DFH Joint Venture Limited

GEOTECHNICAL COMPLETION REPORT

Hitchen Block Stage 18, Pokeno

Project Reference: J00113
August 1, 2025

DOCUMENT CONTROL

Version	Date	Comments
A	1 August 2025	Issued for 224c

Version	Prepared By	Reviewed & Authorised By
A	Kyle Meffan **Associate Engineering Geologist** *CMEngNZ (PEngGeol)*	Chris Edwards **Principal Engineering Geologist** *CMEngNZ (PEngGeol)*

This report presents all supporting geotechnical data and our Suitability Statement in relation to land development works undertaken at the above location.

It has been prepared in accordance with instructions received from DFH Joint Venture Limited and forms part of the documentation required by Waikato District Council to achieve certification under Section 224(c) of the Resource Management Act.

If you have any queries or you require any further clarification on any aspects of this report, please do not hesitate to contact the engineers listed above.

CONTENTS

APPENDICES:

1 INTRODUCTION

This Geotechnical Completion Report (GCR) has been prepared for DFH Joint Venture Limited as part of the documentation required to be submitted to the Waikato District Council following residential subdivisional development.

It contains our Suitability Statement, relevant test data and the CivilPlan Consultants Limited as-built plan set relating to Stage 18 of the Hitchen Block Residential Subdivision as follows:

Table 1: CivilPlan Consultants Limited As Built Plans

Title	Reference No.	Date
As Built Contours	136701-18-AB200	May 2025
As Built Cut-Fill Contours, Undercut & Shear Key	136701-18-AB201	May 2025
As Built Geotech	136701-18-AB202	May 2025
As Built Storm Water	136701-18-AB400	May 2025
As Built Waste Water	136701-18-AB401	May 2025

This report covers the construction period September 2021 to July 2025. It is intended to be used for certification purposes as follows:

- 24 residential lots numbered 1 to 24.
- 1 new road named Hitchen Road (part).
- 1 jointly owned access lot (JOAL) named JOAL A (Chris Gatehouse Lane).
- 1 local purpose (drainage) reserve numbered as lot 101.

This stage of the subdivision is located as shown on the CivilPlan Consultants Limited as-built plans. As can be seen on the cut-fill contours as-built plan (drawing AB201), all residential lots have been partly or totally affected by filling, to a maximum depth of approximately 7m.

2 RELATED REPORTS

In the preparation of this GCR, LDE have reviewed the following Geotechnical Reports for the land encompassed by Stage 18 of the Hitchen Block residential subdivision which are summarised in Table 2 below:

Table 2: Related Geotechnical Reports

Report Title	Reference No.	Issue Date
Geotechnical Investigation Report for Hitchen Road Stage 5, Pokeno	J00741	29 August 2018
Lots 926 and 945 to 947 – Additional Slope Stability Analysis, Hitchen Stage 5, Pokeno	J00741	10 September 2020

Report Title	Reference No.	Issue Date
Geotechnical Investigation Report for Hitchen Road Stage 6, Pokeno	J01610 – Rev. A	26 February 2021
Geotechnical Recommendations for Wastewater Pipe Bridge (WWZ1 to WWZ2) – Stage 18, Hitchen Block Residential Subdivision, Pokeno	J00113	25 August 2022
Addendum Geotechnical Slope Stability Assessments, Hitchen Block Stage 17 and 19, Pokeno	J00113	29 May 2023
Geotechnical Assessments and Recommendations for Proposed Diversion Bund at Hitchen Block Stage 18, Pokeno	J00113	19 December 2023

Further, tabulated below is a list of Geotechnical Completion Reports prepared by this Consultancy (some of which were issued formerly trading as Lander Geotechnical) on adjacent recently completed stages of the subdivision.

Table 3: Related Geotechnical Completion Reports

Report Title	Reference No.	Issue Date
Hitchen Block Stage 3A2, 3B and 3C (Residential)	J00113	20 December 2017
Hitchen Block Stage 5A (Residential)	J00113	26 January 2018
Hitchen Block Stage 4A (Residential)	J00113	23 March 2018
Hitchen Block Stage 6A and 6B (Residential)	J00113	23 May 2018
Hitchen Block Stage 4B (Residential)	J00113	28 August 2018
Hitchen Block Stage 7A & 7B (Residential)	J00113	2 November 2018
Hitchen Block Stage 8A & 8B (Residential)	J00113	9 May 2019
Hitchen Block Stage 6D (Residential)	J00113	4 November 2019
Hitchen Block Stages 11, 12 and 14 (Residential)	J00113	13 March 2020
Hitchen Block Stage 9 (Residential)	J00113	24 June 2020
Hitchen Block Stages 6E & 10A to 10D (Residential)	J00113	16 December 2020
Hitchen Block Stages 10E & 10F (Residential)	J00113	11 March 2021
Hitchen Block Stage 12D (Residential)	J00113	20 April 2021
Hitchen Block Stage 13A (Residential)	J00113	16 August 2021
Hitchen Block Stage 13B (Residential)	J00113	17 January 2022
Hitchen Block Stages 15A & 15B (Residential)	J00113	19 May 2022
Hitchen Block Stage 16 (Residential)	J00113	21 October 2022
Hitchen Block Stages 17A, 17B and 17C (Residential)	J00113 - Rev. B	29 November 2023

3 EARTHWORKS OPERATIONS

3.1 Plant

The main items of plant used by the Contractor, Kerry Dines Limited were:

- 7 x bulldozers with scoops;

- 1 x elevating motorscraper;
- 3 x articulated dump trucks;
- 2 x 4WD sheepsfoot compactors;
- 4 x 20T hydraulic excavators;
- 1 x Tractor with disc ploughs.

3.2 Construction Programme

Earthworks operations in September 2021 with topsoil stripping across Stage 18. In October 2021, a toe key was installed in the eastern extent of Lots 10 and 11 to a minimum depth of 1m. The purpose of the toe key was to 'lock in' the filling into the underlying competent ash soils. Underfill drainage (comprising of 160mm perforated drain coils, covered with drainage aggregate and fully wrapped with geotextile cloth) was then installed along the gully invert immediately upslope of the key. Bulk fills then commenced and were completed concurrently with the remaining works listed below during the overall earthworks program.

In November 2021, a similar toe key was installed below Lots 4 and 6, and also below Lot 13. Underfill drainage was then installed above these keys. Concurrently, four counterfort drains were installed within Lot 101, immediately to the north of Lots 8 to 10. The counterfort drainage trenches extended to maximum depths of 6m and were 0.5m wide. A 160mm perforated drain coil was placed in the base of each trench prior to being backfilled with SAP50 scoria. Installation of these drains ceased in January 2022.

In February 2022, a silt pond which had been formed in the previous earthworks season was mucked out to competent inorganic natural soils and reinstated with engineer certified fills. Bulk fill operations were generally completed by March 2022.

In October 2024, earthworks recommenced with topsoil stripping within the eastern portion of Lots 10 and 11. Following this, further bulk fills were placed in this area to recontour these lots. In November 2024, the western portion of these lots was benched, and an engineered soil bund was formed.

In January 2025, a pipe bridge was formed in Lot 101, with construction completed in February 2025.

Between May 2025 and July 2025, outlets were formed for the various underfill and counterfort drains. There remains a silt fence below the bund in Lots 10 and 11, which we understand is to be removed in the near future and prior to building construction commencing.

4 QUALITY ASSURANCE AND CONTROLS

4.1 Inspections

During the earthworks engineering inspections were undertaken on a regular basis to assess compliance with NZS 4431 and our project specific recommendations and specifications. Project specific inspections were required on Stage 18 for:

- Topsoil stripping of earthworks areas.
- Gully areas prior to the placement of fill materials to ascertain that all mullock and soft inorganic subsoils had been removed to our satisfaction.
- Counterfort drain excavations to confirm depths, ground conditions, drain coil placement and backfilling.
- Fill placement and plant performance upon the subgrade periodically throughout the bulk filling works.

4.2 Quality Control Criteria

Due to the varying soil types being used as filling, the compaction control criteria of minimum allowable shear strength and maximum allowable air voids were mainly used for quality assurance purposes. Specification details were as follows for general fills (noting that NZS4431 was amended in 2022 which we adopted from November 2024 once earthworks recommenced):

Clay Fill Compaction Testing Criteria

(a)	**Air Voids Percentage** (As defined in NZS 4402)	
	Prior to 2023	
	Average* value less than	10%
	Maximum single value	12%
	From 2023	
	Maximum single value	10%
(b)	**Undrained Shear Strength** (Measured by Pilcon shear vane - calibrated using NZGS 2001 method)	
	Prior to 2023	
	Average* value not less than	140 kPa
	Minimum single value	120 kPa
	From 2023	
	Minimum single value	150 kPa

*The average value shall be determined over any ten consecutive tests

4.3 Compaction Assurance Testing

Regular insitu density, strength and water content tests were carried out on all areas of the filling at or in excess of the frequency recommended by NZS 4431, and a series of hand auger boreholes were also drilled at selected locations as an added check on quality control. The results of this testing are attached in Appendix B.

Control tests carried out on the filling showed that several occasions the required compaction standards were not being achieved. Results of the test failures were relayed to the site foreman and/or his staff, and the affected areas of fill were re-worked as necessary. In each case, further testing was carried out until compliance with the standards was achieved.

5 LIQUEFACTION SUSCEPTIBILITY

Liquefaction susceptibility has been assessed in our geotechnical investigation report (Ref J00741, dated 29 August 2018). Our assessment concluded this site has a very low risk of seismic liquefaction based on the soil strength and consistency, and expansive soils laboratory testing, in accordance with the requirements of Earthquake Geotechnical Engineering Practice Module 3.

6 PROJECT EVALUATION

6.1 Bearing Capacity and Settlement of Building Foundations

Following the completion of earthworks operations, we returned to the site in My 2025 and drilled a series of hand auger boreholes in order to determine representative finished ground conditions and hence evaluate likely foundation options for future building development.

At current subgrade levels all filled and undisturbed natural ground within residential lots has a geotechnical ultimate bearing capacity of 300 kPa within the influence of conventional shallow residential building foundation loads.

Where any building platforms have been rutted by heavy machinery subsequent to this report, or softened due to ponded rainwater, engineering advice should be sought with a view to affected areas being trimmed back to competent ground and reinstated with compacted hardfill to design subgrade level prior to the commencement of building construction.

It should be noted that NZS 3604 only allows a maximum backfill depth of 600mm over the building platform of a dwelling unless an Engineering design solution or endorsement is proposed, on account of the risk of induced consolidation of the subsoils caused by the weight of the backfill.

6.2 Expansive Soils

Four Shrink-Swell Index tests were carried out on samples selected from Stage 18 (and adjacent Stage 19) and within the zone of likely influence of shallow building foundations to inform the expansive Site Class for this stage of the subdivision.

The Shrink-Swell Index tests were carried out in accordance with AS 1289, "Methods of Testing Soils for Engineering Purposes" test method 7.1.1. These tests were primarily intended to assess the Expansive Classes of the site materials as defined in AS 2870, "Residential Slabs and Footings – Construction" and MBIE Acceptable Solutions and Verification Methods amendment 19[1].

Based on the laboratory testing and visual tactile assessments of the soils observed in our post-construction boreholes, the assessed AS2870:2011 expansive site class for all residential lots is H1 (high) having a characteristic ground surface movement of up to 60mm (based on the scaling factor of the site being adjusted to a 1/300-year event*).

**Note: if the foundation designer needs to design the foundation for 500-yr and 1000-year drought return level events, then the y_s of 60mm should be factored by 1.11 and 1.21 respectively in accordance with Table 22 of BRANZ Addendum Study Report No.120A (2008).*

Specific design alternatives for these Site Classes are presented in the Suitability Statement. These classifications may be re-addressed by end users during building consent if site specific laboratory shrink-swell testing is undertaken by end users, as recommended in the MBIE document attached.

For Class H1 soils, if slab on-grade floor slab construction takes place during a long dry summer, exposed building platform soils may dry put and become highly desiccated. Over time the rehydration of the soils below the floor slab can cause swelling and floor slab uplift. Floor slab uplift can cause distress of tile floors and in garages where cracks are more apparent. It may also rack upper storeys and/or rooflines if non-load bearing ground floor walls are lifted and act as struts. It is prudent to place hardfill immediately upon completion of subgrade trimming, followed by thorough soaking of the hardfill prior to concrete placement (e.g. for slab on-grade construction), all of which can help to limit the problem.

6.3 Lot Gradients

The appended as built cut-fill plan (drawing AB201) shows areas of **Lots 1 to 13 and 15 to 24** having gradients steeper than 1(v) in 4(h) (shaded grey on drawing AB200) or being immediately adjacent to land having such gradients. A 3m to 4m setback zone also applies from significant slopes steeper than 1(v) in 4(h) within **Lots 1 to 13**, which may also be subject to future soil creep (shaded blue on drawing AB200).

[1] Ministry of Business, Innovation and Employment. Verification Methods and Acceptable Solutions Amendment 19 for NZ Building Code B1/AS1, Section 3 (as relevant to expansive soils and good ground). Effective 28 November 2019.

The extent of areas steeper than 1(v) in 4(h) has been determined by the surveyed site gradients and our final walkover inspection, but there may be localised areas having such gradients that have not been shown on the plans.

We are satisfied that these lots are not subject to the hazards described in section 71(3) of the Building Act provided that all development restrictions and recommendations provided in this report are followed.

Details of resulting building and earthworks restrictions within the vicinity of these lots are presented in the Suitability Statement.

6.4 Fill Induced Settlement

As a result of our pre-fill inspections, the installation of subsoil drainage, quality control testing and the elapsed time since the placement of the majority of the filling (generally in excess of 12 months), we are of the opinion that induced differential settlements beneath or within the certified filling due to its imposed weight should be insignificant with respect to conventional NZS 3604 residential building development.

6.5 Vegetation Cover

Wherever practical on sloping land beyond building platform areas any existing bush and grass cover should be maintained and even supplemented with new plantings. Any vegetation cleared beyond the immediate area of building platforms for temporary construction purposes should be replaced as soon as possible. The contribution of appropriate vegetation cover to overall site stability and erosion control should not be underestimated.

6.6 Stormwater Controls

It is important on all sloping lots that due care is paid to the design and construction of appropriate stormwater disposal systems. These systems should serve to collect all runoff from roofs, decks and paved areas, together with discharges from retaining wall drains and other subsoil drains and should connect directly into the public stormwater drainage network.

Uncontrolled stormwater discharges onto the ground surface or into soakage pits can cause erosion, scour and/or instability on sloping land and should not be permitted under any circumstances where stability could be compromised.

6.7 Service Trenches

As is normal on all subdivisions, building developments involving foundations within a 45-degree zone of influence from pipe inverts will require Engineering input.

6.8 Land Drainage

The appended as-built geotechnical drainage plan (drawing AB202) shows the positions of:

6.8.1 Underfill Drains

Perforated underfill drains that were placed in mucked out gully inverts prior to filling to tap groundwater seepages as required by NZS 4431. These drains run beneath portions of **Lots 4 to 6, 10, 11 and 13**. These drains are generally in excess of 2m below finished ground level within the residential lots and as such should not present constraints to conventional residential shallow foundation construction.

These drains were intended to intercept localised groundwater seepages during earthworks and/or to allow engineered fill placement as required by the project specifications. The drains were installed as a precautionary measure, not as remedial works for any existing instability, and they need no specific maintenance.

Notwithstanding, it is recommended that future foundations or site development works preserve these drains. In the event that they are compromised by any future development in any of the lots they should be reinstated under geotechnical engineering observational guidance.

6.8.2 Counterfort Drains

During earthworks construction, a series of 600mm wide and 6m deep (maximum) counterfort drains were constructed in the region of residential **Lot 8 and Lot 9** and local purpose reserve **Lot 101** in the positions shown on the appended as-built geotechnical drainage plan (drawing AB202). These drains were spaced at approximately 15m centres. These drains were installed to help control groundwater levels in the area for global slope stability reasons. Details of resulting building restrictions are presented in the Suitability Statement (although given their location – mostly within Lot 101/ reserve area should not restrict building foundations).

6.9 Topsoil

Topsoil depths in likely building platform areas were checked by the drilling of a borehole in the approximate centre of each lot. Our findings, which are indicative only and subject to variation at other locations, show that likely topsoil depths are between 100mm and 400mm, however, no topsoil was recorded in Lot 11. Site specific findings are presented in the Suitability Statement Summary.

6.10 Contractor's Work

We have relied on the Contractor's work practices and assume that the works have been carried out in accordance with:

i) The approved Contract drawings and design details,
ii) The approved Contract specifications,

iii) Authorised Variations to (i) and (ii) during the execution of the works,

iv) The conditions of Resource, Earthworks and Building Consents where applicable,

v) The relevant LDE Limited reports, recommendations and site instructions,

and that all as-built information and other details provided to the Client and/or LDE Limited are accurate and correct in all respects.

7 STATEMENT OF PROFESSIONAL OPINION AS TO THE SUITABILITY OF LAND FOR BUILDING DEVELOPMENT

I, C.J. Edwards of LDE Limited, Auckland, hereby confirm that:

1. I am a Professional Engineering Geologist (CMEngNZ (PEngGeol)) experienced in the field of geotechnical engineering as defined in section 1.2.2 of NZS 4404 and was retained by the Owner/Developer as the Geotechnical Engineer on Stage 18 of the Hitchen Block residential subdivision.

2. The extent of preliminary investigations carried out to date are described in the reports summarised in Table 2 and the conclusions and recommendations of those documents have been re-evaluated in the preparation of this report.

3. In my professional opinion, not to be construed as a guarantee, I consider that:

   a. The earth fills shown on the appended cut-fill contours plan (drawing AB201) have been placed in compliance with NZS 4431 (NZS4431:1989 prior to 2024 and NZS4431:2022 from 2024 onwards) and related documents.

   b. The completed earthworks give due regard to land slope and foundation stability considerations within the residential lots. However, as shown on the appended as-built contours plan (drawing AB200) areas within residential **Lots 1 to 13 and 15 to 24** that are shown as having gradients steeper than 1(v) in 4(h) or are adjacent to land having such gradients.

      For **Lots 1 to 13 and 15 to 24**, any building or earthworks proposals in areas shaded in grey (steeper than 1(v) in 4(h)) or blue (within 4m of significant land steeper than 1(v) in 4(h)) on the as-built contours plan (drawing AB200) are subject to specific site investigation/assessments and/or foundation design on account of having gradients steeper than 1(v) in 4(h) or proximity to land having such gradients.

   c. A geotechnical ultimate bearing capacity of 300kPa may be assumed for foundation design on all residential lots. Where a geotechnical bearing capacity greater than 300 kPa is required, (i.e. outside the limits of NZS 3604, such as when piling is undertaken), further specific site investigation and design of foundations should be carried out prior to building consent application.

d. The assessed AS2870:2011 expansive Site Class for all residential lots is Class H1 (High) with characteristic ground surface movement of up to 60mm (based on the scaling factor of the site being adjusted to a 1/300 event).

**Note: if the foundation designer needs to design the foundations for 500-yr and 1,000-yr drought return level events, then the y_s of 60mm should be factored by 1.11 and 1.21 respectively in accordance with Table 22 of BRANZ Addendum Study Report No. 120A (2008).*

Site specific laboratory Shrink-Swell testing and calculation of specific y_s values may be undertaken by end-users to re-assess this during building consent stage.

e. The backfilling and compaction of the live stormwater and sanitary sewer trenches on this subdivision has where possible been carried out to appropriate standards having regard for the prevailing ground conditions and associated compaction induced pipe loadings.

Nevertheless, no building development should take place within the 45 degree zone of influence of drain inverts unless endorsed by specific site investigations and/or foundation designs and by construction inspections undertaken by a Chartered Professional Engineer experienced in geomechanics to ensure that lateral stability and differential settlement issues are addressed and that building loads are transferred beyond the influence of the pipe and beyond the extent of the trench backfill.

f. The function of the counterfort drains and underfill drains in residential **Lots 4 to 6, 8 to 11 and 13** and local purpose reserve **Lot 101** should not be impaired by any building development or landscaping works. Any bored or driven piles must be positioned to avoid damaging the underfill drains.

