run). Box 30: 107.48-110.2m.
		2	106		- interval of dark reddish brown, argillaceous chert between 107.15 (45°) & 107.45m (55°). Irregularly banded (<30mm, 40-60°) argillite and argillaceous chert below 107.45m.	RSW		
		1	107 107.75m		Fractured ARGILLITE [SA/FW]; dark grey with minor irregular dark reddish brown seams (<100mm, 40-60°) and occasional greyish brown-green seams (<30mm), mostly S, fresh (95%). Crisscrossed by fractures spaced <40mm. Occasional discontinuous white veins (<3mm, MS to S).			- irregular 65° contact along joint. Broken fracture-joints spaced <250mm apart. Pyrite specks to patches (<10mm) on many joint surfaces. SWL 51.7m on morning 7/06/25. Installing piezometer to 19/06/25. SWL 51.3 & 51.8m on mornings 9-10/06/25.
		0	108		- irregular seam (<100mm, 45°) of dark reddish brown, argillaceous chert between 109.5 & 109.65m. Fewer dark reddish brown seams below 110.0m.			
		-1	109		- broken seam (<65mm, 45°) of greyish green, MS, partly altered rock between 110.7 & 110.9m.	RSWg		Box 31: 110.2-113.0m (EOH).
		-2	110		- variable greyish brown-green to dark greenish grey with occasional irregular brownish red streaks to bands (<5mm), MS to S, slightly altered rock [SA] between 112.0 & 112.5m. - variable dark grey to black with minor irregular greyish brown-green seams (<30mm, 40-60°) below 112.5m.			
		-3	111					
		-4	112					
		-5	113 113m		EOH @ 113m			
		-6	114					
		-7	115					
		-8	116					
		-9	117					
		-10	118					
		-11	119					

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Drilling Methods	Casing Depths	Hole Diameters
Wash drill (blade) to 28.85m. HQ Core 28.85m to EOH.	Temporary HWT casing to <28.85m.	121mm to <28.85m. 96mm to EOH.

BHFORM3 HUN.GPJ G_FISHER.GDT 13/10/25

Appendix D T+T 2025 ground investigation results

- HUN25/2 borehole log and core photographs
- HUN25/3 borehole log and core photographs
- HUN25/TP1 test pit log
- HUN25/TP2 test pit log
- HUN25/TP3 test pit log
- HUN25/TP4 test pit log

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 1 OF 16

PROJECT: Project Mahitahi Geotech	CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE	R.L. GROUND: 191.00m
JOB No.: 1099889.1000		R.L. COLLAR:
LOCATION: At top of access track along boundary	DIRECTION: 0°	DATUM: AUCKHT1946
	ANGLE FROM HORIZ.: -90°	SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	UW SW MW HW CW RS	VS+ S MS W VW EW	HQTT	100	27/9 kPa In barrel	190	1.0			2000 600 200 60 20		*0.00m:* Silty CLAY, minor organics; grey streaked white, spotted black. Soft, moist, medium plasticity; organics, rootlets (partially decomposed). *0.00 - 0.40m* Becomes light greyish brown mottled orange.	15/12/2025 12/12/2025			
				HQTT	100	48/14 kPa In barrel	189	2.0					*1.80m:* SILT, minor clay; grey streaked yellow, mottled orange. Soft to firm, moist, low plasticity.	10/12/2025			
				HQTT	100	52/19 kPa In barrel	188	3.0					*3.00m:* Completely weathered, light grey, GREYWACKE. Extremely weak. Highly fractured. Very close to closely spaced defects. Soil description: clayey SILT. Firm, moist, low to medium plasticity.				Box 0.00-3.00m
				HQTT	100		187	4.0									

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:23 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

BOREHOLE No.: HUN25-2

SHEET: 2 OF 16

Tonkin+Taylor

PROJECT: Project Mahitahi Geotech
JOB No.: 1099889.1000
LOCATION: At top of access track along boundary

CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE
DIRECTION: 0°
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 191.00m
R.L. COLLAR:
DATUM: AUCKHT1946
SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	Rock Weathering (UW SW MW HW VW RS)	Rock Strength (VS+ S MS W VW EW)	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm) (2000 600 200 60 20)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%) (25 50 75)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *3.00m:* Completely weathered, light grey, GREYWACKE. Extremely weak. Highly fractured. Very close to closely spaced defects. Soil description: clayey SILT. Firm, moist, low to medium plasticity. *5.45 - 5. 80m* Becomes greyish orange. *6.45 - 7. 50m* FeST along relict defect. *6.60 - 7. 50m* Relict rock fabric present. *8.70 - 8. 80m* Becomes wet, FeST. *9.00 - 10.20m:* Some gravel up to 15 mm, angular, greywacke. *9.10 - 9. 45m* Relict rock fabric present.			HQTT	100	58/21 kPa In barrel	185	6.0								Box 3.00-5.80m
				HQTT	100	127/52 kPa In barrel	184	7.0									
				HQTT	100	62/17 kPa In barrel	183	8.0									Box 5.80-8.50m
				HQTT	87		182	9.0									

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 3 OF 16

PROJECT: Project Mahitahi Geotech	CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE	R.L. GROUND: 191.00m
JOB No.: 1099889.1000		R.L. COLLAR:
LOCATION: At top of access track along boundary	DIRECTION: 0°	DATUM: AUCKHT1946
	ANGLE FROM HORIZ.: -90°	SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	Rock Weathering (UW SW MW HW DW RS)	Rock Strength (VS+ s ms w vw EW)	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm) (2000 600 200 60 20)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%) (25 50 75)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *3.00m:* Completely weathered, light grey, GREYWACKE. Extremely weak. Highly fractured. Very close to closely spaced defects. Soil description: clayey SILT. Firm, moist, low to medium plasticity. *10.10 - 11.90m* Mottled orange, minor gravel, up to 5-10mm, angular, greywacke. *11.70 - 16.60m* Gravel, up to 15mm, angular, greywacke. Carbonaceous material present. *12.00 - 13.50m* Black and orange staining on faces. *13.50 - 16.50m* Orange staining on faces.			HQTT	87		180	10.5									
				HQTT	100		179	11.0									Box 8.50-11.23m
				HQTT	100		178	12.0									
				HQTT	100		177	13.0									Box 11.23-14.10m
								14.0									

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 4 OF 16

PROJECT: Project Mahitahi Geotech	CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE	R.L. GROUND: 191.00m
JOB No.: 1099889.1000		R.L. COLLAR:
LOCATION: At top of access track along boundary	DIRECTION: 0°	DATUM: AUCKHT1946
	ANGLE FROM HORIZ.: -90°	SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering (UW SW MW HW DW RS)	Rock Strength (VS+ S MS W VW EW)	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm) (2000 600 200 60 20)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%) (25 50 75)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *3.00m:* Completely weathered, light grey, GREYWACKE. Extremely weak. Highly fractured. Very close to closely spaced defects. Soil description: clayey SILT. Firm, moist, low to medium plasticity.			HQTT	100		175	15.5 16.0									
	16.50 - 18.00m Mottled orange, black staining on faces, gravel, up to 5-10mm, angular, greywacke.							16.5									
	17.00 - 17.60m With grey, black and orange staining on faces.						174	17.0									
	17.65 - 17.90m Gravelly SILT, minor sand, non-plastic; gravel, up to 10mm, angular, greywacke; sand, fine.			HQTT	100			17.5									
	18.00 - 18.95m Orange staining on faces, gravel, up to 5-10mm, angular, greywacke.						173	18.0					*18.00 - 39.30m* Short runs undertaken to reduce core loss due to core bound				
	18.95m: CORE LOSS.			HQTT	63			18.5						14/12/2025			
	19.50m: Highly weathered, greyish brown with black and orange staining on faces, GREYWACKE. Very weak. Highly fractured, Very closely to closely spaced defects. Recovered as fine to coarse GRAVEL in places.			HQTT	27		172	19.0 19.5				0					
	19.90m: CORE LOSS.																

Box 14.10-16.85m

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 5 OF 16

PROJECT: Project Mahitahi Geotech
JOB No.: 1099889.1000
LOCATION: At top of access track along boundary

CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE
DIRECTION: 0°
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 191.00m
R.L. COLLAR:
DATUM: AUCKHT1946
SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *19.90m:* CORE LOSS.			HQTT	27			20.5				0					
	21.00m: Highly weathered, grey with black and brown staining on faces, GREYWACKE. Very weak. Highly fractured, Very closely to closely spaced defects. Recovered as fine to coarse GRAVEL in places.			HQTT	100		170	21.0				0					Box 16.85-21.25m
	21.75 - 24.00m Core stones of moderately weathered greywacke recovered.			HQTT	73			21.5				0					
				HQTT	100		169	22.0				0					
				HQTT	60			22.5				26	*22.50m:* switch to using diamond drill bits *22.50-22.65m:* DD				
				HQTT	62		168	23.0				0	*22.85-23.20m:* BZ, gravel up to 20 mm *22.95m:* J, 42°, PL, SM, N, Fe, FeST along relict joint				
	24.00m: Moderately weathered, brownish grey with orange and brown staning on faces, GREYWACKE. Very weak. Highly fractured, closely spaced defects.							23.5				0	*23.25-23.70m:* BZ, gravel up to 40 mm				
							167	24.0				23	*24.30m:* J, 53°, PL, SM, N, Fe, FeST along relict joint	16/12/2025			Box 21.25-24.30m
				HQTT	100			24.5				40	*24.85m:* J, 25°, PL, SM, N, Fe, FeST along relict joint				

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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BOREHOLE LOG

BOREHOLE No.: HUN25-2

SHEET: 6 OF 16

Tonkin+Taylor

PROJECT: Project Mahitahi Geotech
JOB No.: 1099889.1000
LOCATION: At top of access track along boundary

CO-ORDINATES: 776445.75 mN, 421455.79 mE (EDENTM2000)
DIRECTION: 0°
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 191.00m
R.L. COLLAR:
DATUM: AUCKHT1946
SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *24.00m:* Moderately weathered, brownish grey with orange and brown staning on faces, GREYWACKE. Very weak. Highly fractured, closely spaced defects.			HQTT	100							40	*25.00m:* J, 46°, PL, SM, N, Fe, FeST along relict joint *25.05m:* J, 63°, PL, SM, N, Fe, FeST along relict joint *25.25m:* J, 43°, PL, SM, N, Fe, FeST along relict joint				
				HQTT	100			25.5				50	*25.50m:* J, 55°, PL, SM, N, Fe, FeST along relict joint				
	26.30 - 26.75m Recovered as fine to coarse gravel, up to 30mm, angular, greywacke.			HQTT	80		165	26.0				32	*25.75m:* J, 27°, PL, SM, N, Fe, FeST along relict joint *25.85m:* J, 15°, PL, SM, N, Fe, FeST along relict joint *26.00m:* J, 66°, PL, SM, N, Fe, FeST along relict joint *26.10m:* J, 43°, PL, SM, N, Fe, FeST along relict joint *26.25m:* J, 29°, PL, SM, N, Fe, FeST along relict joint *26.30-26.75m:* BZ, gravel up to 30 mm				Box 24.30-27.00m
				HQTT	100		164	27.0				22	*27.05m:* J, 12°, PL, R, N, Fe, FeST along relict joint *27.20m:* J, 26°, ST, R, N, Fe, FeST along relict joint *27.30-27.35m:* DD				
	27.45m: Moderately weathered, grey with brown and orange staning on faces, GREYWACKE. Weak. Highly fractured, very closely to closely spaced defects. *27.80 - 28.25m* Carbonaceous banding present.			HQTT	100			27.5				71	*27.50m:* J, 42°, PL, SM, N, Fe, FeST along relict joint *27.60m:* J, 26°, PL, SM, N, Fe, FeST along relict joint *27.85m:* J, 48°, PL, SM, N, Fe, FeST along relict joint				
				HQTT	100		163	28.0					*28.20m:* J, 38°, PL, SM, N, Fe, FeST along relict joint *28.30m:* J, 32°, PL, R, N, Fe, FeST along relict joint				
	29.15 - 29.40m Recovered as sandy, coarse Gravel. Sand breaks into chunks and disintegrates into finer material under pressure between fingers.			HQTT	100		162	29.0				52	*28.75m:* J, 22°, ST, R, N, Fe, FeST along relict joint *28.90m:* J, 44°, PL, R, N, Fe, FeST along relict joint *29.05m:* J, 43°, PL, R, N, Fe, Silt infill, *29.20-29.40m:* BZ, gravel up to 15 mm. Relict defects observed				
				HQTT	100			29.5				68	*29.55m:* J, 42°, PL, SM, N, Fe *29.65-29.75m:* BZ, gravel up to 5 mm				Box 27.00-29.70m

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 7 OF 16

PROJECT: Project Mahitahi Geotech	CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE	R.L. GROUND: 191.00m
JOB No.: 1099889.1000		R.L. COLLAR:
LOCATION: At top of access track along boundary	DIRECTION: 0°	DATUM: AUCKHT1946
	ANGLE FROM HORIZ.: -90°	SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	Rock Weathering (UW SW MW HW DW RS)	Rock Strength (VS+ S MS W VW EW)	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm) (2000 600 200 60 20)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%) (25 50 75)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *27.45m:* Moderately weathered, grey with brown and orange staning on faces, GREYWACKE. Weak. Highly fractured, very closely to closely spaced defects.			HQTT	100							68	*30.00m:* J, 51°, PL, SM, N, Fe, FeST along relict joint *30.15m:* J, 48°, ST, R, N, Fe, FeST along relict joint				
	30.35m: Slightly weathered, grey with brown staining on defect faces. GREYWACKE. Strong. Highly fractured, very closely to closely spaced, gently to steeply inclined microfracturing of rock mass also present. Iron staining along fractures.							30.5					*30.40m:* J, 17°, PL, SM, N, Clay gouge *30.55m:* J, 50°, PL, SM, N				
				HQTT	100		160	31.0				56	*30.75m:* J, 53°, PL, SM, N *30.80m:* J, 58°, PL, SM, N, silt infill *30.95m:* J, 68°, PL, R, N, silty sand infill				
								31.5									
				HQTT	100		159	32.0				50	*31.00-32.50m:* BZ, gravel up to 40 mm. Relict defect observed within crushed zone *31.35-31.40m:* DD *31.60m:* J, 13°, ST, R, N *31.70m:* J, 6°, ST, R, N *32.10m:* J, 68°, PL, SM, N *32.20m:* J, 22°, ST, R, N, clay gouge				Box 29.70-32.25m
								32.5					*32.35m:* J, 30°, UN, R, MN, Fe				
				HQTT	100		158	33.0				73	*32.80m:* J, 39°, PL, SM, N, Fe *33.10m:* J, 58°, UN, R, MN, Fe *33.25m:* J, 15°, R, Fe *33.35m:* J, 23°, UN, R, MN, Fe				
								33.5									
				HQTT	100		157	34.0				52	*33.80m:* J, 51°, UN, R, MN, Fe *33.95m:* J, 41°, UN, R, MN, Fe *34.15m:* J, 32°, UN, R, MN, clay gouge *34.20m:* J, 21°, ST, R, N, CN *34.35m:* J, 16°, ST, R, N, CN				
								34.5									
				HQTT	100							76	*34.65m:* J, 34°, PL, SM, N, Fe				Box 32.25-34.70m

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 8 OF 16

PROJECT: Project Mahitahi Geotech
JOB No.: 1099889.1000
LOCATION: At top of access track along boundary

CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE
DIRECTION: 0°
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 191.00m
R.L. COLLAR:
DATUM: AUCKHT1946
SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	Rock Weathering (UW SW MW HW DW RS)	Rock Strength (VS+ S MS W VW EW)	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm) (2000 600 200 60 20)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%) (25 50 75)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *30.35m:* Slightly weathered, grey with brown staining on defect faces. GREYWACKE. Strong. Highly fractured, very closely to closely spaced, gently to steeply inclined microfracturing of rock mass also present. Iron staining along fractures.			HQTT	100		155	35.5				76	*35.00m:* J, 18°, PL, SM, N, Fe *35.30m:* J, 58°, UN, R, N, CN				
							154	36.0				73	*35.70m:* J, 51°, UN, R, N, CN *36.20m:* J, 28°, PL, SM, N, CN *36.55m:* J, 73°, PL, SM, N, Fe *36.65m:* J, 52°, PL, SM, MN, Fe *36.80m:* J, 61°, N, cn *37.00m:* J, 62°, PL, R, N, cn				Box 34.70-37.30m
	38.50m: CORE LOSS.			HQTT	19		153	38.0				33	*37.40m:* J, 32°, PL, SM, N, CN *37.60m:* J, 54°, PL, SM, N, CN *37.70m:* J, 42°, PL, N, CN *37.90m:* J, 53°, PL, SM, N, CN *38.30m:* J, 42°, PL, SM, N, CN				
	39.15m: Slightly weathered, bluish grey, GREYWACKE. Strong. Highly fractured, very closely to closely spaced, gently to steeply inclined microfracturing of rock mass also present. Recovered as fine to coarse GRAVEL. Gravel up to 20 mm. *39.30m:* CORE LOSS.						152	39.0				18	*38.50m:* J, 42°, PL, SM, N, silt infill				
	39.60m: Slightly weathered, bluish grey. GREYWACKE. Strong. Highly fractured, very closely to closely spaced, gently to steeply inclined microfracturing of rock mass also present. Recovered as fine to coarse GRAVEL. Gravel up to 30 mm.			HQTT	100			39.5				53	*39.60-39.61m:* BZ, gravel up to 10 mm *39.75m:* J, 42°, PL, SM, N, CN *39.76-39.85m:* BZ, gravel up to 30 mm				

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 9 OF 16

PROJECT: Project Mahitahi Geotech

JOB No.: 1099889.1000

LOCATION: At top of access track along boundary

CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE

DIRECTION: 0°

ANGLE FROM HORIZ.: -90°

R.L. GROUND: 191.00m

R.L. COLLAR:

DATUM: AUCKHT1946

SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce

LOGGED BY: GAAB

CHECKED: PRMM

START DATE: 10/12/2025

FINISH DATE: 15/12/2025

CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	Rock Weathering (UW, SW, MW, HW, DW, RS)	Rock Strength (VS+, S, MS, W, VW, EW)	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm) (2000, 600, 200, 60, 20)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%) (25, 50, 75)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *39.60m:* Slightly weathered, bluish grey. GREYWACKE. Strong. Highly fractured, very closely to closely spaced, gently to steeply inclined microfracturing of rock mass also present. Recovered as fine to coarse GRAVEL. Gravel up to 30 mm.			HQTT	100			40.5				53	*40.00-40.10m:* BZ, gravel up to 10 mm *40.40m:* J, 48°, PL, SM, N, CN				Box 37.30-40.80m
	40.80m: CORE LOSS.			HQTT	30		150	41.0				0	*40.55-40.80m:* BZ, gravel up to 30 mm *40.60m:* J, 61°, UN, R, N, CN				
	41.15m: Slightly weathered, bluish grey. GREYWACKE. Strong. Highly fractured, very closely to closely spaced, steeply inclined microfracturing of rock mass also present. Recovered as fine to coarse GRAVEL. Gravel up to 15 mm.							41.5					*41.50m:* J, 32°, PL, R, N, CN				
	41.60m: Unweathered, bluish grey. GREYWACKE. Strong. Highly fractured, very closely to closely spaced, gently to steeply inclined defects. Criss crossed white veins.			HQTT	100		149	42.0				80	*41.90m:* J, 42°, PL, SM, N, silt infill				
								42.5					*42.40m:* J, 24°, PL, R, N, CN				
				HQTT	100		148	43.0				63	*43.30m:* J, 72°, PL, SM, CN				
								43.5					*43.50m:* J, 52°, PL, R, CN				Box 40.80-43.80m
	43.80m: Unweathered, bluish grey. GREYWACKE. Strong. Very closely to closely spaced, gently to steeply inclined defects. Criss crossed white veins.							44.0					*43.90m:* J, 32°, PL, SM, N, CN *44.00m:* J, 30°, PL, SM, N, CN *44.10-44.15m:* J, 38°, PL, SM, N, CN				
				HQTT	100		147	44.5				76	*44.40m:* J, 28°, PL, R, MN, CN *44.60m:* J, 26°, PL, SM, MN, CN				

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 10 OF 16

PROJECT: Project Mahitahi Geotech	CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE	R.L. GROUND: 191.00m
JOB No.: 1099889.1000		R.L. COLLAR:
LOCATION: At top of access track along boundary	DIRECTION: 0°	DATUM: AUCKHT1946
	ANGLE FROM HORIZ.: -90°	SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *43.80m:* Unweathered, bluish grey. GREYWACKE. Strong. Very closely to closely spaced, gently to steeply inclined defects. Criss crossed white veins.			HQTT	100			45.5				76	*45.30m:* J, 42°, PL, SM, N, CN *45.50m:* J, 48°, PL, SM, CN				
				HQTT	100		145	46.0				86	*45.90m:* J, 76°, CN *46.00m:* J, 32°, PL, SM, CN				
								46.5					*46.50m:* J, 35°, PL, SM, CN *46.65-46.75m:* DD *46.80m:* J, 15°, PL, R, CN *46.90m:* J, 22°, ST, R, CN				Box 43.80-46.60m
				HQTT	100		144	47.0					*47.20m:* J, 62°, PL, SM, CN *47.30m:* J, 72°, PL, R, CN				
								47.5				73	*47.60m:* J, 23°, PL, SM, clay gouge (altered calcite along defect faces) *47.80m:* J, 36°, PL, SM, clay gouge (altered calcite along defect faces)				
							143	48.0					*48.00m:* J, 15°, PL, SM, CN				
								48.5					*48.50m:* J, 17°, PL, R, CN				
				HQTT	100		142	49.0				80	*48.90m:* J, 13°, ST, R, clay gouge (altered calcite along defect faces)				
								49.5					*49.30m:* J, 42°, PL, SM, CN *49.55m:* J, 28°, PL, R, CN				Box 46.60-49.40m
				HQTT	100							70					

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 11 OF 16

PROJECT: Project Mahitahi Geotech	CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE	R.L. GROUND: 191.00m
JOB No.: 1099889.1000		R.L. COLLAR:
LOCATION: At top of access track along boundary	DIRECTION: 0°	DATUM: AUCKHT1946
	ANGLE FROM HORIZ.: -90°	SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *43.80m:* Unweathered, bluish grey. GREYWACKE. Strong. Very closely to closely spaced, gently to steeply inclined defects. Criss crossed white veins.	UW SW MW HW DW CW RS	VS+ S MS W VW EW	HQTT	100		140 139 138 137	50.5 51.0 51.5 52.0 52.5 53.0 53.5 54.0 54.5			2000 600 200 60 20	70 62 80 80	*50.10m:* J, 72°, PL, SM, clay gouge (altered calcite along defect faces) *50.15m:* J, 52°, PL, SM, clay gouge (altered calcite along defect faces) *50.40m:* J, 35°, PL, SM, clay gouge (altered calcite along defect faces) *51.52m:* J, 51°, PL, SM, clay gouge (altered calcite along defect faces) *51.72m:* J, 35°, PL, SM, clay gouge (altered calcite along defect faces) *51.92m:* J, 64°, PL, SM, clay gouge (altered calcite along defect faces) *52.27m:* J, 40°, PL, SM, clay gouge (altered calcite along defect faces) *52.41m:* J, 53°, PL, SM, clay gouge (altered calcite along defect faces) *52.90m:* J, 88°, PL, SM, clay gouge (altered calcite along defect faces) *52.96m:* J, 75°, PL, SM, clay gouge (altered calcite along defect faces) *53.20m:* J, 24°, PL, SM, clay gouge (altered calcite along defect faces) *53.60m:* J, 24°, PL, SM, clay gouge (altered calcite along defect faces) *53.93m:* J, 22°, PL, SM, clay gouge (altered calcite along defect faces) *54.25m:* J, 72°, PL, SM, clay gouge (altered calcite along defect faces) *54.27m:* J, 70°, PL, SM, clay gouge (altered calcite along defect faces) *54.40m:* J, 69°, PL, SM, clay gouge (altered calcite along defect faces) *54.60m:* J, 46°, PL, SM, clay gouge (altered calcite along defect faces) *54.75m:* J, 49°, PL, SM, clay gouge (altered calcite along defect faces) *54.85m:* J, 55°, PL, SM, clay gouge (altered calcite along defect faces)	25 50 75			Box 49.40-52.15m Box 52.15-54.75m

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 12 OF 16

PROJECT: Project Mahitahi Geotech
JOB No.: 1099889.1000
LOCATION: At top of access track along boundary

CO-ORDINATES: 776445.75 mN, 421455.79 mE (EDENTM2000)
DIRECTION: 0°
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 191.00m
R.L. COLLAR:
DATUM: AUCKHT1946
SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *43.80m:* Unweathered, bluish grey. GREYWACKE. Strong. Very closely to closely spaced, gently to steeply inclined defects. Criss crossed white veins.			HQTT	100		135	56.0				80	*55.20m:* J, 16°, PL, SM, clay gouge (altered calcite along defect faces),				
								55.5					*55.50m:* J, 36°, PL, SM, clay gouge (altered calcite along defect faces) , *55.60m:* J, 31°, PL, SM, clay gouge (altered calcite along defect faces) *55.68m:* J, 58°, PL, SM, CN *55.76m:* J, 46°, PL, SM, CN				
													55.88-55.95m: BZ, gravel up to 30 mm				
				HQTT	100		134	57.0				63	*56.35m:* J, 66°, PL, SM, CN				
								56.5					*56.50-57.10m:* BZ, clay gouge				
								57.5					*57.30m:* J, 72°, PL, SM, CN				Box 54.75-57.10m
													57.60m: J, 32°, PL, SM, CN				
				HQTT	100		133	58.0				76	*57.80m:* J, 42°, PL, SM, CN *57.90m:* J, 41°, PL, SM, clay gouge				
													58.10m: J, 73°, PL, SM				
								58.5					*58.30m:* J, 65°, PL, SM				
													58.50m: J, 62°, PL, SM				
				HQTT	100		132	59.0				80	*58.80m:* J, 22°, PL, SM				
													59.00m: J, 17°, PL, SM				
								59.5					*59.25m:* J, 42°, PL, SM, clay gouge				
													59.50m: J, 38°, PL, R, clay gouge				
													59.65m: J, 53°, PL, R, clay gouge				Box 57.10-59.75m
													59.75m: J, 62°, PL, R, clay gouge *59.80m:* J, 58°, PL, R, CN				

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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BOREHOLE LOG

BOREHOLE No.: HUN25-2

SHEET: 13 OF 16

Tonkin+Taylor

PROJECT: Project Mahitahi Geotech
JOB No.: 1099889.1000
LOCATION: At top of access track along boundary

CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE
DIRECTION: 0°
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 191.00m
R.L. COLLAR:
DATUM: AUCKHT1946
SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *43.80m:* Unweathered, bluish grey. GREYWACKE. Strong. Very closely to closely spaced, gently to steeply inclined defects. Criss crossed white veins.			HQTT	100		130	60.5				80	*60.00m:* J, 36°, PL, R, CN				
													60.30m: J, 21°, PL, R, CN				
													60.50m: J, 32°, PL, R, CN				
				HQTT	100							76	*60.80m:* J, 43°, PL, R, CN				
								61.0					*60.95m:* J, 25°, PL, R, CN *61.00m:* J, 31°, PL, R, CN				
													61.20m: J, 73°, PL, R, CN				
													61.40m: J, 36°, PL, R, CN *61.45m:* J, 41°, PL, R, CN *61.50m:* J, 52°, PL, R, CN *61.50-61.60m:* BZ, , gravel up to 40 mm				
								61.5					*61.65m:* J, 28°, PL, SM				
							129	62.0					*61.93m:* J, 21°, PL, SM, CN				Box 59.75-62.00m
				HQTT	100							80	*62.25m:* J, 52°, PL, SM, CN				
													62.40m: J, 72°, PL, SM, CN				
								62.5					*62.50m:* J, 42°, PL, SM, CN				
													62.65m: J, 44°, PL, SM, CN				
													62.75m: J, 63°, PL, SM, clay gouge *62.80m:* J, 67°, PL, SM, CN				
							128	63.0					*62.90m:* J, 28°, PL, SM, CN				
													63.10m: J, 23°, PL, SM, CN				
													63.20m: J, 38°, PL, SM, CN				
								63.5					*63.40m:* J, 72°, PL, SM, CN				
				HQTT	100							80	*63.80m:* J, 22°, PL, SM, CN				
							127	64.0					*63.95m:* J, 58°, PL, SM, CN				
													64.20m: J, 26°, PL, SM, CN				
													64.40m: J, 42°, PL, SM, CN				
								64.5					*64.50m:* J, 61°, PL, SM, CN				
													64.60m: J, 35°, PL, SM, CN				
				HQTT	100							80	*64.70m:* J, 68°, PL, SM, CN *64.80m:* J, 62°, PL, SM, CN				Box 62.00-64.95m
													64.90m: J, 15°, PL, SM, CN				

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 14 OF 16

PROJECT: Project Mahitahi Geotech	CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE	R.L. GROUND: 191.00m
JOB No.: 1099889.1000		R.L. COLLAR:
LOCATION: At top of access track along boundary	DIRECTION: 0°	DATUM: AUCKHT1946
	ANGLE FROM HORIZ.: -90°	SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *43.80m:* Unweathered, bluish grey. GREYWACKE. Strong. Very closely to closely spaced, gently to steeply inclined defects. Criss crossed white veins.	UW SW MW HW DW RS	VS+ S MS W VW EW	HQTT	100		125 124 123 122	65.5 66.0 66.5 67.0 67.5 68.0 68.5 69.0 69.5				80 86 76 93	*65.20m:* J, 75°, PL, SM, CN *65.35-65.40m:* BZ, gravel up to 10 mm *65.50m:* J, 42°, PL, SM *65.65m:* J, 62°, PL, SM, CN *65.90m:* J, 41°, PL, SM, CN *66.00m:* J, 60°, PL, SM, clay gouge, quartz vein along defect face *66.50m:* J, 18°, PL, SM, CN *66.60m:* J, 12°, PL, R, gravel up to 6 mm *66.77m:* J, 48°, PL, SM, CN *67.00m:* J, 10°, PL, SM, CN *67.25m:* J, 22°, PL, SM, CN, quartz vein along defect face *67.75m:* J, 12°, PL, SM, CN *67.80m:* J, 14°, PL, SM, CN *67.85-68.15m:* BZ, *68.30m:* J, 43°, PL, SM, CN *68.70m:* J, 72°, PL, SM, CN *69.25m:* J, 32°, PL, SM, CN *69.50m:* J, 18°, PL, SM, CN *69.80-69.83m:* BZ, gravel up to 10 mm *69.85m:* J, 44°, PL, SM, CN	25 50 75			Box 64.95-67.60m

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

BOREHOLE No.: HUN25-2

SHEET: 15 OF 16

Tonkin+Taylor

PROJECT: Project Mahitahi Geotech
JOB No.: 1099889.1000
LOCATION: At top of access track along boundary

CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE
DIRECTION: 0°
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 191.00m
R.L. COLLAR:
DATUM: AUCKHT1946
SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *43.80m:* Unweathered, bluish grey. GREYWACKE. Strong. Very closely to closely spaced, gently to steeply inclined defects. Criss crossed white veins.			HQTT	100			70.5				93	*70.40m:* J, 36°, PL, SM, CN *70.45m:* J, 48°, PL, SM, CN *70.45-70.55m:* BZ, PL, SM, gravelup to 20 mm				Box 67.60-70.45m
				HQTT	100		120	71.0					*70.80m:* J, 8°, PL, R, CN *71.00m:* J, 43°, PL, R, CN *71.10m:* J, 22°, PL, R, CN *71.25m:* J, 21°, PL, R, CN *71.30m:* J, 72°, PL, R, CN *71.40m:* J, 68°, PL, R, CN				
								71.5				76	*71.60m:* J, 62°, PL, R, CN				
							119	72.0					*71.95m:* J, 76°, PL, R, CN *72.00m:* J, 73°, PL, R, CN *72.10m:* J, 33°, PL, SM, CN				
				HQTT	100			72.5					*72.40m:* J, 28°, PL, SM, CN *72.50m:* J, 56°, PL, SM, quartz vein along defect face *72.60m:* J, 25°, PL, SM, CN *72.70m:* J, 6°, PL, R, CN *72.85m:* J, 15°, PL, R, CN				Box 70.45-73.00m
							118	73.0				66	*73.00m:* J, 52°, PL, R, CN *73.10m:* J, 73°, PL, R, CN *73.20m:* J, 78°, PL, R, CN *73.30m:* J, 62°, PL, R, CN *73.40m:* J, 20°, PL, R, CN				
								73.5					*73.50-73.55m:* BZ, gravel up to 10 mm *73.70m:* J, 43°, PL, SM *73.80m:* J, 72°, PL, SM, CN				
				HQTT	100		117	74.0					*74.00m:* J, 38°, PL, SM, quartz vein along defect face *74.10m:* J, 28°, PL, SM, CN				
								74.5				73	*74.50m:* J, 26°, PL, R, clay gouge *74.60m:* J, 68°, PL, SM, CN *74.80m:* J, 52°, PL, SM, CN *74.90m:* J, 32°, PL, SM, CN				

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-2

SHEET: 16 OF 16

PROJECT: Project Mahitahi Geotech	CO-ORDINATES: (EDENTM2000) 776445.75 mN 421455.79 mE	R.L. GROUND: 191.00m
JOB No.: 1099889.1000		R.L. COLLAR:
LOCATION: At top of access track along boundary	DIRECTION: 0°	DATUM: AUCKHT1946
	ANGLE FROM HORIZ.: -90°	SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: GAAB
CHECKED: PRMM
START DATE: 10/12/2025
FINISH DATE: 15/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	UW SW MW HW DW CW RS	VS+ S MS W VW EW	HQTT	100		115	75.5			2000 600 200 60 20	73	[CONT] *43.80m:* Unweathered, bluish grey. GREYWACKE. Strong. Very closely to closely spaced, gently to steeply inclined defects. Criss crossed white veins. *74.92-74.95m:* BZ, gravel up to 20 mm	25 50 75			Box 73.00-75.40m
													75.40m: J, 36°, PL, SM				
													75.60m: J, 32°, PL, SM, CN				
				HQTT	100			76.0				73	*75.80m:* J, 52°, PL, SM, CN *75.90m:* J, 64°, PL, SM, CN				
													76.00m: J, 32°, PL, SM, CN				
													76.20m: J, 56°, PL, SM, CN				
								76.5					*76.40m:* J, 48°, PL, SM, CN *76.50m:* J, 23°, PL, SM, CN				
													76.60m: J, 18°, PL, SM, CN *76.65m:* J, 72°, PL, SM, CN				
													76.85m: J, 10°, PL, R, CN				
							114	77.0					*77.00m:* J, 38°, PL, SM, CN *77.10m:* J, 38°, PL, R, silty sand infill *77.20m:* J, 72°, PL, SM, silty sand infill				
				HQTT	100							63					
								77.5					*77.40m:* J, 15°, PL, SM, CN *77.50m:* J, 43°, PL, SM, CN *77.60m:* J, 52°, PL, SM, CN *77.70m:* J, 56°, PL, SM, CN *77.80m:* J, 41°, PL, SM, CN *77.90m:* J, 62°, PL, SM, CN *77.95m:* J, 53°, PL, SM, CN				Box 75.40-78.05m
							113	78.0					*78.00-78.10m:* BZ, SM, gravel up to 10 mm				
													78.20m: J, 32°, PL, SM, CN				
								78.5					*78.40m:* J, 42°, PL, SM, CN *78.50m:* J, 38°, PL, SM, clay gouge				
													78.65m: J, 33°, PL, R, gravel along defect face up to 8 mm				
				HQTT	100							60	*78.80m:* J, 48°, PL, SM, clay gouge *78.85m:* J, 42°, ST, SM, clay gouge				
							112	79.0					*79.00m:* J, 32°, PL, SM, CN *79.10m:* J, 53°, PL, SM, clay gouge *79.20m:* J, 65°, PL, SM, clay gouge *79.30m:* J, 51°, PL, SM, clay gouge				
								79.5					*79.45m:* J, 64°, ST, SM *79.50-79.57m:* BZ, gravel up to 50 mm *79.60m:* J, 34°, PL, R, CN				
				HQTT	100							62	*79.80m:* J, 47°, PL, SM, CN *79.85m:* J, 12°, PL, R, CN *79.95m:* J, 43°, PL, SM, CN				Box 78.05-80.00m
	80m: Target depth																

COMMENTS: Groundwater reading measured at the start and each of each day. Piezometer installed in borehole 16/12/2025. Raised PVC cover installed

Hole Depth 80m

Scale 1:25

Rev.: A

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CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

0.00-3.00m

3.00-5.80m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

5.80-8.50m

8.50-11.23m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

Tonkin+Taylor

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

11.23-14.10m

14.10-16.85m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

Tonkin+Taylor

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

16.85-21.25m

21.25-24.30m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

Tonkin+Taylor

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

24.30-27.00m

27.00-29.70m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

29.70-32.25m

32.25-34.70m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

Tonkin+Taylor

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

34.70-37.30m

37.30-40.80m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

40.80-43.80m

43.80-46.60m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

46.60-49.40m

49.40-52.15m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

52.15-54.75m

54.75-57.10m

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CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

57.10-59.75m

59.75-62.00m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

Tonkin+Taylor

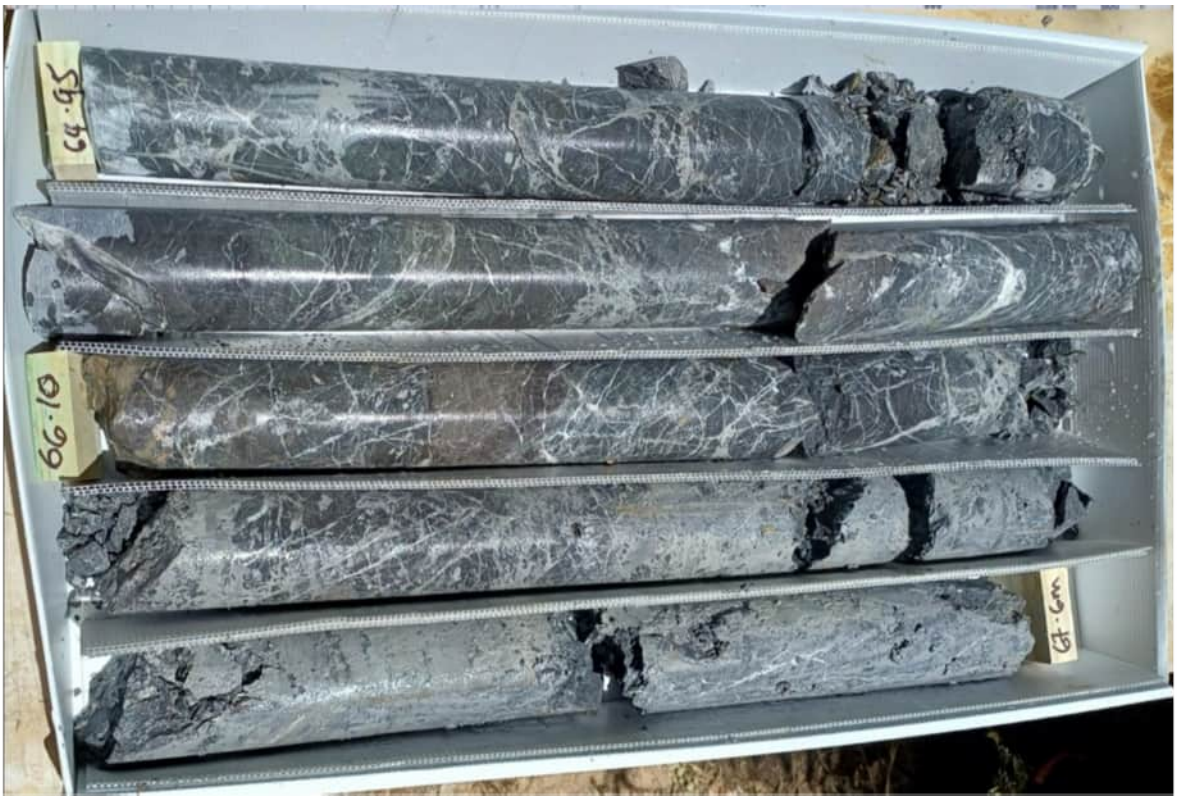
CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

62.00-64.95m



64.95-67.60m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

67.60-70.45m

70.45-73.00m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

73.00-75.40m

75.40-78.05m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

Tonkin+Taylor

CORE PHOTOS

BOREHOLE No.: **HUN25-2**

Hole Location: At top of access track along boundary

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776445.75 mN (EDENTM2000) 421455.79 mE R.L.: 191.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig 2 METHOD: Rotary cored	HOLE STARTED: 10/12/2025 HOLE FINISHED: 15/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: GAAB CHECKED: PRMM

78.05-80.00m

TTNZ_20251211 - GeneralLog - 29/01/2026 1:20:24 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-3

SHEET: 1 OF 7

PROJECT: Project Mahitahi Geotech

JOB No.: 1099889.1000

LOCATION: In clearing on E side of access track.