The counterfort drains have been installed in accordance with good engineering practice and should require no specific maintenance. However, the compaction of the surficial backfill soils may not be to certifiable standards and therefore all buildings having foundations within 6m of a counterfort drain (although unlikely given the location of the counterfort drains mostly within the drainage reserve area) will require Engineering design to ensure foundations appropriately 'bridge' the drains and associated trenches.

g. Subject to the geotechnical limitations, restrictions, recommendations and expansive soil assessments associated with 3(b) to 3(f) above:

i. The filled and undisturbed original ground within residential lot boundaries is generally suitable for residential buildings constructed in accordance with NZS 3604 and related documents.

ii. On all residential lots, foundation design may be carried out in accordance with one of the following methods:

- Class H1 in terms of AS2870:2011; with characteristic ground surface movement of up to 60mm.

- A specific foundation and structural design may be undertaken by a Chartered Professional Engineer who should allow for expansive soil effects referenced above in the design.

- For buildings having brittle exterior cladding appropriate control joints should also be specifically designed depending on architectural specifications and structural form.

4. Road Subgrades and lot accessway subgrades have been formed having due regard for slope stability and settlement, although available subgrade strengths are dependent on-site conditions and on construction trafficking and variable results should be expected

5. Drainage reserve areas have been formed to geotechnical standards appropriate for their intended use.

It does not remove the necessity for the normal inspection of ground conditions and the design of foundations as would be made under all normal circumstances, especially in cases where settlement sensitive buildings are sited partly on fill and partly on natural ground, or where they are entirely sited on filling whose depth changes significantly across the building platform.

The appended table summarises the status of each residential lot covered by this Suitability Statement.

8 LIMITATIONS

This report should be read and reproduced in its entirety including the limitations to understand the context of the opinions and recommendations given.

This report has been prepared exclusively for DFH Joint Venture Limited in accordance with the brief given to us or the agreed scope and they will be deemed the exclusive owner on full and final payment of the invoice. Information, opinions, and recommendations contained within this report can only be used for the purposes with which it was intended. LDE accepts no liability or responsibility whatsoever for any use or reliance on the report by any party other than the owner or parties working for or on behalf of the owner, such as local authorities, and for purposes beyond those for which it was intended.

This report was prepared in general accordance with current standards, codes and best practice at the time of this report. These may be subject to change.

Opinions given in this report are based on visual methods and subsurface investigations at discrete locations designed to the constraints of the project scope to provide the best assessment of the environment. It must be appreciated that the nature and continuity of the subsurface materials between these locations are inferred and that actual conditions could vary from that described herein. We should be contacted immediately if the conditions are found to differ from those described in this report.

Table 4: Suitability Statement Summary

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class	NZS1170.5 Seismic Site Class
1	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	250	300	H1	C
2	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	250	300	H1	C
3	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	200	300	H1	C
4	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	250	300	H1	C

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class	NZS1170.5 Seismic Site Class
5	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application. Function of underfill and/or counterfort drains required to be maintained (refer Section 6.8 and Section 7(3f) for further details.	200	300	H1	C
6	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application. Function of underfill and/or counterfort drains required to be maintained (refer Section 6.8 and Section 7(3f) for further details.	100	300	H1	C
7	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	250	300	H1	C

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class	NZS1170.5 Seismic Site Class
8	Within areas shaded grey or blue on the as-built contour drawing, and/or within 6m of counterfort drains (red dashed line on as-built drawing), specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application. Function of counterfort drains required to be maintained (refer Section 6.8 and Section 7(3f) for further details.	100	300	H1	C
9	Within areas shaded grey or blue on the as-built contour drawing, and/or within 6m of counterfort drains (red dashed line on as-built drawing), specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	200	300	H1	C
10	Within areas shaded grey or blue on the as-built contour drawing, and/or within 6m of counterfort drains (red dashed line on as-built drawing), specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application. Function of underfill and counterfort drains required to be maintained (refer Section 6.8 and Section 7(3f) for further details.	150	300	H1	C

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class	NZS1170.5 Seismic Site Class
11	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application. Function of underfill drains required to be maintained (refer Section 6.8 and Section 7(3f) for further details.	0	300	H1	C
12	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	400	300	H1	C
13	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application. Function of underfill drains required to be maintained (refer Section 6.8 and Section 7(3f) for further details.	200	300	H1	C
14	Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	200	300	H1	C

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class	NZS1170.5 Seismic Site Class
15	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	350	300	H1	C
16	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	100	300	H1	C
17	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	300	300	H1	C
18	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	200	300	H1	C

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class	NZS1170.5 Seismic Site Class
19	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	350	300	H1	C
20	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	250	300	H1	C
21	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	250	300	H1	C
22	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	200	300	H1	C

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class	NZS1170.5 Seismic Site Class
23	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	300	300	H1	C
24	Within areas shaded grey or blue on the as-built contour drawing, specific site investigation, foundation design and construction inspections due to global slope stability considerations. Elsewhere, Foundation design in accordance with AS2870:2011 or engineer approved alternative foundation design. Where cuts and/or fills greater than 600mm are proposed, further specific site investigation and design of foundations and/or geotechnical endorsement should be carried out prior to building consent application.	400	300	H1	C

APPENDIX A

CIVILPLAN CONSULTANTS LIMITED AS BUILT DRAWINGS

NOTES
1. ALL LEVELS ARE IN METRES AND IN TERMS OF THE LANDS & SURVEY DATUM (MEAN SEA LEVEL) AUCKLAND 1945.
2. CONTOUR INTERVAL IS 1m
3. CONTOURS ACCURACY IS + OR - 0.5m

LEGEND
MAJOR 5m CONTOUR
MINOR 1m CONTOUR
LAND STEEPER THAN 1:4
4m SETBACK - SUBJECT TO SPECIFIC GEOTECH DESIGN

N

797 798 799 800 801 802 803 804 805 809 947

101
RESERVE TO VEST

EX. BUSH AREA

STAGE 19

STAGE 18

HITCHEN ROAD

JOAL A

CHRIS GATEHOUSE LANE

BUILDING LINE RESTRICTION

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

980 981 982 983 984

2
DP 176205

2
DP 199997

1
DP 51064

50m 55m 60m 65m 70m 75m 80m 85m 90m 95m

I, MICHAEL STEPHEN SMITH, CMENGNZ CPENG HEREBY BELIEVE ON ALL REASONABLE GROUNDS THAT THE CONTOURS SHOWN ARE ACCURATELY PLOTTED IN RELATION TO BOUNDARIES AS THIS INFORMATION HAS BEEN PROVIDED BY THE CONTRACTOR OF THE WORKS - KERRY DINES LTD.

---------- -----
MICHAEL STEPHEN SMITH DATE
CMENGNZ CPENG

REV	REVISION DETAILS	BY	DATE
A	ISSUED FOR 224c	RJP	05-25

PLOTTED: RJP DATE: 05-25
DRAWN: RJP DATE: 05-25
APPROVED: MSS DATE: 05-25

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
DFH JOINT VENTURE
HITCHEN STAGE 18 SUBDIVISION
POKENO

SHEET TITLE:
As Built Contours

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 136701-18-AB200 REV: A

Filepath: PARKINSON\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 18\AS BUILT\136701-18-AB200.DWG

NOTES
1. ALL LEVELS ARE IN METRES AND IN TERMS OF THE LANDS & SURVEY DATUM (MEAN SEA LEVEL) AUCKLAND 1945.
2. CONTOUR INTERVAL IS 1m
3. CONTOURS ACCURACY IS + OR - 0.5m

LEGEND
MAJOR 5m CONTOUR
MINOR 1m CONTOUR
FILL AREA

N

797 798 799 800 801 802 803 804 805 809 947 984

101
RESERVE TO VEST

EX. BUSH AREA

CUT

HITCHEN ROAD

STAGE 19

980 981 982 983

CHRIS GATEHOUSE LANE

JOALA

CUT

CUT

STAGE 18

2
DP 176205

2
DP 199997

1
DP 51064

I, MICHAEL STEPHEN SMITH, CMENGNZ CPENG HEREBY BELIEVE ON ALL REASONABLE GROUNDS THAT THE CONTOURS SHOWN ARE ACCURATELY PLOTTED IN RELATION TO BOUNDARIES AS THIS INFORMATION HAS BEEN PROVIDED BY THE CONTRACTOR OF THE WORKS - KERRY DINES LTD.

---------- -----
MICHAEL STEPHEN SMITH DATE
CMENGNZ CPENG

REV	REVISION DETAILS	BY	DATE
A	ISSUED FOR 224c	RJP	05-25

PLOTTED: RJP DATE: 05-25
DRAWN: RJP DATE: 05-25
APPROVED: MSS DATE: 05-25

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
DFH JOINT VENTURE
HITCHEN STAGE 18 SUBDIVISION
POKENO

SHEET TITLE:
As Built Cut-Fill Contours
Undercut & Shear Key

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 136701-18-AB201 REV: A

Filepath: PARKINSON\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 18\AS BUILT\136701-18-AB201.DWG

NOTES
1. ALL LEVELS ARE IN METRES AND IN TERMS OF THE LANDS & SURVEY DATUM (MEAN SEA LEVEL) AUCKLAND 1945.
2. CONTOUR INTERVAL IS 1m
3. CONTOURS ACCURACY IS + OR - 0.5m

N

STAGE 19

STAGE 18

101
RESERVE TO VEST

EX. BUSH AREA

COUNTERFORT DRAINS

SHEAR KEY

150Ø NOVACOIL DRAINS

HITCHEN ROAD

REDUNDANT WATERMAIN & POWER TRENCH UNDERCUT

JOAL A

CHRIS GATEHOUSE LANE

KEYCUT

UNDERCUT

2
DP 176205

2
DP 199997

1
DP 51064

797 798 799 800 801 802 803 804 805 809 947 984 980 981 982 983

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

I, MICHAEL STEPHEN SMITH, CMENGNZ CPENG HEREBY BELIEVE ON ALL REASONABLE GROUNDS THAT THE CONTOURS SHOWN ARE ACCURATELY PLOTTED IN RELATION TO BOUNDARIES AS THIS INFORMATION HAS BEEN PROVIDED BY THE CONTRACTOR OF THE WORKS - KERRY DINES LTD.

---------- -----
MICHAEL STEPHEN SMITH DATE
CMENGNZ CPENG

LEGEND
- MAJOR 5m CONTOUR
- MINOR 1m CONTOUR
- UNDERFILL DRAINS
- COUNTERFORT DRAINS

REV	REVISION DETAILS	BY	DATE
A	ISSUED FOR 224c	RJP	05-25

PLOTTED: RJP DATE: 05-25
DRAWN: RJP DATE: 05-25
APPROVED: MSS DATE: 05-25

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
DFH JOINT VENTURE
HITCHEN STAGE 18 SUBDIVISION
POKENO

SHEET TITLE:
As Built Geotech

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 136701-18-AB202 REV: A

Filepath: PARKINSON\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 18\AS BUILT\136701-18-AB202.DWG

STORMWATER COORDINATES

CON=LOT CONNECTION

CON1	758330.01	421695.85
CON2	758316.25	421706.11
CON3	758307.62	421710.13
CON4	758299.50	421710.23
CON5	758280.44	421712.91
CON6	758247.57	421635.09
CON7	758242.21	421612.96
CON8	758231.78	421585.89
CON9	758242.54	421556.87
CON10	758228.51	421529.59
CON11	758203.19	421533.36
CON12	758210.86	421565.01
CON13	758180.19	421572.41
CON14	758220.25	421597.11
CON15	758227.78	421619.03
CON16	758233.52	421643.61
CON17	758194.99	421628.66
CON18	758229.14	421676.69
CON19	758239.05	421694.40
CON20	758250.94	421718.11
CON21	758231.48	421719.52
CON22	758213.44	421721.50
CON23	758200.08	421675.63
CON24	758187.38	421731.44
Stage 19		
CON980	758297.88	421764.70
CON981	758244.70	421770.18
CON982	758254.46	421792.26
CON983	758223.42	421772.62

STORMWATER COORDINATES

MH=MANHOLE, BC=BLANK CAP

MH12.7	758334.40	421759.82
MH12.8	758251.96	421768.43
BC12.9	758223.05	421770.97
MH18.2	758342.16	421680.54
MH18.3	758323.27	421695.03
MH18.4	758307.62	421707.46
BC18.5	758280.06	421711.92
MH21.4	758237.44	421534.85
MH21.5	758223.96	421520.98
MH21.6	758191.07	421537.80
BC21.7	758178.88	421572.10
MH22.1	758366.20	421711.44
MH23.1	758242.89	421554.19
MH23.2	758222.81	421561.54
MH23.3	758233.10	421598.07
MH23.4	758240.20	421612.75
MH23.5	758245.77	421634.17
MH23.6	758243.68	421665.31
MH23.7	758244.17	421675.99
MH23.8	758249.16	421689.28
MH23.9	758261.95	421711.15
MH23.10	758252.04	421715.77
MH23.11	758197.29	421721.38
MH24.1	758255.51	421744.51
BC17	758194.24	421626.74
BC23	758200.24	421673.42
BC982	758255.45	421792.14

STORMWATER COORDINATES

CP=CATCHPIT, DCP=DOUBLE CP

SD=STRIP DRAIN

CP1	758253.05	421769.82
CP2	758363.88	421717.74
DCP3	758322.57	421744.73
DCP4	758324.05	421752.67
DCP5	758255.89	421751.93
DCP6	758259.13	421759.66
SD1	758255.69	421712.59
SD2	758237.18	421667.05
SD3	758232.85	421611.94
SD4	758214.74	421556.13

I, MICHAEL STEPHEN SMITH, CMENGNZ CPENG HEREBY BELIEVE ON ALL REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS, POSITIONS, COORDINATES AND LEVELS SHOWN ARE ACCURATELY PLOTTED IN RELATION TO BOUNDARIES AND IS CORRECT AS THIS INFORMATION HAS BEEN PROVIDED BY THE CONTRACTOR OF THE WORKS - KERRY DINES LTD.

---------- -----

MICHAEL STEPHEN SMITH DATE

CMENGNZ, CPENG

NOTES

1. ALL COORDINATES ARE IN METRES AND IN TERMS OF GEODETIC 2000 MT. EDEN

2. ALL LEVELS ARE IN METRES AND IN TERMS OF THE LANDS AND SURVEY DATUM (MEAN SEA LEVEL) AUCKLAND 1946

3. ALL LOT CONNECTIONS ARE 150NB PVC UNLESS SHOWN OTHERWISE.

4. MANHOLE INVERT LEVELS ARE LISTED CLOCKWISE FROM THE OUTLET PIPE.

5. ALL MANHOLES ARE 1050NB WITH STANDARD DUTY LIDS AND COVERS UNLESS SHOWN OTHERWISE.
ALL STORMWATER PIPES 225NB AND OVER ARE RCRRJ CLASS 2 UNLESS SHOWN OTHERWISE EXCEPT FOR CATCHPIT LEADS WHICH ARE ALL CLASS 4. ALL CATCHPIT LEADS ARE 225NB UNLESS SHOWN OTHERWISE.

6. ALL CONCRETE PIPES AND STRUCTURES ARE MANUFACTURED BY HYNDS PIPES. ALL PLASTIC PIPES ARE MANUFACTURED BY MARLEY.

LEGEND

MANHOLE
OUTLET
CATCHPIT
SW LINE
EX.MANHOLE
EX.CATCHPIT
EX.SW LINE
STRIP DRAIN

101 RESERVE_TO_VEST

EX_BUSH_AREA

DRAINAGE_RESERVE

HITCHEN_ROAD

JOAL_A

CHRIS_GATEHOUSE_LANE

STAGE 18

REV	REVISION DETAILS	BY	DATE
A	ISSUED FOR 224c	RJP	05-25

PLOTTED: RJP DATE: 05-25
DRAWN: RJP DATE: 05-25
APPROVED: MSS DATE: 05-25

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
DFH JOINT VENTURE
HITCHEN STAGE 18 SUBDIVISION
POKENO

SHEET TITLE:
AS BUILT
STORM WATER

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 136701-18-AB400 REV: A

Filepath: PARKINSON\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 18\AS BUILT\136701-18-AB400.DWG

WASTEWATER COORDINATES

MH=MANHOLE, BC=BLANK CAP
CON=LOT CONNECTION

CON1	758342.50	421686.20
CON2	758327.40	421697.83
CON3	758310.67	421711.37
CON4	758301.32	421710.99
CON5	758263.25	421709.87
CON6	758247.71	421636.11
CON7	758241.95	421613.81
CON8	758231.22	421587.93
CON9	758239.34	421557.65
CON10	758229.72	421531.28
CON11	758204.84	421534.17
CON12	758210.28	421564.14
CON13	758219.24	421589.42
CON14	758221.72	421599.05
CON15	758229.76	421618.65
CON16	758231.21	421643.11
CON17	758198.92	421648.82
CON18	758232.26	421678.88
CON19	758239.98	421696.19
CON20	758249.55	421717.96
CON21	758233.25	421718.98
CON22	758214.58	421720.84
CON23	758194.92	421715.91
CON24	758184.89	421729.17
STAGE 19		
CON980	758299.29	421764.54
CON981	758245.07	421769.84
CON982	758253.47	421792.20
CON983	758222.36	421771.44
CON984	758348.85	421749.60

WASTEWATER COORDINATES

MH=MANHOLE, BC=BLANK CAP
CON=LOT CONNECTION

MHA1	758238.83	421545.18
MHA2	758240.83	421552.04
MHA3	758216.39	421558.84
MHA4	758227.67	421597.27
MHA5	758240.27	421634.96
MHA6	758237.15	421676.90
MHA7	758255.01	421709.56
MHA8	758248.88	421713.02
MHA9	758197.12	421718.11
BCA10	758185.32	421730.25
MHB1	758236.34	421536.68
MHB2	758223.51	421523.28
BCB3	758203.95	421533.43
MHJ7	758249.54	421762.97
BCJ8	758221.33	421766.03
BCJ9	758254.03	421792.35
MHU5	758311.34	421708.46
BCU6	758300.64	421709.78
BC17	758198.28	421647.23
MHZ2	758265.15	421562.69
MHZ3	758244.29	421543.61

I, MICHAEL STEPHEN SMITH, CMENGNZ CPENG HEREBY BELIEVE ON ALL REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS, POSITIONS, COORDINATES AND LEVELS SHOWN ARE ACCURATELY PLOTTED IN RELATION TO BOUNDARIES AND IS CORRECT AS THIS INFORMATION HAS BEEN PROVIDED BY THE CONTRACTOR OF THE WORKS - KERRY DINES LTD.

---------- -----
MICHAEL STEPHEN SMITH DATE
CMENGNZ, CPENG

NOTES

1. ALL COORDINATES ARE IN METRES AND IN TERMS OF GEODETIC 2000 MT. EDEN

2. ALL LEVELS ARE IN METRES AND IN TERMS OF THE LANDS AND SURVEY DATUM (MEAN SEA LEVEL) AUCKLAND 1946

3. ALL LOT CONNECTIONS ARE 100NB PVC UNLESS SHOWN OTHERWISE.

4. MANHOLE INVERT LEVELS ARE LISTED CLOCKWISE FROM THE OUTLET PIPE.

5. ALL MANHOLES ARE 1050NB WITH STANDARD DUTY LIDS AND COVERS UNLESS SHOWN OTHERWISE.

6. ALL PIPES ARE MANUFACTURED BY MARLEY AND MANHOLES BY HYNDS PIPES.

REV	REVISION DETAILS	BY	DATE
A	ISSUED FOR 224c	RJP	05-25

PLOTTED: RJP DATE: 05-25
DRAWN: RJP DATE: 05-25
APPROVED: MSS DATE: 05-25

CIVILPLAN CONSULTANTS
Level 9, Laidlaw House, 20 Amersham Way, Manukau, Auckland. Phone: 09 222 2445

PROJECT TITLE:
DFH JOINT VENTURE
HITCHEN STAGE 18 SUBDIVISION
POKENO

SHEET TITLE:
AS BUILT
WASTE WATER

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 136701-18-AB401 REV: A

Filepath: PARKINSON\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 18\AS BUILT\136701-18-AB401.DWG

APPENDIX B

FIELD DENSITY SUMMARY SHEETS

9 May 2025
Our Ref: 2021000.1740.0.0/Rep1

Land Development & Engineering Ltd
Level 1, Wilson James Centre
77 Peel Street
Gisborne 4040

Attention: Kyle Meffan

Dear Kyle,

Hitchen Earthworks

Site Report – Quality Assurance Testing

Customer's Instructions

We were instructed to complete:

Nuclear densometer (NDM) and shear vane testing at the above-mentioned site when requested by the customer and report the results.

Specifications

Specification provided by LDE requires:

- Average shear strength ≥ 140 kPa with a minimum single value of 120 kPa.
- Average air voids ≤ 10% with a maximum of 12%.
- Average value to be determined over 10 consecutive tests.

Updated specification from 1/11/2024 requires shear strength to be $\geq$ 150 kPa and air voids $\leq$ 10 %.

Dates of Procedures

Testing was carried out from 2/02/2021 – 26/11/2024.

Locations

Test locations were determined on site by the Geotechnics technician on behalf of the customer. Individual test locations were selected to be representative of the test area.

The attached plan(s) provides indicative locations only and is not to scale. All other information we provide regarding location should be referenced to the asset owner.

Methods

NZGS 8:2001 - Test method for determining the vane shear strength of a cohesive soil using a hand held shear vane

NZS 4407:2015 Test 4.2 - Method using a nuclear surface moisture-density gauge (Direct Transmission Mode) – NDM

NZS 4407:2015 Test 3.1 - Determination of water content

Material Description

Material descriptions are provided in the attached results. All descriptions were provided by the customer.

Results

The following is attached:

- Earthworks Summary & Test Location Plans.

Test Remarks

NDM – Direct Transmission

The test method may not be appropriate for materials containing a nominal maximum particle size of >40 mm.

Nuclear densometers are calibrated for a bulk density range of 1,728 kg/m^3 to 2,756 kg/m^3. Test results outside of these bulk density limits are not covered under the IANZ endorsement of this report.

A solid density value of 2.70 t/m^3 was provided by the customer. We do not take responsibility for misrepresentation or misinterpretation arising from the use of this value to calculate air voids.

Where oven calculated air voids are negatives, these have been reported as zero.

The calculation of air voids is based on wet density (measured by the nuclear densometer), moisture content (measured by oven drying) and solid density (either assumed or measured by laboratory testing). Negative air voids may be caused by incorrect assumed solid density or due to the variability of onsite material when compared to that tested in a laboratory.

Determination of Water Content

Samples used for the determination of the water content were taken in conjunction with NDM testing and disposed of after 24 hours.

Pass/Fail Criteria

We accept no liability for any circumstances that may arise due to the inclusion of the pass/fail criteria or the use of this information by third parties. Pass/fail criteria are based solely on numerical values with no consideration given to uncertainty and are not covered under the IANZ endorsement of these results.

General Remarks

This report has been prepared for the benefit of Land Development & Engineering Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement.

The inherent uncertainties of site investigation work, mean the nature and continuity of subsoil away from the test location could vary from the data logged.

Material descriptions are not covered under the IANZ endorsement of this report.

Please reproduce this report in full when transmitting to others or including in internal reports.

If we can be of any further assistance, feel free to get in touch. Contact details are provided at the bottom of the letterhead page.

GEOTECHNICS LTD

Report approved by:

.....

Daniel McKay
Project Manager
Key Technical Person

Authorised for Geotechnics by:

Digitally signed by Corey Papu-Gread
DN: cn=Corey Papu-Gread, c=NZ, o=Geotechnics , email=cpapu-gread@geotechnics.co.nz
Date: 2025.05.09 10:15:02 +12'00'

.....

Corey Papu-Gread
Project Director

ACCREDITED IANZ TESTING LABORATORY

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

9-May-25
t:\geotechnicsgroup\projects\2021000\2021000.1740 - hitchen - civil stage 18\issueddocuments\report 1\9 may 2025.docx

GEOTECHNICS

Job: Hitchens Block Stage 5

Client: Land Development & Engineering Ltd.

Project Number	2021000.1740.0.0/Rep1
Entered By	DAMC
Checked By	DBRA
Approved By KTP	DAMC

URN	Tech.	Date	Location	Layer	Material	Test Type		NDM 0°			NDM 90°			AVERAGE NDM			Solid Density (t/m³) Assumed	Oven Moisture content (%)	Final Corrected		Average Air Voids (10 X Tests)	Shear Vane Reading (kPa)						Retest URN	PASS / FAIL	Comments
						NDM / SV	Probe Depth (mm)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)			Oven Dry Density (t/m³)	Average Air Voids (%)		Reading 1	Reading 2	Reading 3	Reading 4	Average SV (4 x Tests)	Average SV (10 X Sets)		(P) Pass / (F) Fail	
85.1	DASA	2/02/2021	Fill B	RL 44.6	Clayey SILT	NDM / SV	200	1.87	25.4	7.1	1.87	24.0	8.2	1.87	24.7	**7.6**	2.70	28.6	1.45	4.8	4.8	170	185	173	188	179	179	-	P	Specification provided by LDE requires: Average shear strength ≥ 140 kPa with a minimum single value of 120 kPa. Average air voids ≤ 10% with a maximum of 12%. Average value to be determined over 10 consecutive tests.
85.2				RL 46.6		NDM / SV	200	1.80	31.4	6.5	1.80	30.3	7.0	1.80	30.9	**6.7**	2.70	32.7	1.35	5.5	5.2	185	188	216	216	201	190	-	P	
85.3				RL 48.9		NDM / SV	200	1.78	28.3	9.5	1.77	28.4	9.6	1.78	28.4	**9.6**	2.70	29.5	1.37	8.8	6.4	216	188	200	200	201	194	-	P	
86.1	DASA	3/02/2021	Fill C	FL	Clayey SILT	NDM / SV	200	1.79	45.7	0.0	1.79	45.7	0.0	1.79	45.7	**0.0**	2.70	38.1	1.29	2.7	5.5	216	216	216	216	216	199	-	P	
86.2				RL 78		NDM / SV	200	1.83	30.3	5.3	1.83	29.7	5.8	1.83	30.0	**5.5**	2.70	31.3	1.40	4.6	5.3	216	216	216	216	216	203	-	P	
88.11	DASA	5/02/2021	Fill C	1m placed	Clayey SILT	NDM / SV	200	1.79	39.6	1.6	1.80	38.3	2.0	1.80	39.0	**1.8**	2.70	36.0	1.32	3.6	5.0	216	216	216	216	216	205	-	P	
88.12						NDM / SV	200	1.77	36.6	4.8	1.77	37.0	4.1	1.77	36.8	**4.5**	2.70	36.1	1.30	4.9	5.0	216	216	216	216	216	206	-	P	
116.1	DASA	15/10/2021	Shearkey 2	Layer 1 500 mm placed	Clayey SILT	NDM / SV	200	1.80	34.3	4.3	1.78	37.3	3.8	1.79	35.8	**4.0**	2.70	33.7	1.34	5.3	5.0	103	103	105	102	103	194	117.1	F	Retested 15/10/2021. Retest = Pass
116.2						NDM / SV	200	1.84	34.3	2.5	1.84	28.3	6.5	1.84	31.3	**4.5**	2.70	34.0	1.37	2.7	4.8	106	105	105	103	105	184	117.2	F	Retested 15/10/2021. Retest = Pass
117.1	DASA	15/10/2021	Shearkey 2	Layer 1 500 mm placed	Clayey SILT	NDM / SV	200	1.82	30.7	5.5	1.86	31.7	3.2	1.84	31.2	**4.4**	2.70	29.0	1.43	5.9	4.9	190	174	178	206	187	184	-	P	
117.2						NDM / SV	200	1.85	31.1	3.8	1.86	28.3	5.3	1.86	29.7	**4.5**	2.70	30.8	1.42	3.8	4.8	209	206	174	171	190	185	-	P	
118.1	DASA / HABU	20/10/2021	Shearkey 2	Layer 2 500 mm placed	Clayey SILT	NDM / SV	200	1.83	32.6	3.7	1.82	36.9	1.5	1.83	34.8	**2.6**	2.70	34.5	1.36	2.8	4.6	190	190	174	174	182	185	-	P	
118.2						NDM / SV	200	1.84	30.8	4.6	1.81	29.7	7.0	1.82	30.3	**5.8**	2.70	37.0	1.33	1.5	4.2	136	135	135	143	137	179	-	P	
119.1	DASA / HABU	26/10/2021	Shearkey 2	Layer 3 500 mm placed	Clayey SILT	NDM / SV	200	1.76	36.0	5.5	1.82	24.3	10.0	1.79	30.2	**7.5**	2.70	36.4	1.31	3.5	3.8	157	159	165	165	161	175	-	P	
119.2						NDM / SV	200	1.76	32.0	7.8	1.79	31.4	6.7	1.78	31.7	**7.2**	2.70	36.3	1.30	4.4	3.9	121	127	133	130	128	167	-	P	
120.1	DASA / HABU	27/10/2021	Shearkey 2	Layer 4 500 mm placed	Clayey SILT	NDM / SV	200	1.77	36.0	4.8	1.75	37.1	5.6	1.76	36.6	**5.2**	2.70	40.0	1.26	3.2	3.8	142	147	139	140	142	161	-	P	
120.2						NDM / SV	200	1.78	34.9	5.2	1.76	35.3	5.8	1.77	35.1	**5.5**	2.70	37.6	1.29	4.0	3.7	199	142	139	150	157	155	-	P	
121.1	DASA / HABU	8/11/2021	Shearkey 1	Layer 1 500 mm placed	Clayey SILT	NDM / SV	200	1.89	28.7	3.6	1.84	27.5	6.8	1.86	28.1	**5.2**	2.70	30.3	1.43	3.6	3.5	188	167	159	167	170	151	-	P	
121.2						NDM / SV	200	1.80	33.6	4.9	1.84	29.5	5.3	1.82	31.6	**5.1**	2.70	23.5	1.47	10.8	4.4	181	159	152	152	161	157	-	P	
122.1	DASA / HABU	9/11/2021	Shearkey 1	Layer 2 500 mm placed	Clayey SILT	NDM / SV	200	1.81	32.4	5.2	1.77	38.0	3.5	1.79	35.2	**4.3**	2.70	31.2	1.37	6.8	4.4	203	203	203	203	203	165	-	P	
122.2						NDM / SV	200	1.83	31.6	4.4	1.83	32.2	4.2	1.83	31.9	**4.3**	2.70	37.5	1.33	0.7	4.1	203	203	203	203	203	167	-	P	
123.1	HABU	11/11/2021	Shearkey 1	Layer 3 1 m placed	Clayey SILT	NDM / SV	200	1.78	39.1	2.5	1.77	38.7	3.3	1.78	38.9	**2.9**	2.70	35.5	1.31	4.9	4.3	145	135	135	126	135	162	-	P	
123.2						NDM / SV	200	1.79	35.7	3.8	1.81	32.4	5.2	1.80	34.1	**4.5**	2.70	34.7	1.34	4.0	4.6	200	200	196	159	189	162	-	P	
123.3			Shearkey 2	Layer 5 500 mm placed		NDM / SV	200	1.71	38.6	6.4	1.70	38.5	7.4	1.71	38.6	**6.9**	2.70	41.2	1.21	5.4	4.8	174	159	130	130	149	163	-	P	
123.4						NDM / SV	200	1.77	32.7	6.9	1.75	34.7	6.7	1.76	33.7	**6.8**	2.70	32.3	1.33	7.7	5.1	181	167	152	130	158	163	-	P	
124.1	HABU	19/11/2021	Shearkey 1	Layer 4 1 m placed	Clayey SILT	NDM / SV	200	1.78	34.7	5.0	1.77	34.6	5.6	1.78	34.7	**5.3**	2.70	35.7	1.31	4.7	5.3	130	138	138	145	138	164	-	P	
124.2						NDM / SV	200	1.75	33.3	7.5	1.76	32.0	8.1	1.76	32.7	**7.8**	2.70	31.9	1.33	8.2	5.7	138	138	133	126	134	163	-	P	
124.3			Shearkey 2	Layer 6 1 m placed		NDM / SV	200	1.77	40.9	1.8	1.77	38.7	3.2	1.77	39.8	**2.5**	2.70	39.1	1.28	2.9	5.6	138	138	138	152	141	162	-	P	
124.4						NDM / SV	200	1.75	38.8	4.6	1.75	41.4	2.9	1.75	40.1	**3.7**	2.70	40.2	1.25	3.7	4.9	138	125	123	123	127	158	-	P	
125.1	HABU	23/11/2021	Shearkey 1	Layer 5 500 mm placed	Clayey SILT	NDM / SV	200	1.96	28.8	0.1	1.98	26.6	0.4	1.97	27.7	**0.2**	2.70	34.1	1.47	0.0	4.2	151	152	167	180	162	158	-	P	
125.2						NDM / SV	200	1.76	36.7	4.9	1.74	35.8	6.9	1.75	36.3	**5.9**	2.70	34.3	1.30	7.1	4.9	159	159	162	181	166	155	-	P	
125.3			Shearkey 2	Layer 7 500 mm placed		NDM / SV	200	1.78	43.6	0.3	1.75	40.4	3.3	1.76	42.0	**1.8**	2.70	42.6	1.24	1.5	4.5	133	133	142	177	146	149	-	P	
125.4						NDM / SV	200	1.76	37.4	4.6	1.76	35.8	5.8	1.76	36.6	**5.2**	2.70	39.6	1.26	3.5	4.5	148	145	142	191	156	151	-	P	
126.1	DASA	26/11/2021	Shearkey 1	Layer 6 500 mm placed	Clayey SILT	NDM / SV	200	1.75	36.0	6.2	1.75	40.0	3.9	1.75	38.0	**5.0**	2.70	33.0	1.31	8.0	4.7	159	174	174	178	171	150	-	P	
126.2						NDM / SV	200	1.82	32.6	4.5	1.80	35.0	3.9	1.81	33.8	**4.2**	2.70	36.9	1.32	2.2	4.2	159	155	157	159	157	151	-	P	
126.3			Shearkey 2	Layer 8 500 mm placed		NDM / SV	200	1.82	33.1	4.4	1.79	41.8	0.3	1.80	37.5	**2.2**	2.70	35.3	1.33	3.6	4.1	151	143	159	162	153	150	-	P	
126.4						NDM / SV	200	1.70	35.8	8.7	1.70	39.8	6.5	1.70	37.8	**7.6**	2.70	37.5	1.24	7.7	4.0	159	165	174	174	168	153	-	P	

GEOTECHNICS

Job: Hitchens Block Stage 5

Client: Land Development & Engineering Ltd.

Project Number	2021000.1740.0.0/Rep1
Entered By	DAMC
Checked By	DBRA
Approved By KTP	DAMC

URN	Tech.	Date	Location	Layer	Material	Test Type		NDM 0°			NDM 90°			AVERAGE NDM			Solid Density (t/m³) Assumed	Oven Moisture content (%)	Final Corrected		Average Air Voids (10 X Tests)	Shear Vane Reading (kPa)						Retest URN	PASS / FAIL	Comments
						NDM / SV	Probe Depth (mm)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)			Oven Dry Density (t/m³)	Average Air Voids (%)		Reading 1	Reading 2	Reading 3	Reading 4	Average SV (4 x Tests)	Average SV (10 X Sets)		(P) Pass / (F) Fail	
127.1	HABU	29/11/2021	Shearkey 1	RL 76.034	Clayey SILT	NDM / SV	200	1.77	33.3	6.8	1.77	37.4	4.2	1.77	35.4	**5.5**	2.70	40.0	1.26	2.7	4.0	130	128	125	122	126	152	-	P	
127.2				RL 77.231		NDM / SV	200	1.81	33.1	4.7	1.81	34.8	3.4	1.81	34.0	**4.1**	2.70	34.8	1.34	3.5	4.0	130	152	146	126	139	152	-	P	
127.3			Shearkey 2	RL 57.005		NDM / SV	200	1.73	42.8	3.5	1.70	43.1	4.5	1.72	43.0	**4.0**	2.70	42.3	1.21	4.4	4.4	109	112	107	101	107	150	128.1	F	Retested 1/12/2021. Retest = Pass
127.4				RL 56.397		NDM / SV	200	1.79	36.7	3.3	1.77	40.6	2.2	1.78	38.7	**2.7**	2.70	39.8	1.27	2.1	3.9	145	142	138	128	138	148	-	P	
128.1	HABU	1/12/2021	Shearkey 2	RL 59.614	Clayey SILT	NDM / SV	200	1.72	37.1	7.1	1.71	36.1	7.9	1.72	36.6	**7.5**	2.70	24.7	1.38	15.0	5.3	145	152	159	159	154	147	129.1	F	Retested 3/12/2021. Retest = Pass
128.2				RL 58.527		NDM / SV	200	1.70	43.8	4.5	1.70	41.5	5.8	1.70	42.7	**5.2**	2.70	36.6	1.24	8.5	5.8	167	159	159	145	158	148	-	P	
129.1	HABU	3/12/2021	Shearkey 2	500 mm placed	Clayey SILT	NDM / SV	200	1.66	57.2	0.6	1.67	51.0	2.7	1.66	54.1	**1.6**	2.70	48.5	1.12	4.2	5.4	145	148	133	123	137	146	-	P	
129.2						NDM / SV	200	1.66	47.3	5.1	1.68	44.1	5.7	1.67	45.7	**5.4**	2.70	40.3	1.19	8.1	6.0	174	177	165	159	169	146	-	P	
130.1	HABU	6/12/2021	Shearkey 2	RL 63.986	Clayey SILT	NDM / SV	200	1.76	39.1	3.9	1.76	37.8	4.7	1.76	38.5	**4.3**	2.70	40.8	1.25	2.9	5.9	145	139	130	130	136	144	-	P	
130.2				RL 64.541		NDM / SV	200	1.64	50.7	4.7	1.63	51.9	4.5	1.63	51.3	**4.6**	2.70	45.5	1.12	7.3	5.9	181	181	152	145	165	145	-	P	
131.1	HABU	8/12/2021	Shearkey 1	RL 79.69	Clayey SILT	NDM / SV	200	1.71	41.4	4.9	1.70	43.6	4.7	1.71	42.5	**4.8**	2.70	54.9	1.10	0.0	5.6	139	139	141	151	142	143	-	P	
131.2				RL 77.03		NDM / SV	200	1.64	46.5	6.6	1.64	48.7	5.6	1.64	47.6	**6.1**	2.70	55.2	1.05	2.7	5.5	159	159	136	133	147	145	-	P	
132.1	HABU	10/12/2021	Shearkey 1	RL 80.096	Clayey SILT	NDM / SV	200	1.69	46.0	3.7	1.68	46.0	4.5	1.69	46.0	**4.1**	2.70	48.1	1.14	3.1	5.4	174	174	174	174	174	148	-	P	
132.2				RL 75.992		NDM / SV	200	1.84	35.1	1.6	1.84	32.7	3.2	1.84	33.9	**2.4**	2.70	34.1	1.37	2.3	5.4	159	159	167	167	163	153	-	P	
133.1	HABU	20/12/2021	SRP 1	RL 65.35	Clayey SILT	NDM / SV	200	1.84	39.2	0.0	1.85	37.1	0.0	1.84	38.2	**0.0**	2.70	37.6	1.34	0.0	3.9	174	177	177	167	174	156	-	P	
133.2				RL 66.73		NDM / SV	200	1.83	36.4	1.4	1.83	36.4	1.6	1.83	36.4	**1.5**	2.70	36.7	1.34	1.3	3.2	159	161	159	155	159	157	-	P	
133.3			Shearkey 1	RL 80.23		NDM / SV	200	1.72	44.9	2.6	1.73	44.5	2.5	1.73	44.7	**2.5**	2.70	47.1	1.17	1.3	2.9	145	136	126	128	134	154	-	P	
133.4				RL 80.61		NDM / SV	200	1.71	49.5	0.9	1.70	48.3	1.9	1.71	48.9	**1.4**	2.70	48.7	1.15	1.5	2.2	174	181	190	168	178	158	-	P	
134.1	HABU	22/12/2021	SRP 1	RL 65.50	Clayey SILT	NDM / SV	200	1.70	52.8	0.0	1.70	50.4	1.3	1.70	51.6	**0.6**	2.70	43.2	1.19	4.7	2.4	152	146	130	129	139	156	-	P	
134.2				RL 67.00		NDM / SV	200	1.58	57.3	5.0	1.59	57.1	4.9	1.59	57.2	**5.0**	2.70	50.7	1.05	7.7	2.5	141	138	138	128	136	156	-	P	
134.3				RL 67.14		NDM / SV	200	1.71	53.3	0.0	1.71	53.1	0.0	1.71	53.2	**0.0**	2.70	49.3	1.14	1.2	2.6	159	156	154	148	154	155	-	P	
135.1	HABU	10/01/2022	Shearkey 1	500 mm placed	Clayey SILT	NDM / SV	200	1.79	33.2	5.5	1.79	34.4	4.9	1.79	33.8	**5.2**	2.70	31.5	1.36	6.6	3.0	174	175	167	170	171	157	-	P	
135.2						NDM / SV	200	1.80	41.2	0.2	1.81	37.1	2.1	1.81	39.2	**1.2**	2.70	40.4	1.29	0.4	2.7	139	138	133	132	135	156	-	P	
135.3			SRP 1	500 mm placed		NDM / SV	200	1.81	37.1	2.1	1.71	43.8	3.6	1.76	40.5	**2.8**	2.70	44.4	1.22	0.6	2.5	181	187	187	177	183	157	-	P	
135.4			SRP 2	500 mm placed		NDM / SV	200	1.71	43.2	4.0	1.72	39.5	5.8	1.71	41.4	**4.9**	2.70	40.4	1.22	5.4	3.1	145	146	133	129	138	155	-	P	
135.5						NDM / SV	200	1.77	36.7	4.3	1.79	39.1	2.1	1.78	37.9	**3.2**	2.70	42.8	1.25	0.4	3.0	159	170	175	178	171	154	-	P	
136.1	HABU	12/01/2022	Shearkey 1	RL 84.16	Clayey SILT	NDM / SV	200	1.75	36.6	5.6	1.74	36.3	6.1	1.75	36.5	**5.9**	2.70	36.3	1.28	5.9	3.4	161	164	148	149	155	154	-	P	
136.2				RL 84.27		NDM / SV	200	1.56	64.2	3.6	1.57	59.9	5.1	1.56	62.1	**4.3**	2.70	61.8	0.97	4.4	3.7	151	155	139	138	146	155	-	P	
136.3			SRP 2	RL 85.61		NDM / SV	200	1.72	38.8	5.9	1.73	39.5	5.2	1.73	39.2	**5.5**	2.70	41.6	1.22	4.2	3.7	159	162	171	177	167	154	-	P	

GEOTECHNICS

Job: Hitchens Block Stage 5

Client: Land Development & Engineering Ltd.