CO-ORDINATES: (EDENTM2000) 776624.30 mN, 421468.90 mE

DIRECTION: 0°

ANGLE FROM HORIZ.: -90°

R.L. GROUND: 150.00m

R.L. COLLAR:

DATUM: AUCKHT1946

SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce

LOGGED BY: JOWI

CHECKED: PRMM

START DATE: 03/12/2025

FINISH DATE: 05/12/2025

CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	*0.00m:* CORE LOSS. Likely drilling induced.																
	0.40m: Silty CLAY; light brownish grey streaked orange. Stiff, moist, moderate plasticity.			HQTT	73			0.5									
	1.00m: CLAY, some silt; light grey and orange. Stiff, moist, high plasticity. *1.20 - 1.80m* Orange with light grey streaks. *1.80 - 2.00m* Light grey.						149	1.0									
	2.00m: Completely weathered, light grey and orange mottled GREYWACKE. Extremely weak, highly fractured, very closely to closely spaced defects. Soil Description: Clayey SILT. Stiff, moist, moderate plasticity.			HQTT	73		148	1.5 2.0									
	2.60m: CORE LOSS. Likely drilling induced.							2.5									
	3.00m: Completely weathered, light brownish grey mottled orange GREYWACKE. Extremely weak, highly fractured, very closely to closely spaced defects. Soil Description: Clayey SILT. Stiff, moist, moderate plasticity.			HQTT	50		147	3.0 3.5									
	3.80m: CORE LOSS. Likely drilling induced.																
	4.50m: Completely weathered, brownish orange mottled grey GREYWACKE. Extremely weak, highly fractured, very closely to closely spaced defects. Soil Description: SILT, some clay and sand. Very stiff, moist, low plasticity. Sand, fine.			HQTT	100	UTP	146	4.0 4.5									

Water Level / Fluid Loss (%): 25, 50, 75

04/12/2025 5:PM

03/12/2025 5:PM

Box 0.00-3.60m

COMMENTS: Groundwater reading measured at the start and each of each day. Dual Nested Piezometer installed in borehole 8/12/2025. Raised PVC cover installed.

Hole Depth 35m

Scale 1:25

Rev.: A

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-3

SHEET: 2 OF 7

PROJECT: Project Mahitahi Geotech

JOB No.: 1099889.1000

LOCATION: In clearing on E side of access track.

CO-ORDINATES: (EDENTM2000) 776624.30 mN 421468.90 mE

DIRECTION: 0°

ANGLE FROM HORIZ.: -90°

R.L. GROUND: 150.00m

R.L. COLLAR:

DATUM: AUCKHT1946

SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce

LOGGED BY: JOWI

CHECKED: PRMM

START DATE: 03/12/2025

FINISH DATE: 05/12/2025

CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *4.50m:* Completely weathered, brownish orange mottled grey GREYWACKE. Extremely weak, highly fractured, very closely to closely spaced defects. Soil Description: SILT, some clay and sand. Very stiff, moist, low plasticity. Sand, fine. *5.25 - 6. 00m* Relic rock fabric present.			HQTT	100			5.5									
	6.00 - 6. 75m Becoming clayey SILT, some sand, trace gravel. Very stiff, moist, low plasticity. Sand, fine; Gravel, greywacke, angular, 5-10mm.			HQTT	80		144	6.0									
	6. 75m: CORE LOSS. Likely drilling induced.			HQTT	100			6.5						04/12/2026 AM			
	7. 15m: Completely weathered, brownish orange mottled grey GREYWACKE. Extremely weak, highly fractured, very closely to closely spaced defects. Soil Description: Clayey SILT, some sand and trace gravel. Very stiff, moist, low plasticity. Sand, fine; Gravel, greywacke, angular, 5-10mm.			HQTT	33		143	7.0									
	7. 50m: CORE LOSS.			HQTT	0			7.5						05/12/2026 AM			
	9. 00m: Completely weathered, brownish orange mottled grey GREYWACKE. Extremely weak, highly fractured, very closely to closely spaced defects. Soil Description: Clayey SILT, some sand and trace gravel. Very stiff, moist, low plasticity. Sand, fine; Gravel, greywacke, angular, 5-10mm.			HQTT	0		142	8.0									
	9. 20m: CORE LOSS. Likely drilling induced.			HQTT	13			8.5									
	9. 75m: Completely weathered, brownish orange mottled grey GREYWACKE. Extremely weak, highly fractured, very closely to closely spaced defects. Soil Description: Silty SAND, some			HQTT	53		141	9.0									
								9.5									

COMMENTS: Groundwater reading measured at the start and each of each day. Dual Nested Piezometer installed in borehole 8/12/2025. Raised PVC cover installed.

Hole Depth 35m

Scale 1:25

Rev.: A

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

BOREHOLE No.: HUN25-3

SHEET: 3 OF 7

Tonkin+Taylor

PROJECT: Project Mahitahi Geotech
JOB No.: 1099889.1000
LOCATION: In clearing on E side of access track.

CO-ORDINATES: (EDENTM2000) 776624.30 mN 421468.90 mE
DIRECTION: 0°
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 150.00m
R.L. COLLAR:
DATUM: AUCKHT1946
SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: JOWI
CHECKED: PRMM
START DATE: 03/12/2025
FINISH DATE: 05/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	clay. Loosely packed, moist, non plastic. Sand, fine to medium.																
	10.00m: Completely weathered, orange and light grey GREYWACKE. Extremely weak, highly fractured, very closely to closely spaced defects. Soil Description: Silty CLAY. Very stiff, dry to moist, moderate plasticity.			HQTT	53												
	10.15m: CORE LOSS. Likely drilling induced.			HQTT	33		139	10.5									Box 3.60-10.50m
	11.00m: Completely weathered, orange and light grey GREYWACKE. Extremely weak, highly fractured, very closely to closely spaced defects. Soil Description: Silty CLAY. Very stiff, dry to moist, moderate plasticity.							11.0									
	11.25m: CORE LOSS.			HQTT	0			11.5									
				HQTT	0		138	12.0									
	12.75m: Completely weathered, light grey and orange mottled GREYWACKE. Extremely weak, highly fractured, very closely to closely spaced defects. Soil Description: Sandy SILT, some clay and gravel. Loose, moist, low plasticity. Sand, fine to medium; Gravel, fine, angular, greywacke.							12.5					*12.75m:* Switched to using extended catcher.				
	12.95m: Highly Weathered, light brown with black and orange staining on faces GREYWACKE. Very weak, highly fractured, very closely to closely spaced defects. Recovered as: fine to coarse, angular GRAVEL.			HQTT	100		137	13.0					*12.95m:* J, 70°, PL, SM, N, Fe *13.00m:* J, 20°, PL, SM, N, Fe				
													13.20m: J, 15°, PL, SM, N, Fe				
								13.5					*13.40m:* J, 60°, PL, SM, N, Fe				
				HQTT	100		136	14.0				0	*13.90m:* J, 20°, PL, SM, N, Fe *14.10m:* J, 20°, PL, SM, N, Fe				
													14.30m: J, 70°, PL, SM, N, Fe				
								14.5									
	14.60m: CORE LOSS. Loss considered drilling-induced; interval likely comprised highly fractured material (based on adjacent recovered core).			HQTT	0							0					

COMMENTS: Groundwater reading measured at the start and each of each day. Dual Nested Piezometer installed in borehole 8/12/2025. Raised PVC cover installed.

Hole Depth 35m

Scale 1:25

Rev.: A

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-3

SHEET: 4 OF 7

PROJECT: Project Mahitahi Geotech

JOB No.: 1099889.1000

LOCATION: In clearing on E side of access track.

CO-ORDINATES: (EDENTM2000) 776624.30 mN 421468.90 mE

DIRECTION: 0°

ANGLE FROM HORIZ.: -90°

R.L. GROUND: 150.00m

R.L. COLLAR:

DATUM: AUCKHT1946

SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce

LOGGED BY: JOWI

CHECKED: PRMM

START DATE: 03/12/2025

FINISH DATE: 05/12/2025

CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *14.60m:* CORE LOSS. Loss considered drilling-induced; interval likely comprised highly fractured material (based on adjacent recovered core).			HQTT	0			15.0				0					
	15.20m: Highly weathered, light brown with black and orange staining on faces GREYWACKE. Very weak, highly fractured, very closely spaced defects. Recovered as: fine-coarse GRAVEL core stones of moderately weathered, greywacke.			HQTT	100		134	15.5				0					Box 10.50-15.80m
								16.0				0					
								16.5				0	*16.60m:* J, 90°, PL, SM, N, Fe				
													16.80m: J, 30°, PL, SM, N, Fe				
				HQTT	100		133	17.0				0	*17.20m:* J, 40°, PL, SM, N, Fe *17.25m:* J, 45°, PL, SM, N, Fe				
								17.5					*17.60m:* J, 30°, PL, SM, N, Fe				
													17.80m: J, 60°, PL, SM, N, Fe				
							132	18.0				0	*18.30m:* J, 20°, PL, R, N, Fe				
								18.5					*18.50m:* J, 70°, PL, R, N, Fe				Box 15.80-18.80m
				HQTT	100							0	*18.70m:* J, 40°, PL, R, N, Fe				
							131	19.0					*19.20m:* J, 50°, PL, R, Fe				
								19.5									
				HQTT	100							0					

COMMENTS: Groundwater reading measured at the start and each of each day. Dual Nested Piezometer installed in borehole 8/12/2025. Raised PVC cover installed.

Hole Depth 35m

Scale 1:25

Rev.: A

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-3

SHEET: 5 OF 7

PROJECT: Project Mahitahi Geotech
JOB No.: 1099889.1000
LOCATION: In clearing on E side of access track.

CO-ORDINATES: (EDENTM2000) 776624.30 mN 421468.90 mE
DIRECTION: 0°
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 150.00m
R.L. COLLAR:
DATUM: AUCKHT1946
SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: JOWI
CHECKED: PRMM
START DATE: 03/12/2025
FINISH DATE: 05/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	*20.00m:* Moderately weathered, grey with brown and orange staining on faces GREYWACKE. Moderately strong, closely spaced, steep to very steep defects.			HQTT	82			20.5				0	*20.00m:* Removed extended catcher due to rock strength. *20.20m:* J, 40°, UN, N, Fe *20.30m:* BZ *20.30-20.50m:* J, 90°, UN, N, Fe *20.50-20.70m:* BZ				
	20.85m: CORE LOSS. Loss considered drilling-induced; interval likely comprised highly fractured material (based on adjacent recovered core).						129	21.0									
	21.25m: Moderately weathered, grey with brown and orange staining on faces and around joints GREYWACKE. Moderately strong, closely spaced, steep to very steep joints. *22.00 - 22.40m* Highly fractured, closely spaced, steep to very steep defects.			HQTT	69			21.5				0	*21.40m:* J, 10°, UN, R, Fe *21.50m:* J, 10°, UN, R, Fe *21.80m:* J, 10°, UN, R, Fe *22.00m:* J, 40°, UN, R, Fe				
							128	22.0									
								22.5					*22.60m:* J, 5°, ST, SM, N *22.65m:* BZ				
								23.0				25	*23.00-23.10m:* BZ				
	23.50 - 23.60m Highly fractured. Recovered as sandy, coarse GRAVEL.						127	23.5									
	23.60m: CORE LOSS. Loss considered drilling-induced; interval likely comprised highly fractured material (based on adjacent recovered core).												*23.80m:* , BZ				
	24.00m: Moderately weathered, brown grey GREYWACKE. Moderately strong, sub-horizontal to sub- vertical, very closely to closely spaced joints. *24.40 - 24.50m* Highly fractured, closely spaced, gently to steeply inclined.			HQTT	33		126	24.0					*24.00m:* J, 80°, UN, MN, Fe *24.20m:* BZ				
								24.5				15					
	24.50m: CORE LOSS. Loss considered drilling-induced; interval likely comprised highly fractured material (based on adjacent recovered core).																

Box 18.80-22.45m

COMMENTS: Groundwater reading measured at the start and each of each day. Dual Nested Piezometer installed in borehole 8/12/2025. Raised PVC cover installed.

Hole Depth 35m

Scale 1:25

Rev.: A

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-3

SHEET: 6 OF 7

PROJECT: Project Mahitahi Geotech
JOB No.: 1099889.1000
LOCATION: In clearing on E side of access track.

CO-ORDINATES: (EDENTM2000) 776624.30 mN 421468.90 mE
DIRECTION: 0°
ANGLE FROM HORIZ.: -90°

R.L. GROUND: 150.00m
R.L. COLLAR:
DATUM: AUCKHT1946
SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce
LOGGED BY: JOWI
CHECKED: PRMM
START DATE: 03/12/2025
FINISH DATE: 05/12/2025
CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION (SOIL: Classification, colour, consistency / density, moisture, plasticity; ROCK: Weathering, colour, fabric, name, strength, cementation)	Rock Weathering	Rock Strength	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%)	Casing	Installation	Core Box No
Waipapa Group	[CONT] *24.50m:* CORE LOSS. Loss considered drilling-induced; interval likely comprised highly fractured material (based on adjacent recovered core).			HQTT	33			25.5				15					
	25.50m: Moderately weathered, brown grey GREYWACKE. Moderately strong, very closely to closely spaced. Recovered as fine to coarse GRAVEL.																
	25.80m: CORE LOSS. Loss considered drilling-induced; interval likely comprised highly fractured material (based on adjacent recovered core). *25.81 - 26.50m* Driller's note: due to drillbit grinding away on gravels due to hard rock above.			HQTT	30		124	26.0				0					
				HQTT	0			26.5				0					
	27.20m: Moderately weathered, brown grey GREYWACKE. Moderately strong, very closely to closely spaced. Recovered as fine to coarse GRAVEL.			HQTT	33		123	27.0				0					
	27.30m: CORE LOSS.							27.5				0					
	27.50m: Moderately weathered, brown grey GREYWACKE. Moderately strong, very closely to closely spaced. Recovered as fine to coarse GRAVEL.			HQTT	25		122	28.0				0					
	27.70m: CORE LOSS.																
	28.10m: Moderately weathered, brown grey GREYWACKE. Moderately strong, sub-horizontal to sub- vertical, very closely to closely spaced joints. Recovered as fine to coarse GRAVEL.			HQTT	100			28.5				0	*28.20m:* J, 20°, UN, MN, Fe *28.50m:* BZ				Box 22.45-28.60m
	28.60m: Moderately weathered, brown grey GREYWACKE. Moderately strong, closely spaced joints, joints iron stained.						121	29.0				20	*28.70m:* J, 10° *28.80m:* J, 40°, UN, N, Fe *29.10m:* J, 70°, UN, N, Fe *29.20m:* J, 60°, UN, R, MN, Fe				
	29.30m: CORE LOSS. Loss considered drilling-induced. Interval likely comprised highly fractured material (based on adjacent recovered core).			HQTT	57			29.5					*29.30m:* BZ				

COMMENTS: Groundwater reading measured at the start and each of each day. Dual Nested Piezometer installed in borehole 8/12/2025. Raised PVC cover installed.

Hole Depth 35m

Scale 1:25

Rev.: A

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

BOREHOLE LOG

Tonkin+Taylor

BOREHOLE No.: HUN25-3

SHEET: 7 OF 7

PROJECT: Project Mahitahi Geotech

JOB No.: 1099889.1000

LOCATION: In clearing on E side of access track.

CO-ORDINATES: (EDENTM2000) 776624.30 mN 421468.90 mE

DIRECTION: 0°

ANGLE FROM HORIZ.: -90°

R.L. GROUND: 150.00m

R.L. COLLAR:

DATUM: AUCKHT1946

SURVEY: Total Station\Surveyed

DRILLED BY: Drillforce

LOGGED BY: JOWI

CHECKED: PRMM

START DATE: 03/12/2025

FINISH DATE: 05/12/2025

CONTRACTOR: Drillforce Ltd

GEOLOGICAL UNIT	MATERIAL DESCRIPTION SOIL: Classification, colour, consistency / density, moisture, plasticity ROCK: Weathering, colour, fabric, name, strength, cementation	Rock Weathering (UW SW MW HW DW RS)	Rock Strength (VS+ S MS W VW EW)	Sampling Method	Core Recovery (%)	Testing	RL (m)	Depth (m)	Graphic Log	ROCK MASS DISCONTINUITIES: Defect Log	Fracture Spacing (mm) (2000 600 200 60 20)	RQD (%)	Description & Additional Observations	Water Level / Fluid Loss (%) (25 50 75)	Casing	Installation	Core Box No
Waipapa Group	*30.00m:* Moderately weathered, brown grey GREYWACKE. Moderately strong, sub-horizontal to sub- vertical, very closely to closely spaced. Recovered as fine to coarse GRAVEL.												*30.20m:* J, 60°, UN, R, N, Fe				
	30.20m: Moderately weathered; grey with brown on faces GREYWACKE. Moderately Strong, very closely to closely spaced joints. Very closely spaced microfractures present in rock mass.			HQTT	93			30.5				30	*30.65m:* J, 10°, UN, R, N, Fe *30.70m:* J, 15°, UN, R, Fe *30.80m:* BZ *30.90m:* BZ				
	31.50 - 32.50m Gently to moderately inclined, very tight spaced joints. Very closely spaced microfractures present in rock mass.						119	31.0					*31.10m:* J, 15°, ST, R *31.40m:* BZ				
	32.50m: CORE LOSS. Loss considered drilling-induced. Interval likely comprised highly fractured material (based on adjacent recovered core).			HQTT	67		118	31.5 32.0				0	*31.60m:* J, 20°, SM, VN, Fe *31.70m:* BZ *31.90m:* BZ *32.20m:* BZ *32.40m:* BZ, gravels				Box 28.60-32.00m
	33.00m: Slightly to moderately weathered, grey brown GREYWACKE. Moderately Strong, highly fractured, very closely to closely spaced, gently to steeply inclined joints. Very closely spaced microfractures present in rock mass. Iron staining along fractures.			HQTT	67		117	32.5 33.0				0	*33.50m:* J, 40°, SM, N, Fe				
	34.00m: CORE LOSS. Loss considered drilling-induced; interval likely comprised highly fractured material (based on adjacent recovered core).						116	33.5 34.0									
	34.50m: Slightly to moderately weathered, grey brown GREYWACKE. Moderately Strong, highly fractured, very closely to closely spaced, gently to steeply inclined joints. Very closely spaced microfractures present in rock mass. Iron staining along fractures.			HQTT	100			34.5				0					Box 32.00-35.00m
	35m: EOBH. Target depth																

COMMENTS: Groundwater reading measured at the start and each of each day. Dual Nested Piezometer installed in borehole 8/12/2025. Raised PVC cover installed.

Hole Depth 35m

Scale 1:25

Rev.: A

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

CORE PHOTOS

BOREHOLE No.: **HUN25-3**

Hole Location: In clearing on E side of access track.

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776624.30 mN (EDENTM2000) 421468.90 mE R.L.: 150.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig METHOD: Rotary cored	HOLE STARTED: 03/12/2025 HOLE FINISHED: 05/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: JOWI CHECKED: PRMM

0.00-3.60m

3.60-10.50m

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

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CORE PHOTOS

BOREHOLE No.: **HUN25-3**

Hole Location: In clearing on E side of access track.

PROJECT: Project Mahitahi Geotech		LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: (EDENTM2000)	776624.30 mN 421468.90 mE	DRILL TYPE: Rotary Rig METHOD: Rotary cored	HOLE STARTED: 03/12/2025 HOLE FINISHED: 05/12/2025 DRILLED BY: Drillforce Ltd
R.L.:	150.00m		
DATUM:	AUCKHT1946		LOGGED BY: JOWI CHECKED: PRMM

10.50-15.80m

15.80-18.80m

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

CORE PHOTOS

BOREHOLE No.: **HUN25-3**

Hole Location: In clearing on E side of access track.

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: 776624.30 mN (EDENTM2000) 421468.90 mE R.L.: 150.00m DATUM: AUCKHT1946	DRILL TYPE: Rotary Rig METHOD: Rotary cored	HOLE STARTED: 03/12/2025 HOLE FINISHED: 05/12/2025 DRILLED BY: Drillforce Ltd LOGGED BY: JOWI CHECKED: PRMM

18.80-22.45m

22.45-28.60m

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

Tonkin+Taylor

CORE PHOTOS

BOREHOLE No.: **HUN25-3**

Hole Location: In clearing on E side of access track.

PROJECT: Project Mahitahi Geotech		LOCATION: 165 Middleton Road, Hunua	JOB No.: 1099889.1000
CO-ORDINATES: (EDENTM2000)	776624.30 mN 421468.90 mE	DRILL TYPE: Rotary Rig METHOD: Rotary cored	HOLE STARTED: 03/12/2025 HOLE FINISHED: 05/12/2025 DRILLED BY: Drillforce Ltd
R.L.:	150.00m		
DATUM:	AUCKHT1946		LOGGED BY: JOWI CHECKED: PRMM

28.60-32.00m

32.00-35.00m

TTNZ_20260116 - GeneralLog - 29/01/2026 1:21:05 pm - Produced with Core-GS by GeRoc

EXCAVATION LOG

Excavation Id.: **HUN25-TP1**

Hole Location: To the east of Mangapu Stream.

SHEET: 1 OF 1

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua		JOB No.: 1099889.1000
CO-ORDINATES: (EDENTM2000) 776695 mN 421519 mE	METHOD: Trial pit/trench	EXCAV. STARTED:	02/12/2025
	EQUIPMENT: Kobelco Excavator SK135SR	EXCAV. FINISHED:	02/12/2025
R.L.: 142m	OPERATOR: Winstones	LOGGED BY:	ANDS
DATUM: AUCKHT1946	DIMENSIONS: 3m by 2m	CHECKED BY:	PRMM

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			98/25 kPa Insitu		141 1		*0.00m:* Clayey SILT; brownish orange. Stiff, moist, non-plastic to low plasticity. [WAIPAPA GROUP].	RS	M	St	VS 12 S 25 F 50 St 100 VSt 200 H		Waipapa Group
			115/20 kPa Insitu				*0.50m:* CLAY, some silt; orange mottled grey. Stiff to very stiff, moist, medium plasticity.			St-VSt			
			92/33 kPa Insitu		140 2		*1.00m:* Completely weathered, orange brown streaked grey, GREYWACKE. Extremely weak, iron stained banded. Soil description: clayey SILT. Stiff, moist, low to medium plasticity, mottled reddish brown and black faces. Very closely spaced defects.	CW		St			
					139 3					EW			
					138 4								
					137 5		5m: Target depth						

SKETCH / PHOTO:

0.0 - 5.0m:

COMMENTS: Test pit dry upon completion

Hole Depth 5m

Scale 1:46

Rev.: A

TTNZ_20251211 - ExcavationLog - 24/03/2026 7:51:20 am - Produced with Core-GS by GeRoc

EXCAVATION LOG

Excavation Id.: **HUN25-TP2**

Hole Location: South of TP01

SHEET: 1 OF 1

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua		JOB No.: 1099889.1000
CO-ORDINATES: (EDENTM2000) 776693 mN 421496 mE	METHOD: Trial pit/trench	EXCAV. STARTED:	02/12/2025
	EQUIPMENT: Kobelco Excavator SK135SR	EXCAV. FINISHED:	02/12/2025
R.L.: 141m	OPERATOR: Winstones	LOGGED BY:	ANDS
DATUM: AUCKHT1946	DIMENSIONS: 3m by 2m	CHECKED BY:	PRMM

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		
			57/20 kPa Insitu				TS	*0.00m:* Organics SILT; dark brown. Firm, moist, non-plastic. [TOP SOIL].	RS	M	F			TSoil
								0.30m: Clayey SILT; orange. Very stiff, moist, low plasticity. [WAIPAPA GROUP].			VSt			
			107/33 kPa Insitu		140	1		*1.00m:* Completely weathered, orange brown, mottled reddish brown and black, GREYWACKE. Extremely weak, iron stained. Soil description: clayey SILT. Very stiff, moist, low to medium plasticity.	CW					
			164/33 kPa Insitu		139	2					EW			Waipapa Group
					138	3		*3.00m:* Highly weathered, orange brown, GREYWACKE. Extremely weak to very weak, iron stained. Mottled reddish brown and black on faces. Very closely spaced defects.	HW		EW-VW			
		02/12/2025			137	4								
					136	5		5m: Target depth						

SKETCH / PHOTO:

0.0 - 5.0m:

COMMENTS: Groundwater noted on side walls at 4.8 m depth.

Hole Depth 5m

Scale 1:46

Rev.: A

TTNZ_20251211 - ExcavationLog - 24/03/2026 7:51:22 am - Produced with Core-GS by GeRoc

EXCAVATION LOG

Excavation Id.: **HUN25-TP3**

Hole Location: South of TP02

SHEET: 1 OF 1

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua		JOB No.: 1099889.1000
CO-ORDINATES: (EDENTM2000) 776689 mN 421482 mE	METHOD: Trial pit/trench	EXCAV. STARTED:	02/12/2025
	EQUIPMENT: Kobelco Excavator SK135SR	EXCAV. FINISHED:	02/12/2025
R.L.: 143m	OPERATOR: Winstones	LOGGED BY:	ANDS
DATUM: AUCKHT1946	DIMENSIONS: 3m by 2m	CHECKED BY:	PRMM

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		
			75/20 kPa Insitu			0.5	TS	*0.00m:* Organics SILT; dark brown. Firm, moist, non-plastic. [TOP SOIL].	RS	M	F			TSoil
								0.30m: Silty CLAY; orange brown . Stiff, moist, low plasticity. [WAIPAPA GROUP].			St			
			98/13 kPa Insitu		142	1.0		*1.00m:* Highly to completely weathered, orange brown, GREYWACKE. Extremely weak, iron stained. Mottled reddish brown and black on faces. Very closely spaced defects.	HW-CW		VSt			Waipapa Group
			148/16 kPa Insitu		141	2.0					EW			
					140	3.0								
					139	4.0								
						4.5		4.5m: Machine limit						

SKETCH / PHOTO:

0.0 - 4.5m:

COMMENTS: Refusal due to confined working area that reduced excavator arm reach.

Hole Depth 4.5m

Scale 1:42

Rev.: A

TTNZ_20251211 - ExcavationLog - 24/03/2026 7:51:25 am - Produced with Core-GS by GeRoc

EXCAVATION LOG

Tonkin+Taylor

Excavation Id.: **HUN25-TP4**

Hole Location: South of TP03

SHEET: 1 OF 1

PROJECT: Project Mahitahi Geotech	LOCATION: 165 Middleton Road, Hunua		JOB No.: 1099889.1000
CO-ORDINATES: (EDENTM2000) 776683 mN 421470 mE	METHOD: Trial pit/trench	EXCAV. STARTED:	02/12/2025
	EQUIPMENT: Kobelco Excavator SK135SR	EXCAV. FINISHED:	02/12/2025
R.L.: 144m	OPERATOR: Winstones	LOGGED BY:	ANDS
DATUM: AUCKHT1946	DIMENSIONS: 3m by 2m	CHECKED BY:	PRMM

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		
			● 102/25 kPa Insitu			0.5	TS	*0.00m:* Organics SILT; dark brown. Firm, non-plastic. [TOP SOIL].	RS		F			TSoil
								0.30m: Clayey SILT; orange brown streaked grey. Very stiff to hard, moist, low plasticity. [WAIPAPA GROUP].		M	VSt-H			
			● >230 kPa Insitu		143	1.0		*1.00m:* Trace boulders. Boulders, up to 200mm, unweathered to moderately weathered, grey, greywacke.						
			● >230 kPa Insitu			1.5								
			● 123/16 kPa Insitu		142	2.0		*2.00m:* Completely weathered, orange brown, mottled reddish brown and black, GREYWACKE. Extremely weak, iron stained. Very closely spaced defects. Soil description: clayey SILT. Very stiff, moist, low to medium plasticity.	CW		EW			Waipapa Group
						2.5								
					141	3.0								
						3.5								
					140	4.0								
								4m: Machine limit						

SKETCH / PHOTO:

0.0 - 4.0m:

COMMENTS: Refusal due to confined working area that reduced excavator arm reach.

Hole Depth 4m

Scale 1:38

Rev.: A

TTNZ_20251211 - ExcavationLog - 24/03/2026 7:51:27 am - Produced with Core-GS by GeRoc

Appendix E Kinematic Analyses

- Stereograph Summary Plots for Defect Data
- DIPs Results Summary Tables

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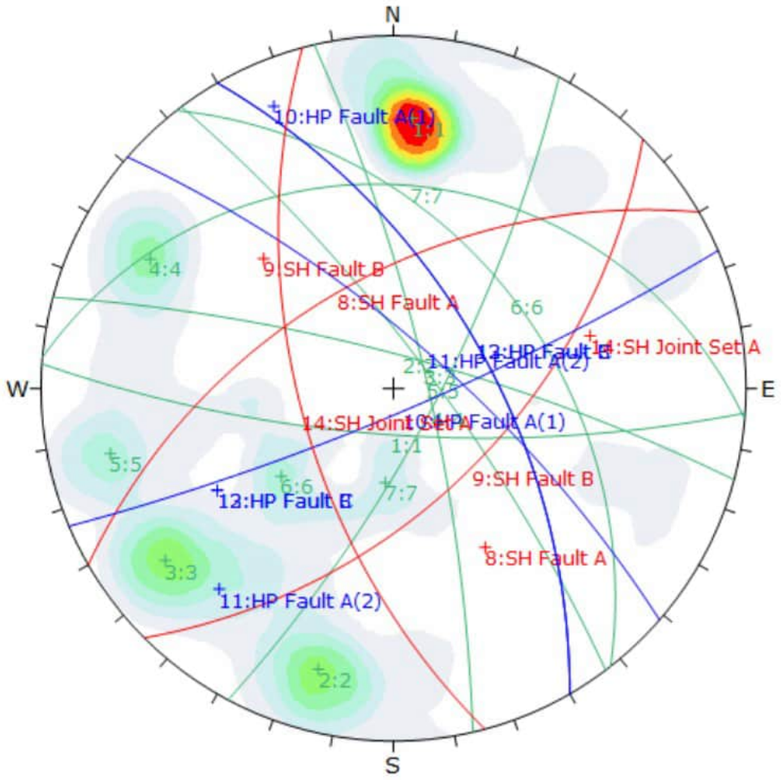
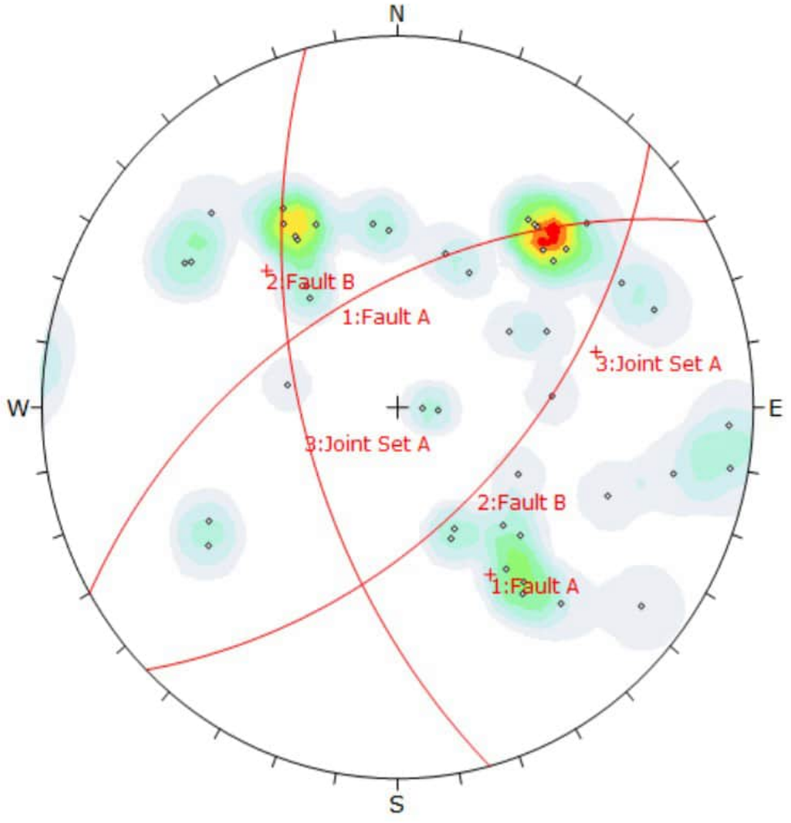


Color	Density Concentrations
	0.00 - 1.00
	1.00 - 2.00
	2.00 - 3.00
	3.00 - 4.00
	4.00 - 5.00
	5.00 - 6.00
	6.00 - 7.00
	7.00 - 8.00
	8.00 - 9.00
	9.00 - 10.00

Contour Data	Pole Vectors
Maximum Density	9.98%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Plot Mode	Pole Vectors
Vector Count	1158 (1158 Entries)
Hemisphere	Lower
Projection	Equal Angle

ALL DEFECT DATA



SYMONDS HILL DATA

Symbol	Feature
◇	Pole Vectors

Color	Density Concentrations
	0.00 - 1.30
	1.30 - 2.60
	2.60 - 3.90
	3.90 - 5.20
	5.20 - 6.50
	6.50 - 7.80
	7.80 - 9.10
	9.10 - 10.40
	10.40 - 11.70
	11.70 - 13.00

Contour Data	Pole Vectors
Maximum Density	12.70%
Contour Distribution	Fisher
Counting Circle Size	1.0%

Plot Mode	Pole Vectors
Vector Count	45 (45 Entries)
Hemisphere	Lower
Projection	Equal Angle

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NOTES:
1) THE COMBINED SYMONDS HILL AND HUNUA PIT DEFECT DATA IS SHOWN IN THE LEFT STEREOGRAPH
2) THE 2025 SYMONDS HILL DEFECT DATA COLLECTED IN 2025 IS SHOWN IN THE RIGHT STEREOGRAPH

REV	DESCRIPTION	GIS	CHK	DATE

LOCATION PLAN

APPROVED DATE

PROJECT No. 1099889.1000

DESIGNED	TAKI
DRAWN	TAKI
CHECKED	PRMM

CLIENT **FLETCHER CONCRETE AND INFRASTRUCTURE LTD**

PROJECT **PROJECT MAHITAHI**

TITLE STEREOGRAPH SUMMARY PLOTS FOR DEFECT DATA

SCALE (A3) FIG No. REV 1

Percentage of critical sections for planar failures in Symonds Hill Pit

Slope Orientation	Analysis Case					
	80° slope, 45° friction angle ***UW/SW - 15m bench***	*70° slope, 45° friction angle* ***UW/SW - 15m bench***	*60° slope, 40° friction angle* ***MW - 15m bench***	*50° slope, 35° friction angle* ***HW - 15m bench***	*43° slope, 45° friction angle* ***UW/SW - full slope***	*38° slope, 40° friction angle* ***MW Full - full slope***
000/360	18	11	7	4	0	0
030	16	4	4	0	0	0
060	4	4	0	2	0	0
090	24	7	4	2	0	0
120	31	18	7	7	0	0
150	33	22	18	7	0	0
180	47	36	18	7	0	0
210	47	31	13	7	0	0
240	40	24	13	4	0	0
270	47	20	11	7	0	0
300	24	18	16	9	0	0
330	18	16	13	9	0	0

Percentage of critical sections for wedge failures in Symonds Hill Pit

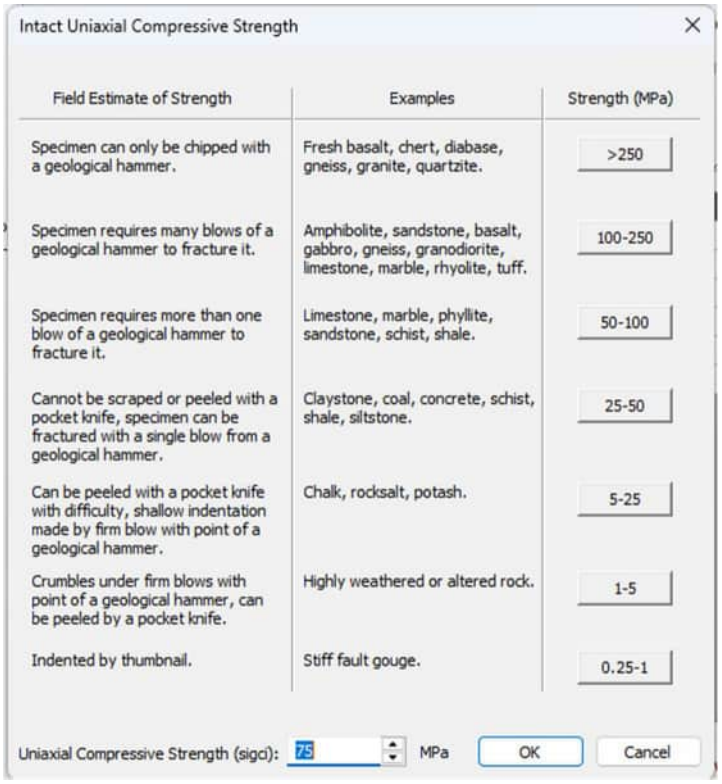
Slope Orientation	Analysis Case					
	80° slope, 45° friction angle ***UW/SW - 15m bench***	*70° slope, 45° friction angle* ***UW/SW - 15m bench***	*60° slope, 40° friction angle* ***MW - 15m bench***	*50° slope, 35° friction angle* ***HW - 15m bench***	*43° slope, 45° friction angle* ***UW/SW - full slope***	*38° slope, 40° friction angle* ***MW Full - full slope***
000/360	6	4	5	5	0	0
030	6	4	4	3	0	0
060	9	8	0	0	0	0
090	4	3	2	1	0	0
120	22	7	6	3	0	0
150	34	29	20	7	0	0
180	29	26	27	11	0	0
210	37	30	23	14	0	0
240	38	26	19	10	0	0
270	22	15	14	10	0	0
300	18	13	14	10	0	0
330	19	15	12	8	0	0

Percentage of critical sections for toppling failures in Symonds Hill Pit

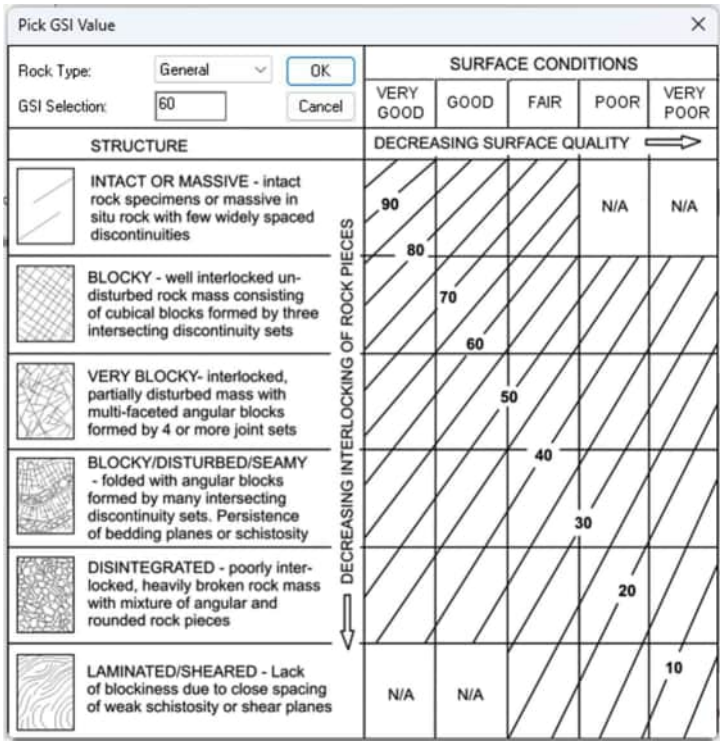
Slope Orientation	Analysis Case					
	80° slope, 45° friction angle ***UW/SW - 15m bench***	*70° slope, 45° friction angle* ***UW/SW - 15m bench***	*60° slope, 40° friction angle* ***MW - 15m bench***	*50° slope, 35° friction angle* ***HW - 15m bench***	*43° slope, 45° friction angle* ***UW/SW - full slope***	*38° slope, 40° friction angle* ***MW Full - full slope***
000/360	0	0	0	0	0	0
030	16	2	2	0	0	0
060	13	7	7	0	0	0
090	9	9	9	7	0	0
120	11	9	7	7	0	0
150	9	2	0	0	0	0
180	0	0	0	0	0	0
210	0	0	0	0	0	0
240	4	2	0	0	0	0
270	0	0	0	0	0	0
300	7	7	4	0	0	0
330	13	2	2	0	0	0

Appendix F SLIDE2 Hoek Brown Parameter Selection

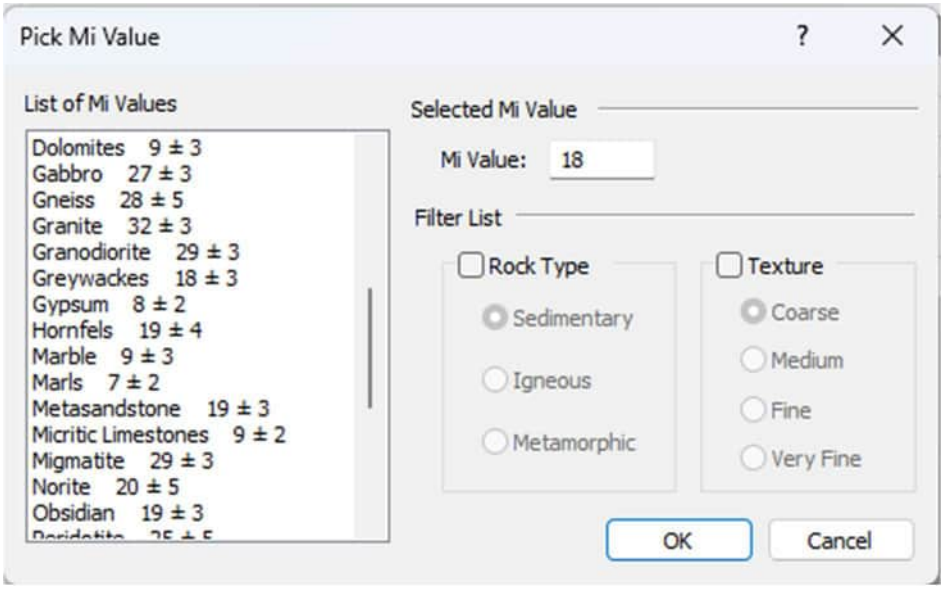
UCS – Slightly to Unweathered Greywacke



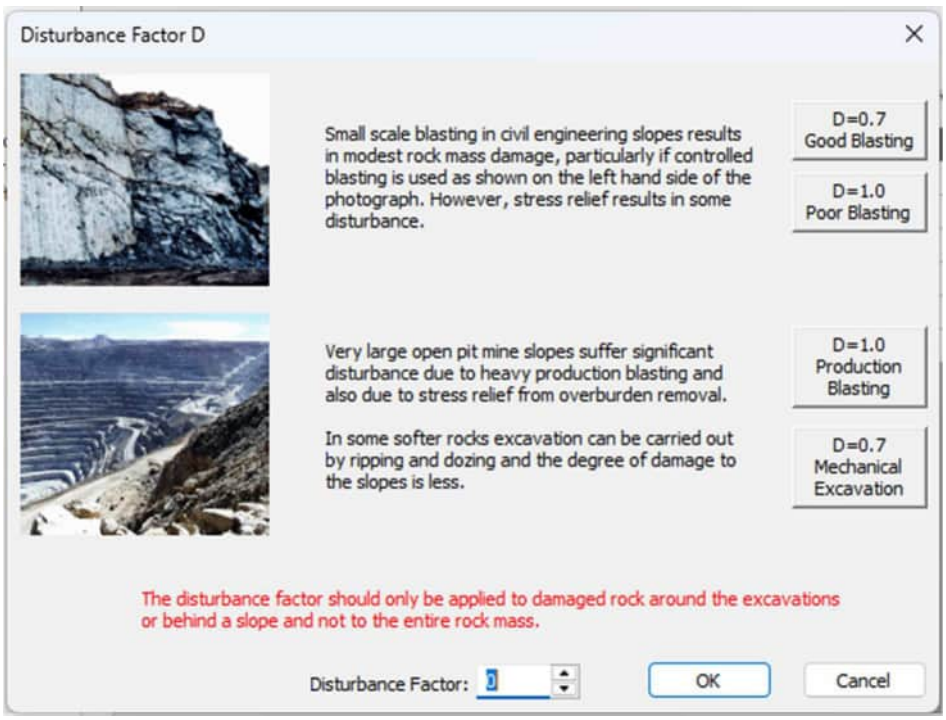
GSI – Slightly to unweathered greywacke



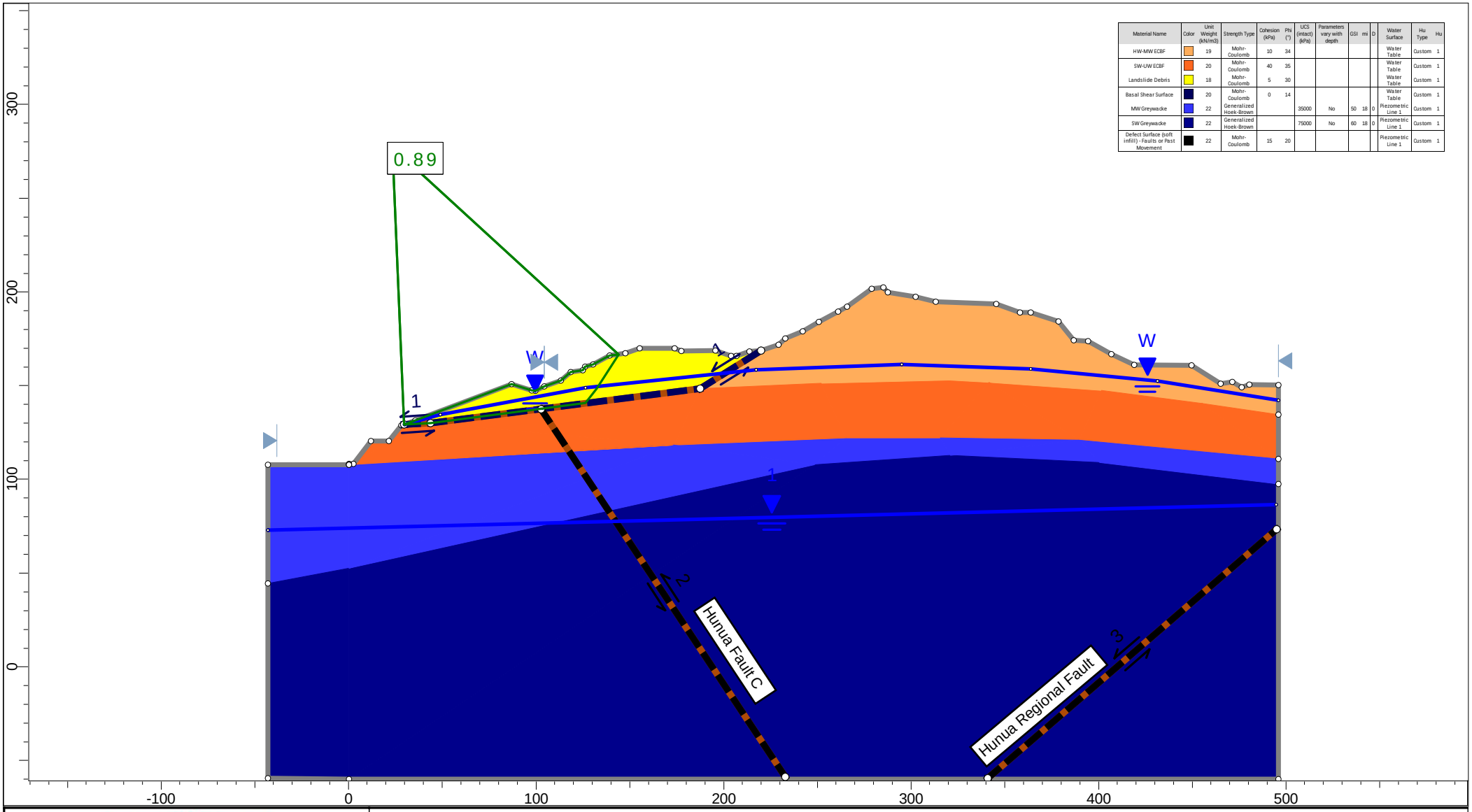
Mi – Slightly to unweathered greywacke



D – Slightly to unweathered greywacke



Appendix G SLIDE2 Outputs



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Water Table	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Water Table	Custom	1
Landslide Debris		18	Mohr-Coulomb	5	30						Water Table	Custom	1
Basal Shear Surface		20	Mohr-Coulomb	0	14						Water Table	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1

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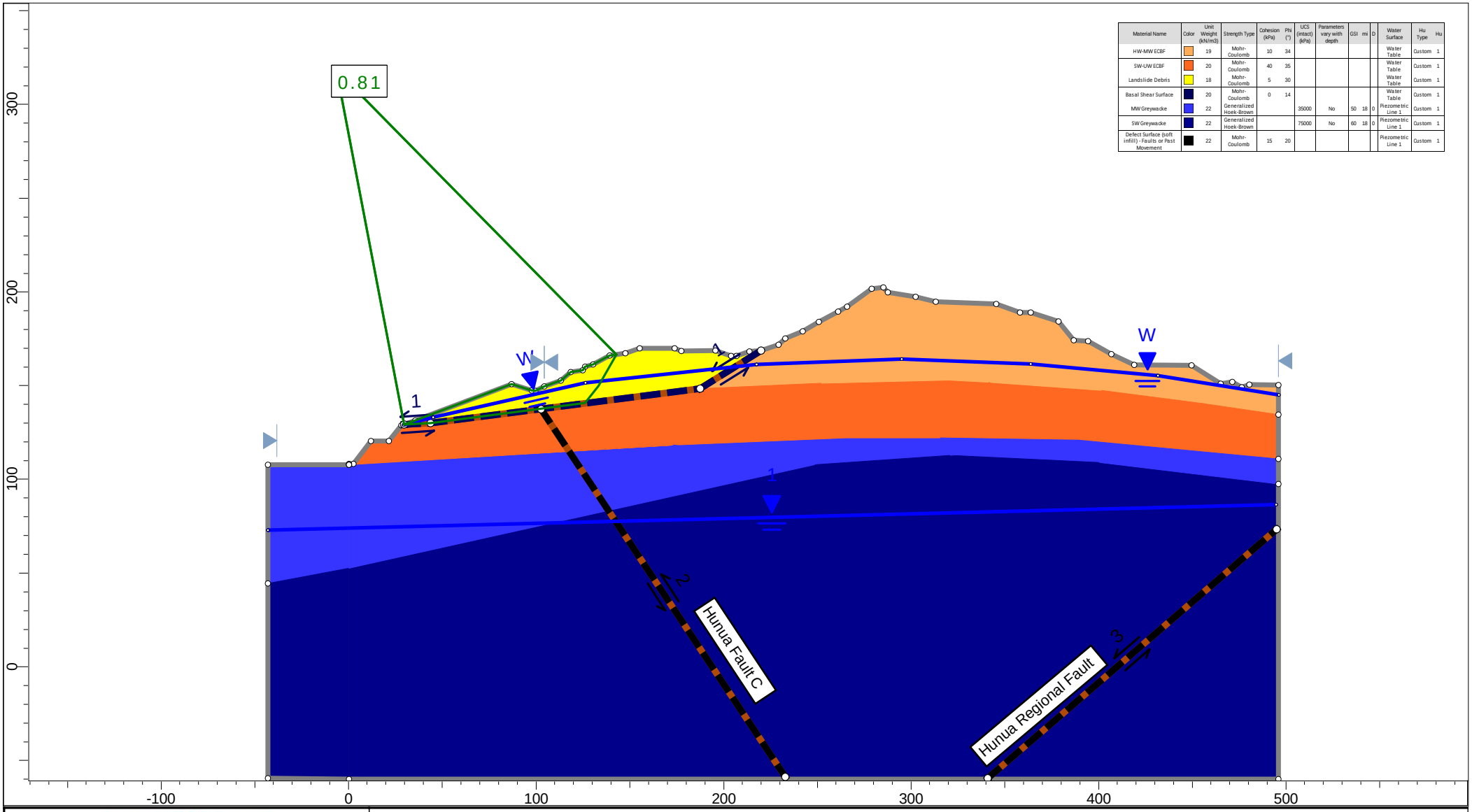
Project	Project Mahitahi		
Group	Section 2	Scenario	Stage 2 - Static
		Company T+T	*Date:* 28/01/2026
File Name: Section2 Rv2.slmd		*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Water Table	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Water Table	Custom	1
Landslide Debris		18	Mohr-Coulomb	5	30						Water Table	Custom	1
Basal Shear Surface		20	Mohr-Coulomb	0	14						Water Table	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1

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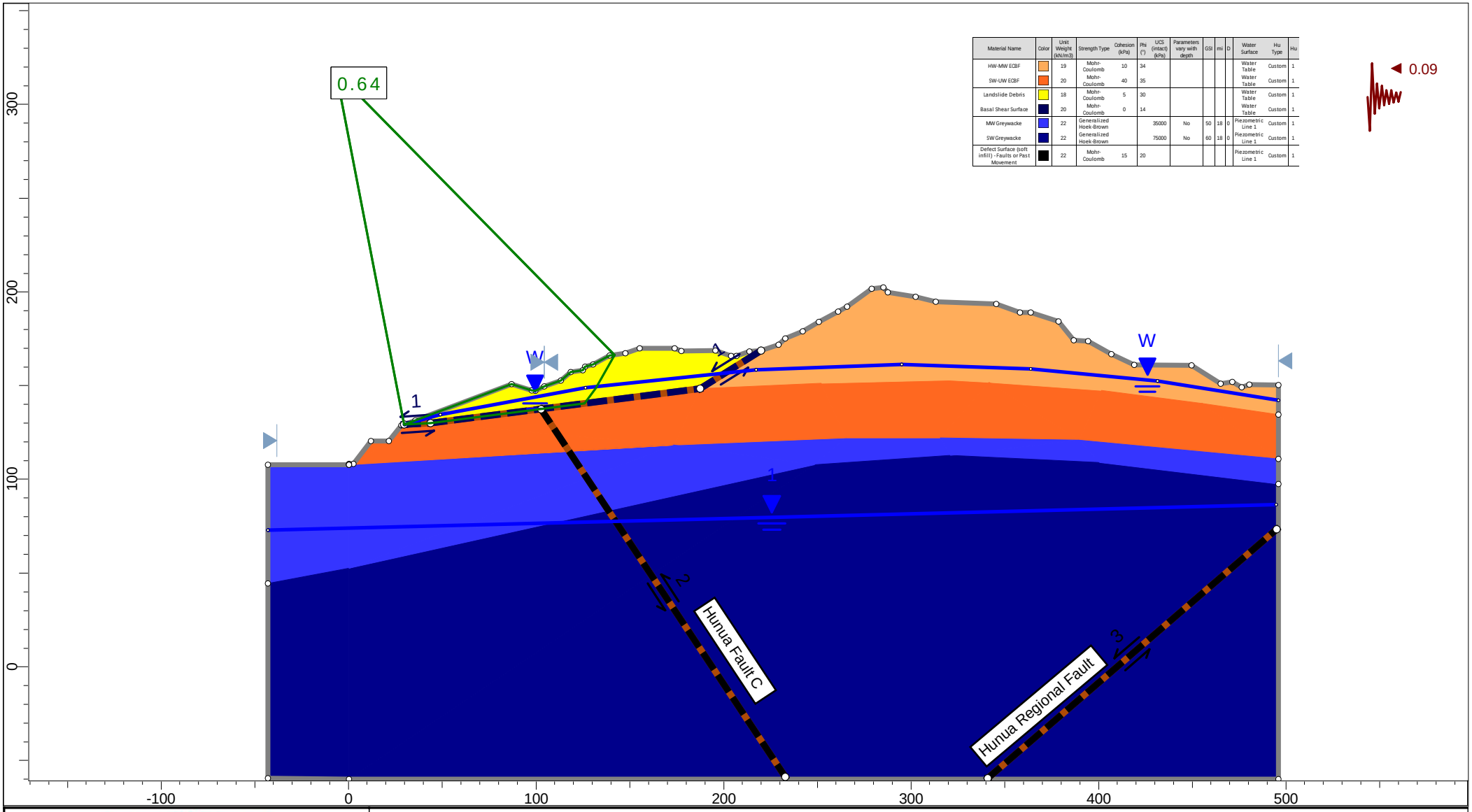
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Group	Section 2	Scenario	Stage 2 - EGWT
		Company T+T	*Date:* 28/01/2026
File Name: Section2 Rv2.slmd		*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Water Table	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Water Table	Custom	1
Landslide Debris		18	Mohr-Coulomb	5	30						Water Table	Custom	1
Basal Shear Surface		20	Mohr-Coulomb	0	14						Water Table	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1

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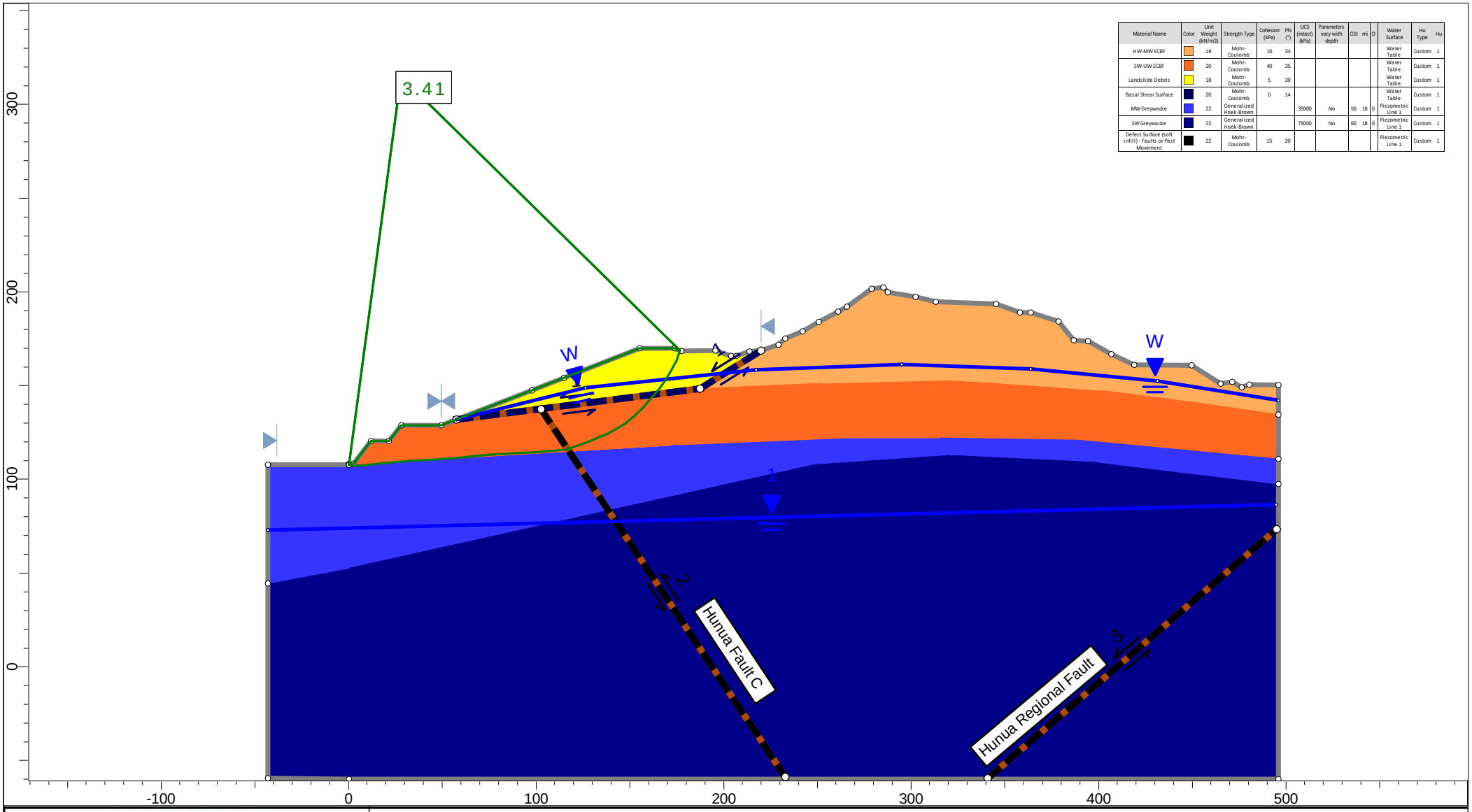
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Group	Section 2	Scenario	Stage 2 - Seismic
		Company T+T	*Date:* 28/01/2026
File Name: Section2 Rv2.slmd		*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Water Table	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Water Table	Custom	1
Landslide Debris		18	Mohr-Coulomb	5	30						Water Table	Custom	1
Basal Shear Surface		20	Mohr-Coulomb	0	14						Water Table	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1

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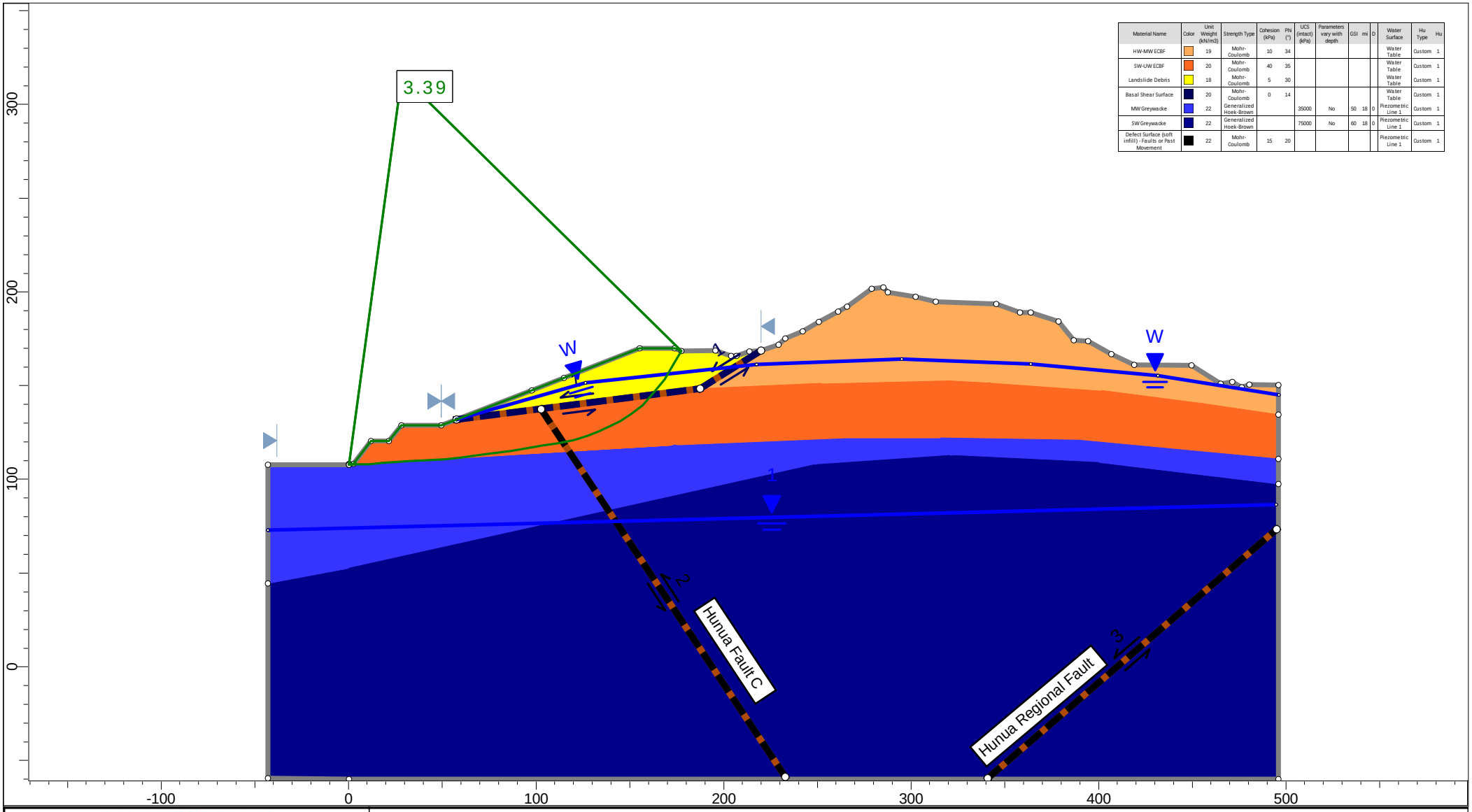
Project	Project Mahitahi		
Group	Section 2	Scenario	Stage 2 - Static - Landslide Reshaped
		Company T+T	*Date:* 28/01/2026
File Name: Section2 Rv2.slmd		*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Water Table	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Water Table	Custom	1
Landslide Debris		18	Mohr-Coulomb	5	30						Water Table	Custom	1
Basal Shear Surface		20	Mohr-Coulomb	0	14						Water Table	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1

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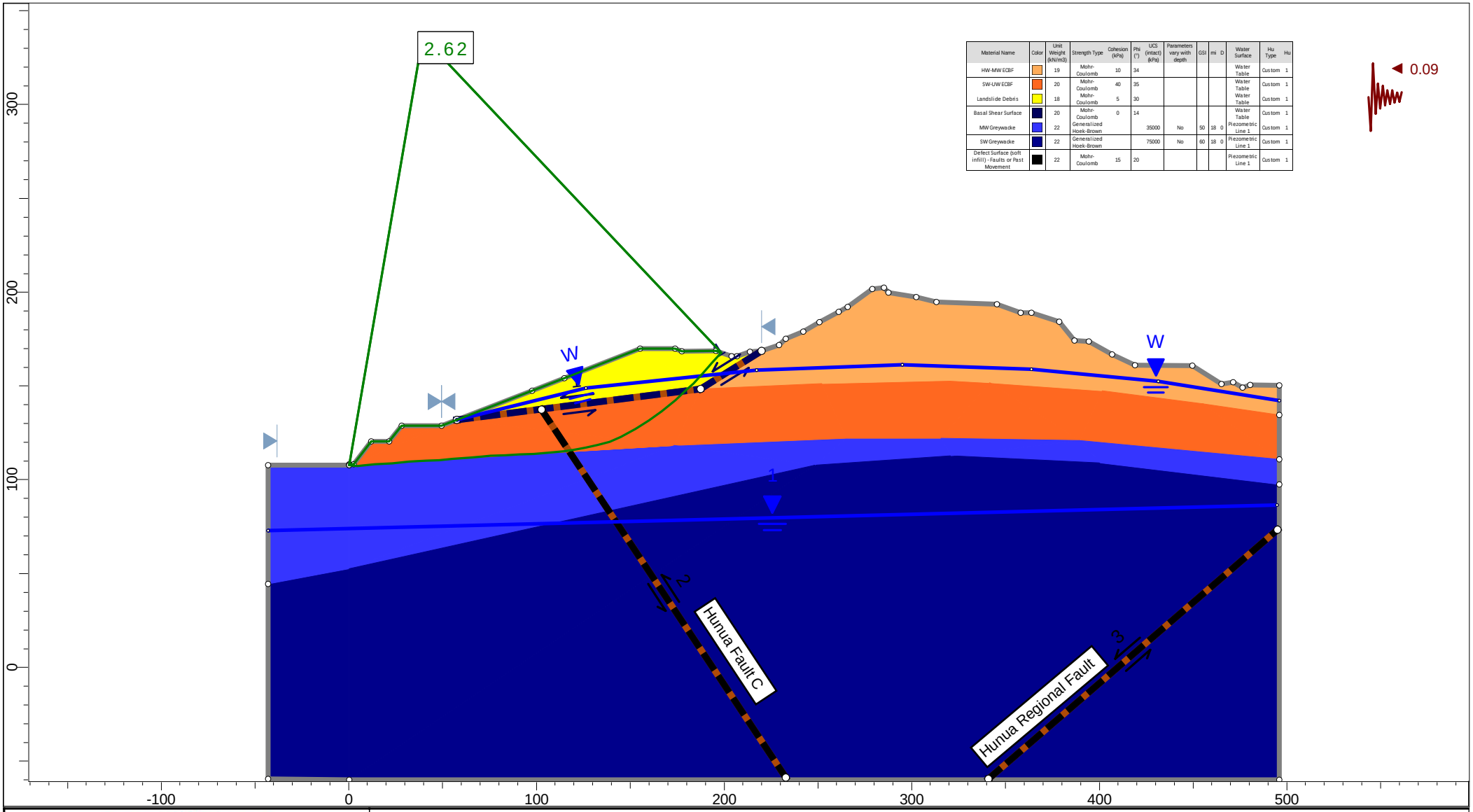
Project	Project Mahitahi		
Group	Section 2	Scenario	Stage 2 - EGWT - Landslide Reshaped
		Company T+T	*Date:* 28/01/2026
File Name: Section2 Rv2.slmd		*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Water Table	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Water Table	Custom	1
Landslide Debris		18	Mohr-Coulomb	5	30						Water Table	Custom	1
Basal Shear Surface		20	Mohr-Coulomb	0	14						Water Table	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1

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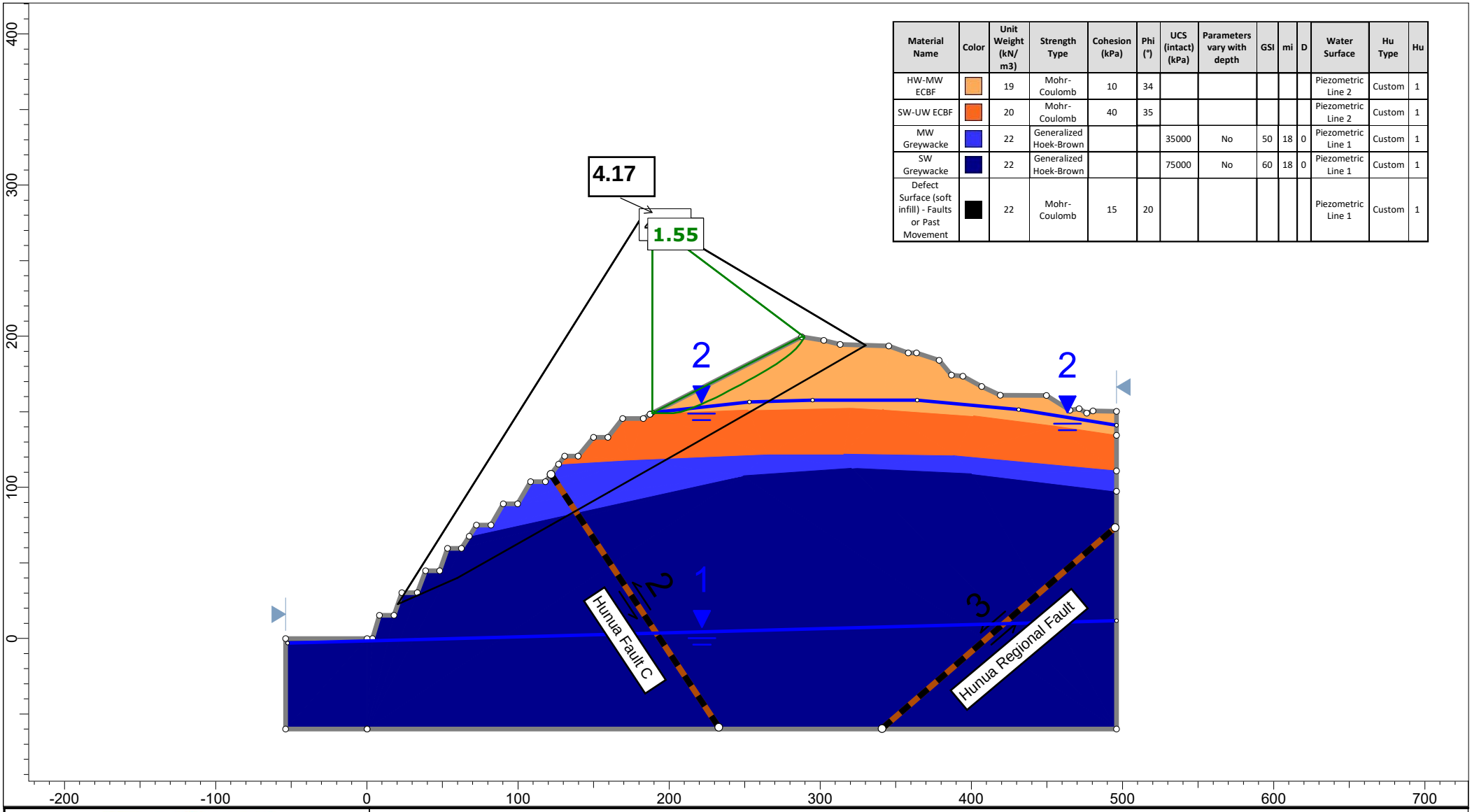
Project	Project Mahitahi		
Group	Section 2	Scenario	Stage 2 - Seismic - Landslide Reshaped
		Company T+T	*Date:* 28/01/2026
File Name: Section2 Rv2.slmd		*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1



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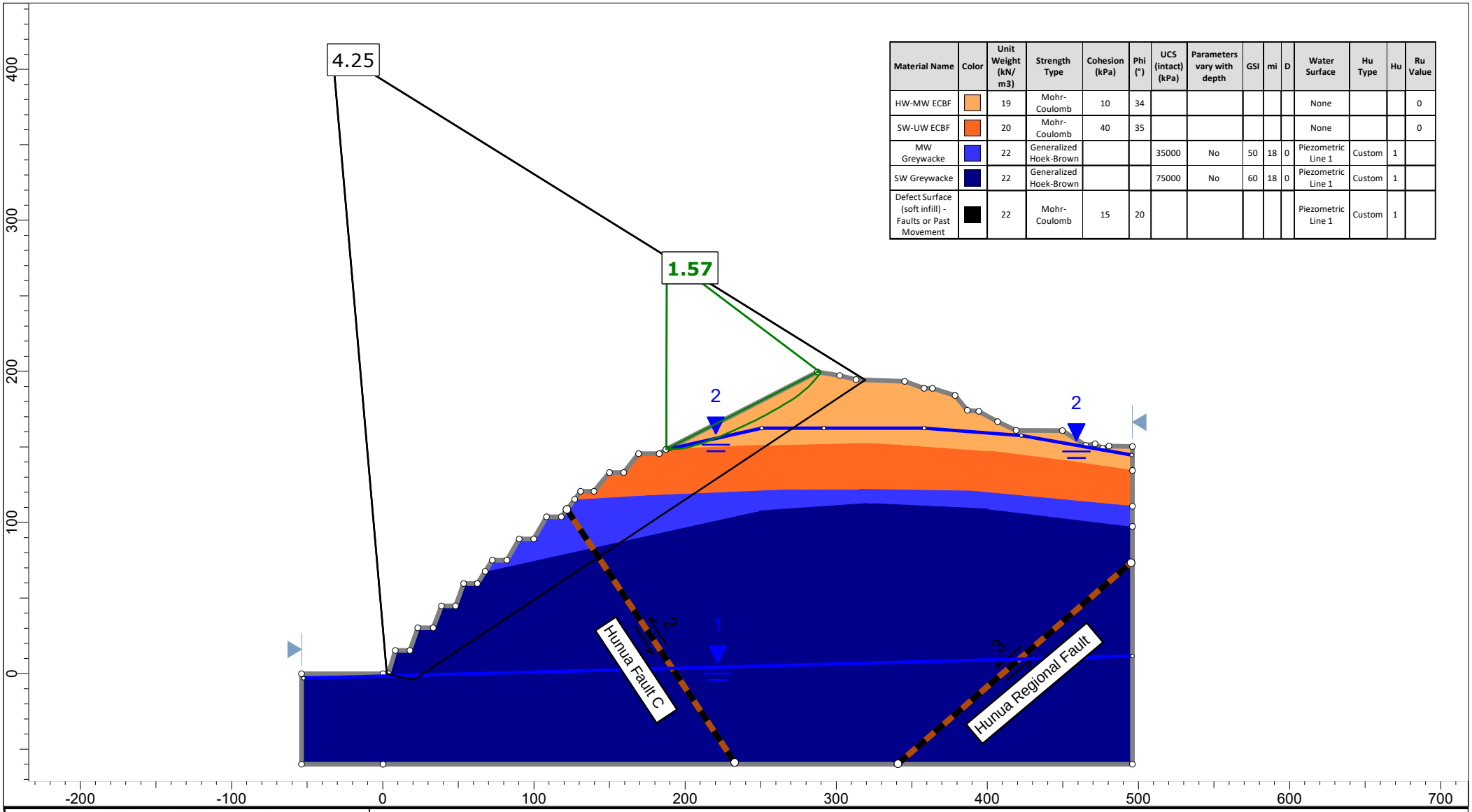
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 2	Scenario name	Stage 7 - Static
		Company TT	*Date:* 4/02/2026
File Name: Section2 Rv2.slmd		*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu	Ru Value
HW-MW ECBF		19	Mohr-Coulomb	10	34						None			0
SW-UW ECBF		20	Mohr-Coulomb	40	35						None			0
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1	
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1	
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1	