Project Number	2021000.1740.0.0/Rep1
Entered By	DAMC
Checked By	DBRA
Approved By KTP	DAMC

URN	Tech.	Date	Location	Layer	Material	Test Type		NDM 0°			NDM 90°			AVERAGE NDM			Solid Density (t/m³) Assumed	Oven Moisture content (%)	Final Corrected		Average Air Voids (10 X Tests)	Shear Vane Reading (kPa)						Retest URN	PASS / FAIL	Comments
						NDM / SV	Probe Depth (mm)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)			Oven Dry Density (t/m³)	Average Air Voids (%)		Reading 1	Reading 2	Reading 3	Reading 4	Average SV (4 x Tests)	Average SV (10 X Sets)		(P) Pass / (F) Fail	
137.7	HABU	14/01/2022	Shearkey 1	RL 90.15	Clayey SILT	NDM / SV	200	1.79	34.4	4.9	1.79	38.3	2.3	1.79	36.4	**3.6**	2.70	32.8	1.35	5.8	3.5	175	159	161	155	163	175	-	P	
137.8				RL 85.13		NDM / SV	200	1.84	31.6	3.9	1.84	32.1	3.9	1.84	31.9	**3.9**	2.70	33.1	1.38	3.1	3.7	145	143	122	123	133	172	-	P	
138.13	HABU	18/01/2022	Shearkey 1	RL 85.94	Clayey SILT	NDM / SV	200	1.77	37.7	4.1	1.78	41.1	1.6	1.77	39.4	**2.8**	2.70	43.2	1.24	0.7	3.1	146	141	129	123	135	166	-	P	
138.14			SRP 2	RL 84.82		NDM / SV	200	1.75	39.7	4.0	1.77	37.3	4.3	1.76	38.5	**4.1**	2.70	43.1	1.23	1.5	3.2	145	139	126	122	133	159	-	P	
139.9	HABU	20/01/2022	Shearkey 1	RL 87.63	Clayey SILT	NDM / SV	200	1.84	29.6	5.4	1.84	29.0	5.9	1.84	29.3	**5.6**	2.70	28.8	1.43	6.0	3.7	156	156	158	161	158	155	-	P	
139.10			SRP 2	RL 84.77		NDM / SV	200	1.82	32.5	4.4	1.83	31.3	5.0	1.82	31.9	**4.7**	2.70	36.5	1.34	1.7	3.4	162	162	174	161	165	158	-	P	
140.1	HABU	26/01/2022	SRP 2	RL 87.93	Clayey SILT	NDM / SV	200	1.80	34.6	4.2	1.80	33.4	4.7	1.80	34.0	**4.5**	2.70	41.9	1.27	0.0	3.3	161	164	162	175	166	163	-	P	
140.2				RL 87.69		NDM / SV	200	1.84	40.1	-1.3	1.85	40.5	0.0	1.84	40.3	**0.0**	2.70	48.4	1.24	0.0	2.7	132	126	125	133	129	162	-	P	
141.1	HABU	28/01/2022	Shearkey 1	Finished Level	Clayey SILT	NDM / SV	200	1.76	38.7	3.6	1.78	41.1	1.7	1.77	39.9	**2.6**	2.70	36.1	1.30	4.9	2.8	148	159	156	158	155	158	-	P	
141.2				Finished Level		NDM / SV	200	1.63	54.6	3.6	1.63	49.3	5.9	1.63	52.0	**4.7**	2.70	39.3	1.17	10.9	3.5	174	174	184	175	177	156	-	P	
141.3	HABU	28/01/2022	Fill Area M - See Site Plan	RL 4.261	Clayey SILT	NDM / SV	200	1.73	41.5	4.1	1.73	43.2	3.2	1.73	42.4	**3.6**	2.70	35.0	1.28	7.8	4.1	162	165	158	152	159	153	-	P	
142.4	HABU	1/02/2022	Fill Area M - See Site Plan	RL 48.32	Clayey SILT	NDM / SV	200	1.58	44.2	10.8	1.57	45.7	10.7	1.58	45.0	**10.7**	2.70	44.6	1.09	10.9	6.9	133	145	149	129	139	154	-	P	
143.7	HABU	3/02/2022	Fill Area M - See Site Plan	RL 48.29	Clayey SILT	NDM / SV	200	1.80	36.8	3.0	1.78	36.3	4.4	1.79	36.6	**3.7**	2.70	30.3	1.37	7.7	4.6	203	203	203	203	203	155	-	P	
143.8				RL 46.55		NDM / SV	200	1.70	45.1	3.5	1.71	42.9	4.5	1.71	44.0	**4.0**	2.70	37.0	1.25	7.8	5.0	203	203	203	203	203	158	-	P	
146.1	HABU	15/02/2022	Shearkey 1	RL 91.45	Clayey SILT	NDM / SV	200	1.74	44.6	1.5	1.75	49.1	0.0	1.75	46.9	**0.3**	2.70	41.1	1.24	3.3	4.9	145	151	156	151	151	158	-	P	
146.2				RL 87.22		NDM / SV	200	1.77	34.7	5.7	1.78	38.3	3.1	1.78	36.5	**4.4**	2.70	36.7	1.30	4.2	5.1	159	177	171	156	166	160	-	P	
146.3				RL 84.46		NDM / SV	200	1.76	41.2	2.6	1.75	40.0	3.5	1.76	40.6	**3.0**	2.70	42.1	1.24	2.2	5.2	156	145	148	145	149	161	-	P	
146.4				RL 94.15		NDM / SV	200	1.78	38.9	2.7	1.76	40.4	2.7	1.77	39.7	**2.7**	2.70	41.0	1.26	1.9	5.0	133	145	149	129	139	161	-	P	
147.1	HABU	16/02/2022	Shearkey 2	RL 56.62	Clayey SILT	NDM / SV	200	1.80	38.4	1.9	1.80	37.6	2.1	1.80	38.0	**2.0**	2.70	38.7	1.30	1.6	4.6	203	203	203	203	203	164	-	P	
147.2				RL 55.56		NDM / SV	200	1.77	42.2	1.4	1.77	44.5	0.3	1.77	43.4	**0.8**	2.70	37.7	1.28	4.0	4.8	203	203	203	203	203	167	-	P	
148.1	HABU	17/02/2022	Shearkey 2	RL 57.28	Clayey SILT	NDM / SV	200	1.81	35.6	3.3	1.81	39.9	0.4	1.81	37.8	**1.8**	2.70	34.9	1.34	3.6	5.1	203	203	203	203	203	170	-	P	
148.2				RL 57.36		NDM / SV	200	1.78	35.7	4.3	1.78	36.4	4.1	1.78	36.1	**4.2**	2.70	37.2	1.30	3.5	5.3	177	180	170	171	174	170	-	P	
149.1	HABU	21/02/2022	Shearkey 2	Finished Level	Clayey SILT	NDM / SV	200	1.90	31.1	1.2	1.89	31.0	2.0	1.89	31.1	**1.6**	2.70	25.1	1.51	5.9	5.4	180	180	183	187	182	174	-	P	
149.2				1 m placed		NDM / SV	200	1.95	29.7	0.0	1.93	31.0	0.0	1.94	30.4	**0.0**	2.70	28.2	1.51	1.4	3.2	123	128	133	130	129	172	-	P	
150.1	HABU	24/02/2022	Fill Area - See Site Plan	RL 62.55	Clayey SILT	NDM / SV	200	1.78	36.5	4.3	1.78	38.2	3.3	1.78	37.4	**3.8**	2.70	31.7	1.35	7.3	3.6	138	139	132	132	135	167	-	P	
150.2				RL 62.48		NDM / SV	200	1.77	41.3	1.8	1.79	39.5	2.1	1.78	40.4	**1.9**	2.70	42.1	1.25	1.0	3.2	145	152	142	155	149	166	-	P	
151.1	DASA	1/03/2022	Fill Area - See Site Plan	RL 68.04	Clayey SILT	NDM / SV	200	1.85	29.9	4.5	1.85	31.4	3.9	1.85	30.7	**4.2**	2.70	38.3	1.34	0.0	3.0	159	162	151	165	159	166	-	P	
151.2				RL 66.90		NDM / SV	200	1.87	33.2	1.5	1.86	35.0	1.0	1.86	34.1	**1.0**	2.70	34.5	1.38	1.0	2.9	159	167	176	179	170	168	-	P	
152.1	ROSM	3/03/2022	Meadows Shearkey - See Site Plan	RL 47.46	Clayey SILT	NDM / SV	200	1.85	26.8	6.8	1.86	27.8	5.6	1.86	27.3	**6.2**	2.70	21.5	1.53	10.6	3.8	213	213	213	208	212	174	-	P	
152.2				RL 48.30		NDM / SV	200	1.81	39.1	0.8	1.81	36.7	2.3	1.81	37.9	**1.5**	2.70	41.0	1.29	0.0	3.4	175	181	173	170	175	172	-	P	
153.1	DASA	4/03/2022	Meadows Shearkey - See Site Plan	RL 49.69	Clayey SILT	NDM / SV	200	1.81	32.8	4.8	1.81	32.9	4.5	1.81	32.9	**4.7**	2.70	48.3	1.22	0.0	3.1	193	203	201	203	200	172	-	P	
153.2				RL 45.20		NDM / SV	200	1.81	32.9	4.5	1.80	34.9	4.2	1.81	33.9	**2.0**	2.70	47.6	1.22	0.0	2.7	176	179	173	174	176	169	-	P	
154.1	DASA	7/03/2022	Meadows Shearkey - See Site Plan	RL 48.80	Clayey SILT	NDM / SV	200	1.78	34.6	5.5	1.79	35.9	4.2	1.78	35.3	**4.8**	2.70	42.1	1.25	0.8	2.2	222	174	190	206	198	171	-	P	
154.2				RL 47.90		NDM / SV	200	1.72	34.4	8.8	1.76	36.6	5.0	1.74	35.5	**6.9**	2.70	38.9	1.25	4.9	2.6	193	174	187	190	186	172	-	P	
155.1	DASA	9/03/2022	Meadows Shearkey - See Site Plan	500 mm placed	Clayey SILT	NDM / SV	200	1.82	30.6	5.7	1.82	27.2	7.9	1.82	28.9	**6.8**	2.70	52.1	1.20	0.0	1.8	165	171	181	190	177	176	-	P	
155.2						NDM / SV	200	1.75	39.3	4.2	1.76	39.0	3.9	1.75	39.2	**4.1**	2.70	49.4	1.17	0.0	1.7	190	197	197	206	197	182	-	P	
156.1	DASA	11/03/2022	Meadows Shearkey - See Site Plan	500 mm placed	Clayey SILT	NDM / SV	200	1.74	38.6	5.3	1.75	39.9	3.7	1.74	39.3	**4.5**	2.70	36.4	1.28	6.1	2.3	213	213	213	213	213	188	-	P	
156.2						NDM / SV	200	1.77	32.4	7.0	1.73	35.5	7.3	1.75	34.0	**7.1**	2.70	29.5	1.35	10.0	3.2	213	213	213	213	213	192	-	P	

GEOTECHNICS

1 Hill Street
Onehunga
Auckland 1061
New Zealand

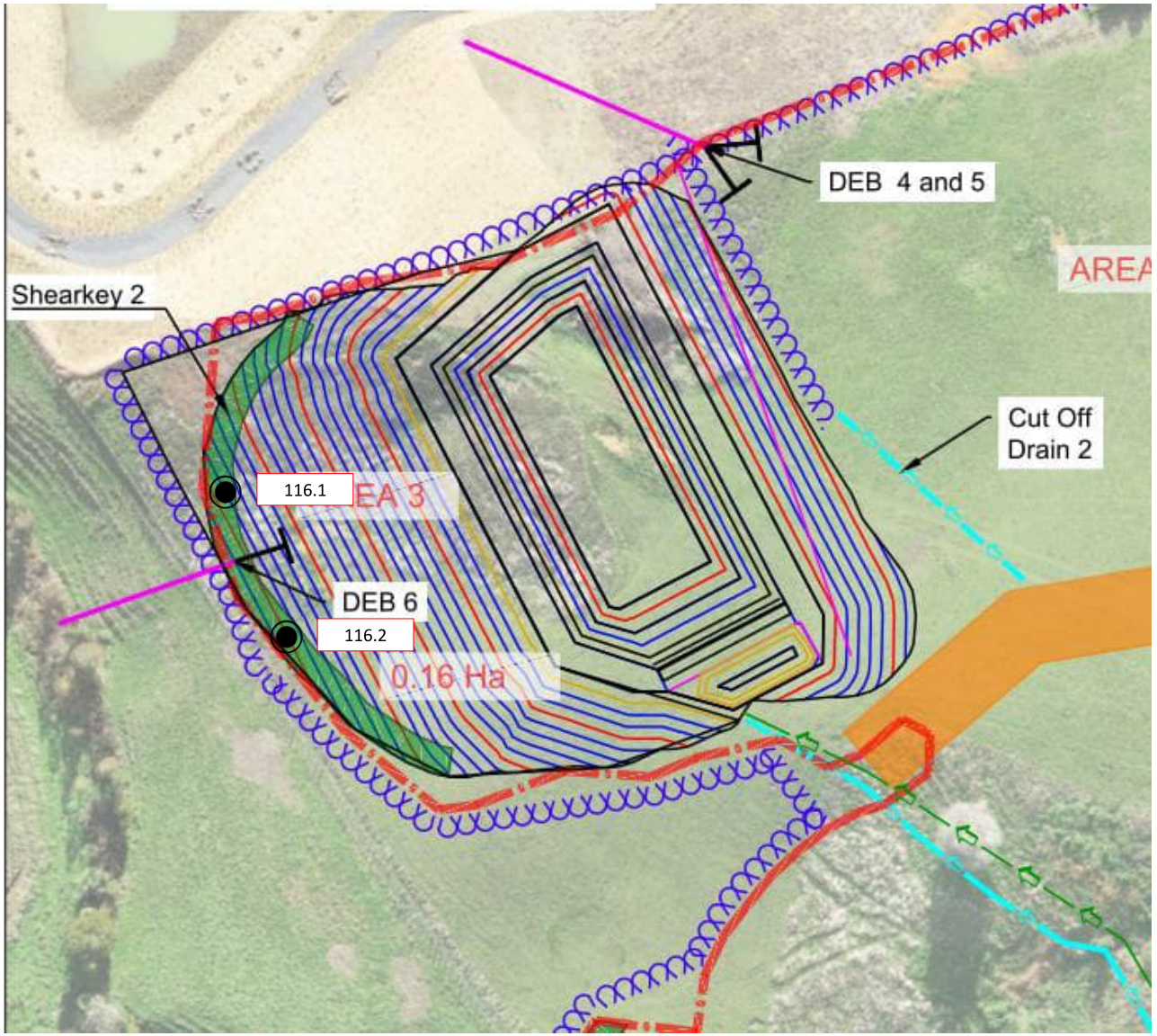
p. +64 9 356 3510

Project Name: Hitchen - Civil Stage 18

Customer: Land Development & Engineering Ltd.