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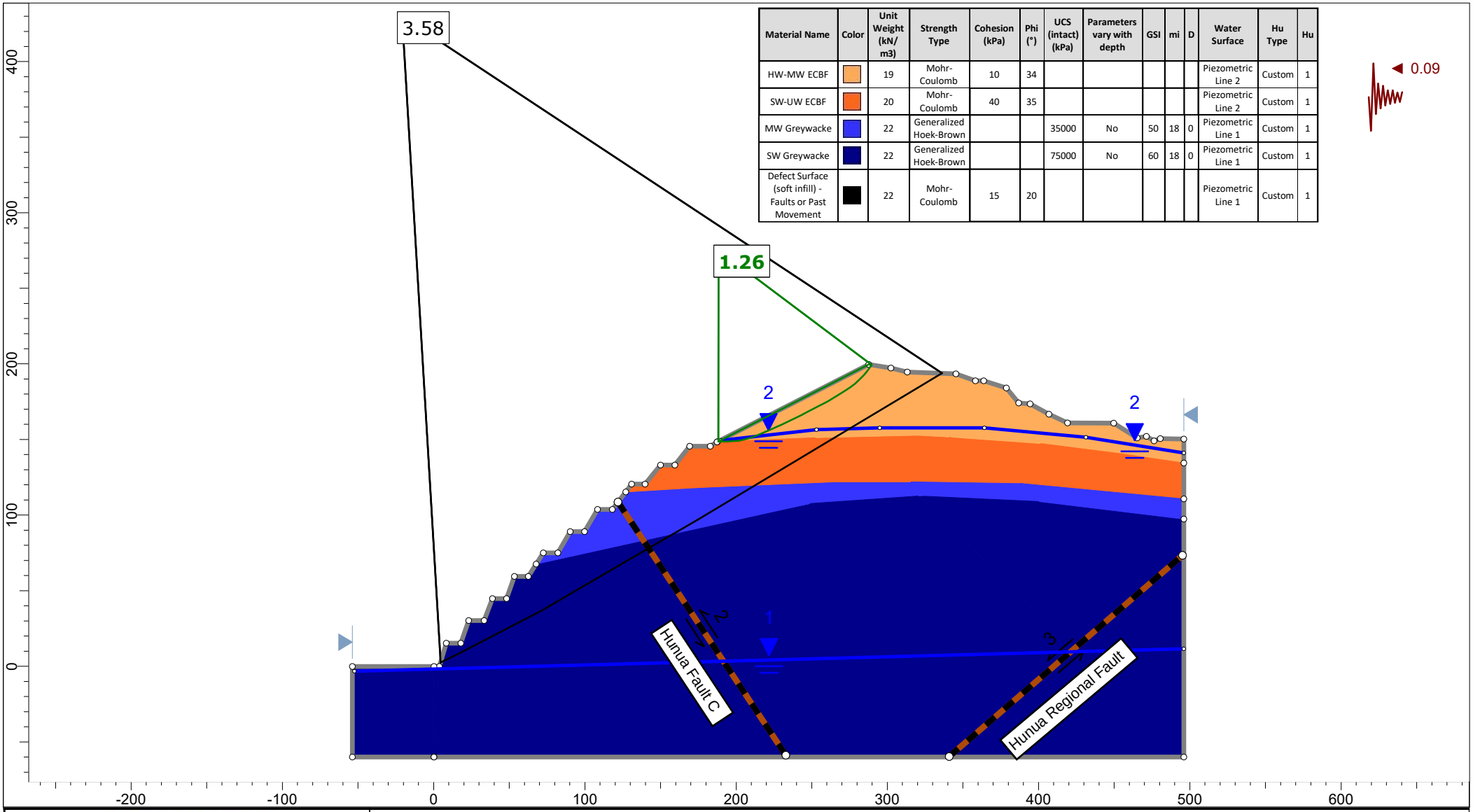
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 2	Scenario name	Stage 7 - EGWT
		Company TT	*Date:* 4/02/2026
File Name:	Section2 Rv2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1



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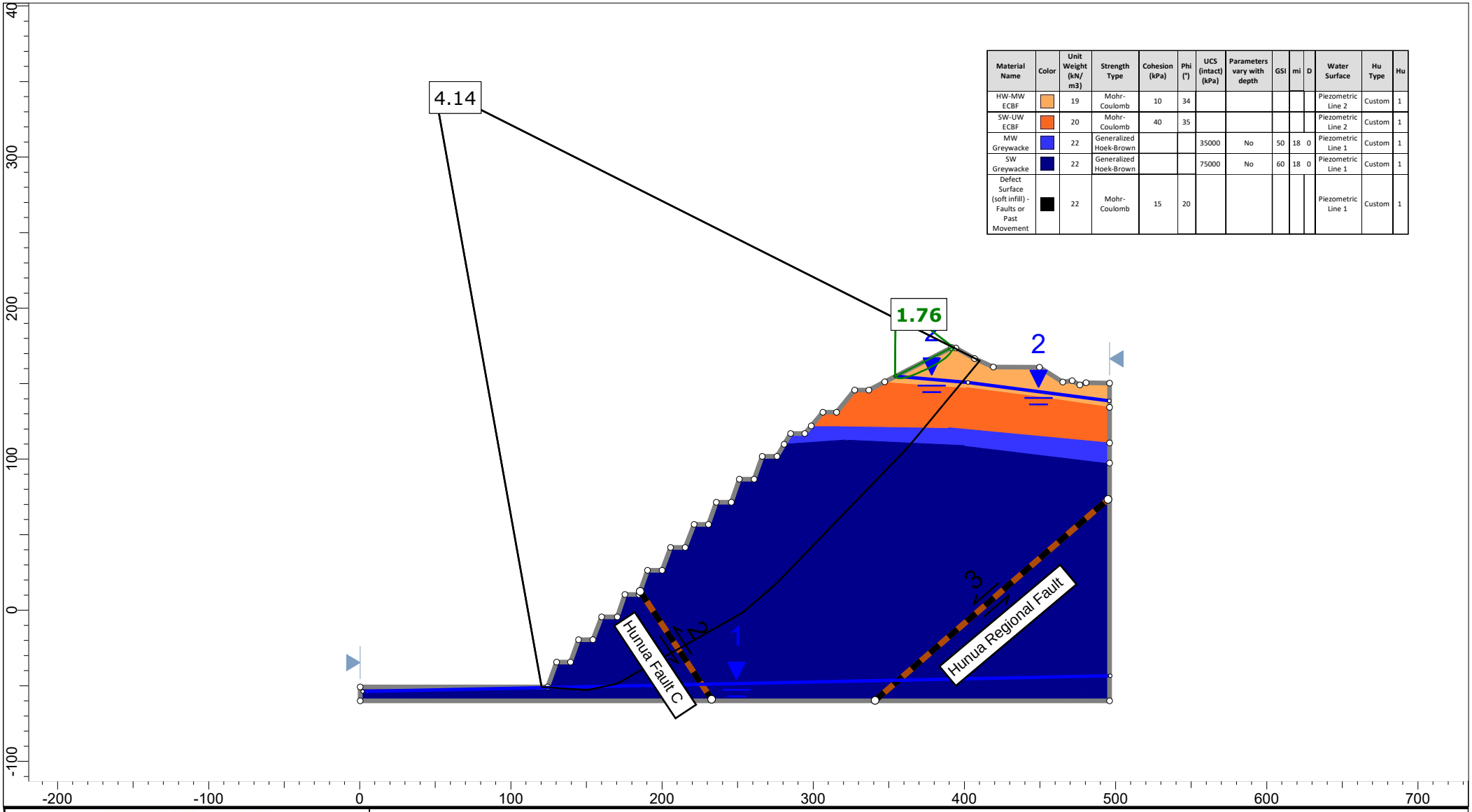
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 2	Scenario name	Stage 7 - Seismic
		Company TT	*Date:* 4/02/2026
File Name:	Section2 Rv2.slmd	*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1

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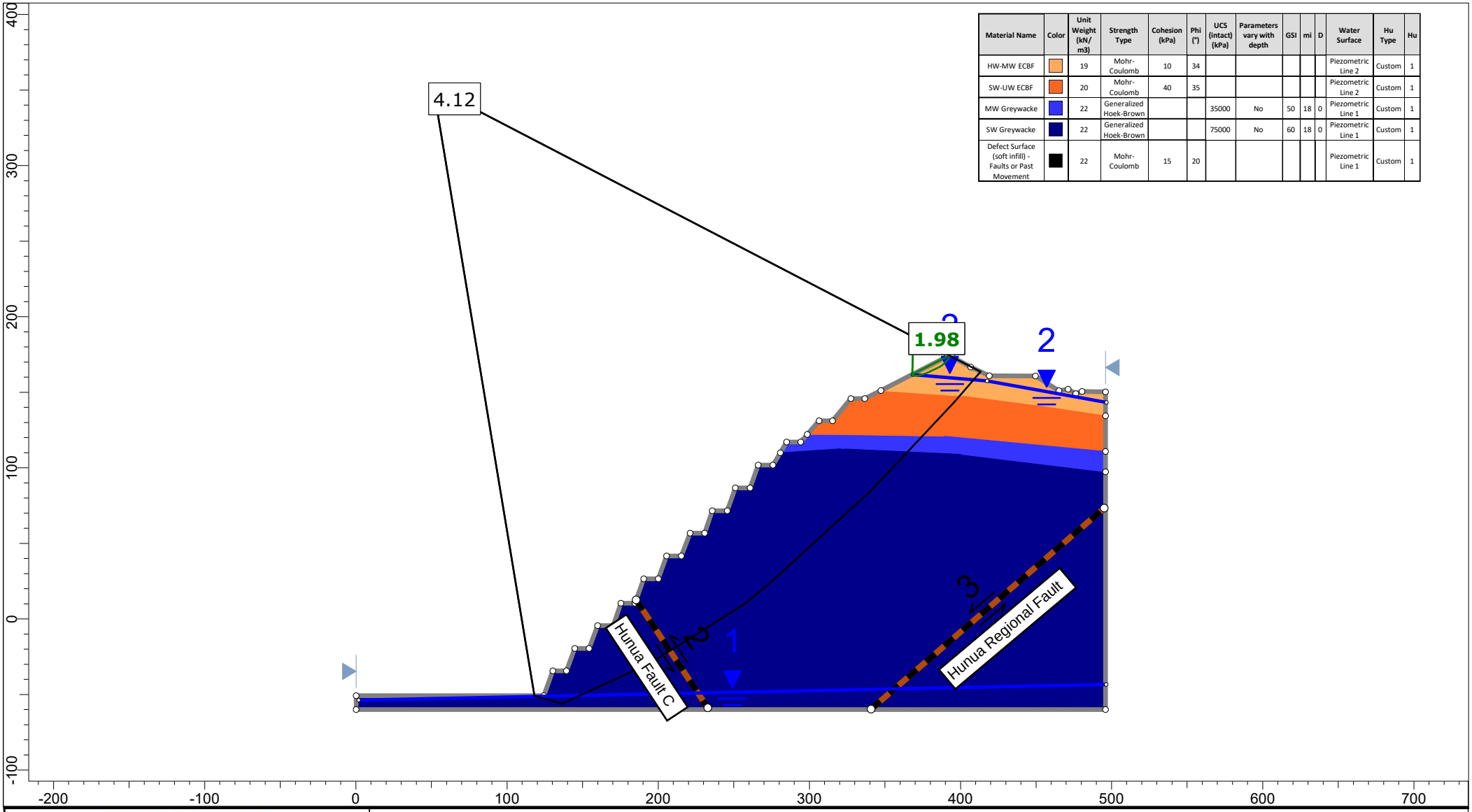
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 2	Scenario name	Stage 8 - Static
		Company TT	*Date:* 4/02/2026
File Name:	Section2 Rv2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1



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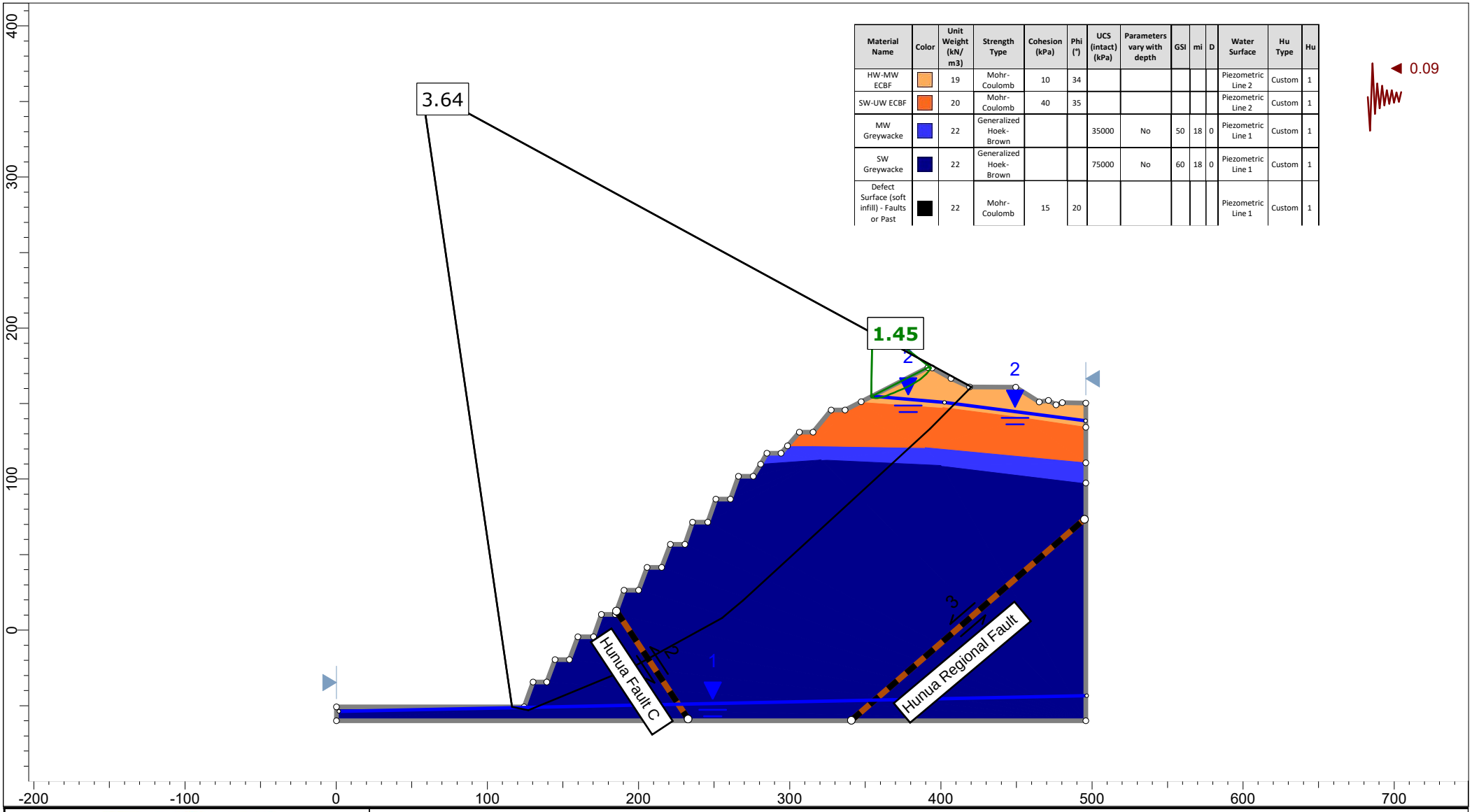
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 2	Scenario name	Stage 8 - EGWT
		Company TT	*Date:* 4/02/2026
File Name:	Section2 Rv2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past		22	Mohr-Coulomb	15	20						Piezometric Line 1	Custom	1



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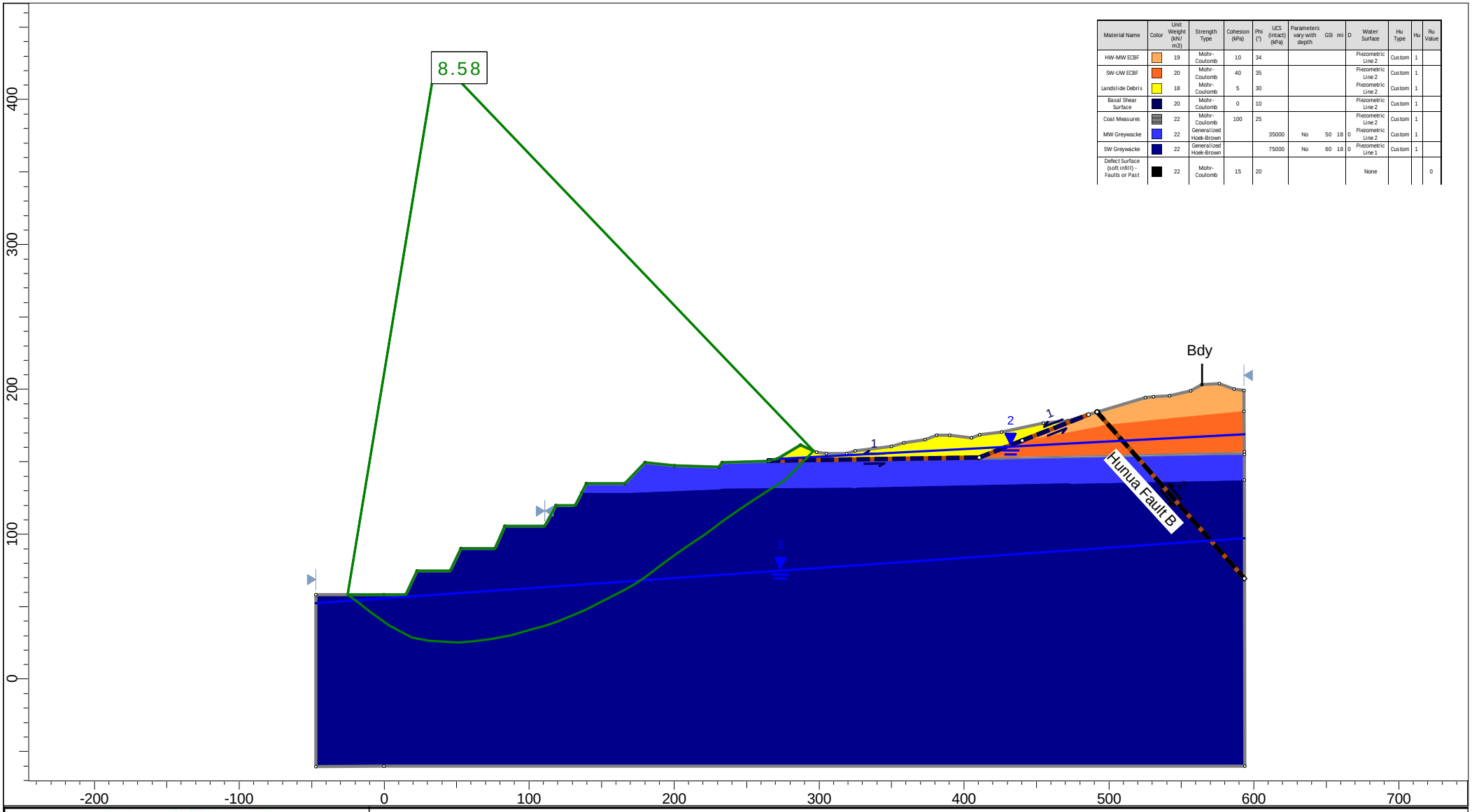
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 2	Scenario name	Stage 8 - Seismic
		Company TT	*Date:* 4/02/2026
File Name:	Section2 Rv2.slmd	*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu	Ru Value
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1	
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1	
Landslide Debris		18	Mohr-Coulomb	5	30						Piezometric Line 2	Custom	1	
Basal Shear Surface		20	Mohr-Coulomb	0	10						Piezometric Line 2	Custom	1	
Coal Measures		22	Mohr-Coulomb	100	25						Piezometric Line 2	Custom	1	
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1	
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1	
Defect Surface (soft infill) - Faults or Past		22	Mohr-Coulomb	15	20						None			0

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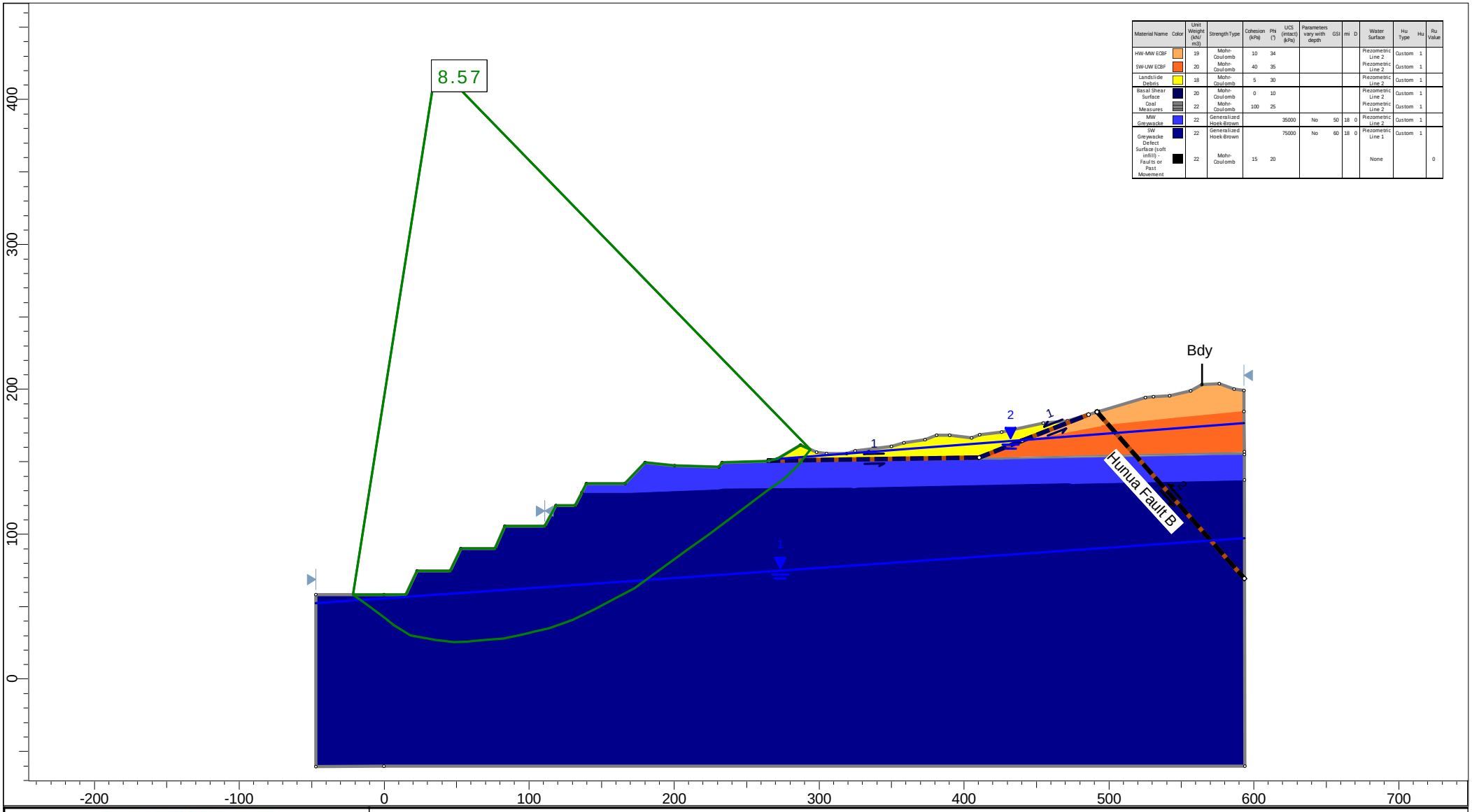
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Group	Section 3	Scenario	Stage 2 - Static
		Company T+T	*Date:* 28/01/2026
File Name:	Section3 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu	Ru Value
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1	
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1	
Landslide Debris		18	Mohr-Coulomb	5	30						Piezometric Line 2	Custom	1	
Basal Shear Surface		20	Mohr-Coulomb	0	10						Piezometric Line 2	Custom	1	
Coal Measures		22	Mohr-Coulomb	100	25						Piezometric Line 2	Custom	1	
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1	
SW Greywacke Defect Surface (soft infill) - Faults or Past Movement		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1	
		22	Mohr-Coulomb	15	20						None			0

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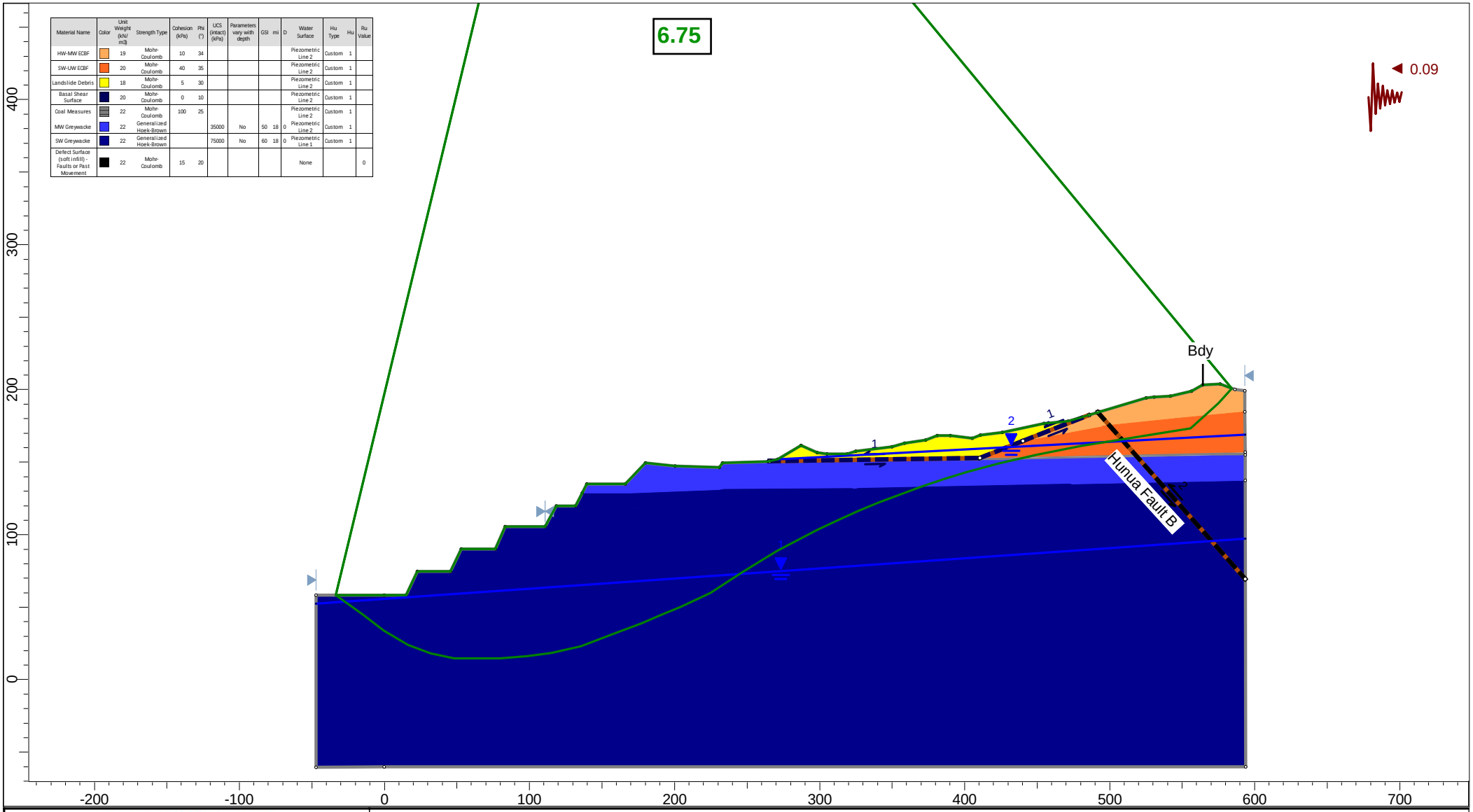
Project	Project Mahitahi		
Group	Section 3	Scenario	Stage 2 - EGWT
		Company T+T	*Date:* 28/01/2026
File Name:	Section3 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu	Ru Value
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1	
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1	
Landslide Debris		18	Mohr-Coulomb	5	30						Piezometric Line 2	Custom	1	
Basal Shear Surface		20	Mohr-Coulomb	0	10						Piezometric Line 2	Custom	1	
Coal Measures		22	Mohr-Coulomb	100	25						Piezometric Line 2	Custom	1	
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1	
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1	
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						None			0



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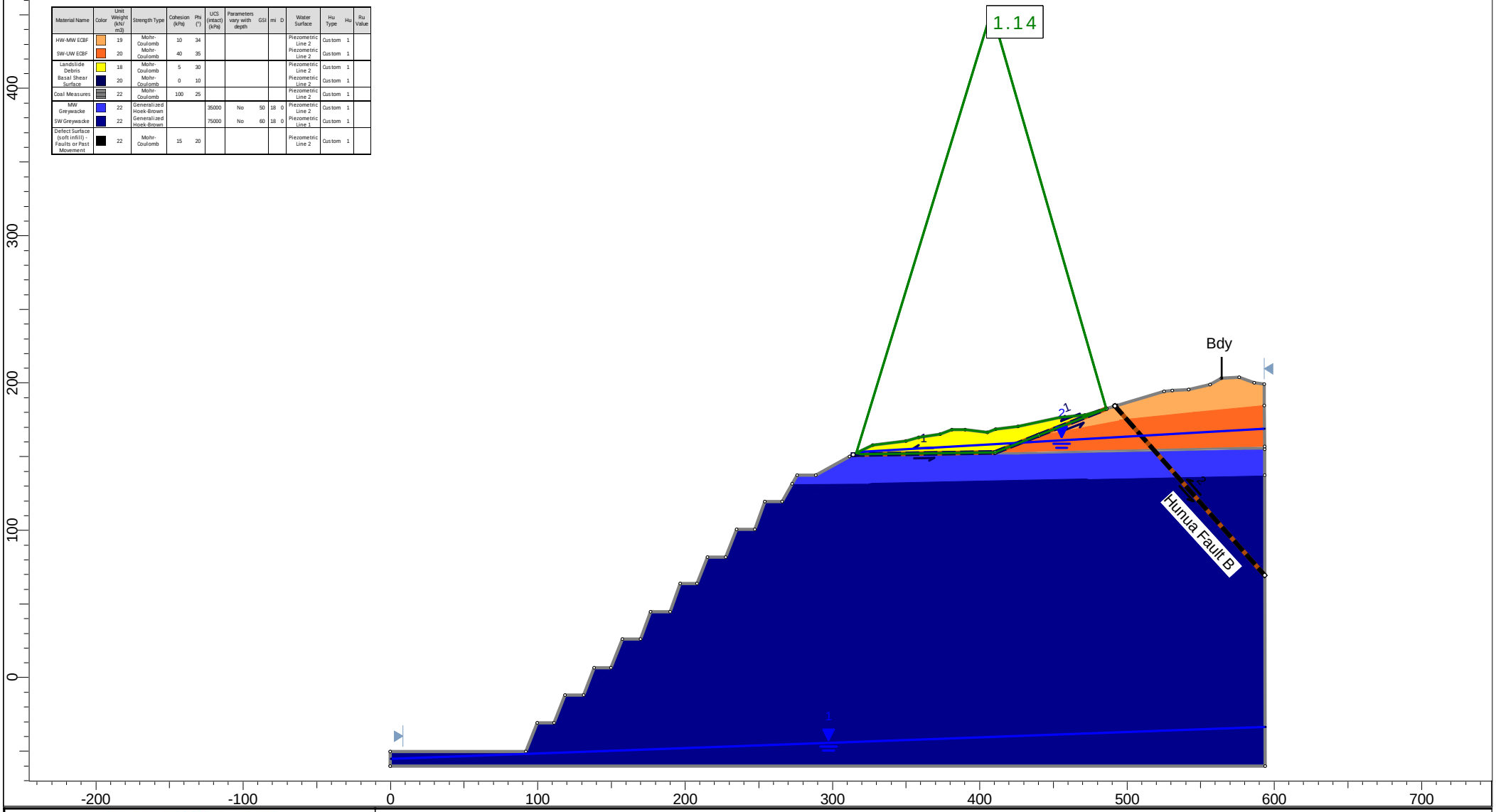
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Group	Section 3	Scenario	Stage 2 - Seismic
		Company T+T	*Date:* 28/01/2026
File Name:	Section3 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu	Ru Value
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1	
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1	
Landslide Debris		18	Mohr-Coulomb	5	30						Piezometric Line 2	Custom	1	
Basal Shear Surface		20	Mohr-Coulomb	0	10						Piezometric Line 2	Custom	1	
Coal Measures		22	Mohr-Coulomb	100	25						Piezometric Line 2	Custom	1	
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1	
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1	
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 2	Custom	1	



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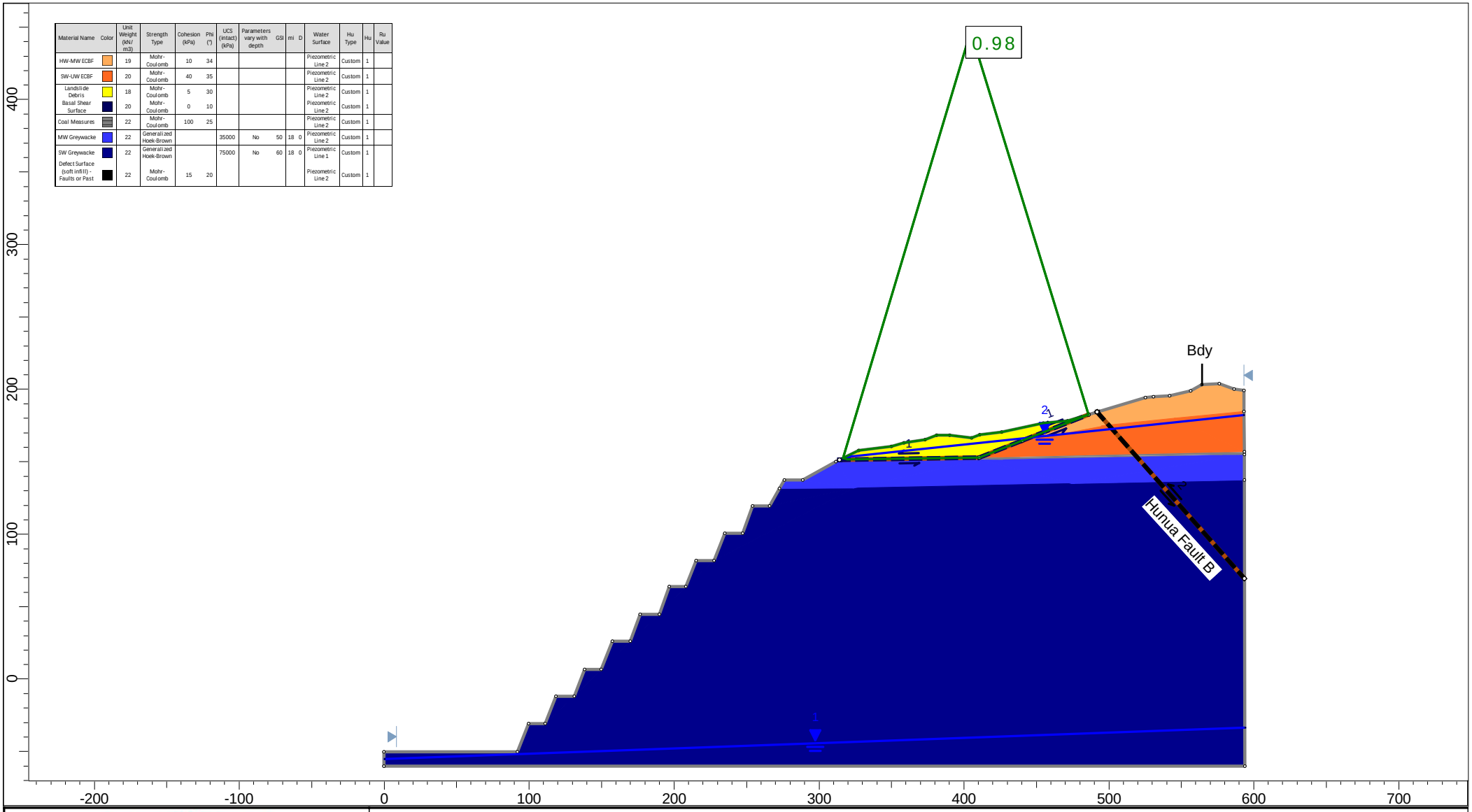
Project	Project Mahitahi		
Group	Section 3	Scenario	Stage 7 - Static
		Company T+T	*Date:* 28/01/2026
File Name:	Section3 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu	Ru Value
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1	
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1	
Landslide Debris		18	Mohr-Coulomb	5	30						Piezometric Line 2	Custom	1	
Basal Shear Surface		20	Mohr-Coulomb	0	10						Piezometric Line 2	Custom	1	
Coal Measures		22	Mohr-Coulomb	100	25						Piezometric Line 2	Custom	1	
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1	
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1	
Defect Surface (soft infill) - Faults or Past		22	Mohr-Coulomb	15	20						Piezometric Line 2	Custom	1	