Project Number	**2021000.1740.0.0/Rep1**
Entered By	**MIBR / CCOU**
Checked By	**DBRA**
Approved by KTP	**DAMC**

URN	Tech	Date	Location	Layer	Material Type	Test Type	Probe Depth (mm)	NDM 0°			NDM 90°			AVERAGE NDM			Solid Density (t/m³) Assumed	Oven Moisture content (%)	Final Corrected		Shear Vane Reading (kPa)					Retest URN	PASS / FAIL	Comments
								Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)			Oven Dry Density (t/m³)	Average Air Voids (%)	Reading 1	Reading 2	Reading 3	Reading 4	Average SV (4 x Tests)		(P) Pass / (F) Fail	
201.1	MIBR	1/11/2024	Fill Area	Final Level	silty CLAY	NDM / SV	300	1.82	30.2	6.2	1.79	30.0	7.8	**1.80**	**30.1**	**7.0**	2.70	36.4	1.32	**3.0**	164	157	161	175	164	-	P	Specification provided by LDE requires undrained shear strength ≥ 150 kPa and air voids ≤ 10 %.
201.2						NDM / SV	300	1.84	31.8	4.0	1.84	31.9	4.0	**1.84**	**31.9**	**4.0**	2.70	32.6	1.39	**3.5**	224	UTP	UTP	UTP	224	-	P	
202.1	CCOU	7/11/2024	Fill Area	500 mm Lift	silty CLAY	NDM / SV	200	1.74	32.7	8.6	1.77	33.6	6.6	**1.75**	**33.2**	**7.6**	2.70	37.0	1.28	**5.3**	172	164	>219	164	>180	-	P	
202.2						NDM / SV	200	1.78	31.4	7.5	1.81	30.4	6.3	**1.79**	**30.9**	**6.9**	2.70	32.3	1.36	**6.0**	>219	>219	188	196	>205	-	P	
202.3						NDM / SV	200	1.76	38.0	4.3	1.78	39.4	2.6	**1.77**	**38.7**	**3.4**	2.70	29.1	1.37	**9.4**	>219	>219	172	156	>192	-	P	
202.4						NDM / SV	200	1.80	36.8	2.9	1.79	41.1	0.6	**1.80**	**39.0**	**1.8**	2.70	35.7	1.32	**3.7**	152	156	>219	172	>175	-	P	
203.1	MIBR	13/11/2024	Bund	750 mm Lift	silty CLAY	NDM / SV	300	1.82	37.8	1.4	1.81	39.1	0.9	**1.81**	**38.5**	**1.2**	2.70	31.5	1.38	**5.5**	161	175	178	171	171	-	P	
203.2						NDM / SV	300	1.75	39.0	4.3	1.75	36.3	5.8	**1.75**	**37.7**	**5.1**	2.70	48.5	1.18	**0.0**	217	178	171	161	182	-	P	
204.1	MIBR	13/11/2024	Bund	Final Level	silty CLAY	NDM / SV	300	1.80	29.7	7.4	1.84	27.2	6.8	**1.82**	**28.5**	**7.1**	2.70	37.5	1.33	**1.2**	UTP	UTP	UTP	UTP	UTP	-	P	
204.2						NDM / SV	300	1.76	33.5	6.9	1.77	33.5	6.2	**1.77**	**33.5**	**6.6**	2.70	34.8	1.31	**5.8**	UTP	UTP	UTP	UTP	UTP	-	P	
205.1	MIBR	26/11/2024	Fill Area	750 mm Lift	silty CLAY	NDM / SV	300	1.86	32.8	2.4	1.85	37.6	0.0	**1.85**	**35.2**	**1.0**	2.70	33.1	1.39	**2.4**	UTP	UTP	UTP	UTP	UTP	-	P	
205.2						NDM / SV	300	1.84	37.5	0.3	1.84	34.0	2.3	**1.84**	**35.8**	**1.3**	2.70	31.7	1.40	**3.9**	192	178	161	175	177	-	P	



Legend:

- Impact Hammer
- NDM (DT + SV Set)
- Shear Vane
- Scala
- Hand Auger

GEOTECHNICS LTD.
233 Manukau Road, Pukekohe
Auckland, New Zealand
ph. +64 (0)9 356 3510
e. enquiry@geotechnics.co.nz
w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA	Date:	15/10/2021
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	116	Date:	15/10/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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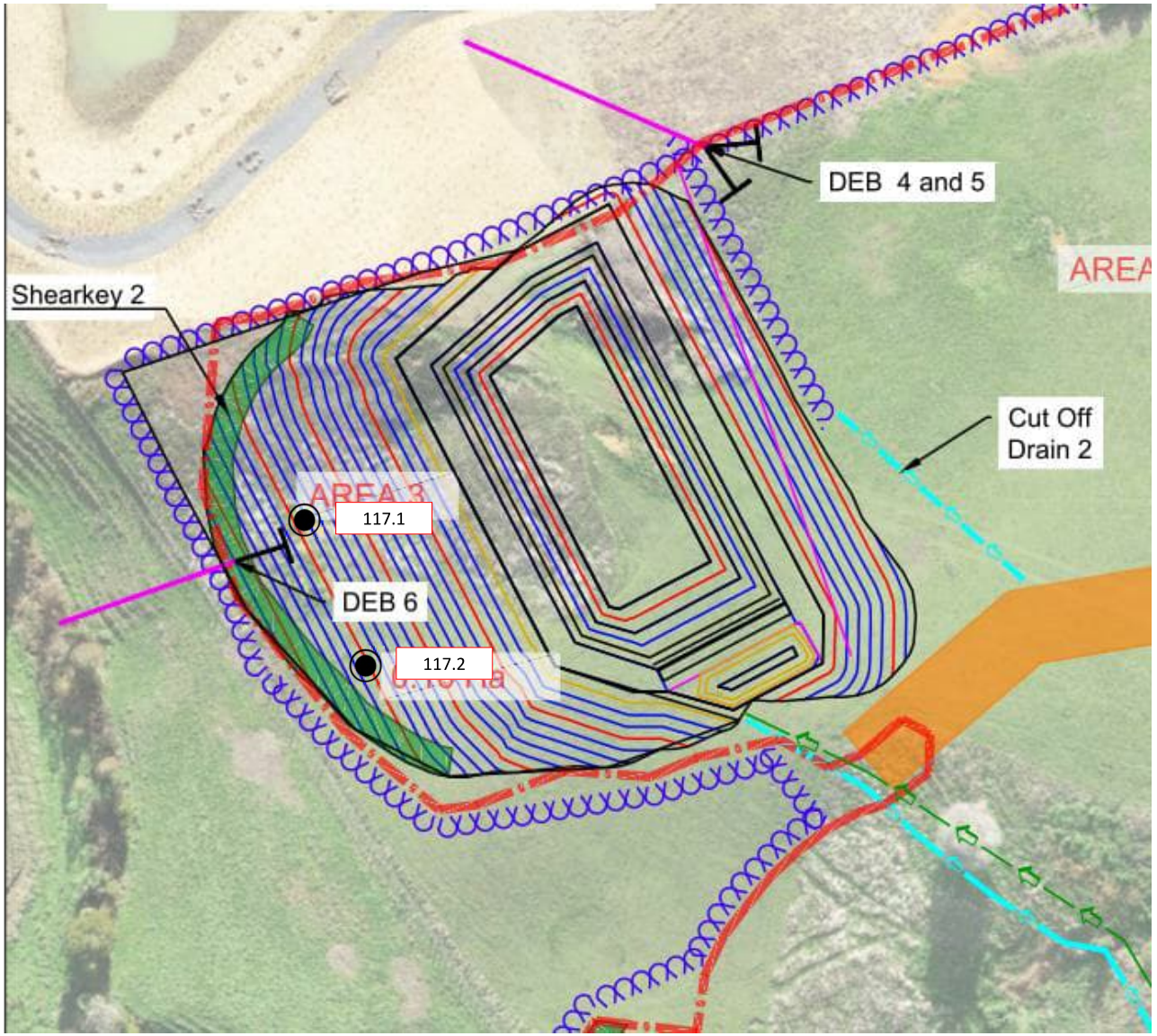

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA	Date:	15/10/2021
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	117	Date:	15/10/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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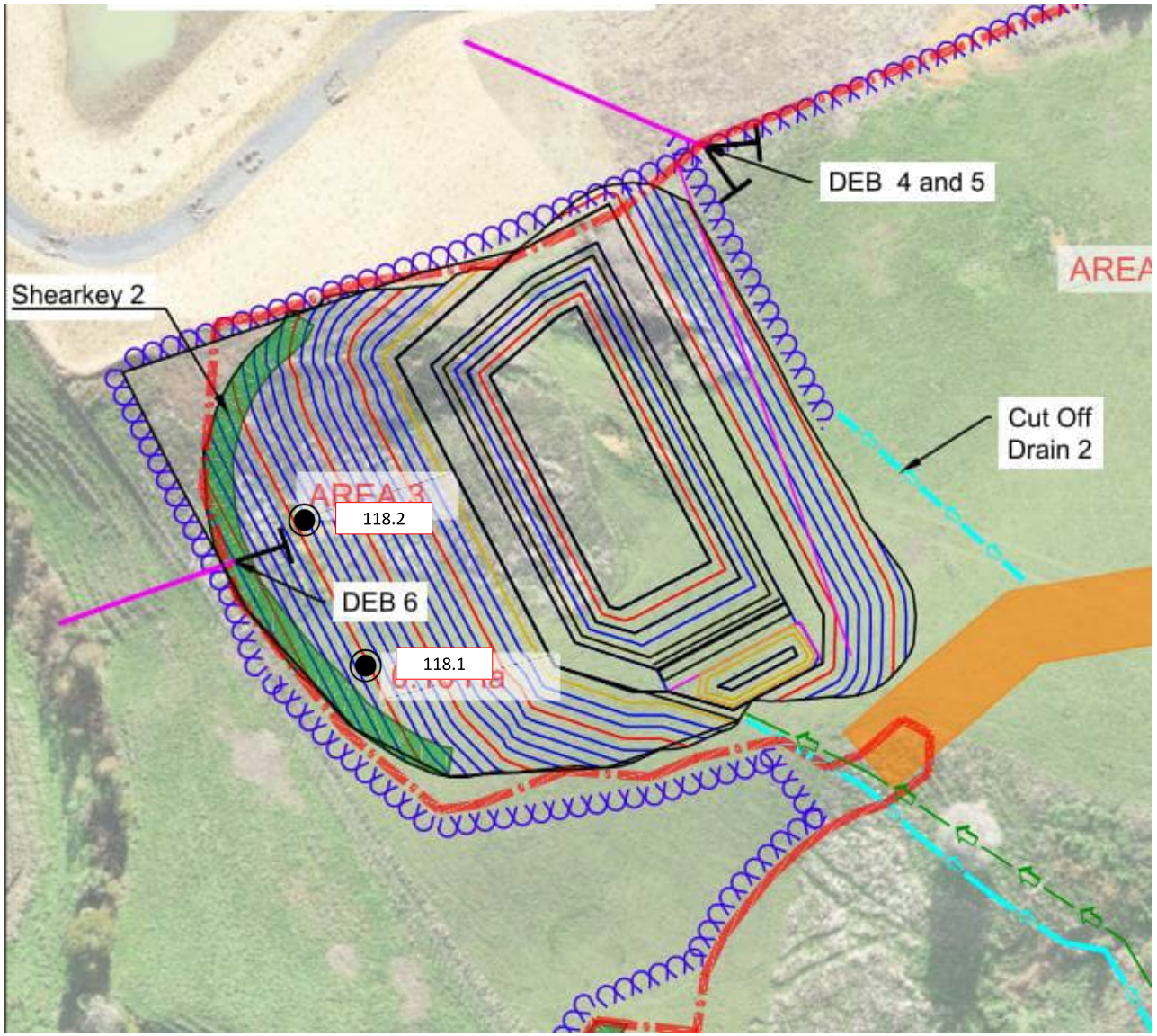

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA/HABU	Date:	20/10/2021
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	118	Date:	20/10/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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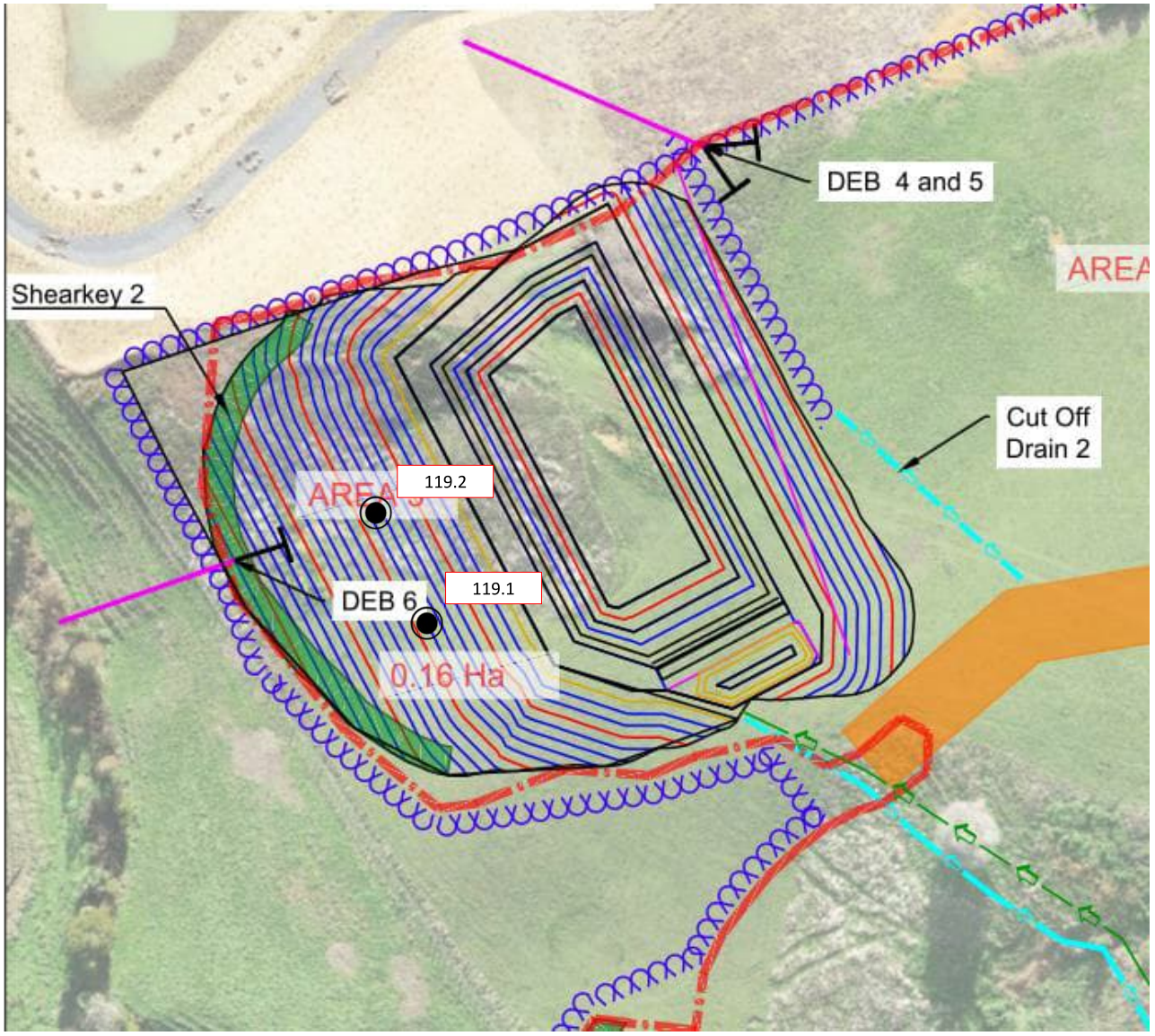

Legend:

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233 Manukau Road, Pukekohe
Auckland, New Zealand
ph. +64 (0)9 356 3510
e. enquiry@geotechnics.co.nz
w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA/HABU	Date:	26/10/2021
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	119	Date:	26/10/2021
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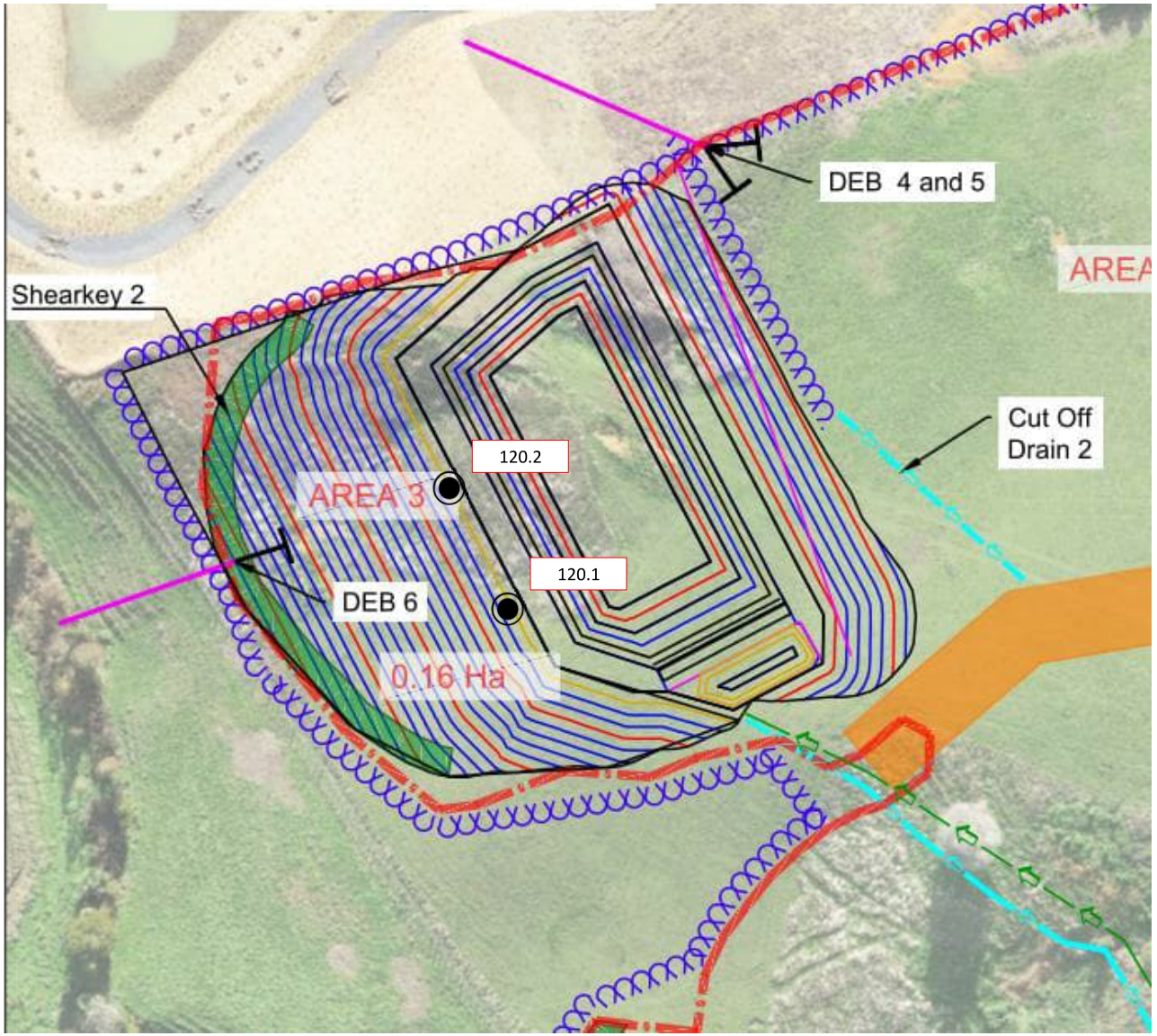

Legend:

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233 Manukau Road, Pukekohe
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w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA/HABU	Date:	27/10/2021
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	120	Date:	27/10/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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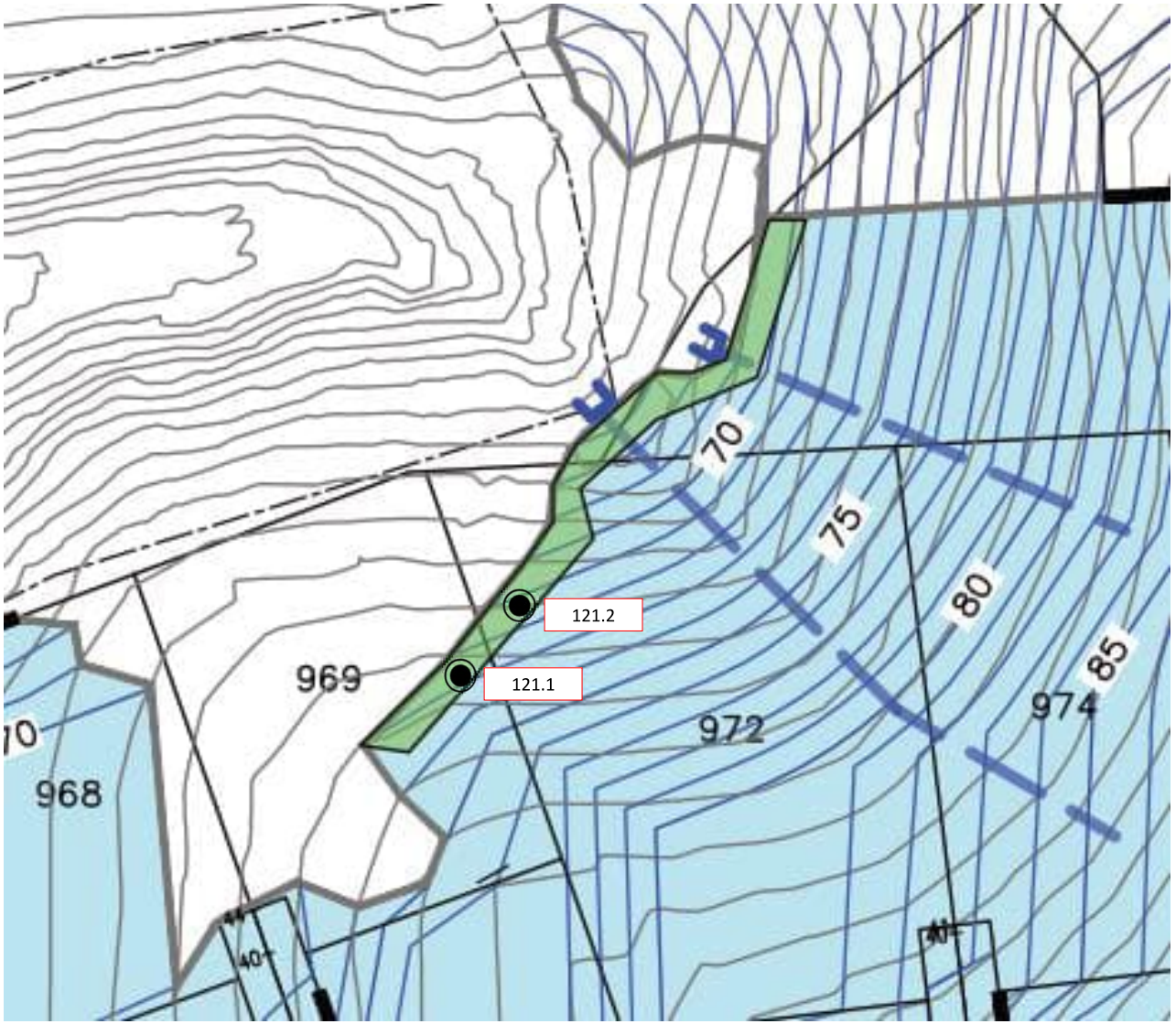