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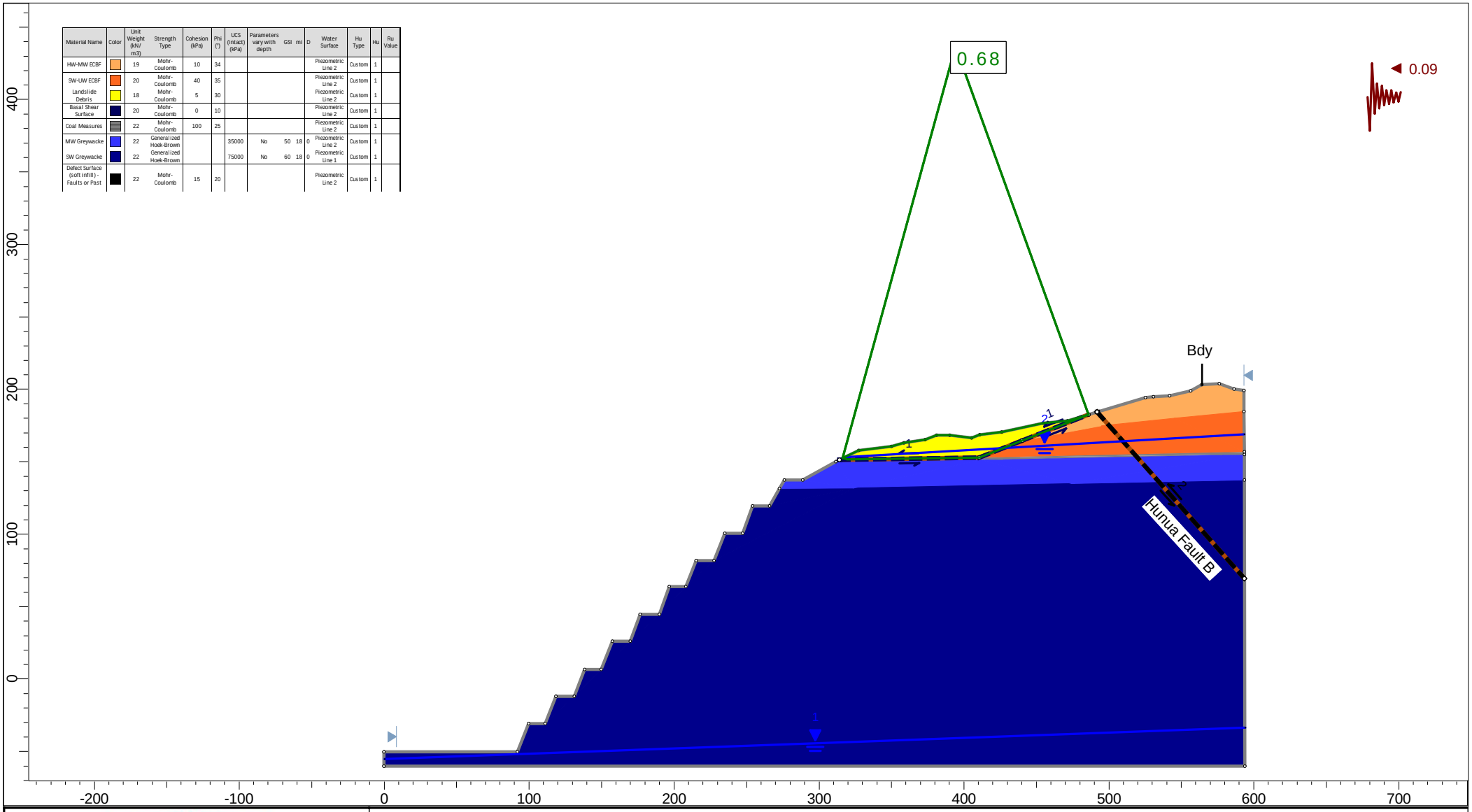
Project	Project Mahitahi		
Group	Section 3	Scenario	Stage 7 - EGWT
		Company T+T	*Date:* 28/01/2026
File Name:	Section3 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu	Ru Value
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1	
SW-LW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1	
Landslide Debris		18	Mohr-Coulomb	5	30						Piezometric Line 2	Custom	1	
Basal Shear Surface		20	Mohr-Coulomb	0	10						Piezometric Line 2	Custom	1	
Coal Measures		22	Mohr-Coulomb	100	25						Piezometric Line 2	Custom	1	
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1	
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1	
Defect Surface (soft infill) : Faults or Past		22	Mohr-Coulomb	15	20						Piezometric Line 2	Custom	1	



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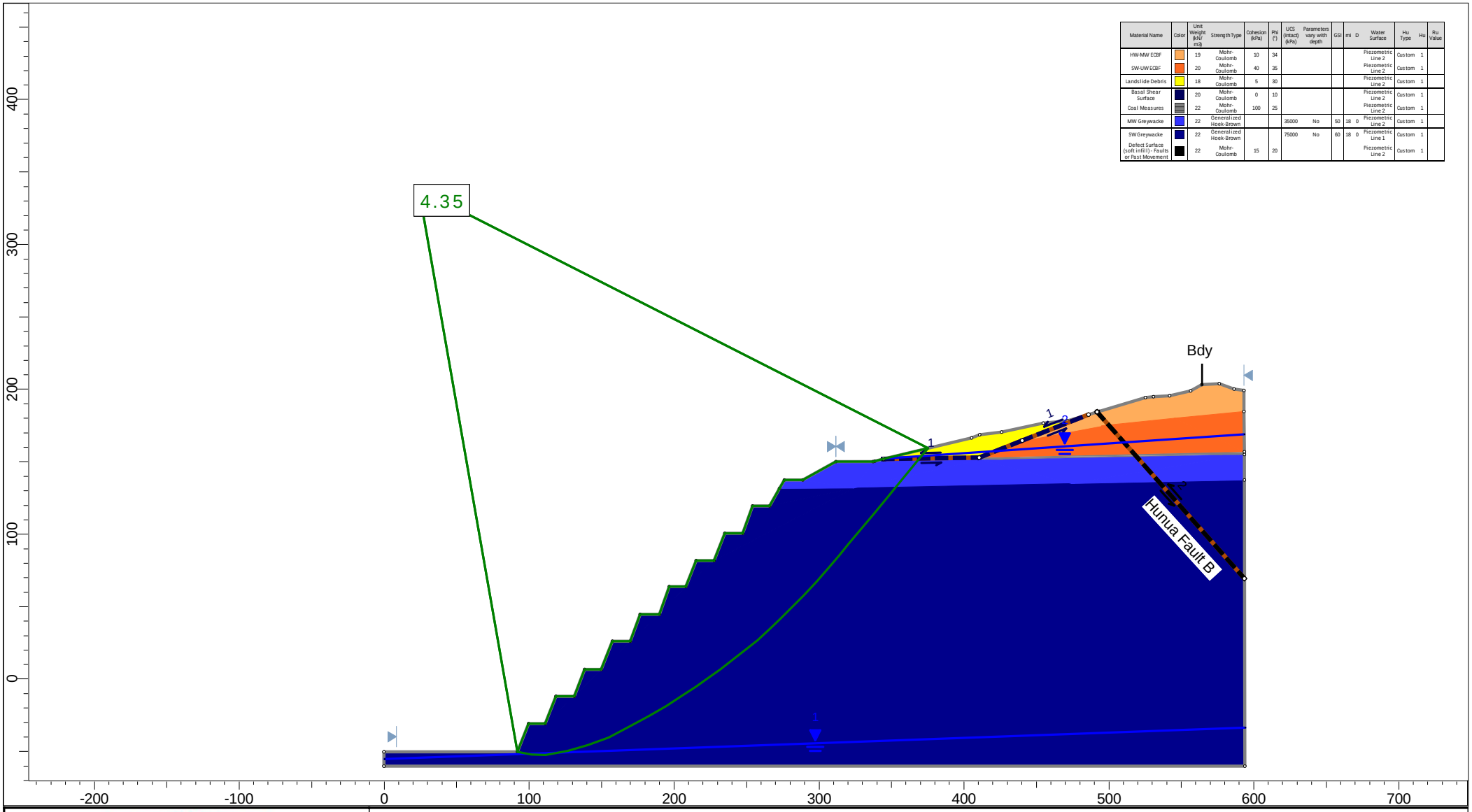
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Group	Section 3	Scenario	Stage 7 - Seismic
		Company T+T	*Date:* 28/01/2026
File Name:	Section3 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu	Ru Value
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1	
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1	
Landslide Debris		18	Mohr-Coulomb	5	30						Piezometric Line 2	Custom	1	
Basal Shear Surface		20	Mohr-Coulomb	0	10						Piezometric Line 2	Custom	1	
Coal Measures		22	Mohr-Coulomb	100	25						Piezometric Line 2	Custom	1	
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1	
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1	
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 2	Custom	1	



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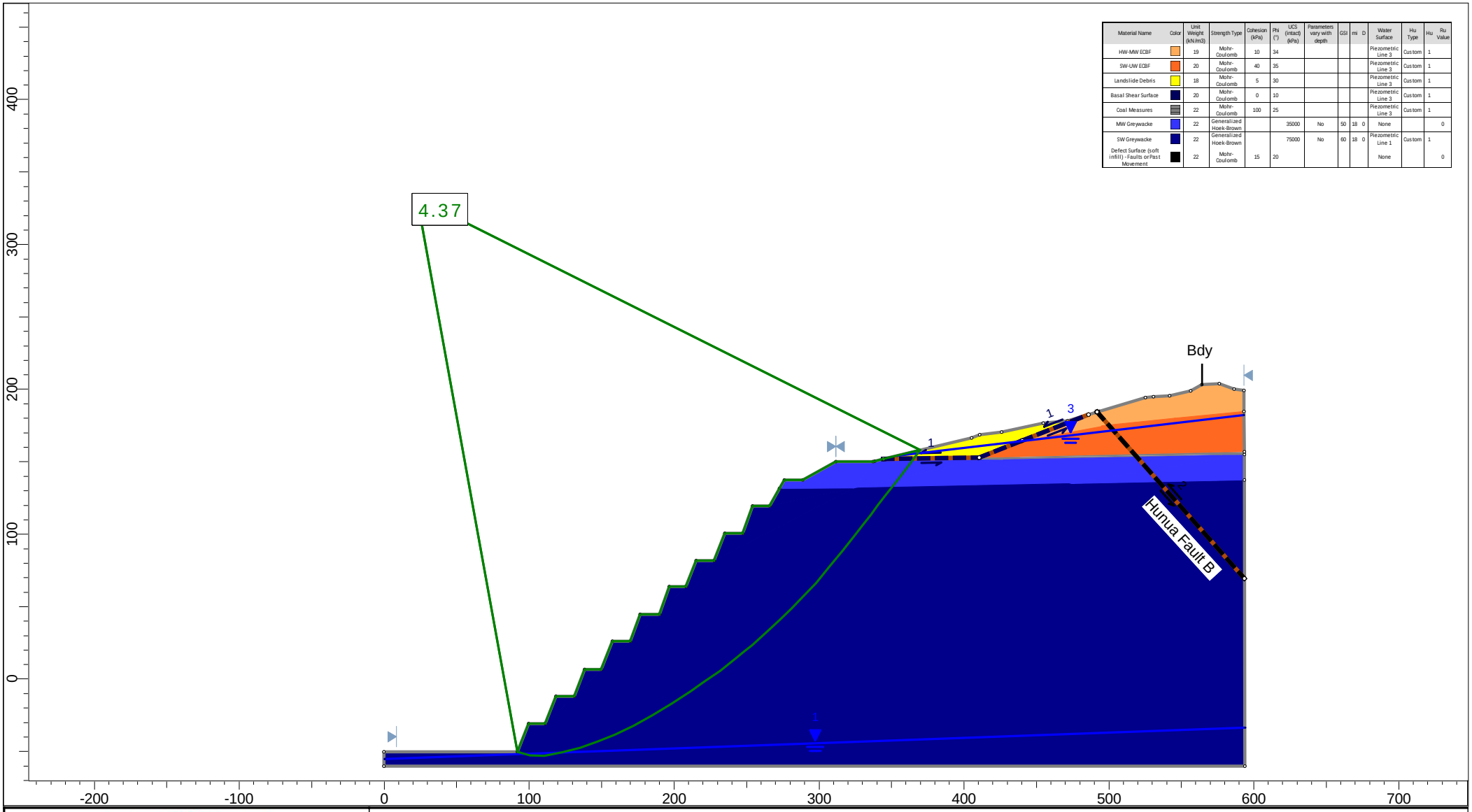
Project	Project Mahitahi		
Group	Section 3	Scenario	Stage 7 - Static - Landslide Reshaped
		Company T+T	*Date:* 28/01/2026
File Name: Section3 Rev2.slmd		*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu	Ru Value
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 3	Custom	1	
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 3	Custom	1	
Landslide Debris		18	Mohr-Coulomb	5	30						Piezometric Line 3	Custom	1	
Basal Shear Surface		20	Mohr-Coulomb	0	10						Piezometric Line 3	Custom	1	
Coal Measures		22	Mohr-Coulomb	100	25						Piezometric Line 3	Custom	1	
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	None			0
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1	
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						None			0



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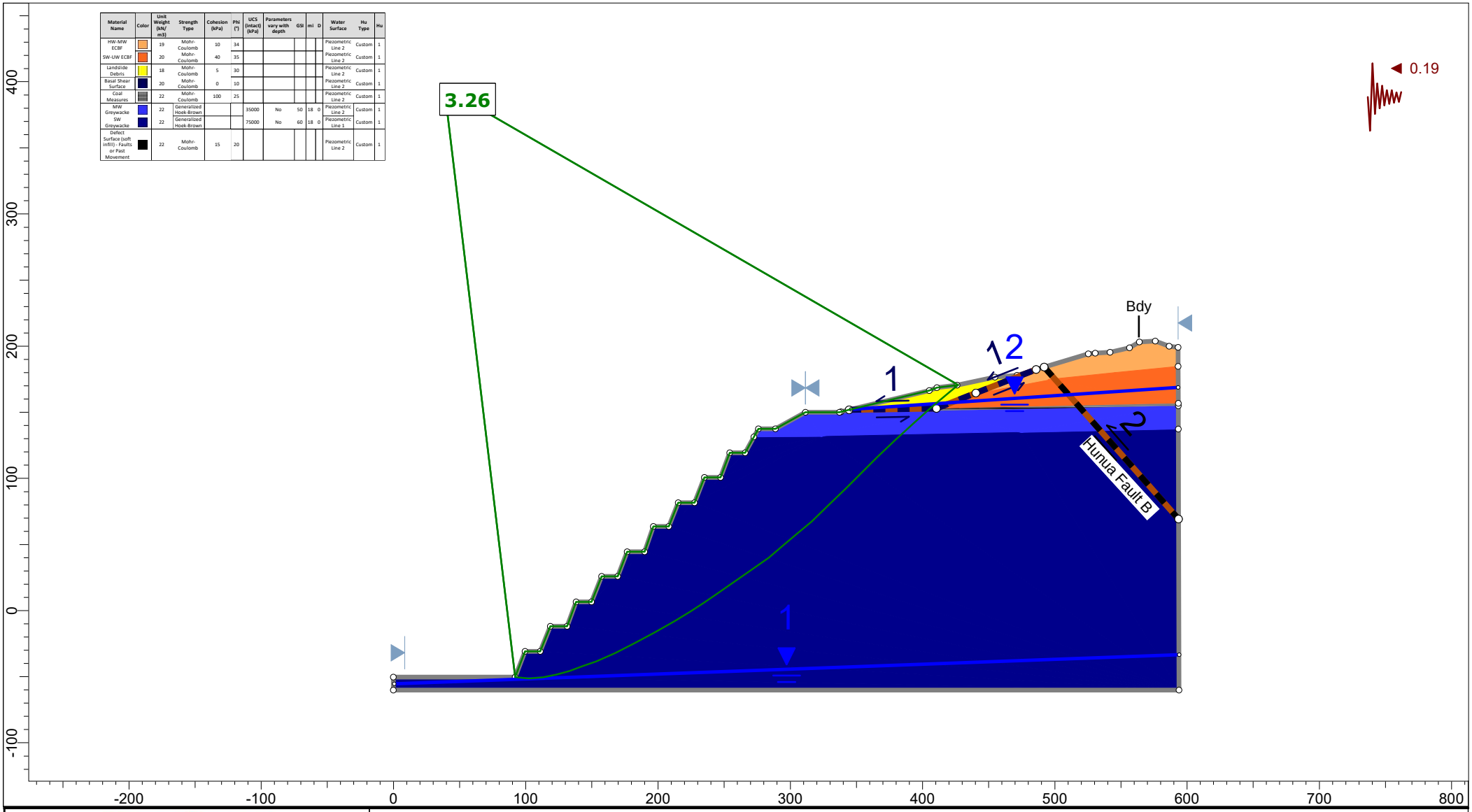
Project	Project Mahitahi		
Group	Section 3	Scenario	Stage 7 - EGWT - Landslide Reshaped
		Company T+T	*Date:* 28/01/2026
File Name:	Section3 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
HW-MW ECBF		19	Mohr-Coulomb	10	34						Piezometric Line 2	Custom	1
SW-UW ECBF		20	Mohr-Coulomb	40	35						Piezometric Line 2	Custom	1
Landslide Debris		18	Mohr-Coulomb	5	30						Piezometric Line 2	Custom	1
Basal Shear Surface		20	Mohr-Coulomb	0	10						Piezometric Line 2	Custom	1
Coal Measures		22	Mohr-Coulomb	100	25						Piezometric Line 2	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (soft infill) - Faults or Past Movement		22	Mohr-Coulomb	15	20						Piezometric Line 2	Custom	1



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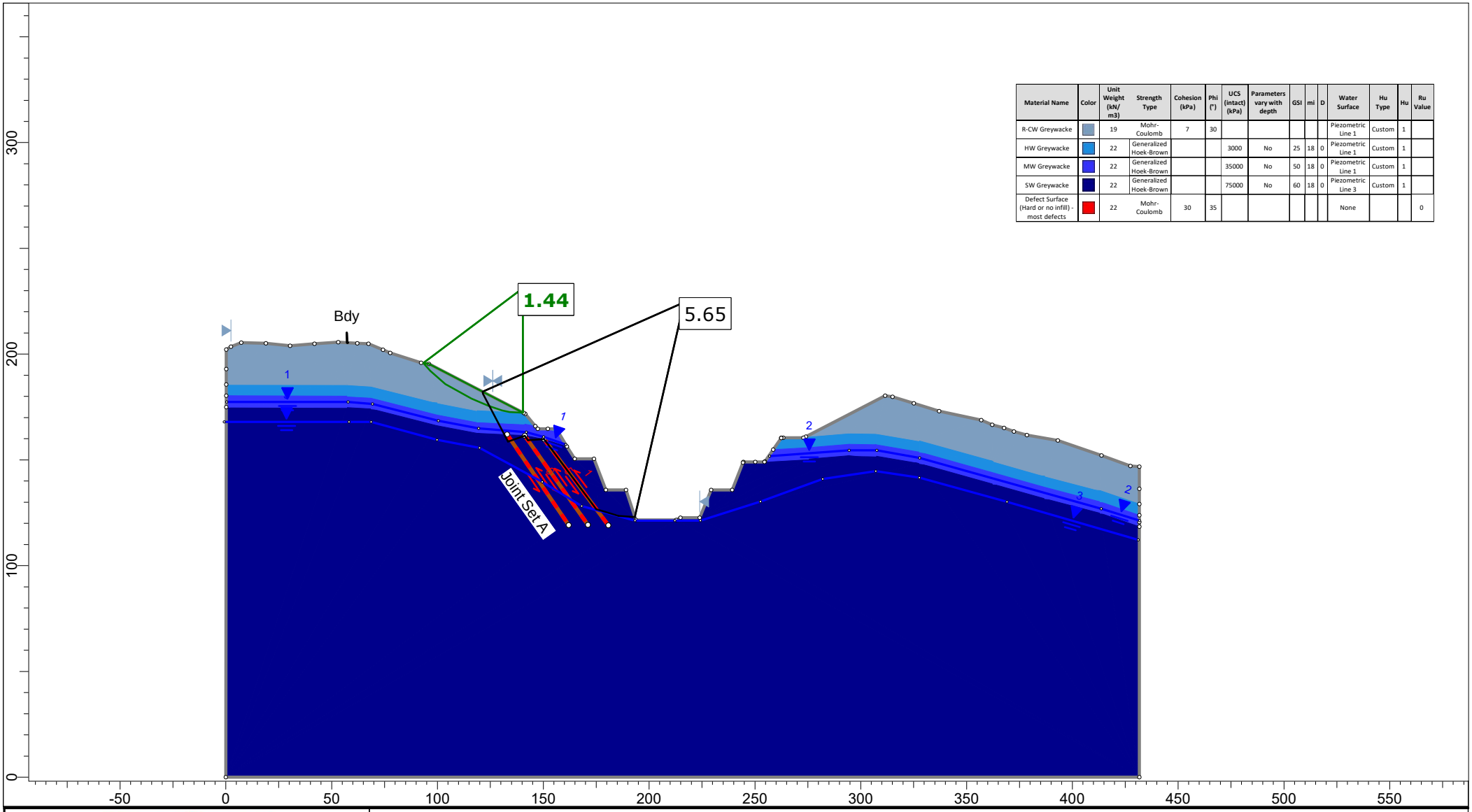
Project	Project Mahitahi		
Analysis Description:	Section 3	Scenario name	Stage 7 - Seismic - Landslide Reshaped
		Company TT	*Date:* 21/02/2026
File Name:	Section3 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu	Ru Value
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 1	Custom	1	
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 1	Custom	1	
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1	
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 3	Custom	1	
Defect Surface (Hard or no infill) - most defects		22	Mohr-Coulomb	30	35						None			0



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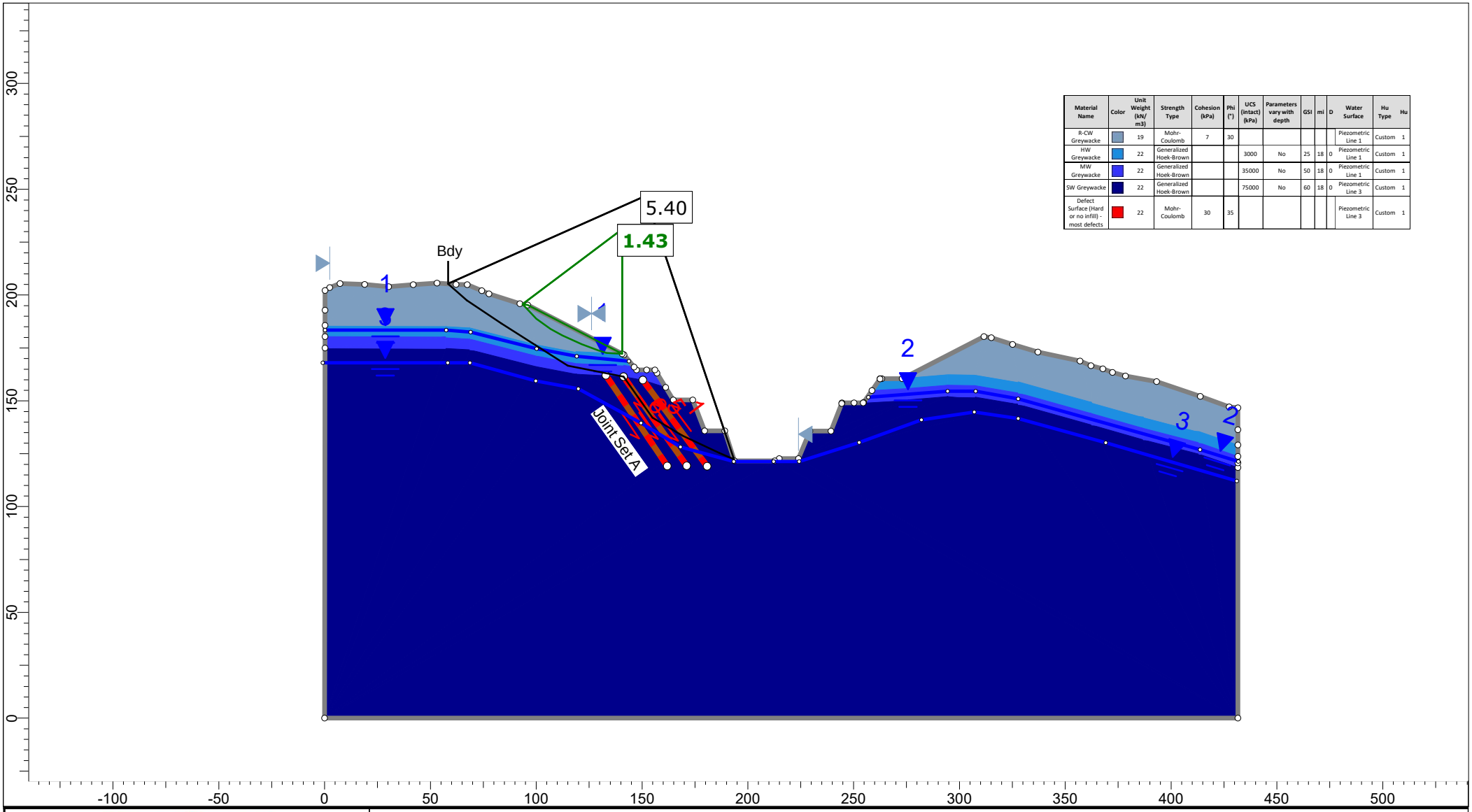
Project	Project MAHITAHI		
Analysis Description:	Section 4	Scenario name	Stage 1 - Static
		Company TT	*Date:* 4/02/2026
File Name: Section4.slmd		*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 1	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 1	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 3	Custom	1
Defect Surface (Hard or no infill) - most defects		22	Mohr-Coulomb	30	35						Piezometric Line 3	Custom	1

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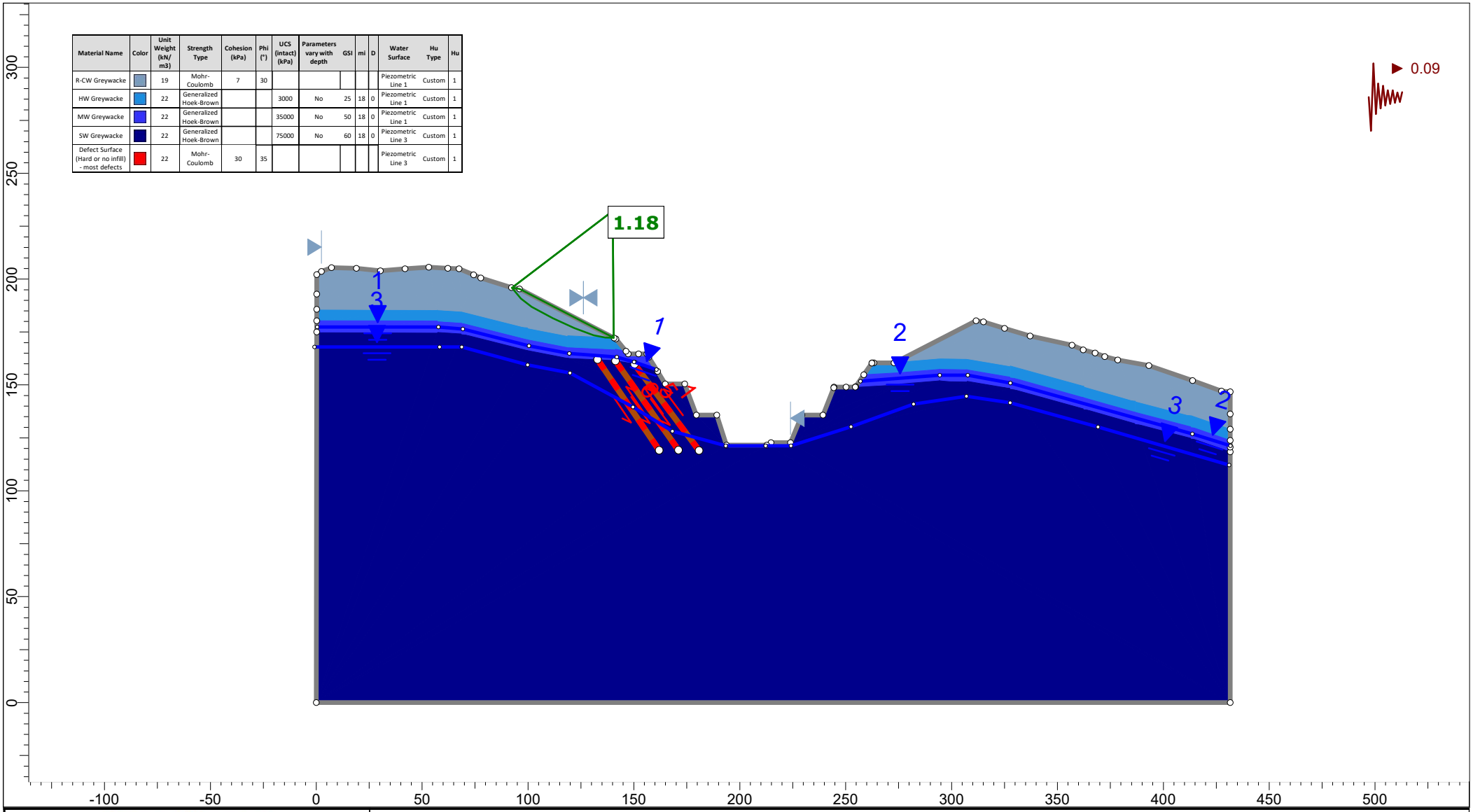
Project	Project MAHITAHI		
Analysis Description:	Section 4	Scenario name	Stage 1 - EGWT
		Company TT	*Date:* 4/02/2026
File Name: Section4.slmd		*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 1	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 1	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 3	Custom	1
Defect Surface (Hard or no infill) - most defects		22	Mohr-Coulomb	30	35						Piezometric Line 3	Custom	1



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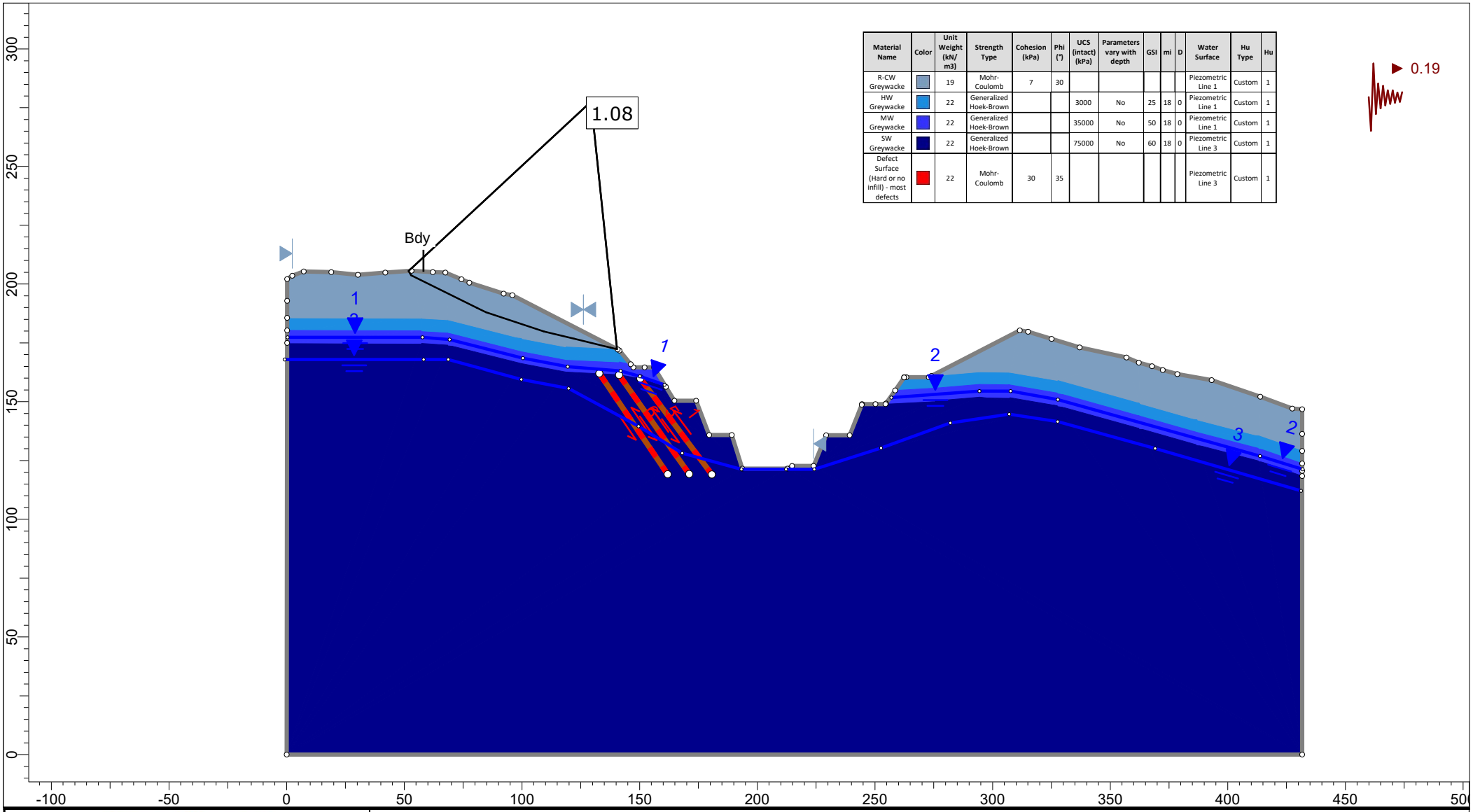
Project	Project MAHITAHI		
Analysis Description:	Section 4	Scenario name	Stage 1 - Seismic - Within Boundary
		Company TT	*Date:* 20/02/2026
File Name:	Section4.slmd	*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 1	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 1	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 3	Custom	1
Defect Surface (Hard or no infill) - most defects		22	Mohr-Coulomb	30	35						Piezometric Line 3	Custom	1

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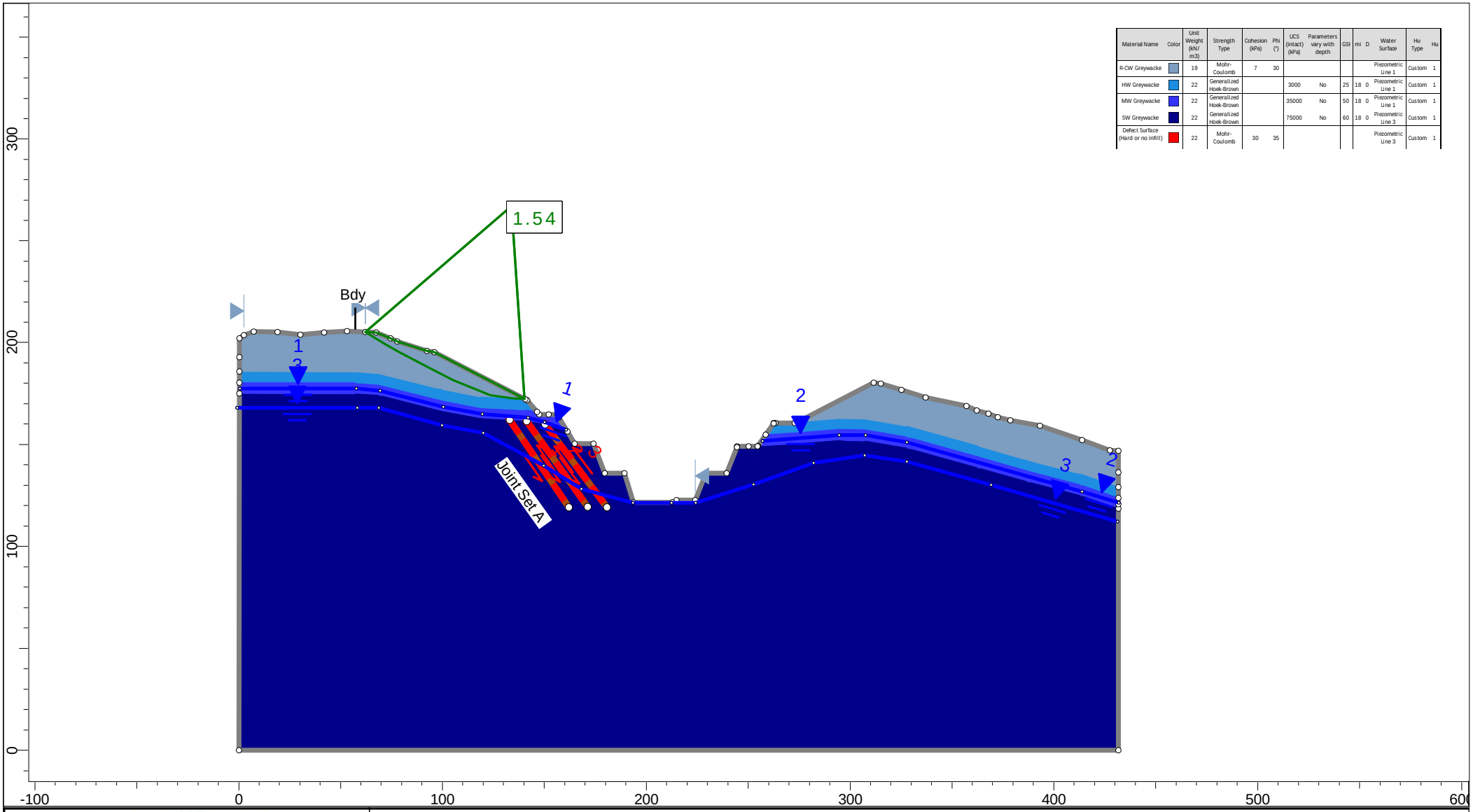
Project	Project MAHITAHI		
Analysis Description:	Section 4	Scenario name	Stage 1 - Seismic - Beyond Boundary
		Company TT	*Date:* 20/02/2026
File Name:	Section4.slmd	*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 1	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 1	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 3	Custom	1
Defect Surface (Hard or no infill)		22	Mohr-Coulomb	30	35						Piezometric Line 3	Custom	1

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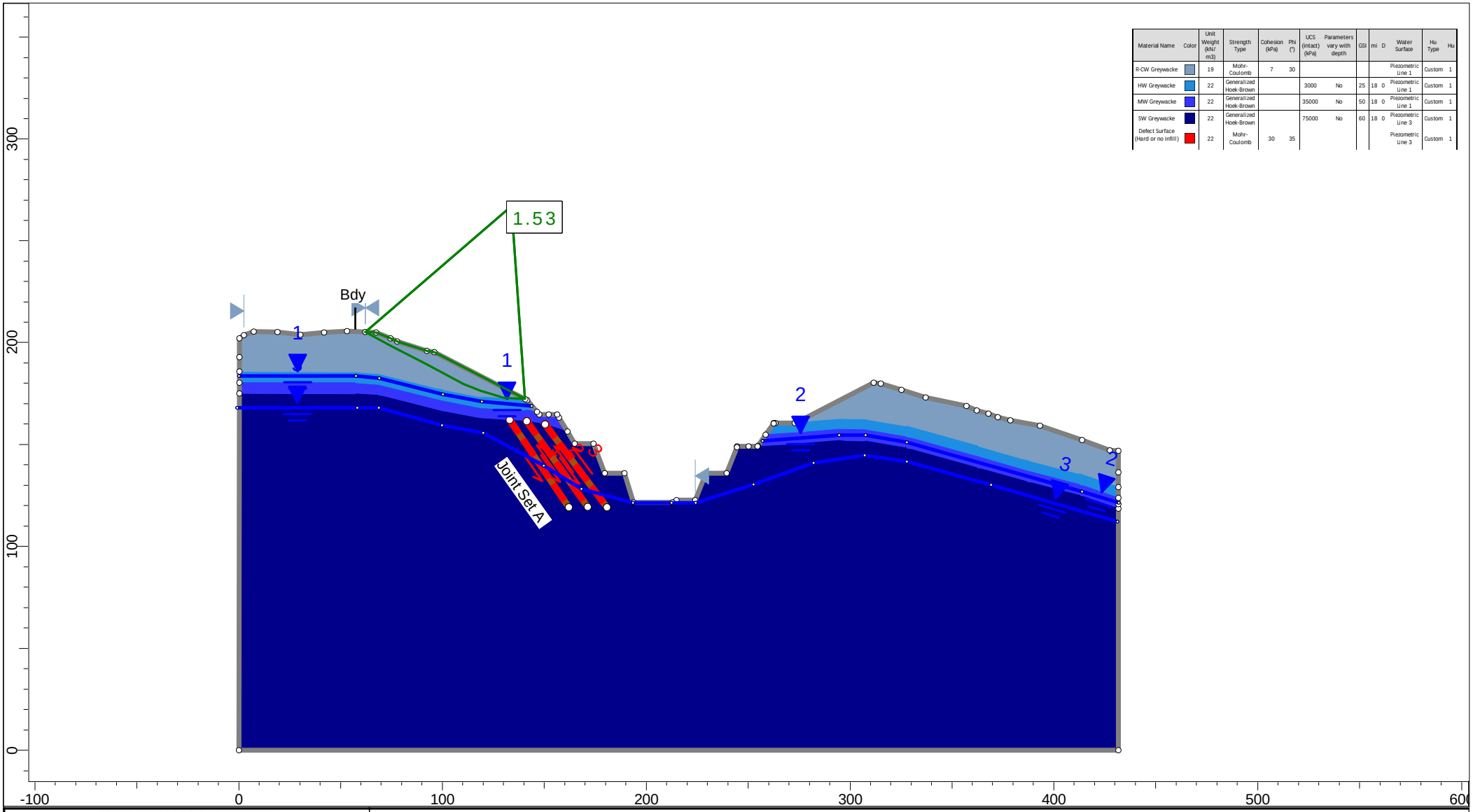
Project	Project MAHITAHI		
Group	Section 4	Scenario	Stage 1 - Static - Near property boundary
		Company T+T	*Date:* 3/02/2026
File Name: Section4.slmd		*Author:* JOWI	*Checked:* PRMM



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 1	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 1	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 3	Custom	1
Defect Surface (Hard or no infill)		22	Mohr-Coulomb	30	35						Piezometric Line 3	Custom	1

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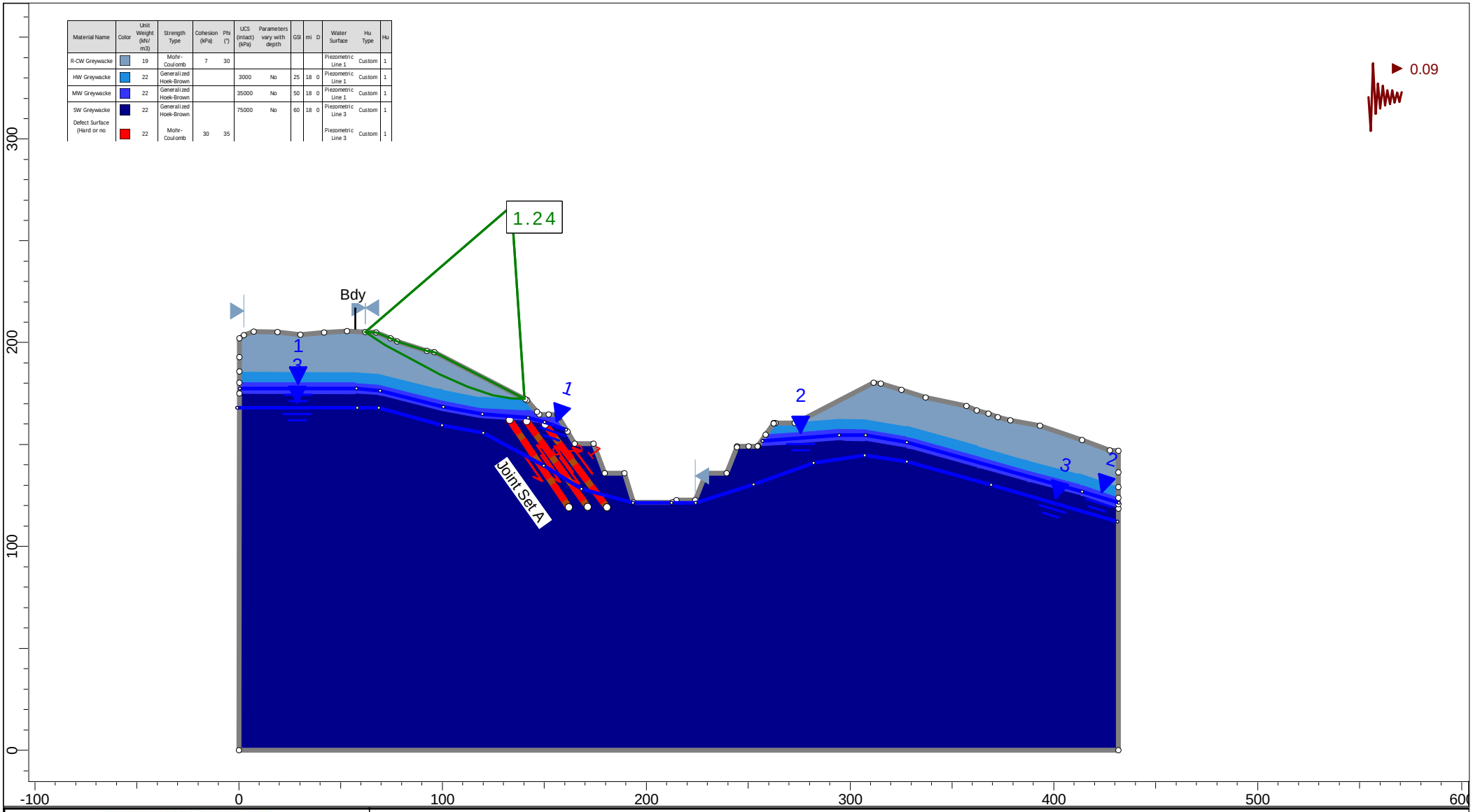
Project	Project MAHITAHI		
Group	Section 4	Scenario	Stage 1 - EGWT - Near property boundary
		Company T+T	*Date:* 3/02/2026
File Name: Section4.slmd		*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 1	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 1	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 3	Custom	1
Defect Surface (Hard or no		22	Mohr-Coulomb	30	35						Piezometric Line 3	Custom	1



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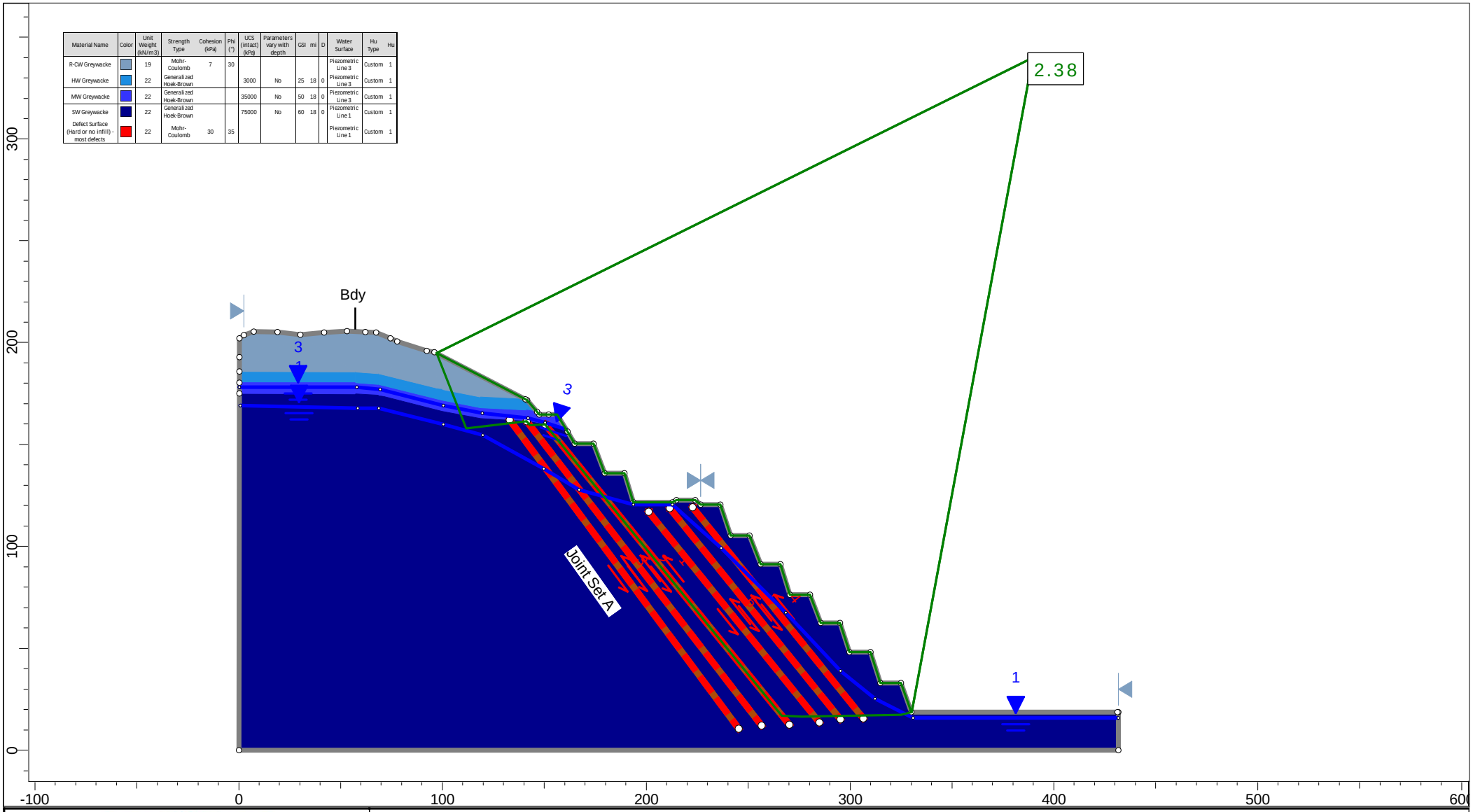
Project	Project MAHITAHI		
Group	Section 4	Scenario	Stage 1 - Seismic - Near property boundary
		Company T+T	*Date:* 3/02/2026
File Name:	Section4.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 3	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 3	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 3	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (Hard or no infill) - most defects		22	Mohr-Coulomb	30	35						Piezometric Line 1	Custom	1



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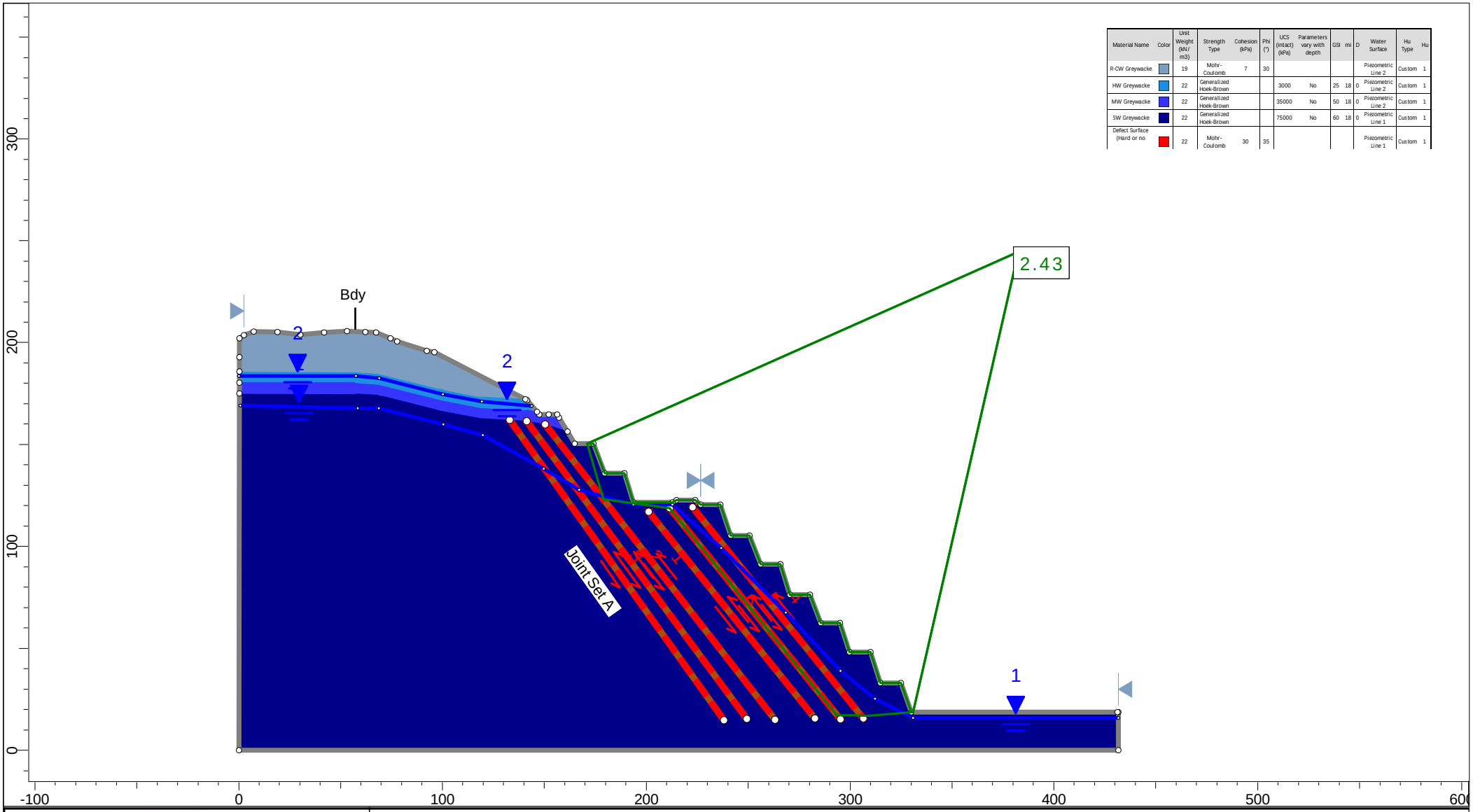
Project	Project MAHITAHI		
Group	Section 4	Scenario	Stage 8 - Static
		Company T+T	*Date:* 3/02/2026
File Name: Section4.slmd		*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 2	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 2	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (Hard or no		22	Mohr-Coulomb	30	35						Piezometric Line 1	Custom	1



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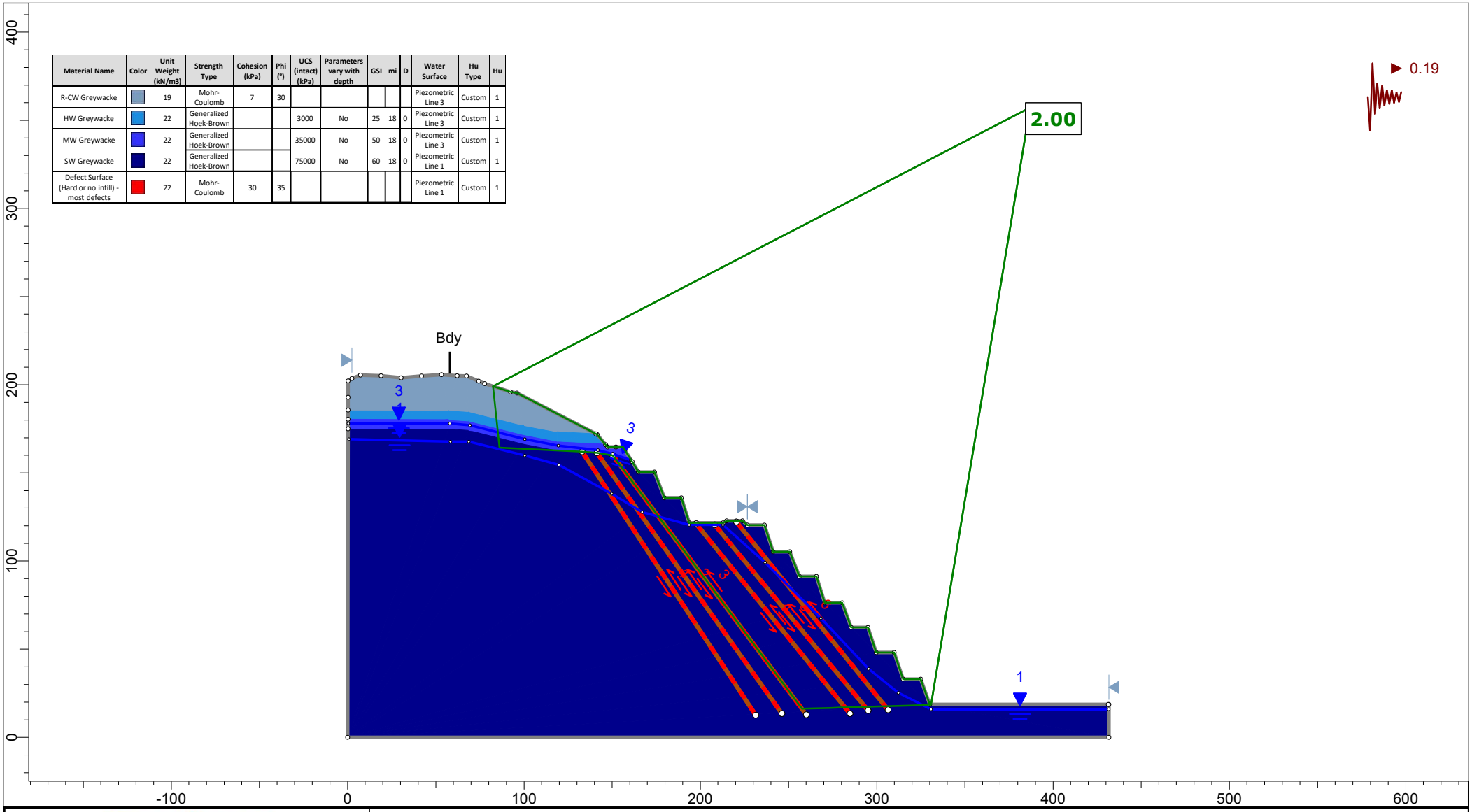
Project	Project MAHITAHI		
Group	Section 4	Scenario	Stage 8 - EGWT
		Company T+T	*Date:* 3/02/2026
File Name: Section4.slmd		*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 3	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 3	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 3	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1
Defect Surface (Hard or no infill) - most defects		22	Mohr-Coulomb	30	35						Piezometric Line 1	Custom	1



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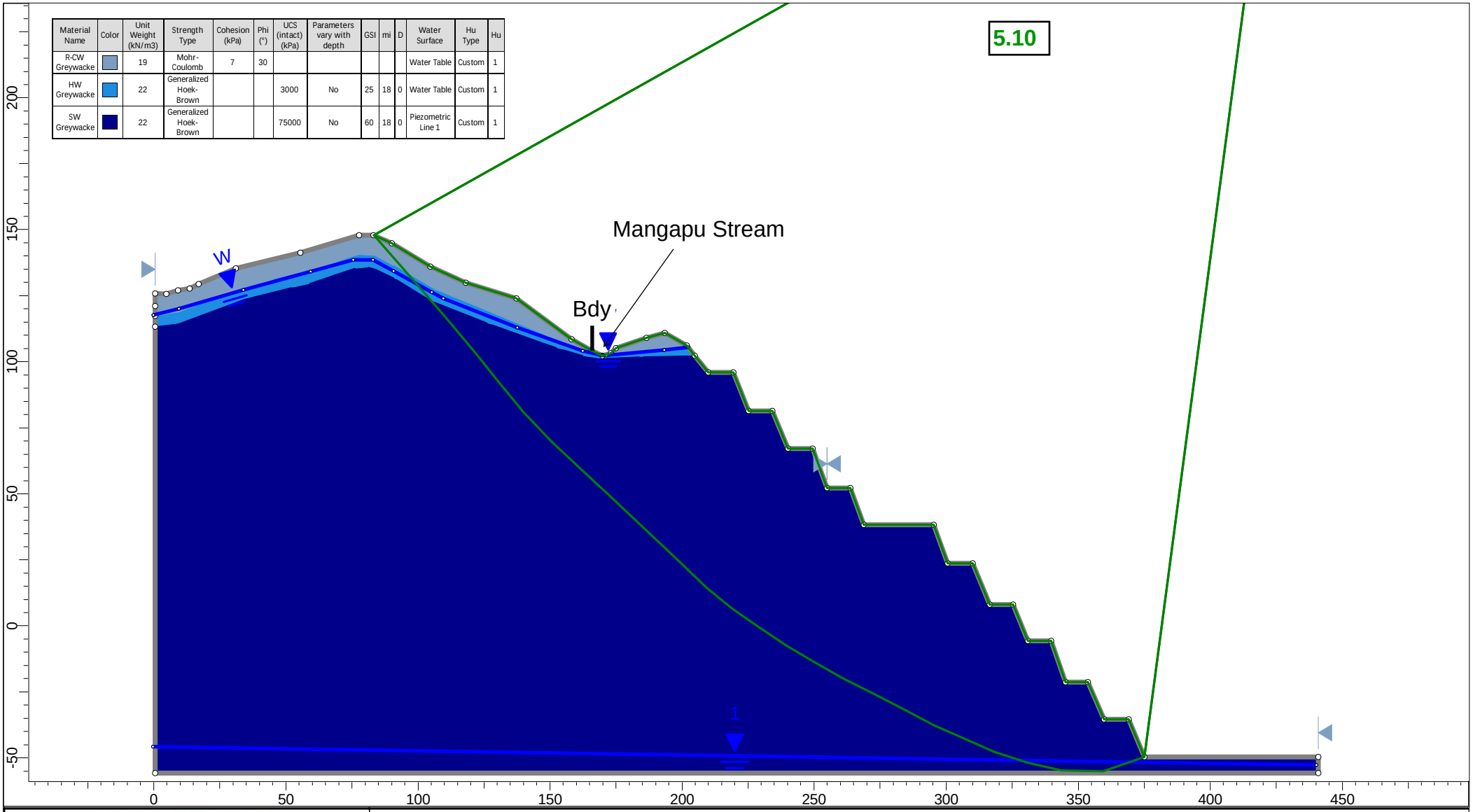
Project	Project MAHITAHI		
Analysis Description:	Section 4	Scenario name	Stage 8 - Seismic
		Company TT	*Date:* 20/02/2026
File Name:	Section4.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1



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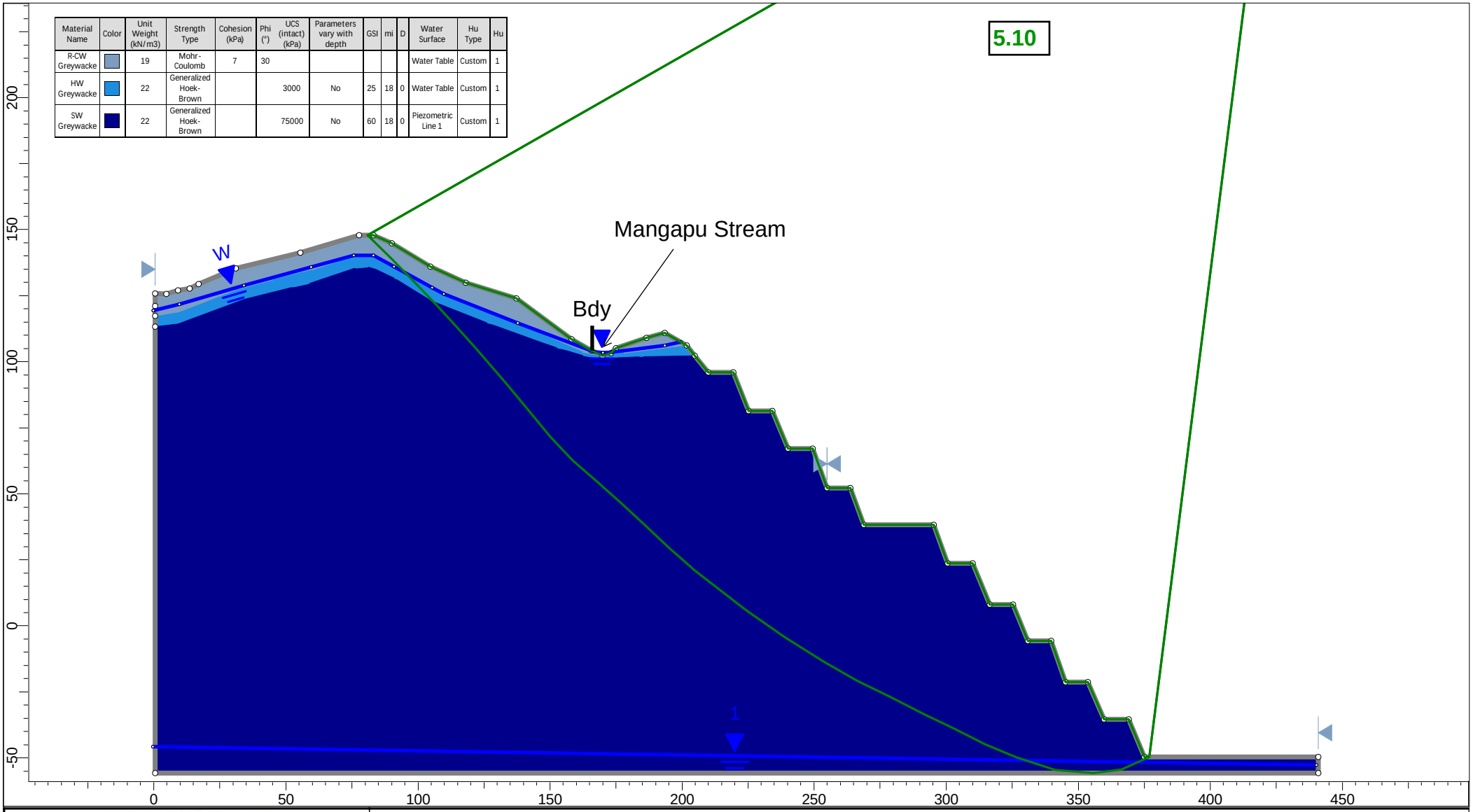
Project	Project Mahitahi		
Group	Section 5	Scenario	Stage 8 - Static
		Company T+T	*Date:* 28/01/2026
File Name:	Section5 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1



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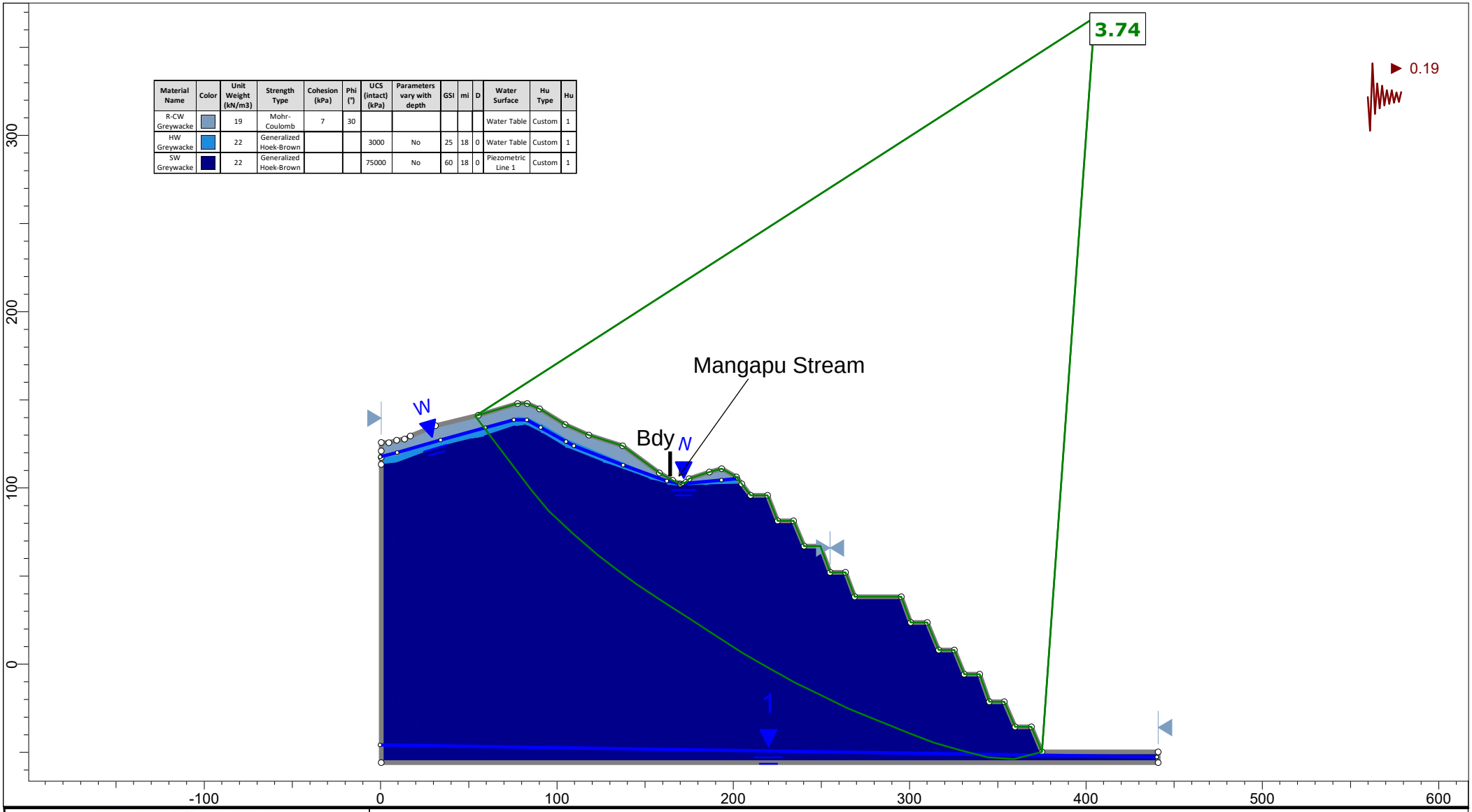
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Group	Section 5	Scenario	Stage 8 - EGWT
		Company T+T	*Date:* 28/01/2026
File Name:	Section5 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1



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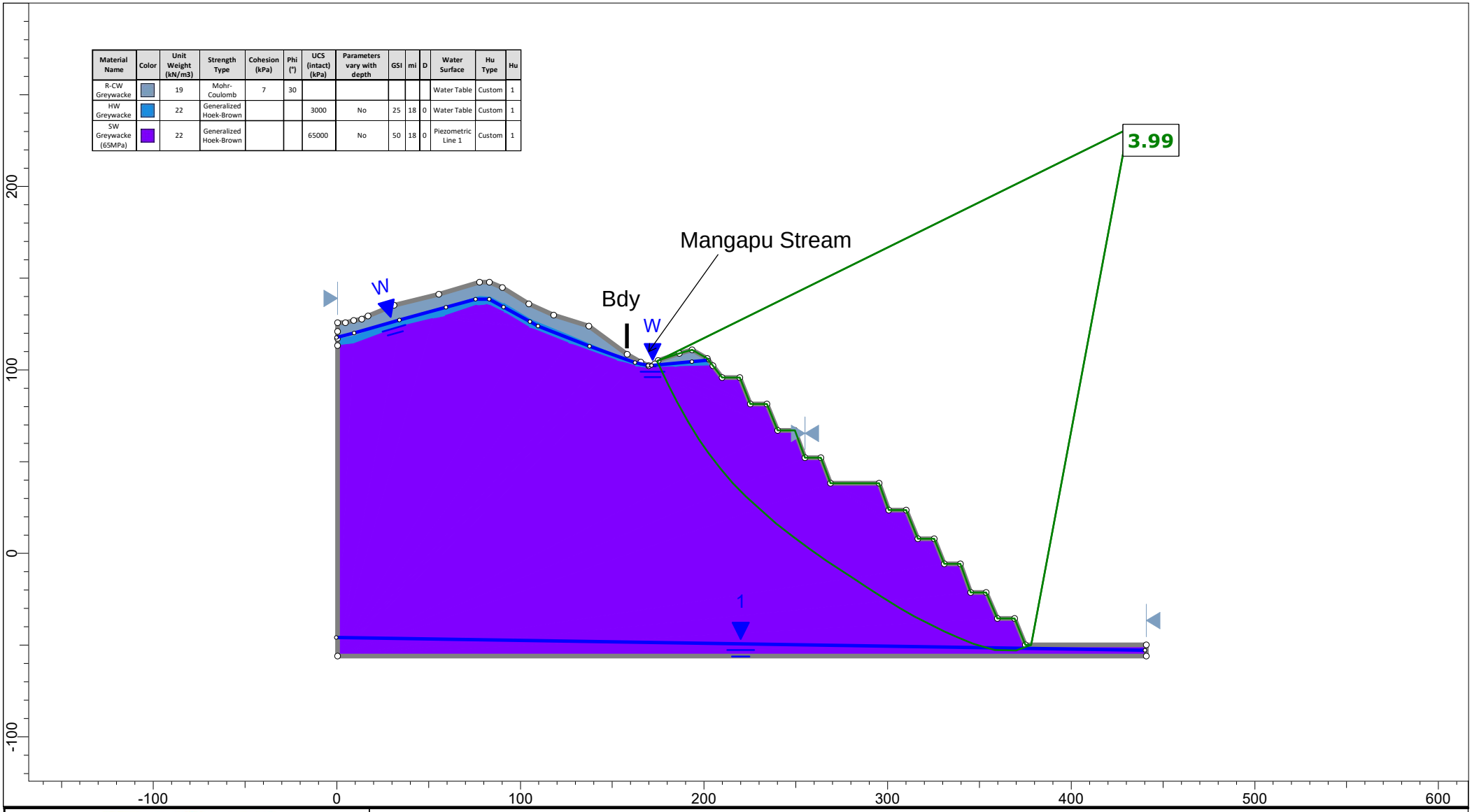
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Stage 8 - Seismic
		Company TT	*Date:* 21/02/2026
File Name:	Section5 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (65MPa)		22	Generalized Hoek-Brown			65000	No	50	18	0	Piezometric Line 1	Custom	1



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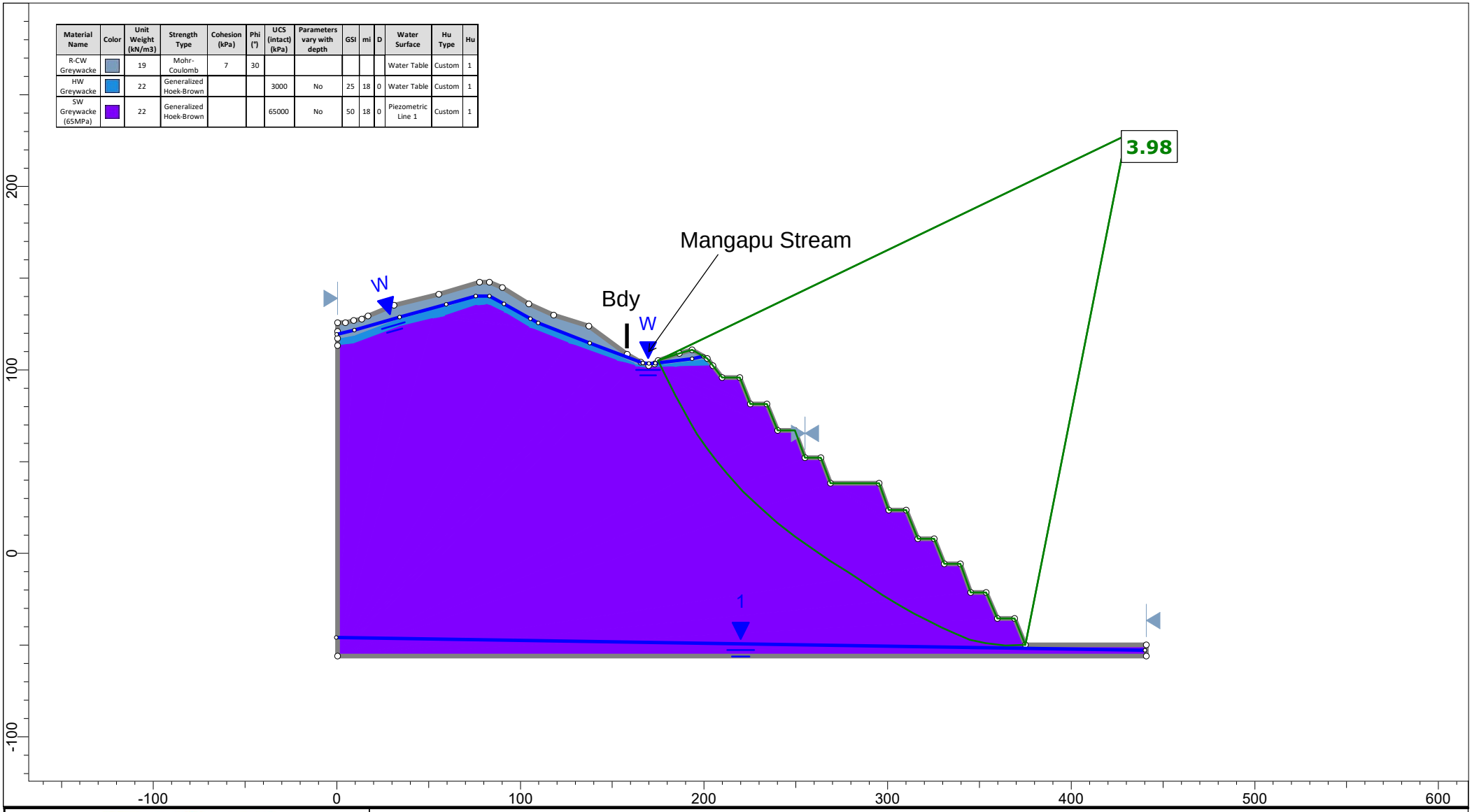
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 1 - Stage 8 - Static
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (65MPa)		22	Generalized Hoek-Brown			65000	No	50	18	0	Piezometric Line 1	Custom	1