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233 Manukau Road, Pukekohe
Auckland, New Zealand
ph. +64 (0)9 356 3510

e. enquiry@geotechnics.co.nz

w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA/HABU	Date:	08/11/2021
Location:	Shearkey 1	Job No.:	2021000.0045.0.0/Rep1	URN:	121	Date:	08/11/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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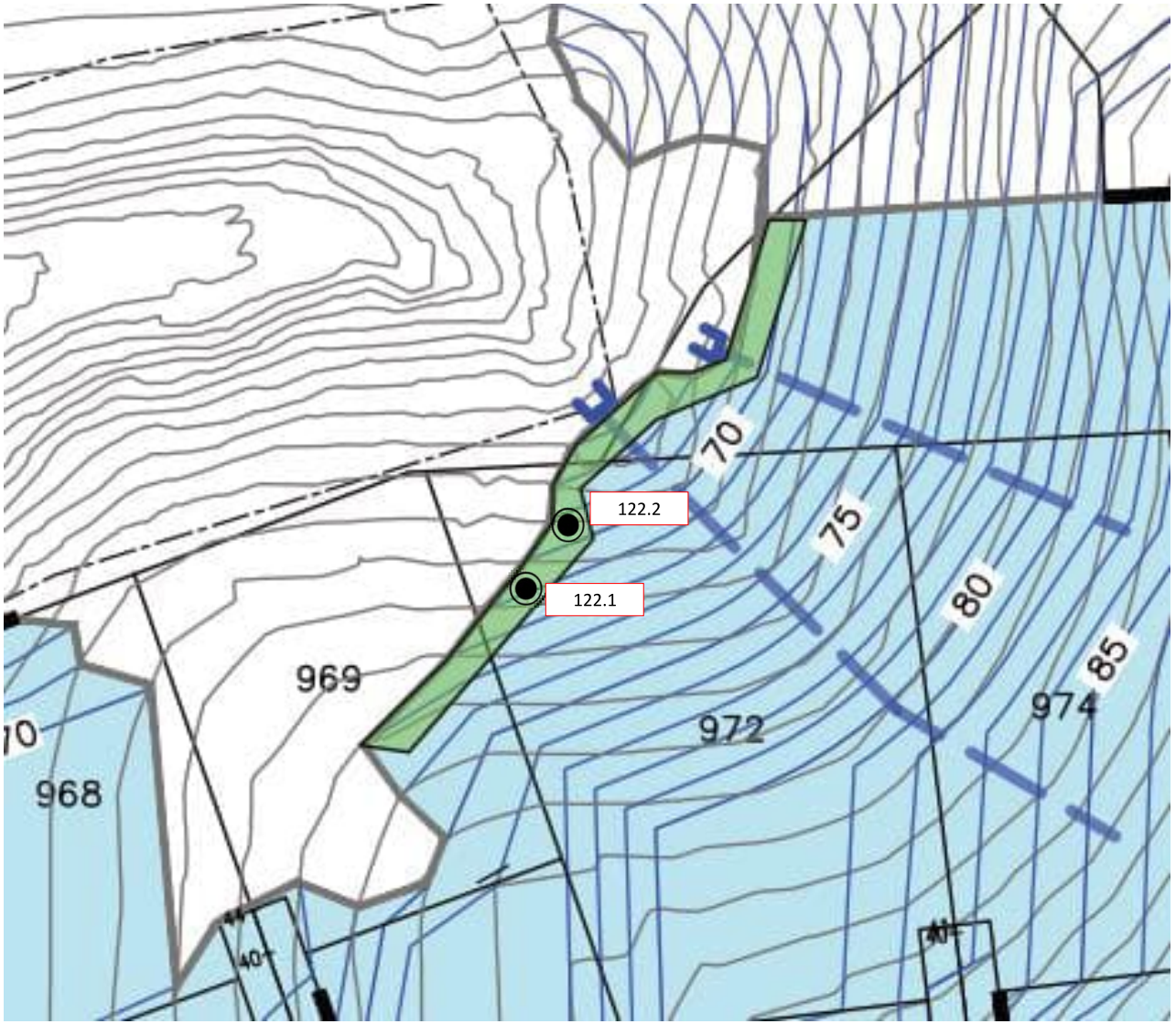

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GEOTECHNICS LTD.
233 Manukau Road, Pukekohe
Auckland, New Zealand
ph. +64 (0)9 356 3510

e. enquiry@geotechnics.co.nz

w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA/HABU	Date:	09/11/2021
Location:	Shearkey 1	Job No.:	2021000.0045.0.0/Rep1	URN:	122	Date:	09/11/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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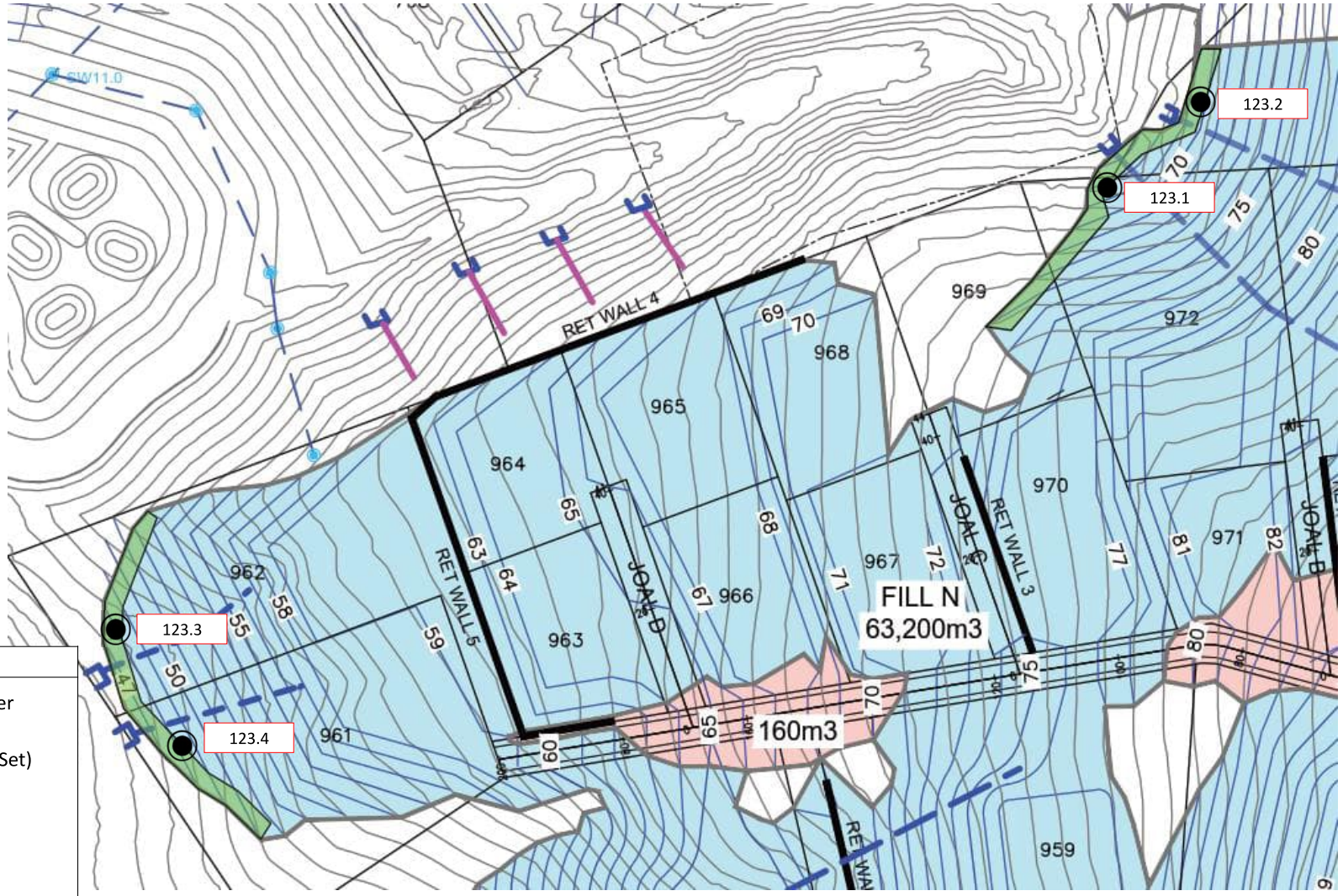

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e. enquiry@geotechnics.co.nz
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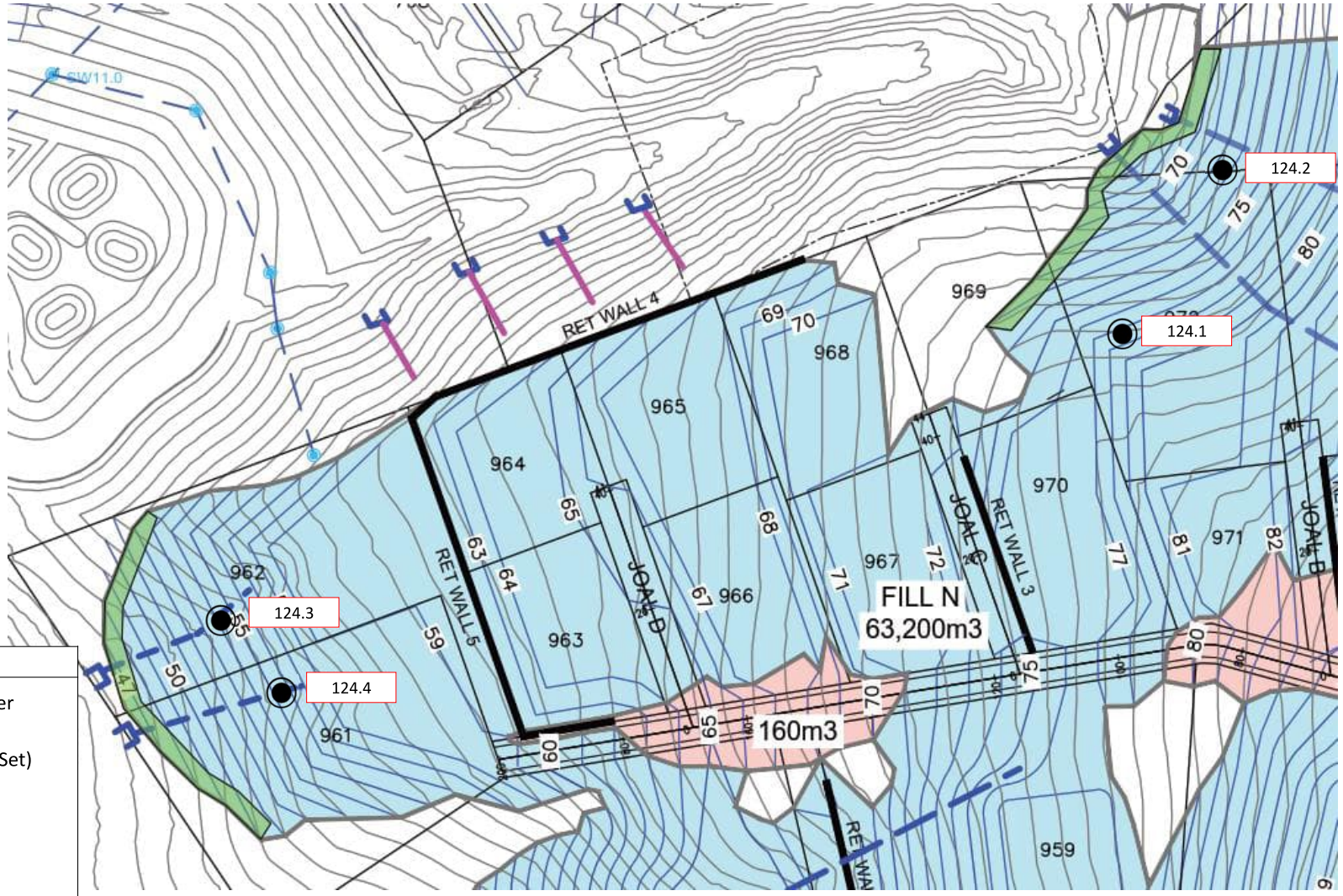
Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	11/11/2021
Location:	Shearkey 1 & 2	Job No.:	2021000.0045.0.0/Rep1	URN:	123	Date:	11/11/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



Legend:

- Impact Hammer
- NDM (DT + SV Set)
- Shear Vane
- Scala
- Hand Auger

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	19/11/2021
Location:	Shearkey 1 & 2	Job No.:	2021000.0045.0.0/Rep1	URN:	124	Date:	19/11/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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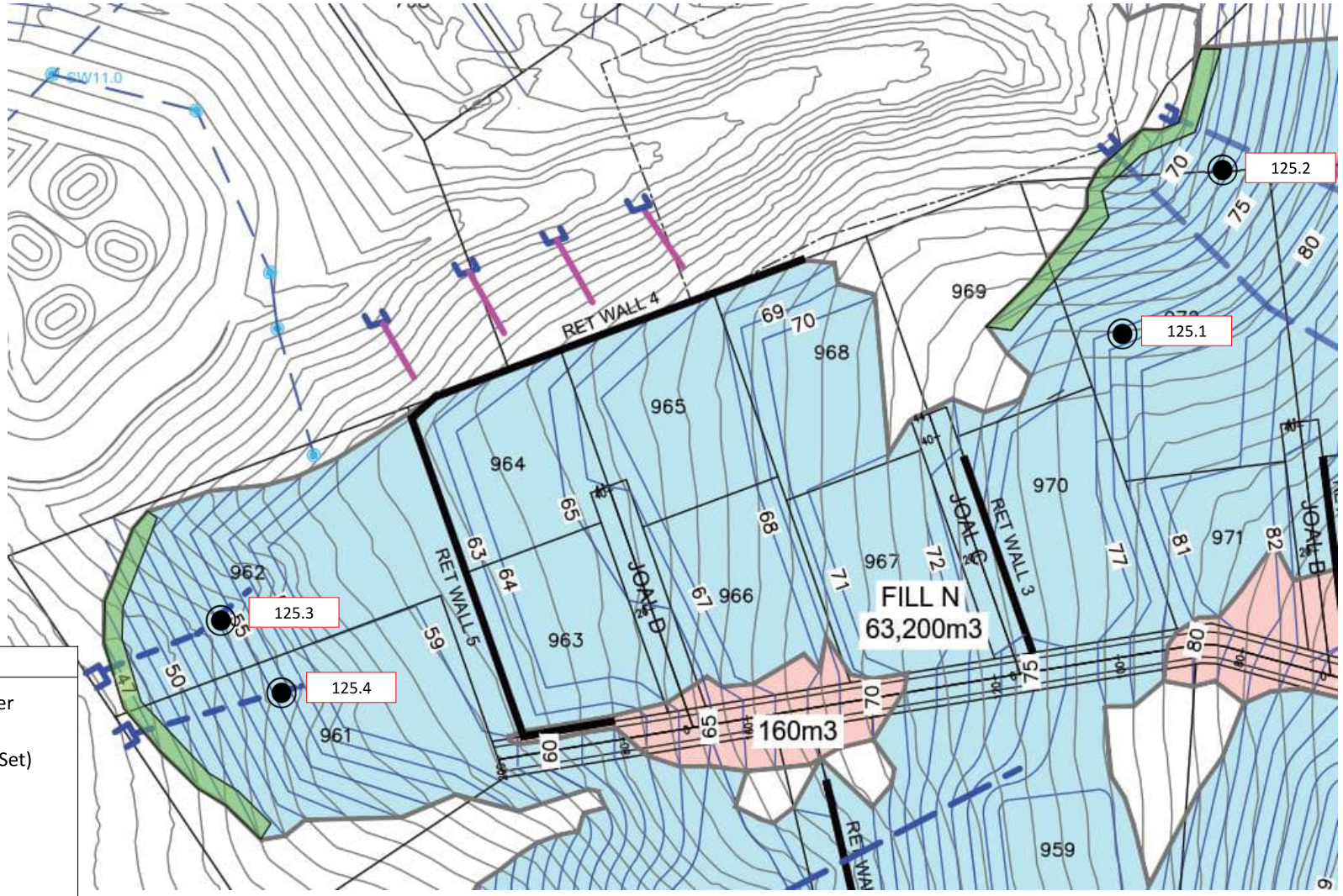

Legend:

- Impact Hammer
- NDM (DT + SV Set)
- Shear Vane
- Scala
- Hand Auger

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	23/11/2021
Location:	Shearkey 1 & 2	Job No.:	2021000.0045.0.0/Rep1	URN:	125	Date:	23/11/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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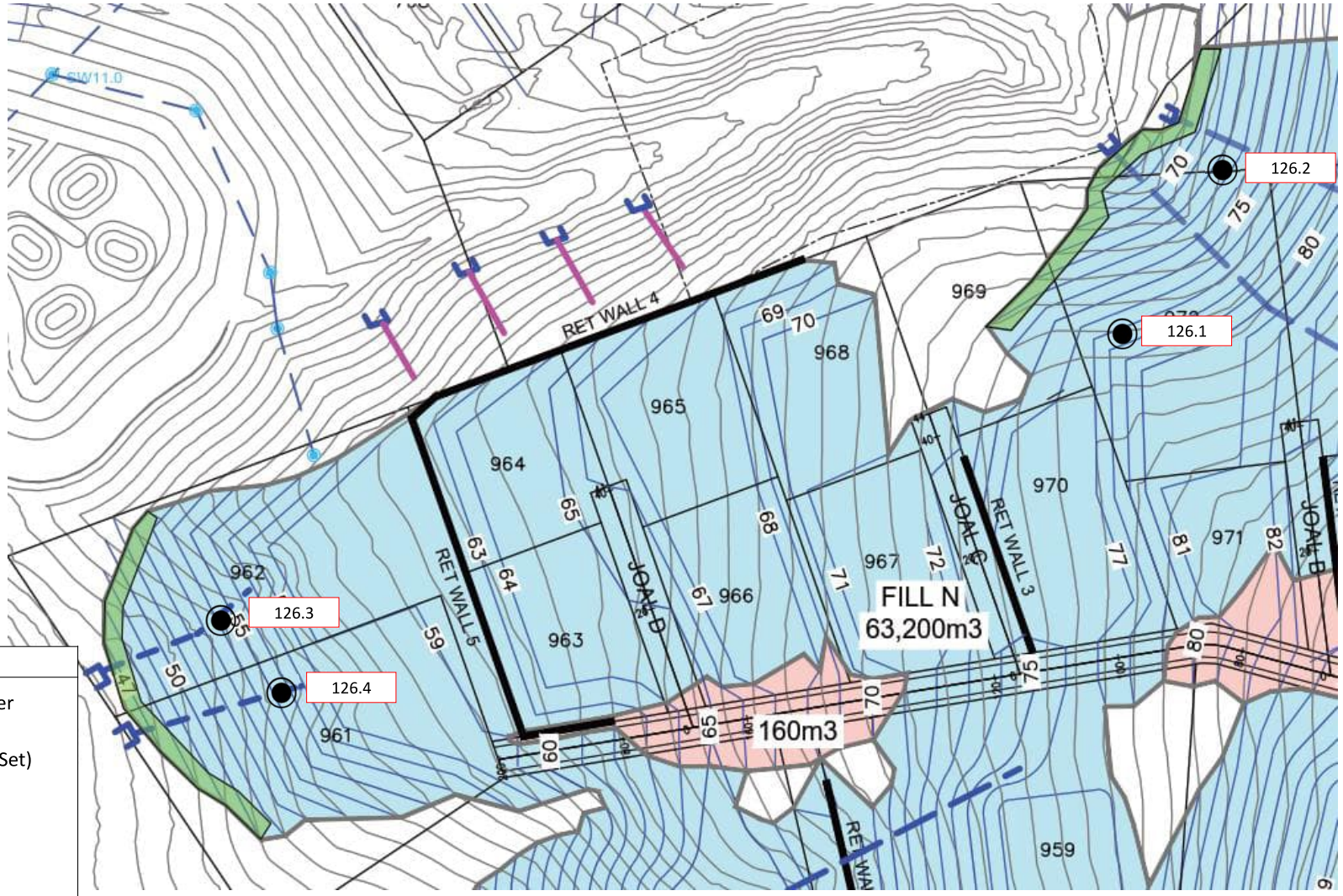