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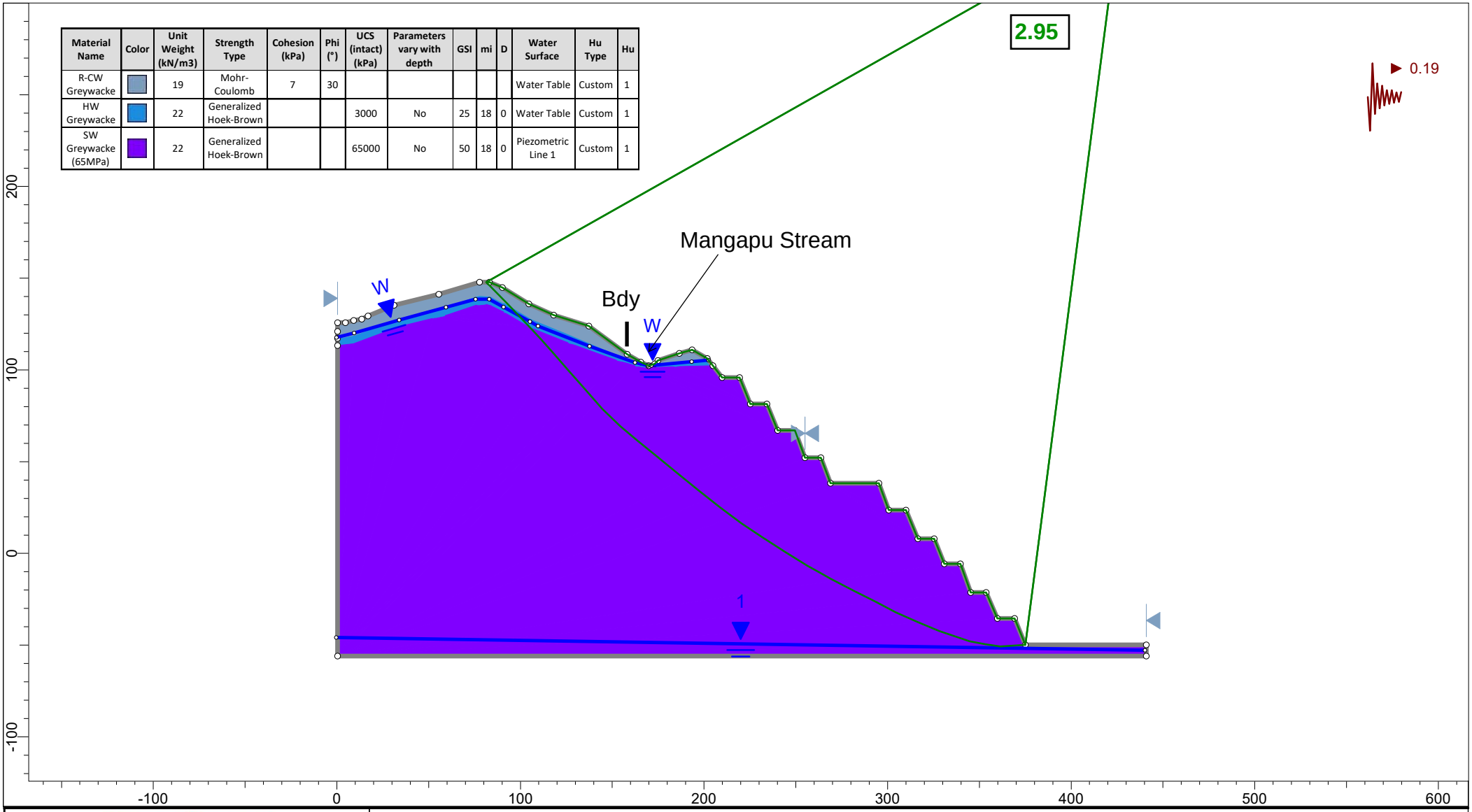
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 1 - Stage 8 - EGWT
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (65MPa)		22	Generalized Hoek-Brown			65000	No	50	18	0	Piezometric Line 1	Custom	1



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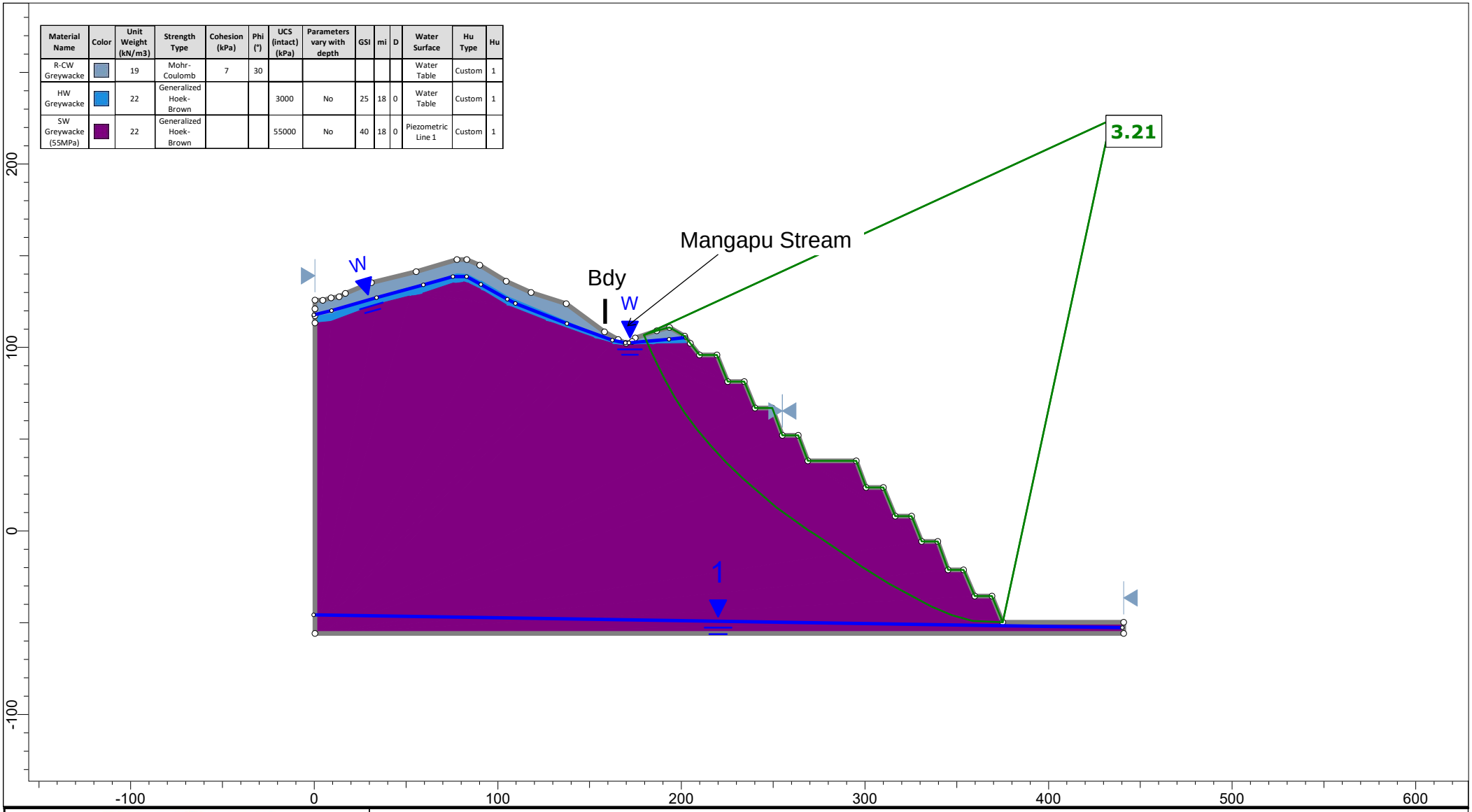
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 1 - Stage 8 - Seismic
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (55MPa)		22	Generalized Hoek-Brown			55000	No	40	18	0	Piezometric Line 1	Custom	1



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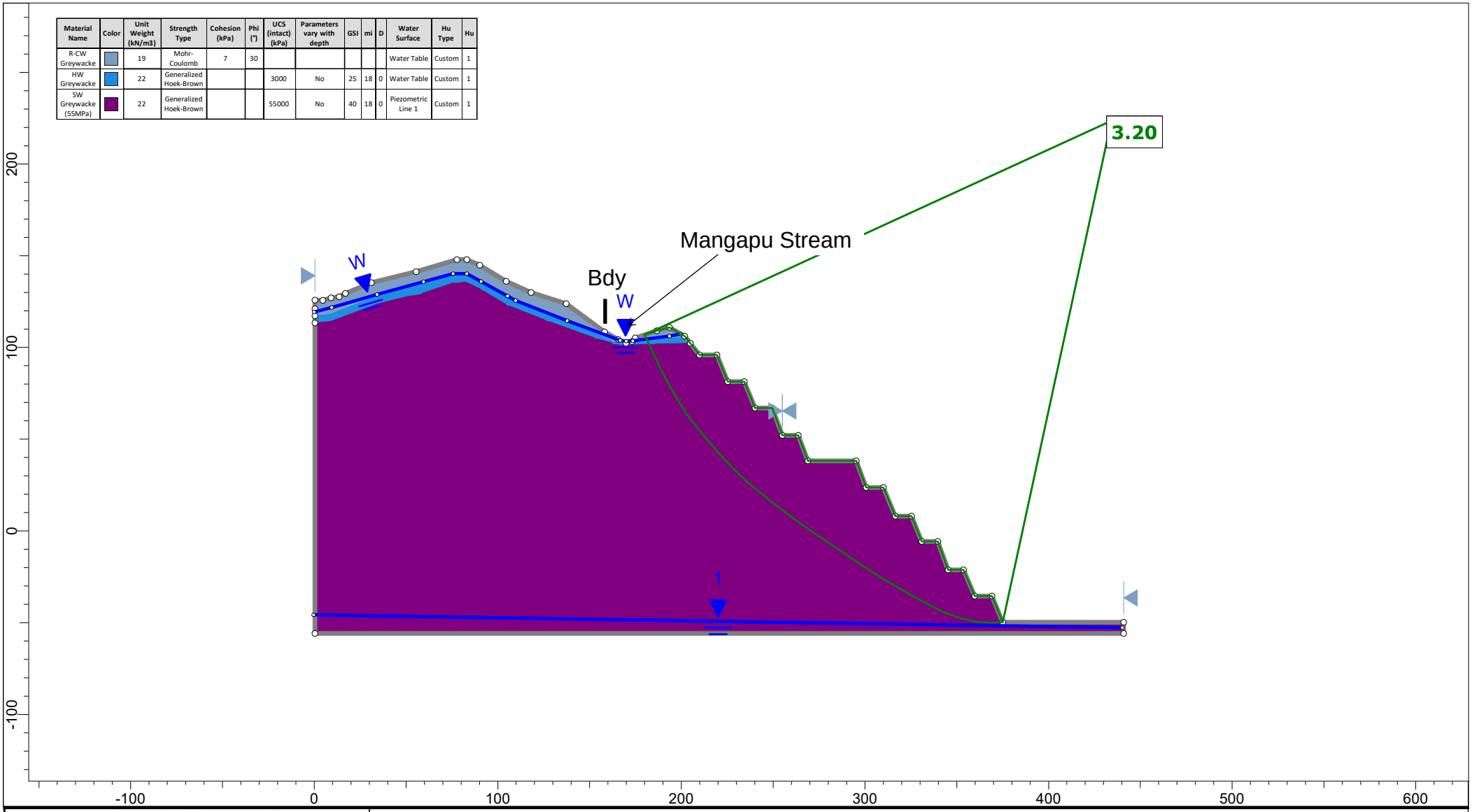
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 2 - Stage 8 - Static
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (55MPa)		22	Generalized Hoek-Brown			55000	No	40	18	0	Piezometric Line 1	Custom	1



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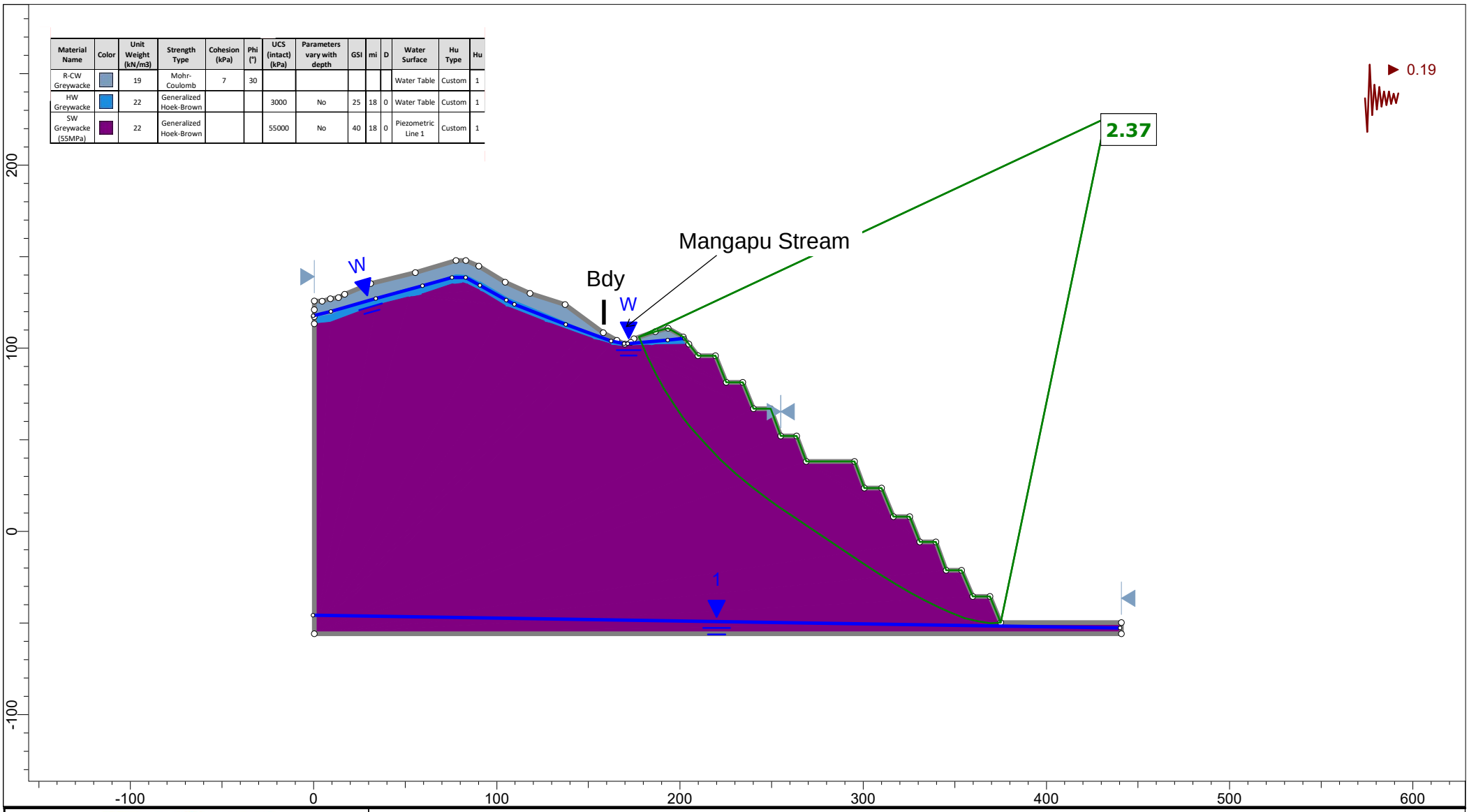
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 2 - Stage 8 - EGWT
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (55MPa)		22	Generalized Hoek-Brown			55000	No	40	18	0	Piezometric Line 1	Custom	1



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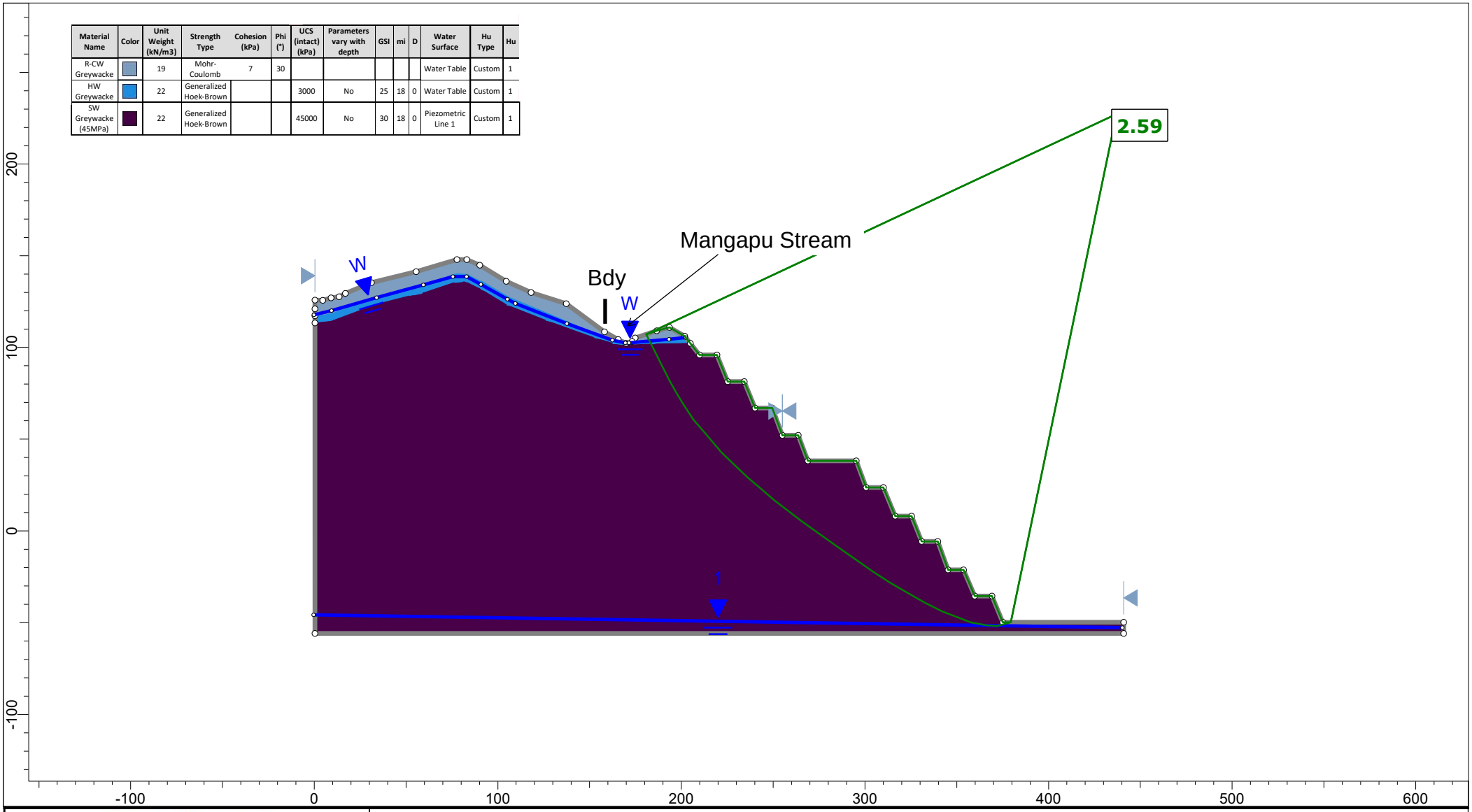
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 2 - Stage 8 - Seismic
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (45MPa)		22	Generalized Hoek-Brown			45000	No	30	18	0	Piezometric Line 1	Custom	1



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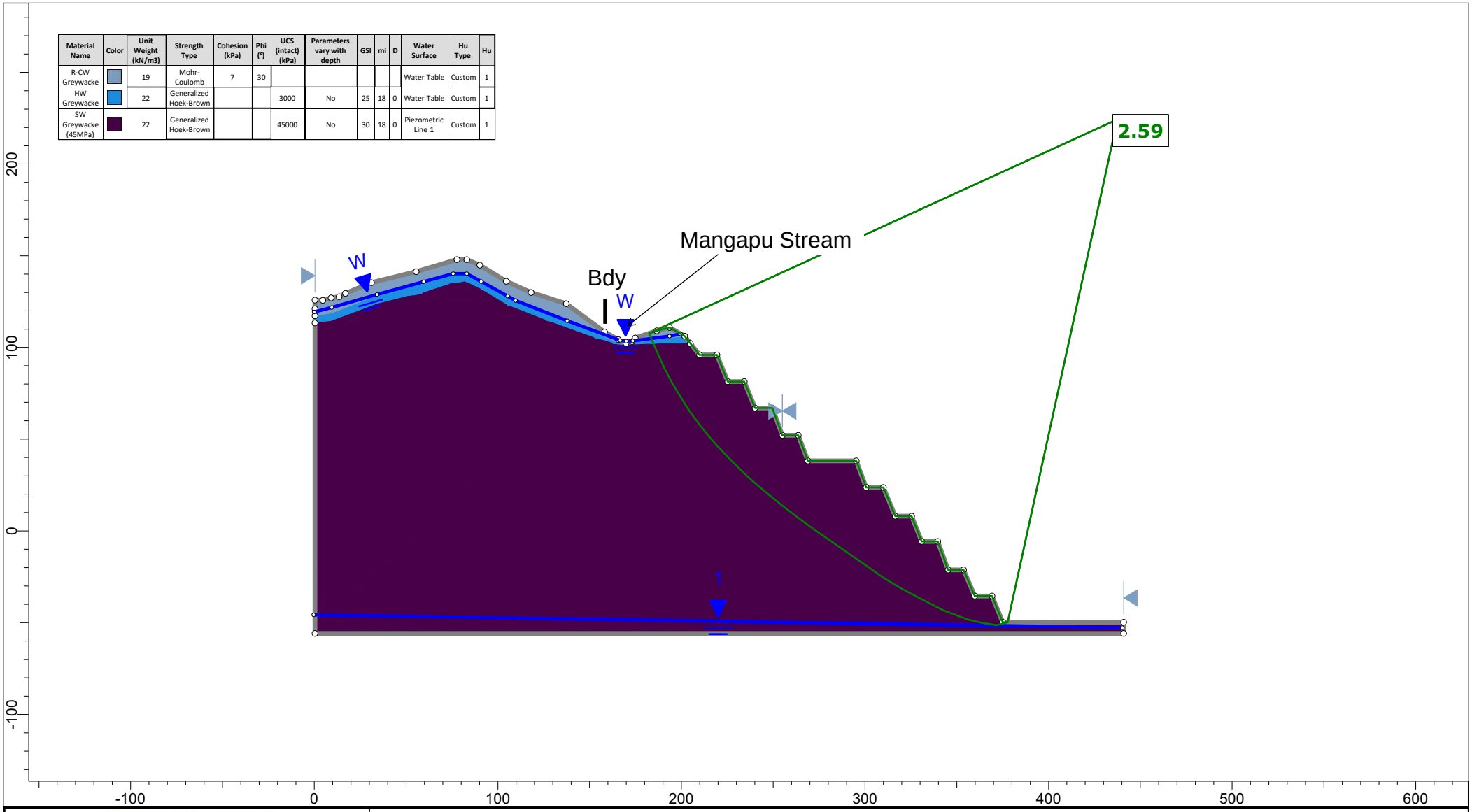
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 3 - Stage 8 - Static
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (45MPa)		22	Generalized Hoek-Brown			45000	No	30	18	0	Piezometric Line 1	Custom	1



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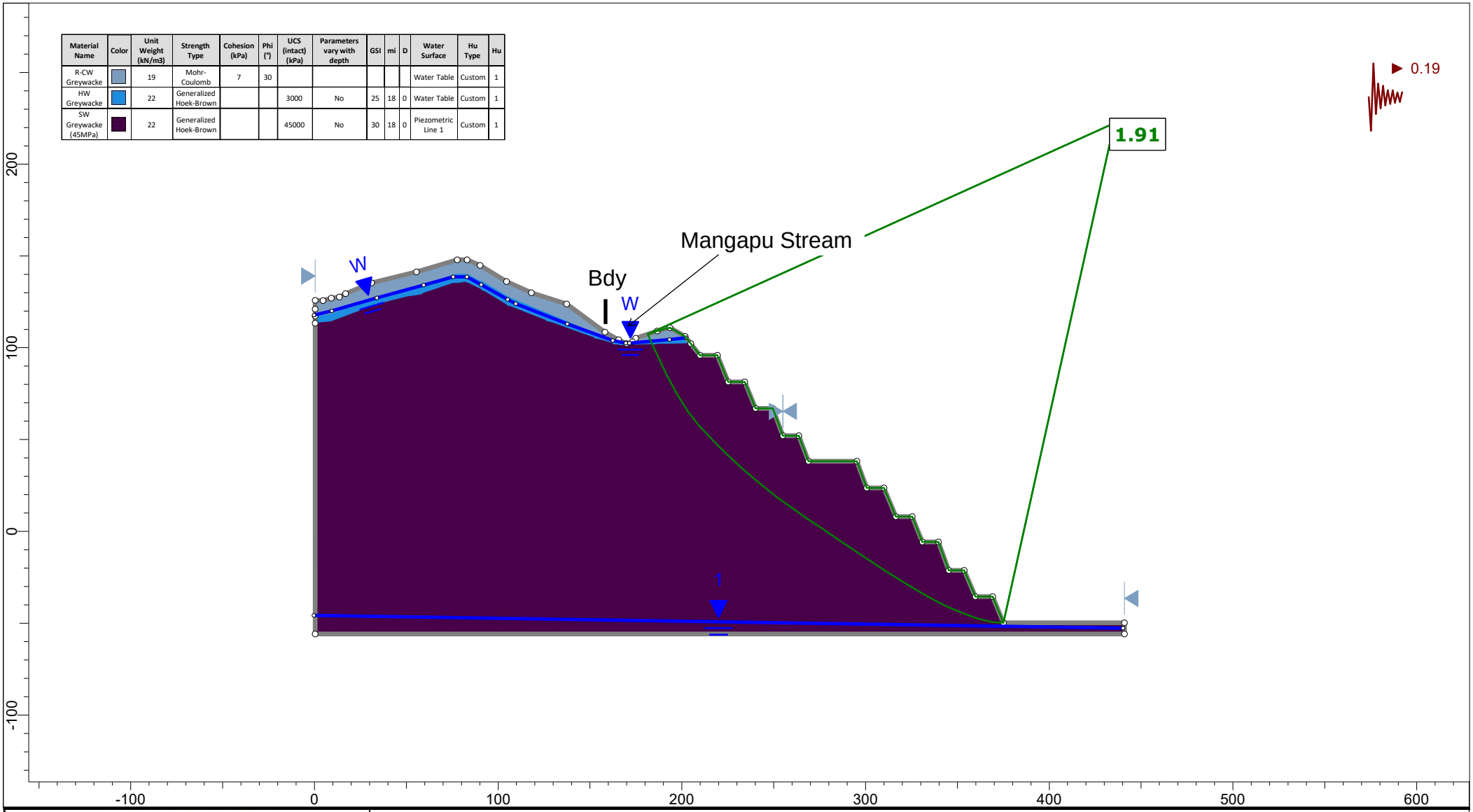
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 3 - Stage 8 - EGWT
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (45MPa)		22	Generalized Hoek-Brown			45000	No	30	18	0	Piezometric Line 1	Custom	1



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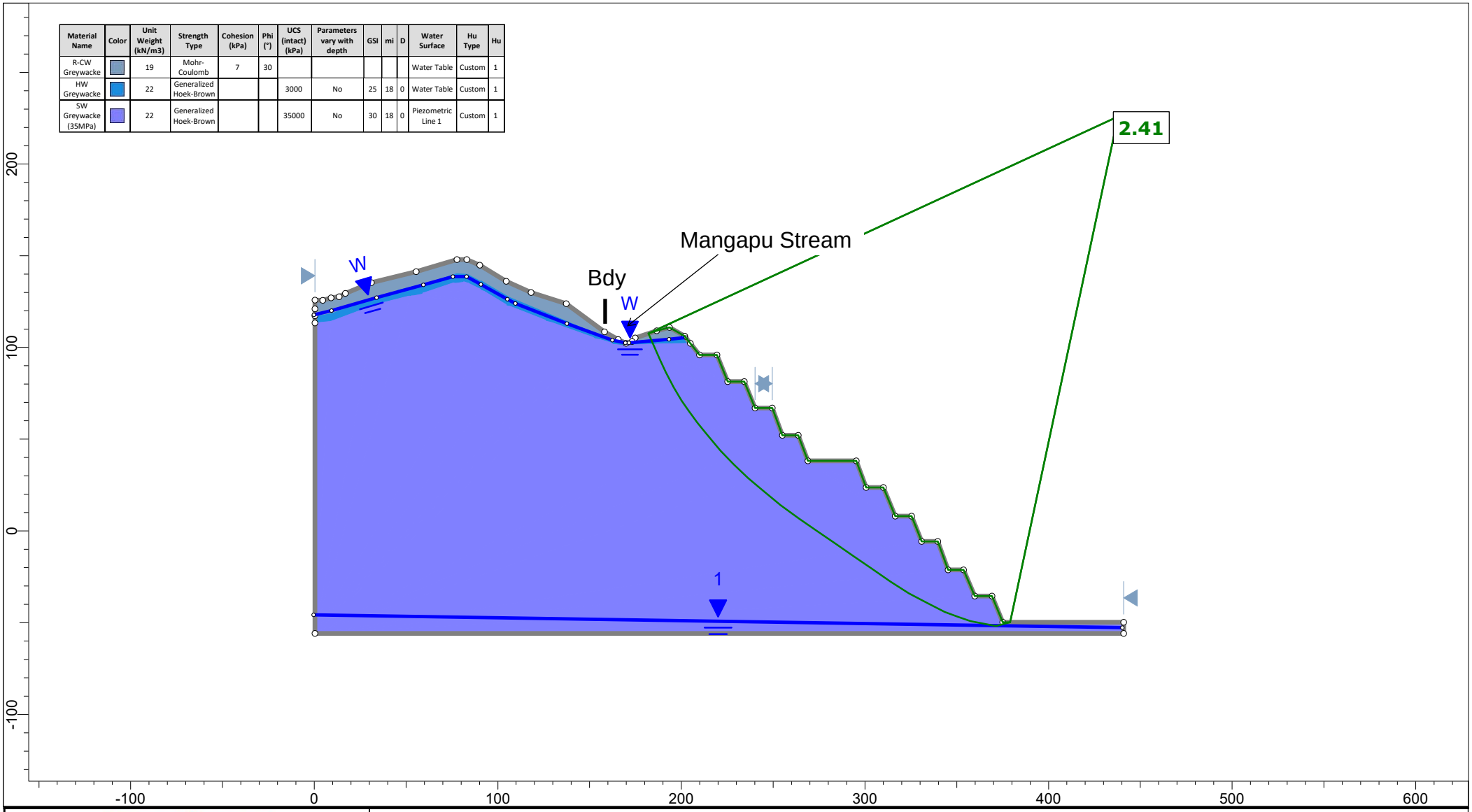
SLIDEINTERPRET 9.028

Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 3 - Stage 8 - Seismic
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (35MPa)		22	Generalized Hoek-Brown			35000	No	30	18	0	Piezometric Line 1	Custom	1



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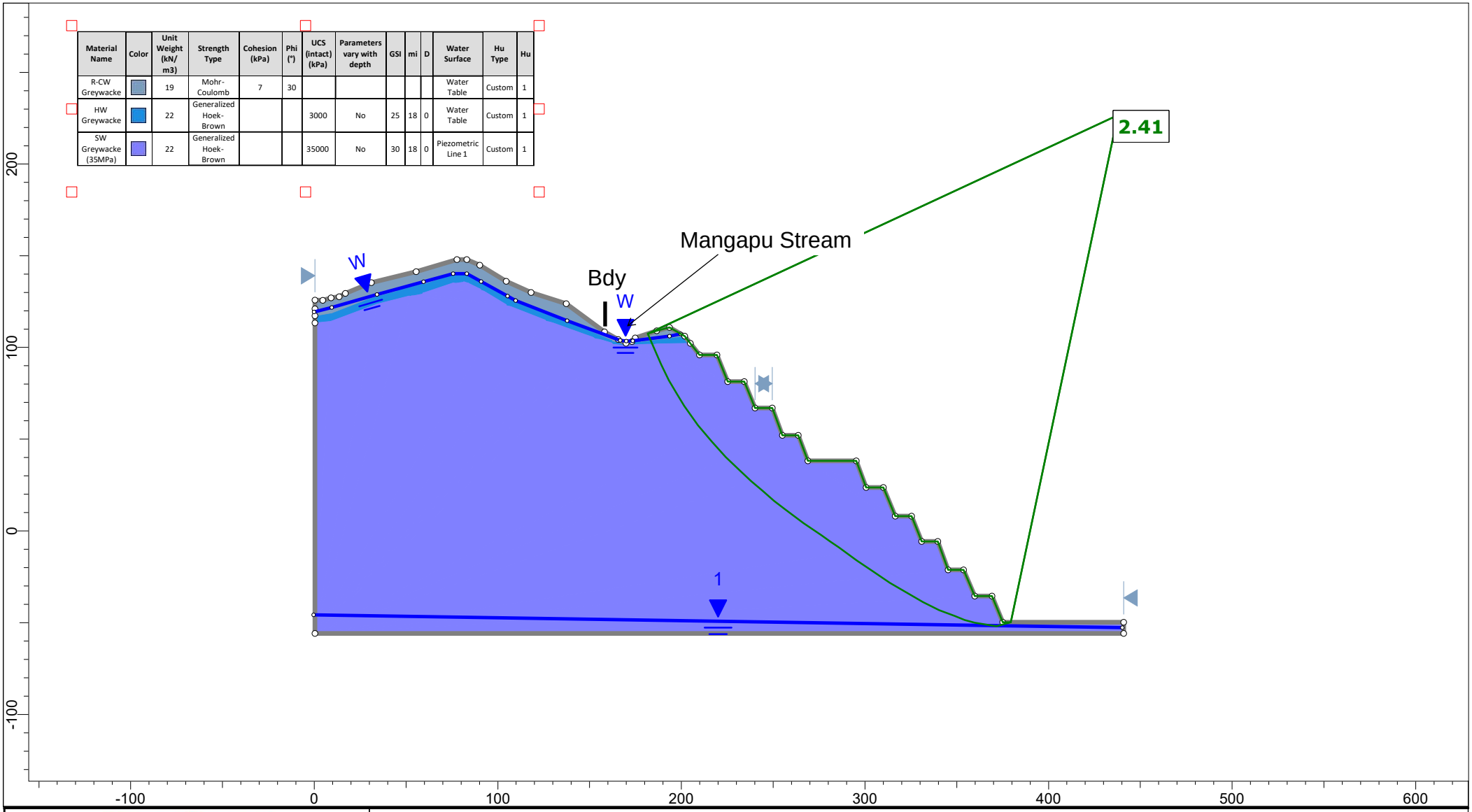
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 4 - Stage 8 - Static
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (35MPa)		22	Generalized Hoek-Brown			35000	No	30	18	0	Piezometric Line 1	Custom	1



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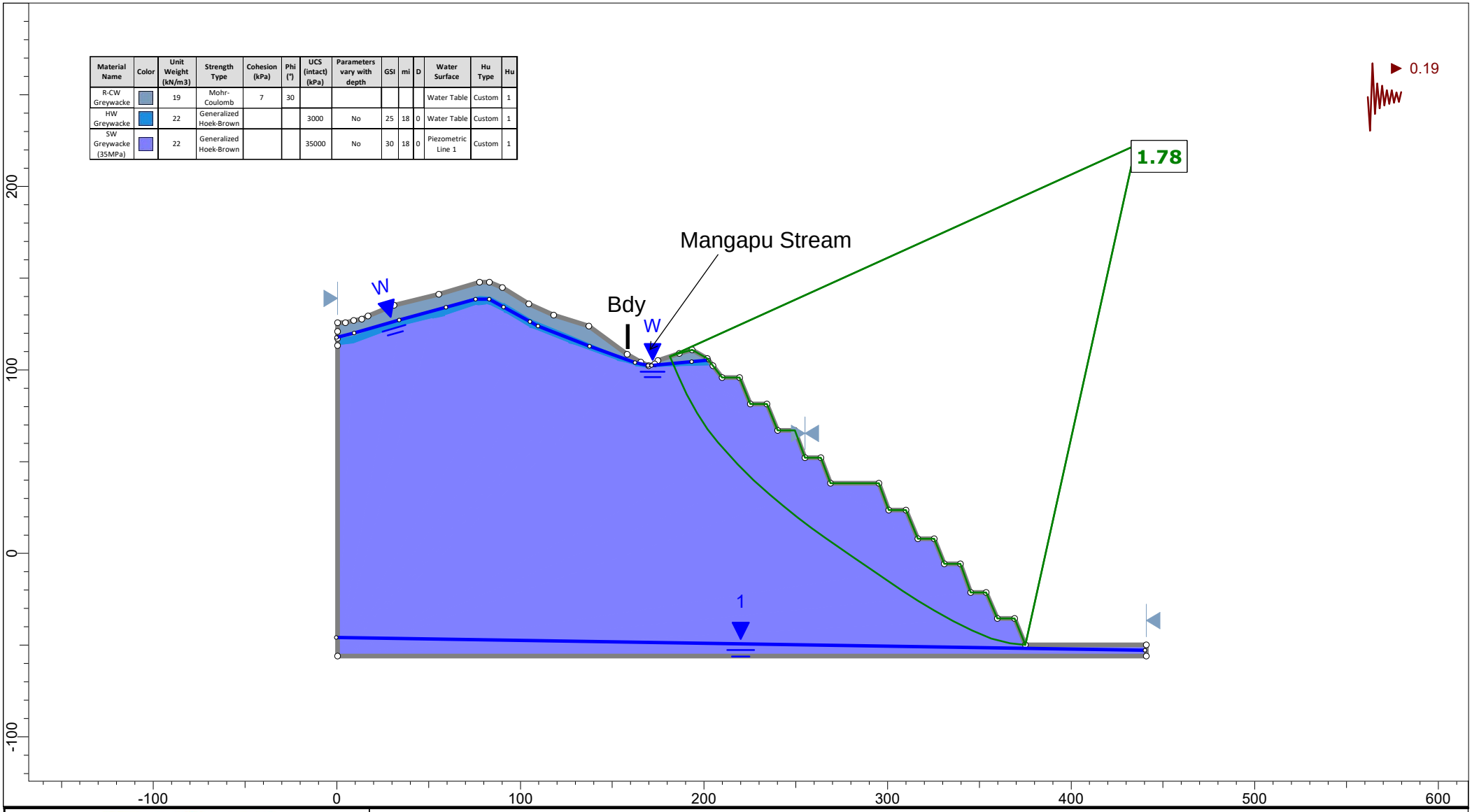
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 4 - Stage 8 - EGWT
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (35MPa)		22	Generalized Hoek-Brown			35000	No	30	18	0	Piezometric Line 1	Custom	1



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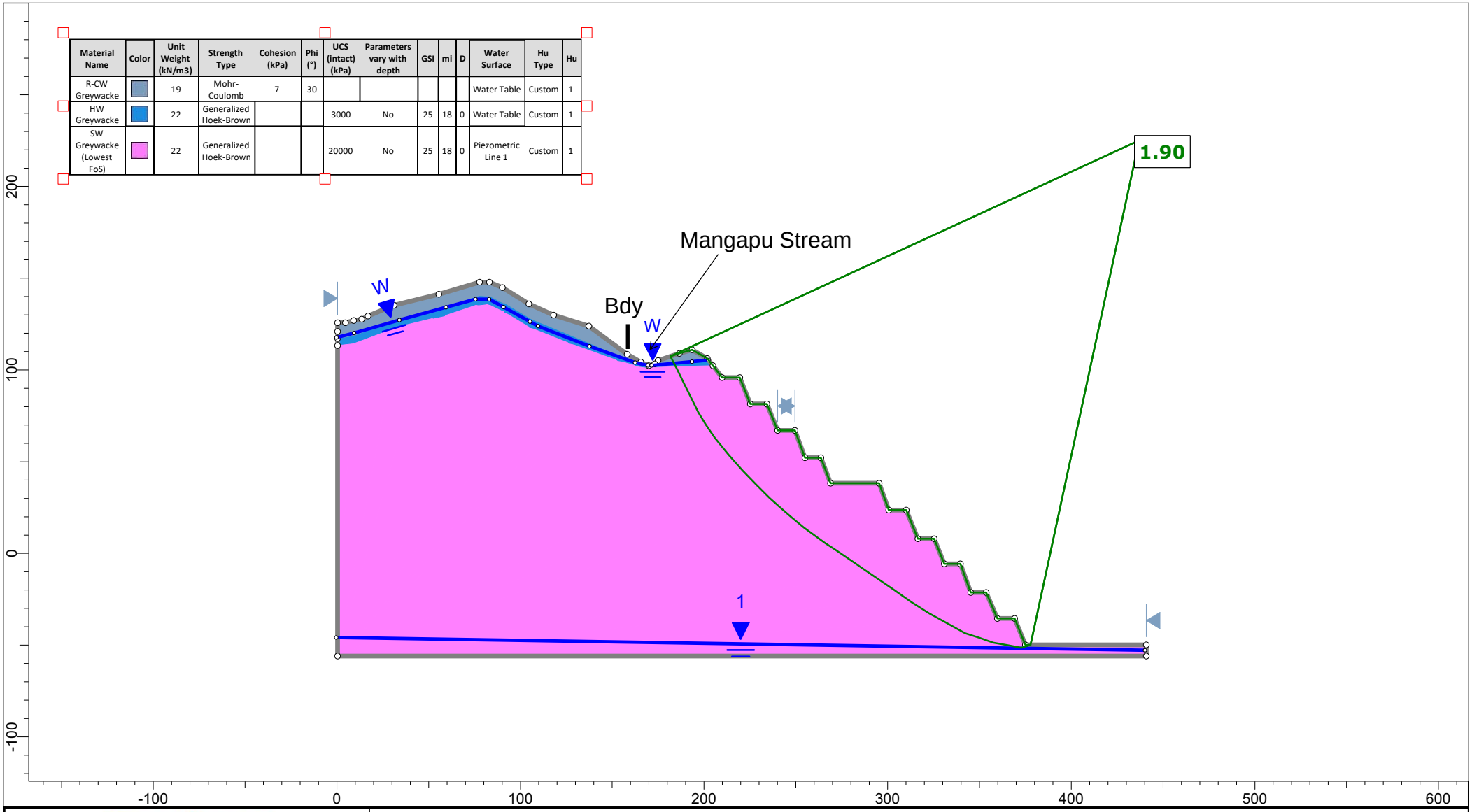
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 4 - Stage 8 - Seismic
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (Lowest FoS)		22	Generalized Hoek-Brown			20000	No	25	18	0	Piezometric Line 1	Custom	1



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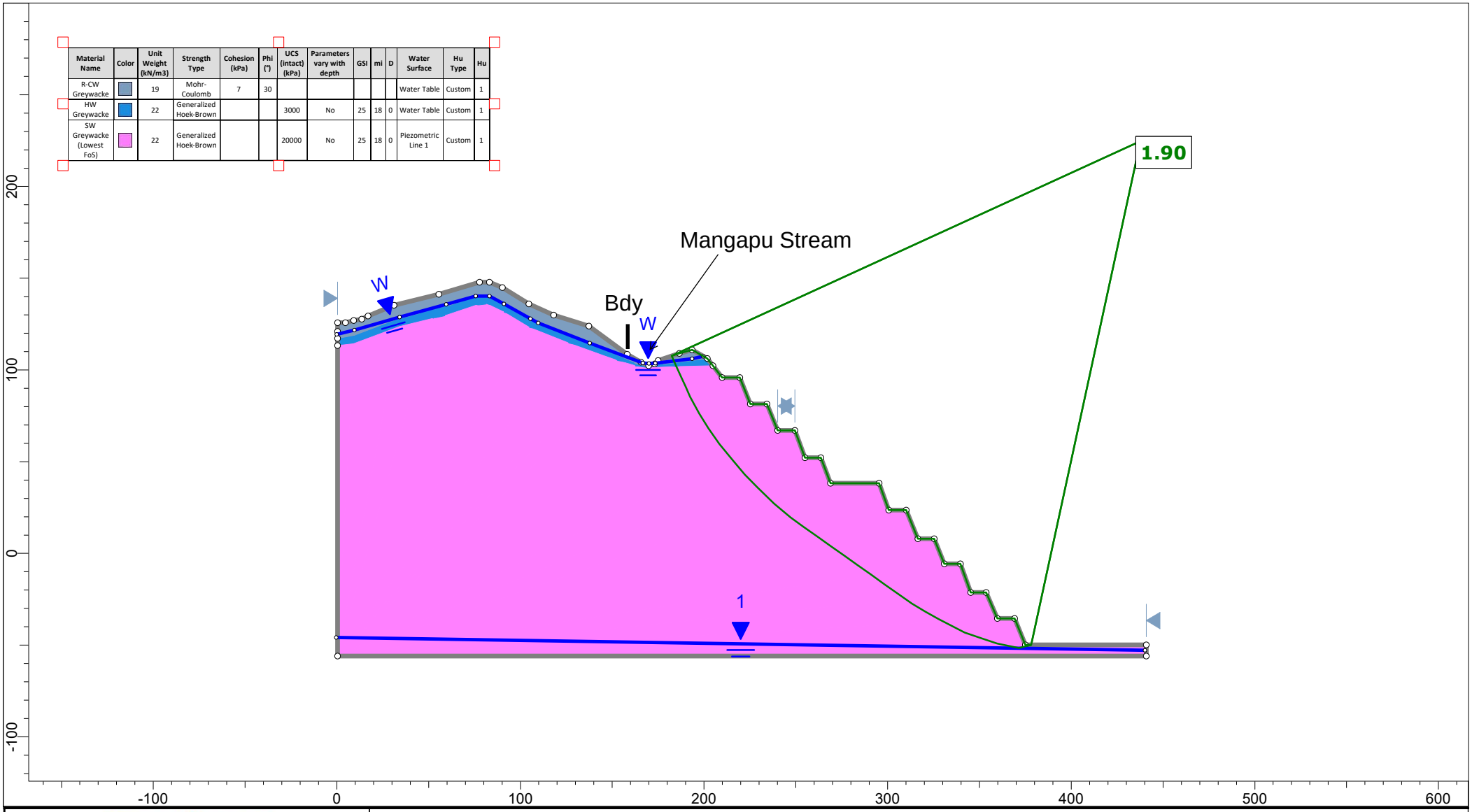
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 5 - Stage 8 - Static
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (Lowest FoS)		22	Generalized Hoek-Brown			20000	No	25	18	0	Piezometric Line 1	Custom	1



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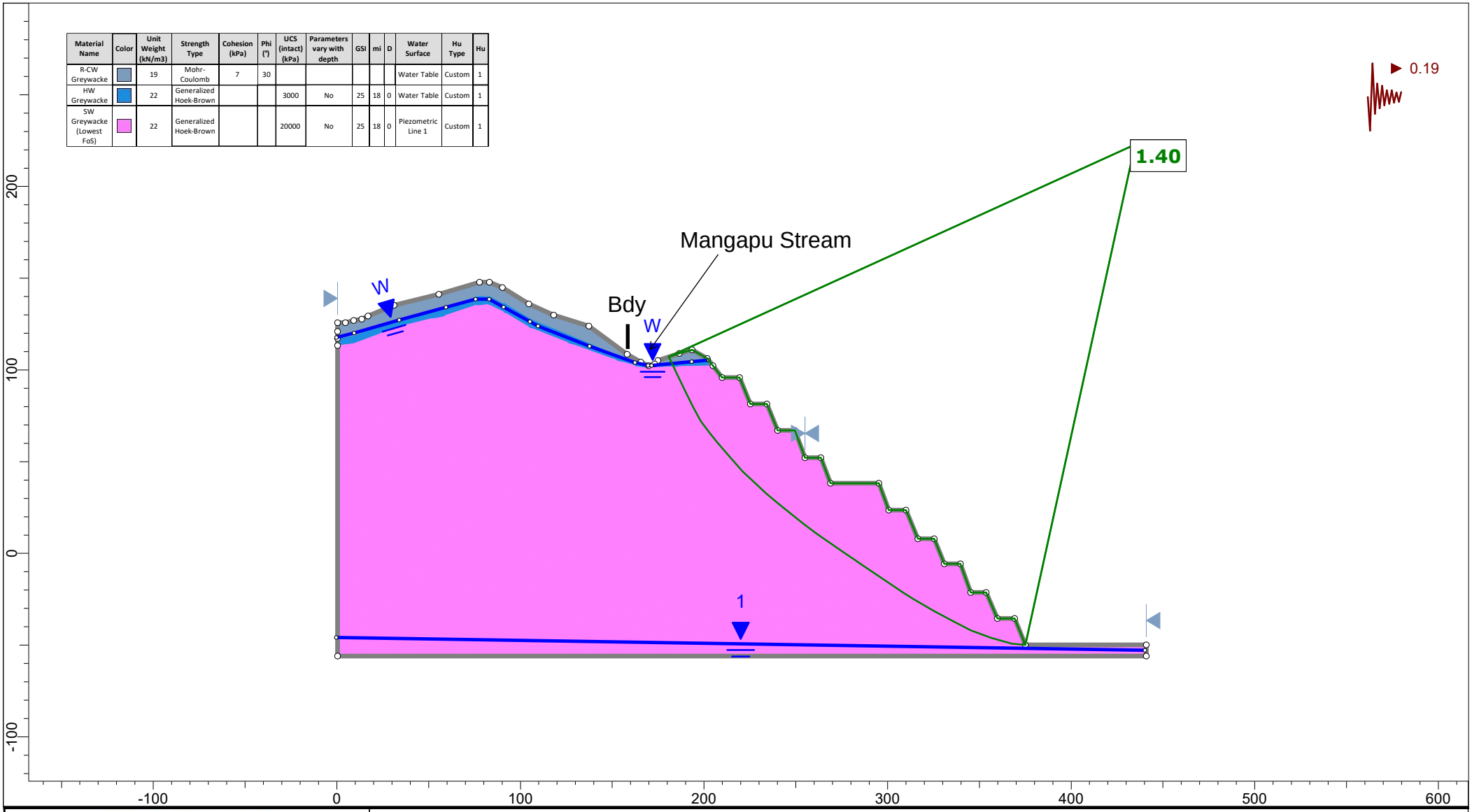
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 5 - Stage 8 - EGWT
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
SW Greywacke (Lowest FoS)		22	Generalized Hoek-Brown			20000	No	25	18	0	Piezometric Line 1	Custom	1



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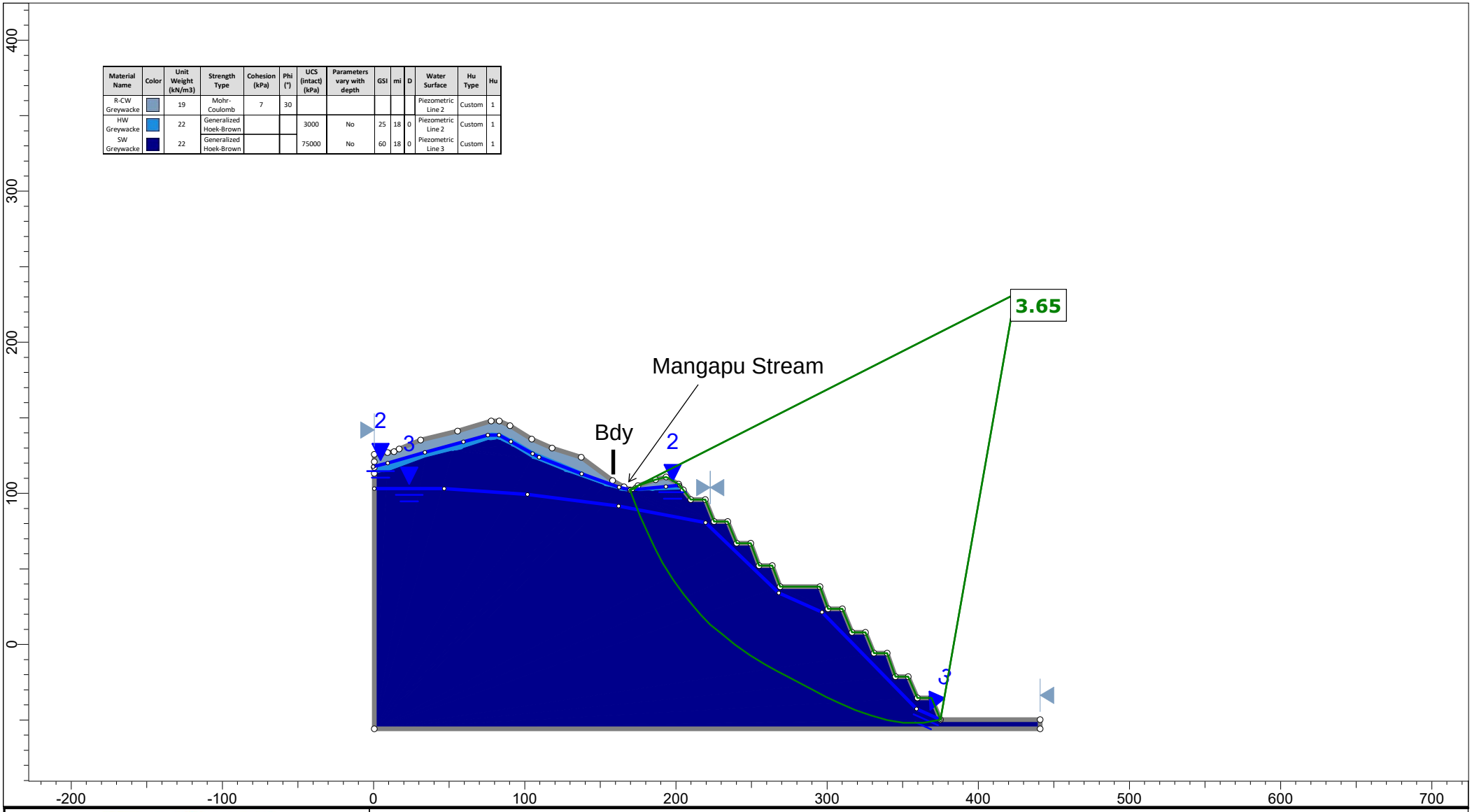
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 5 - Stage 8 - Seismic
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2_global stability check.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 2	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 2	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 3	Custom	1



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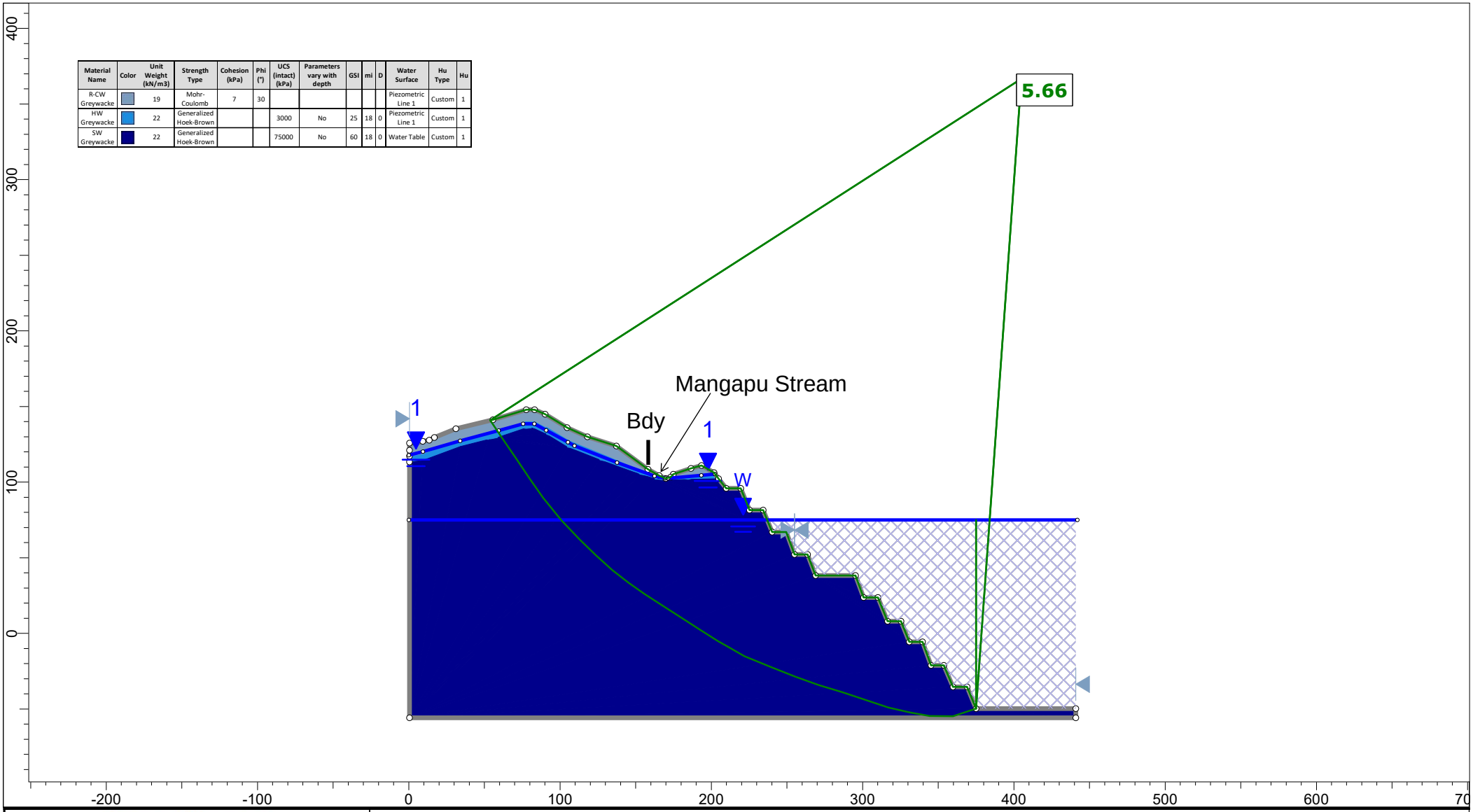
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 6 - Stage 8 - Alternate GWT
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 1	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Water Table	Custom	1



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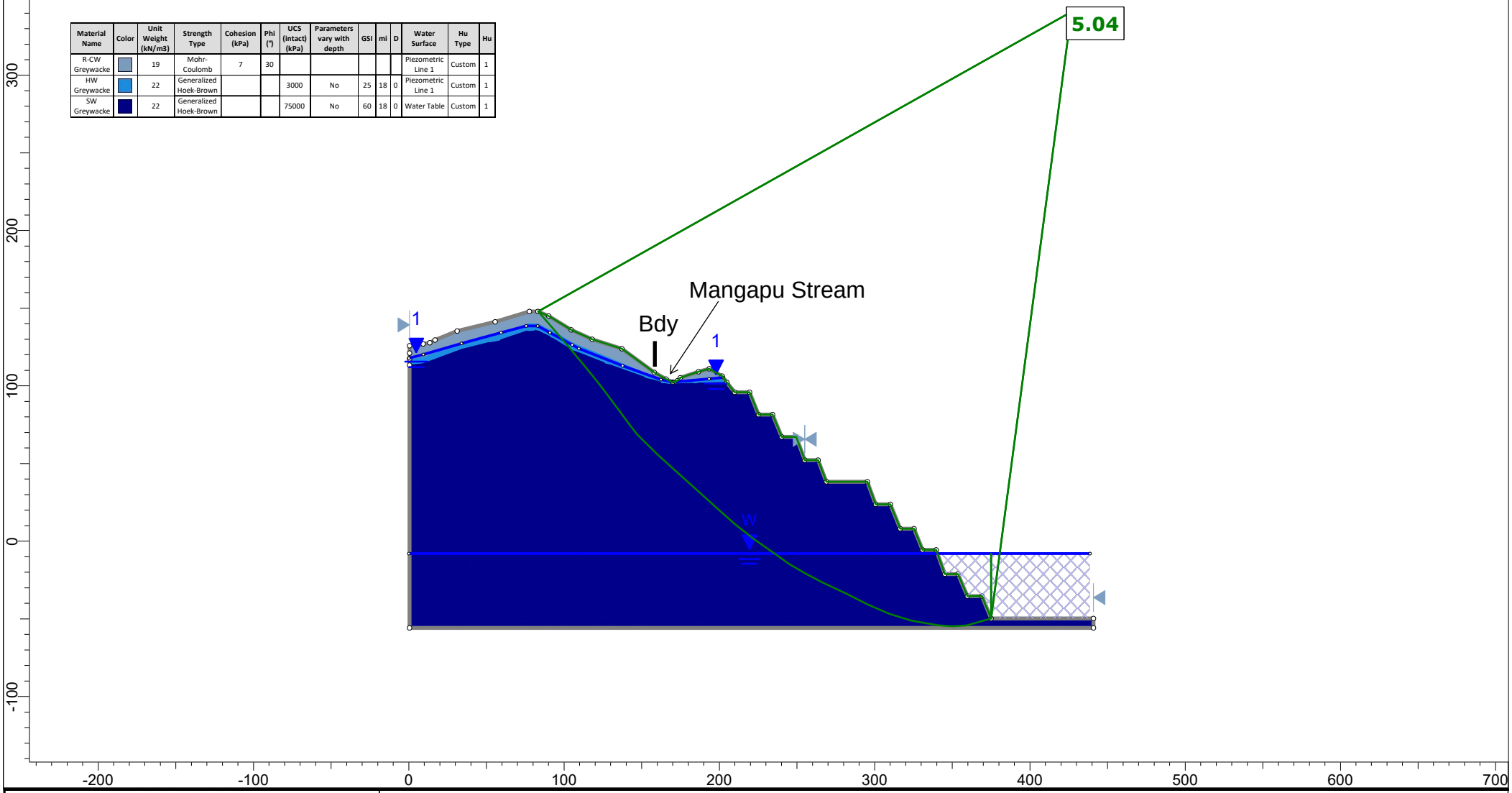
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 7 - Quarry Closure - Full Lake
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 1	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 1	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Water Table	Custom	1



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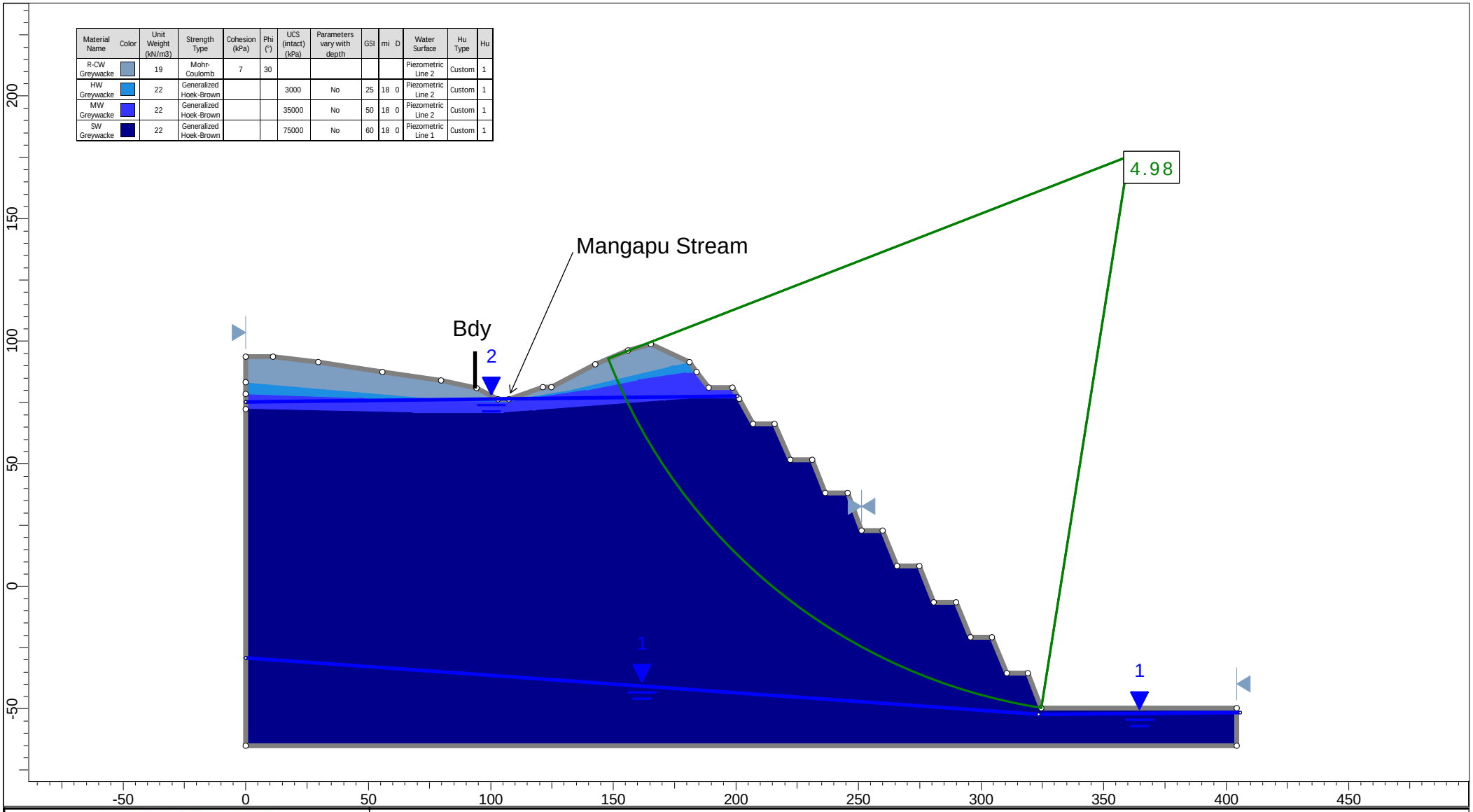
Project	Project Mahitahi		
Analysis Description:	Section 5	Scenario name	Sensitivity Check 8 - Quarry Closure - 1/3 Full
		Company TT	*Date:* 4/02/2026
File Name:	Section5 Rev2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 2	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 2	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1



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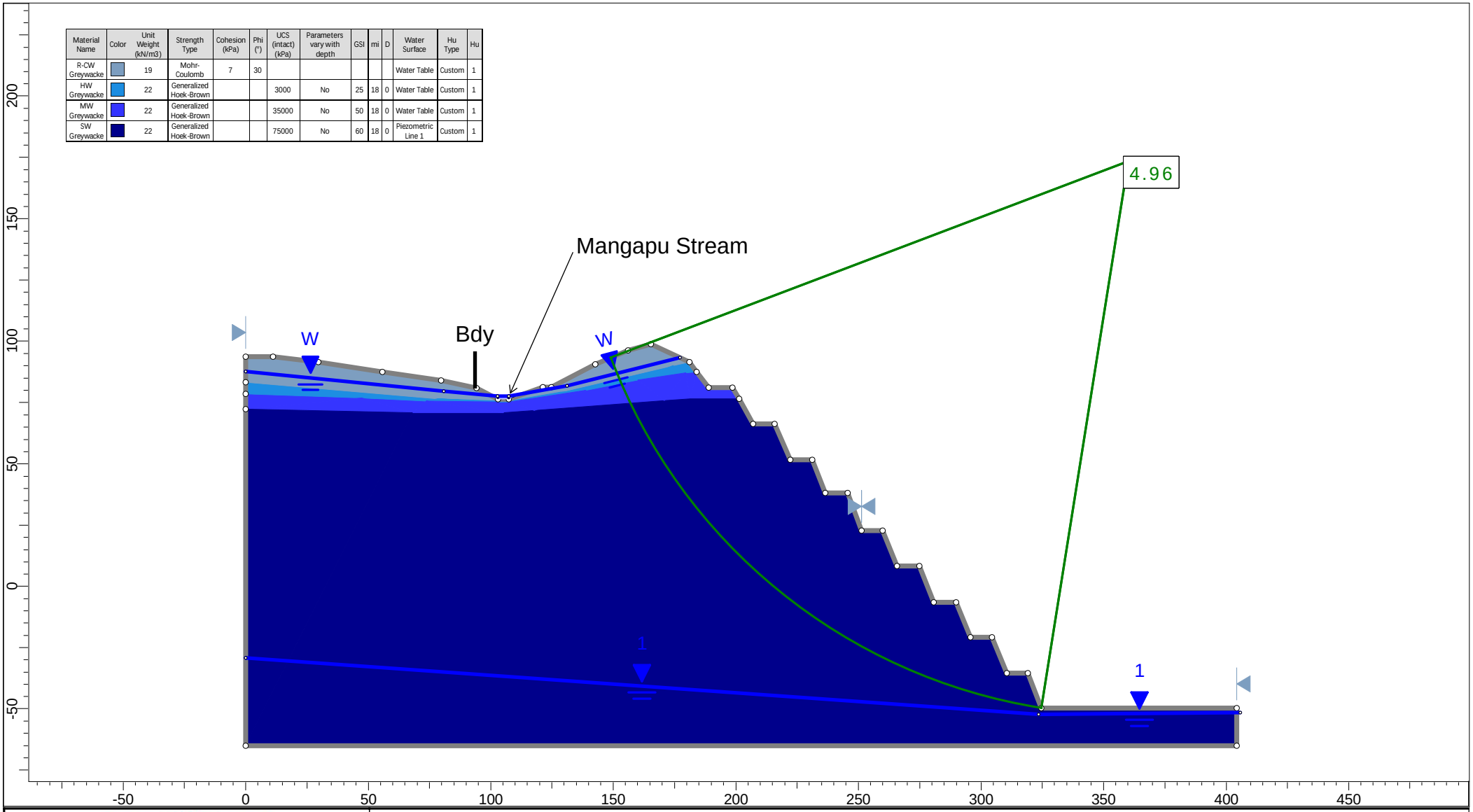
Project	Project Mahitahi		
Group	Section 6	Scenario	Stage 8 - Static
		Company T+T	*Date:* 28/01/2026
File Name:	Section 6 Rv2.slmd	*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Water Table	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Water Table	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Water Table	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1



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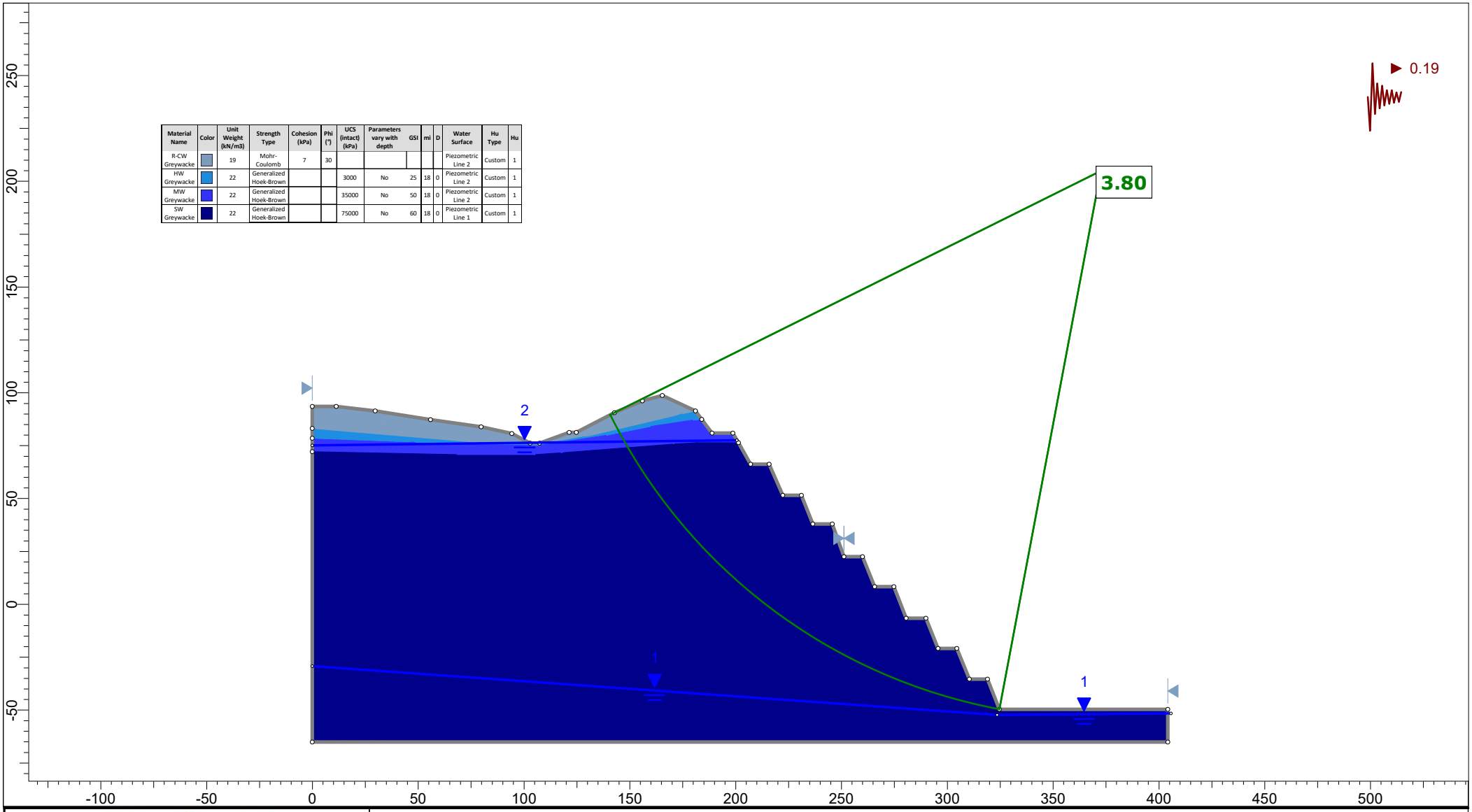
Project	Project Mahitahi		
Group	Section 6	Scenario	Stage 8 - EGWT
		Company T+T	*Date:* 28/01/2026
File Name: Section 6 Rv2.slmd		*Author:* JOWI	*Checked:* PRMM

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (°)	UCS (intact) (kPa)	Parameters vary with depth	GSI	mi	D	Water Surface	Hu Type	Hu
R-CW Greywacke		19	Mohr-Coulomb	7	30						Piezometric Line 2	Custom	1
HW Greywacke		22	Generalized Hoek-Brown			3000	No	25	18	0	Piezometric Line 2	Custom	1
MW Greywacke		22	Generalized Hoek-Brown			35000	No	50	18	0	Piezometric Line 2	Custom	1
SW Greywacke		22	Generalized Hoek-Brown			75000	No	60	18	0	Piezometric Line 1	Custom	1



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Project	Project Mahitahi		
Analysis Description:	Section 6	Scenario name	Stage 8 - Seismic
		Company TT	*Date:* 21/02/2026
File Name:	Section 6 Rv2.slmd	*Author:* JOWI	*Checked:* PRMM

Appendix H Design Risk Tables

A summary of the design risk tables and definitions of risk terms adopted for this assessment are set out below. In relation to the geotechnical design it is understood that the following apply:

- R1 for all land and land use beyond the site boundary (not in FCIL ownership)
- R1 / R2 for land within the site boundary (owned by FCIL but beyond consent boundary)
- R2 for main overall quarry design with and consented design pit shell
- R3 for selected design elements within the quarry where the consequences of failure can be managed
- R4 and R5 are unacceptable in all cases

Risk Assessment Matrix

		Consequence				
		Low	Moderate	High	Very High	Extreme
Likelihood	Certain/Defined	R2	R3	R4	R5	R5
	Almost Certain	R1	R2	R3	R4	R5
	Likely	R1	R2	R3	R4	R4
	Possible	R1	R2	R3	R3	R4
	Unlikely	R1	R1	R2	R3	R3
	Rare	R1	R1	R1	R2	R2

Term Definitions

Likelihood	Certain/Defined	Attribute observed and measured across the full extent of design and operation
	Almost Certain	Attribute observed and measured / forecast with confidence across the full extent of design and operation
	Likely	Attribute not observed but expected and maybe forecast to occur within extent of design and operations
	Possible	Attribute not observed on site and while not forecast could occur within extent of design and operations
	Unlikely	Attribute not observed on site and while not expected cannot be ruled out within extent of design and operations
	Rare	Attribute not observed and not expected to occur within extent of design and operations

Consequence	Low	No disruption to commercial operations. No measurable offsite effects and no H&S implications. Impacts can be managed with standard operations.
	Moderate	Minor disruption to commercial operations. Offsite effects are measurable, however, are less than minor. Increased risk of H&S non-compliance.
	High	Greater disruption to commercial operations and H&S implications (potentially unsafe activities). Measurable offsite effects unlikely to cause damage. Impacts require specific Design and Operations management.
	Very High	Significant commercial disruption and H&S implications and unsafe working conditions. Damaging offsite effects.
	Extreme	Major commercial disruption and H&S implications. Expected negative offsite effects.

Design Risk Appetite	**R1**	Acceptable Design Risk - Risk can be managed by design and standard management and operational plans
	R2	Acceptable Design Risk - Risk can be managed with mitigation measures in place
	R3	Acceptable Design Risk - BUT only with extensive mitigation measures and contingency plans in place
	R4	Unacceptable - Re-design required
	R5	Unacceptable – Project potentially not viable

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