Legend:

- Impact Hammer
- NDM (DT + SV Set)
- Shear Vane
- Scala
- Hand Auger

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e. enquiry@geotechnics.co.nz
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA	Date:	26/11/2021
Location:	Shearkey 1 & 2	Job No.:	2021000.0045.0.0/Rep1	URN:	126	Date:	26/11/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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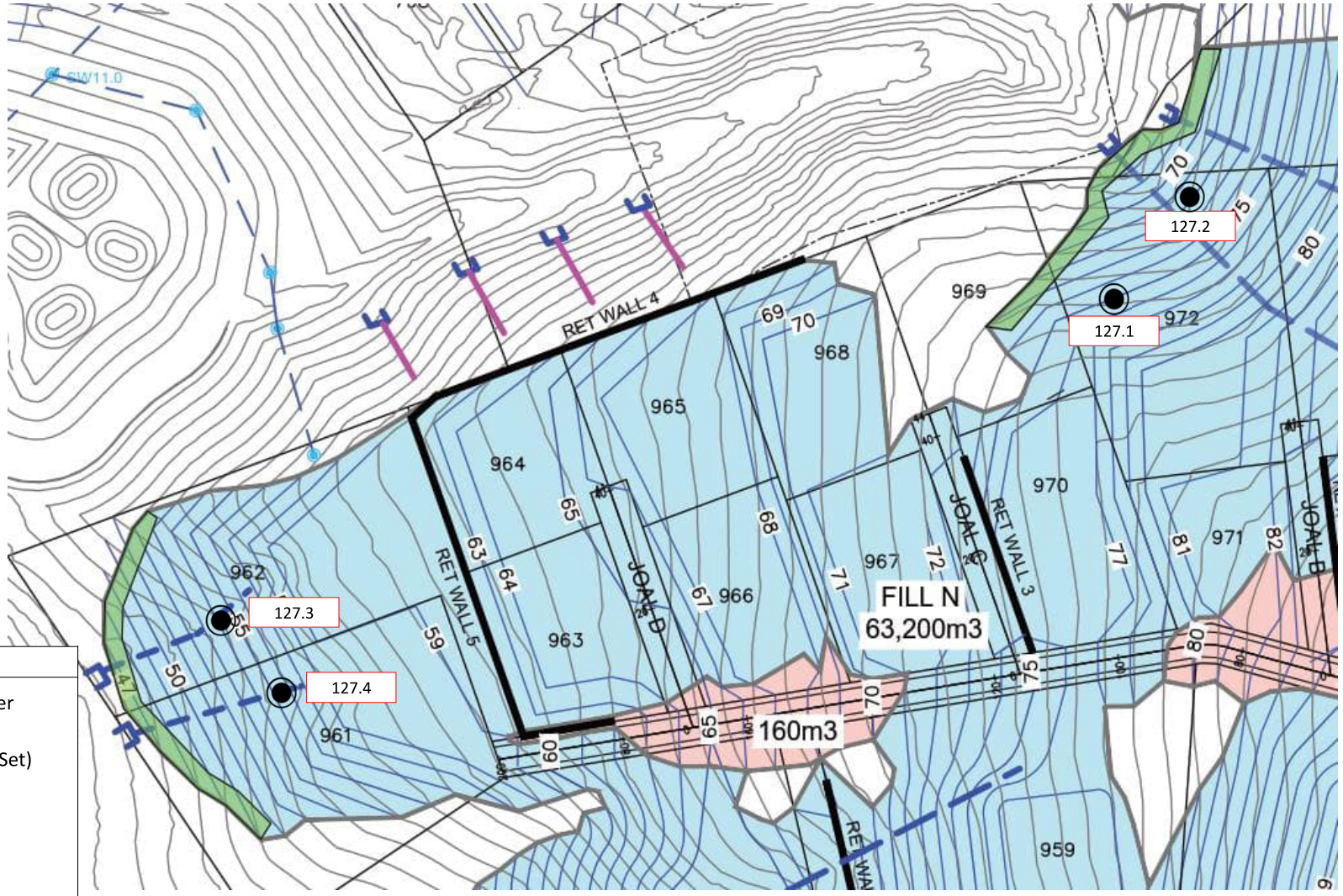

Legend:

- Impact Hammer
- NDM (DT + SV Set)
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- Scala
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e. enquiry@geotechnics.co.nz
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	29/11/2021
Location:	Shearkey 1 & 2	Job No.:	2021000.0045.0.0/Rep1	URN:	127	Date:	29/11/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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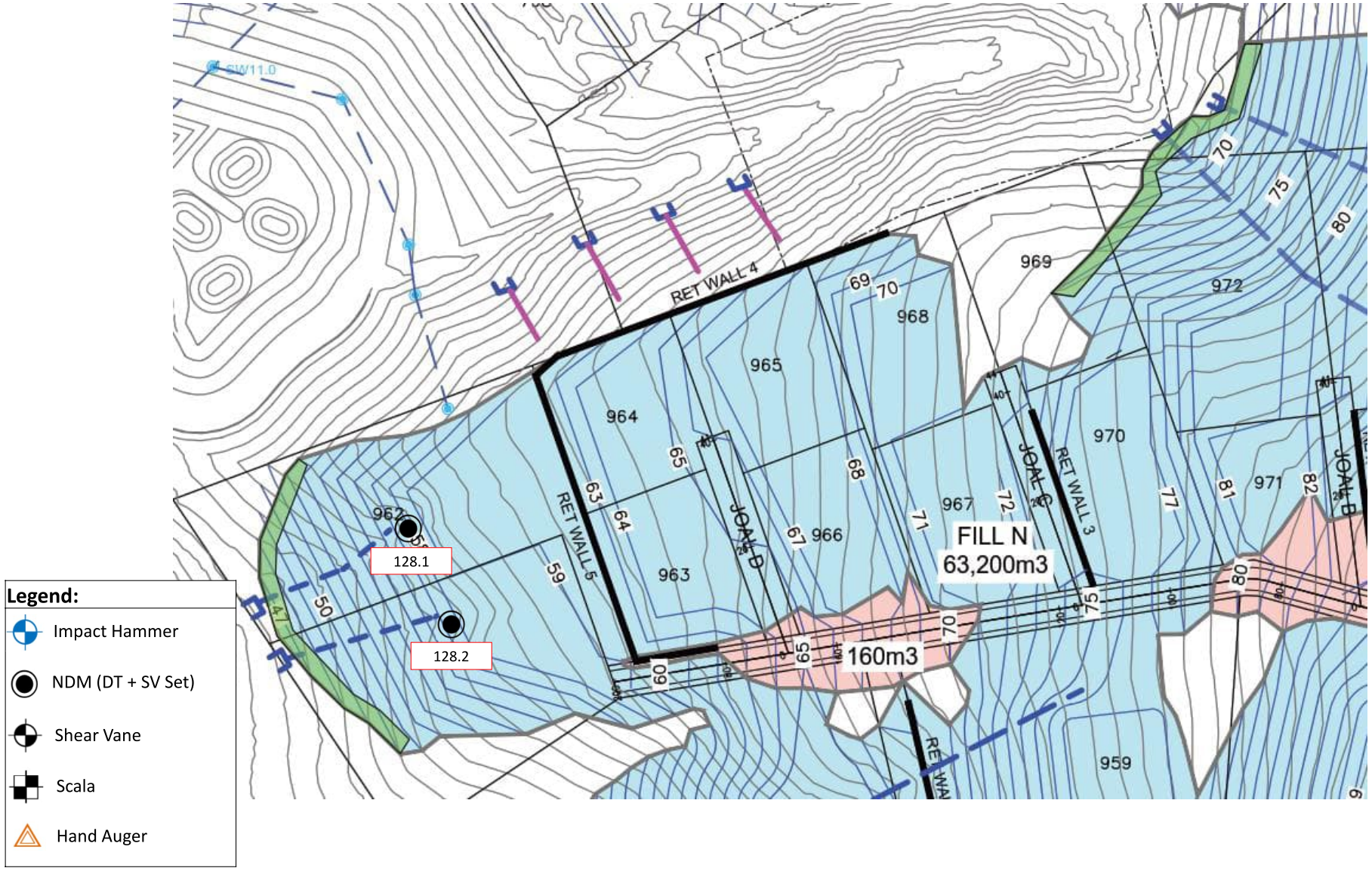

Legend:

- Impact Hammer
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e. enquiry@geotechnics.co.nz
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	01/12/2021
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	128	Date:	01/12/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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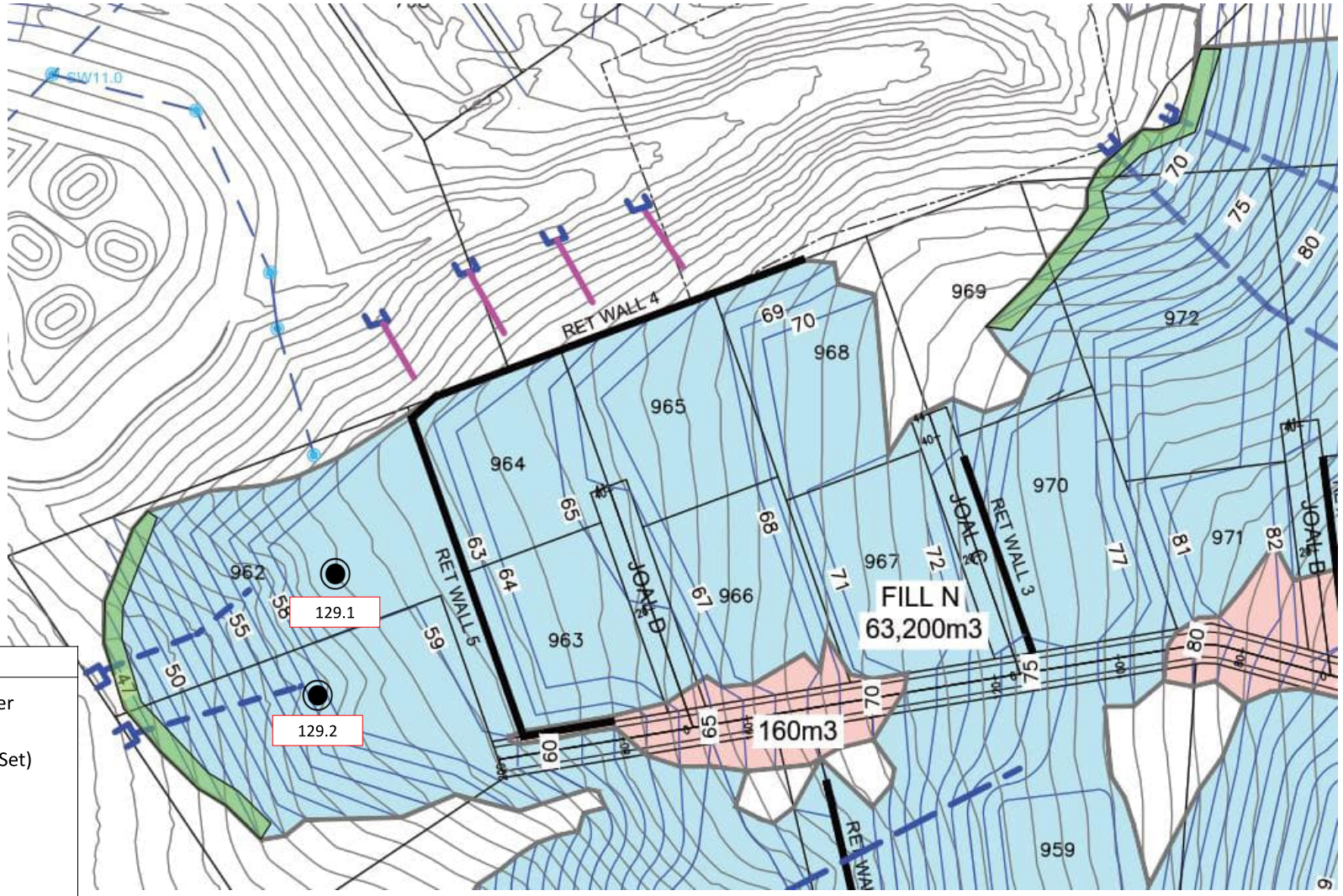

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e. enquiry@geotechnics.co.nz
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	03/12/2021
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	129	Date:	03/12/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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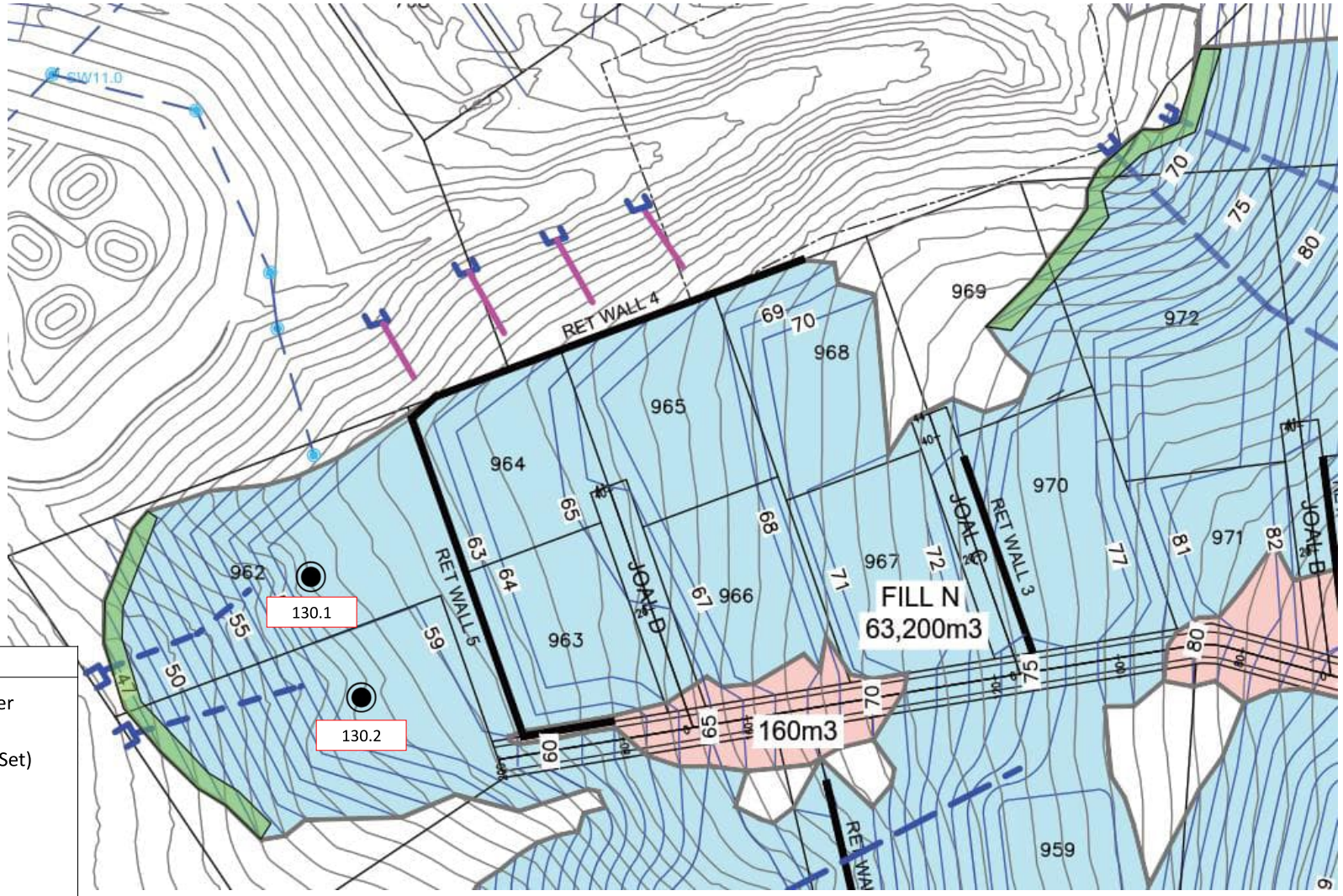

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e. enquiry@geotechnics.co.nz
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	06/12/2021
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	130	Date:	06/12/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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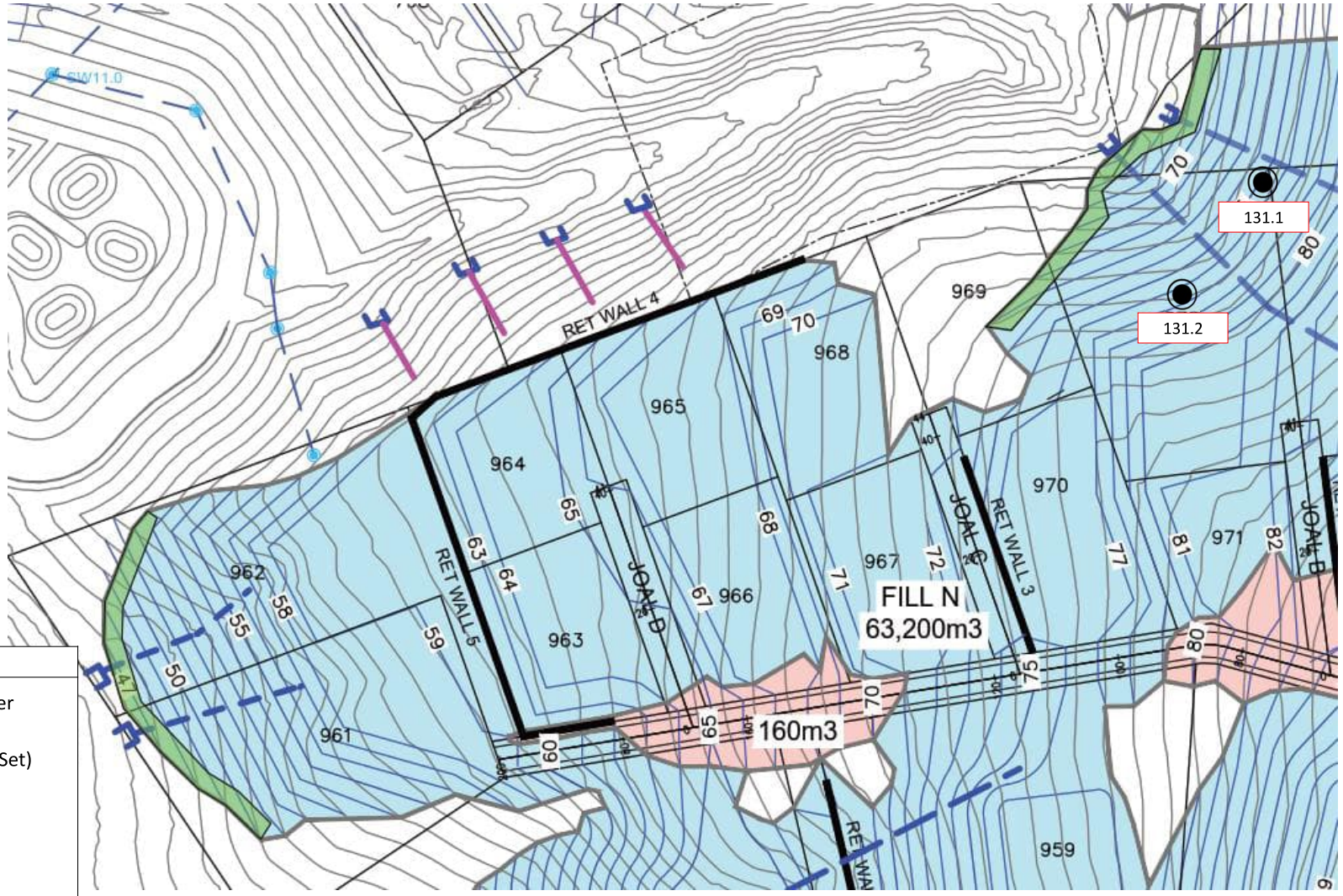

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	08/12/2021
Location:	Shearkey 1	Job No.:	2021000.0045.0.0/Rep1	URN:	131	Date:	08/12/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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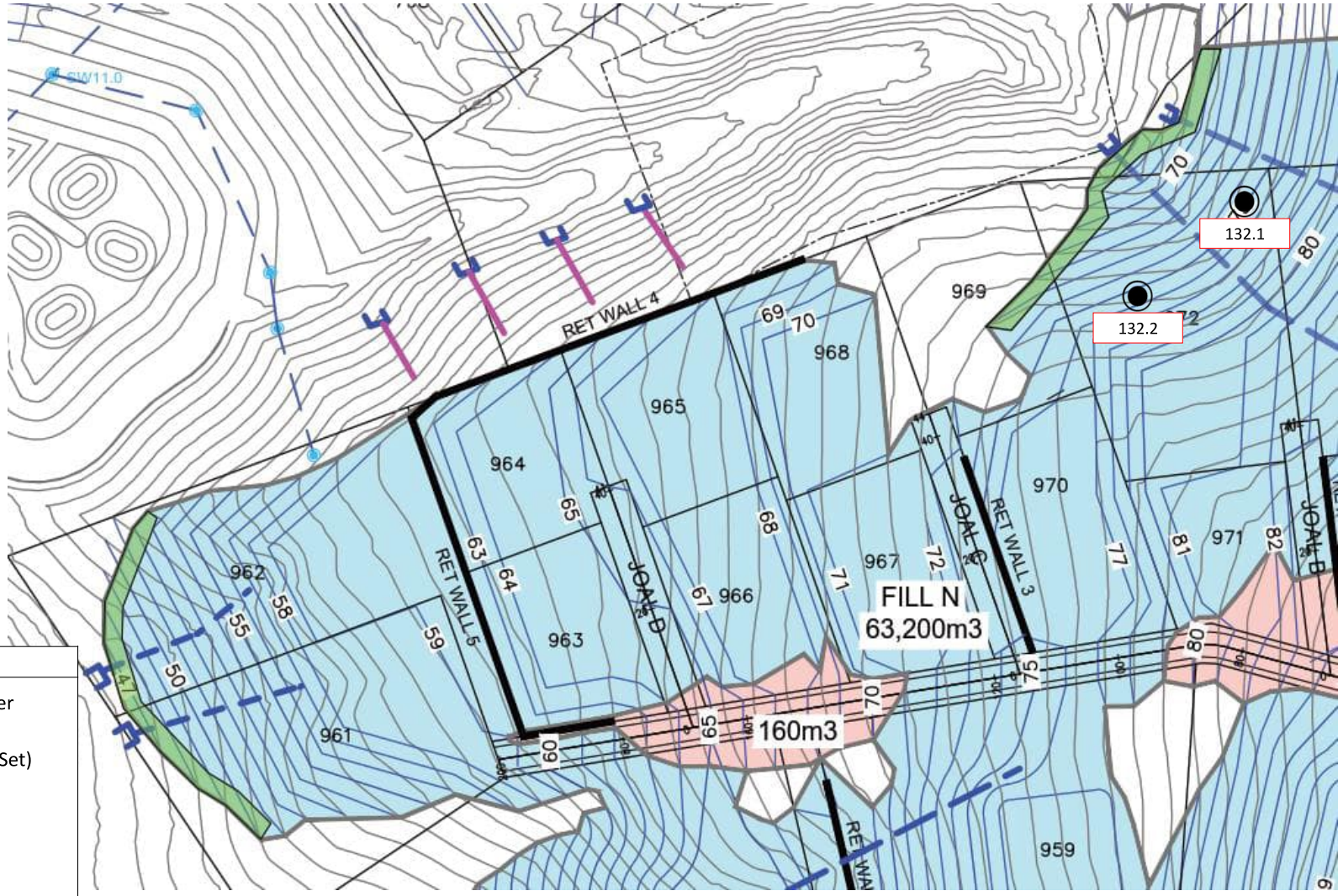

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	10/12/2021
Location:	Shearkey 1	Job No.:	2021000.0045.0.0/Rep1	URN:	132	Date:	10/12/2021
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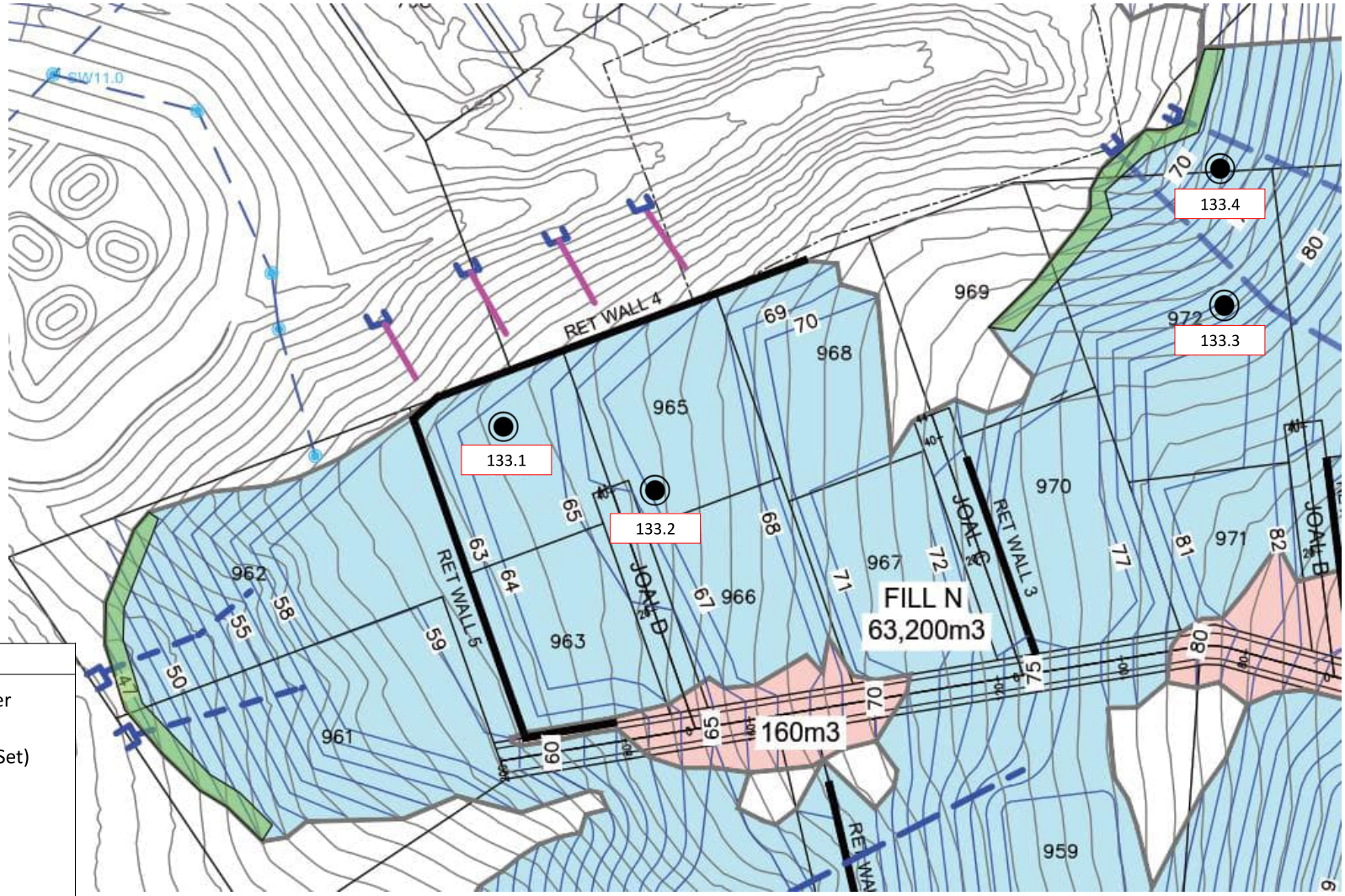

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	20/12/2021
Location:	Shearkey 1 SRP 1	Job No.:	2021000.0045.0.0/Rep1	URN:	133	Date:	20/12/2021
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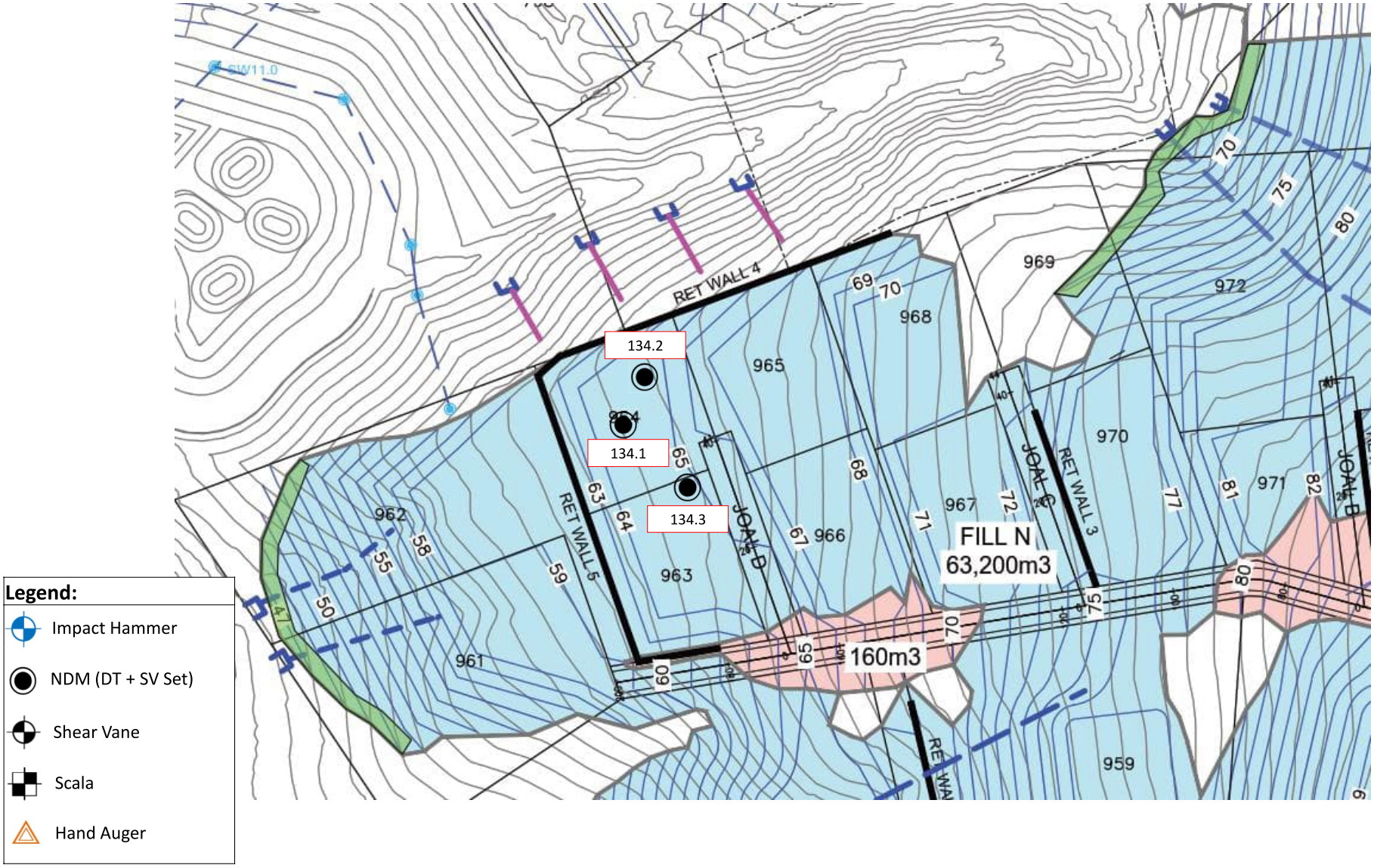

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	22/12/2021
Location:	SRP 1	Job No.:	2021000.0045.0.0/Rep1	URN:	134	Date:	22/12/2021
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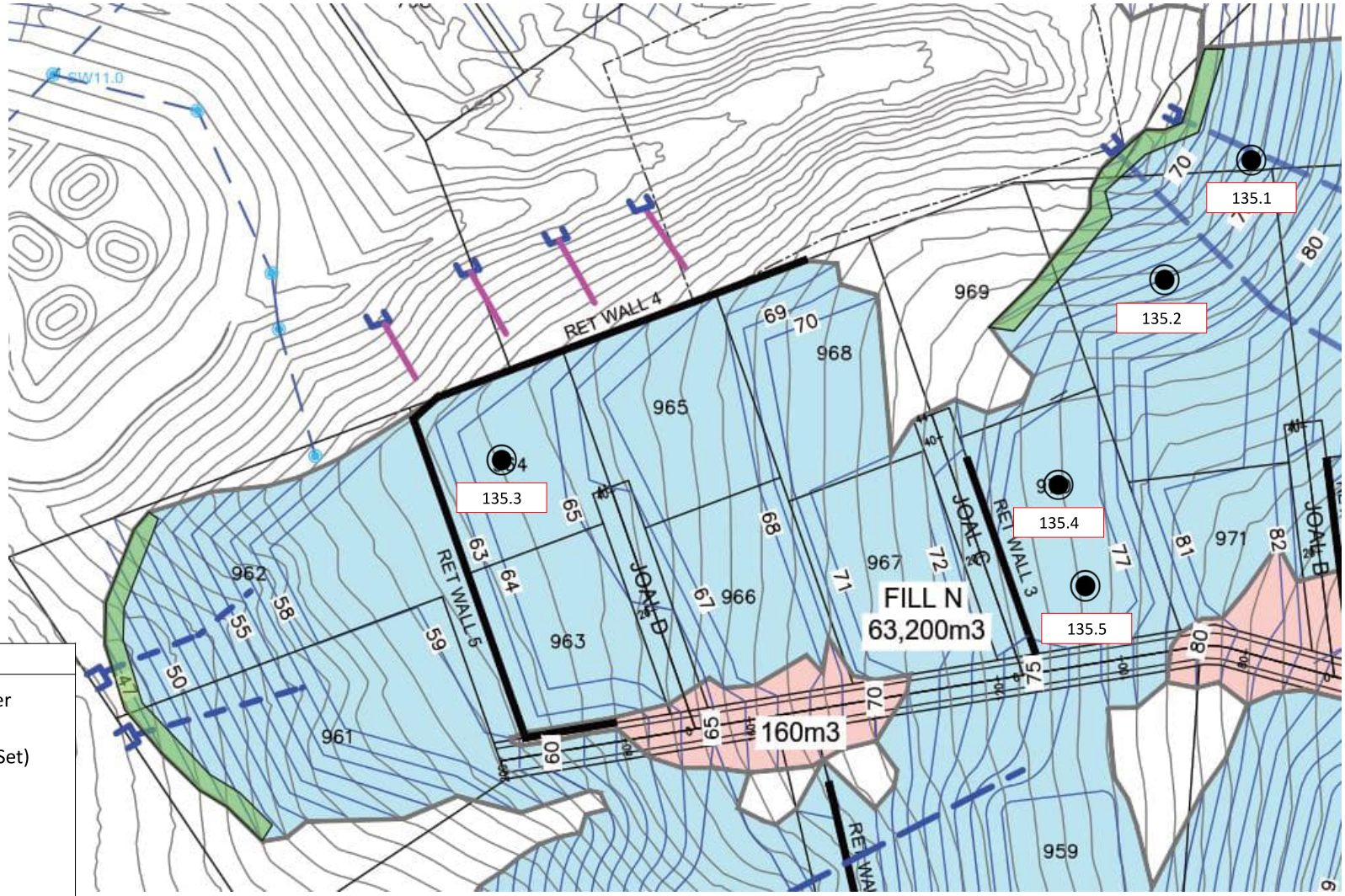

Legend:

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	10/01/2022
Location:	Shearkey 1 SRP 1 & 2	Job No.:	2021000.0045.0.0/Rep1	URN:	135	Date:	10/01/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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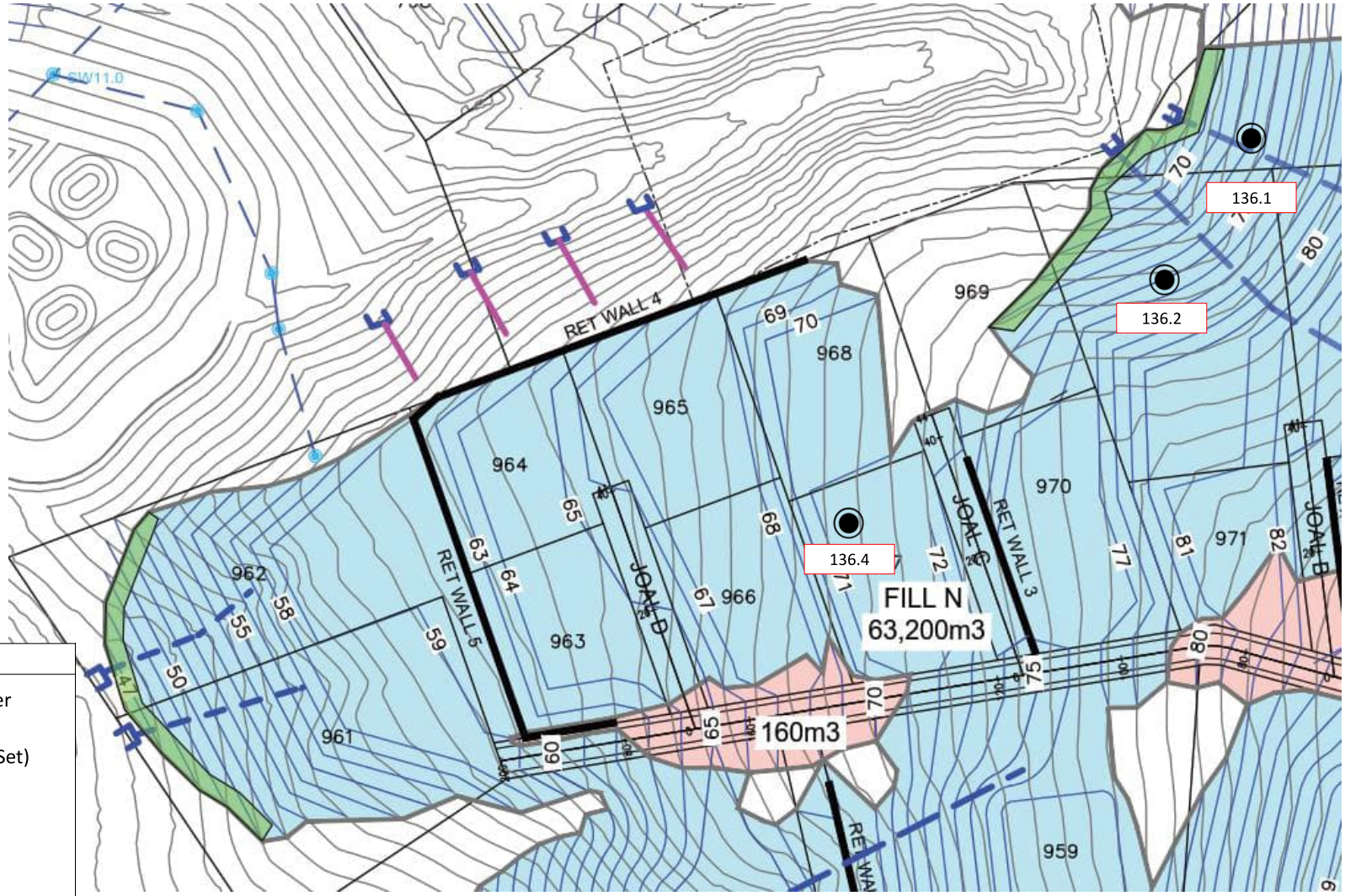

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	12/01/2022
Location:	Shearkey 1 SRP 1	Job No.:	2021000.0045.0.0/Rep1	URN:	136	Date:	12/01/2022
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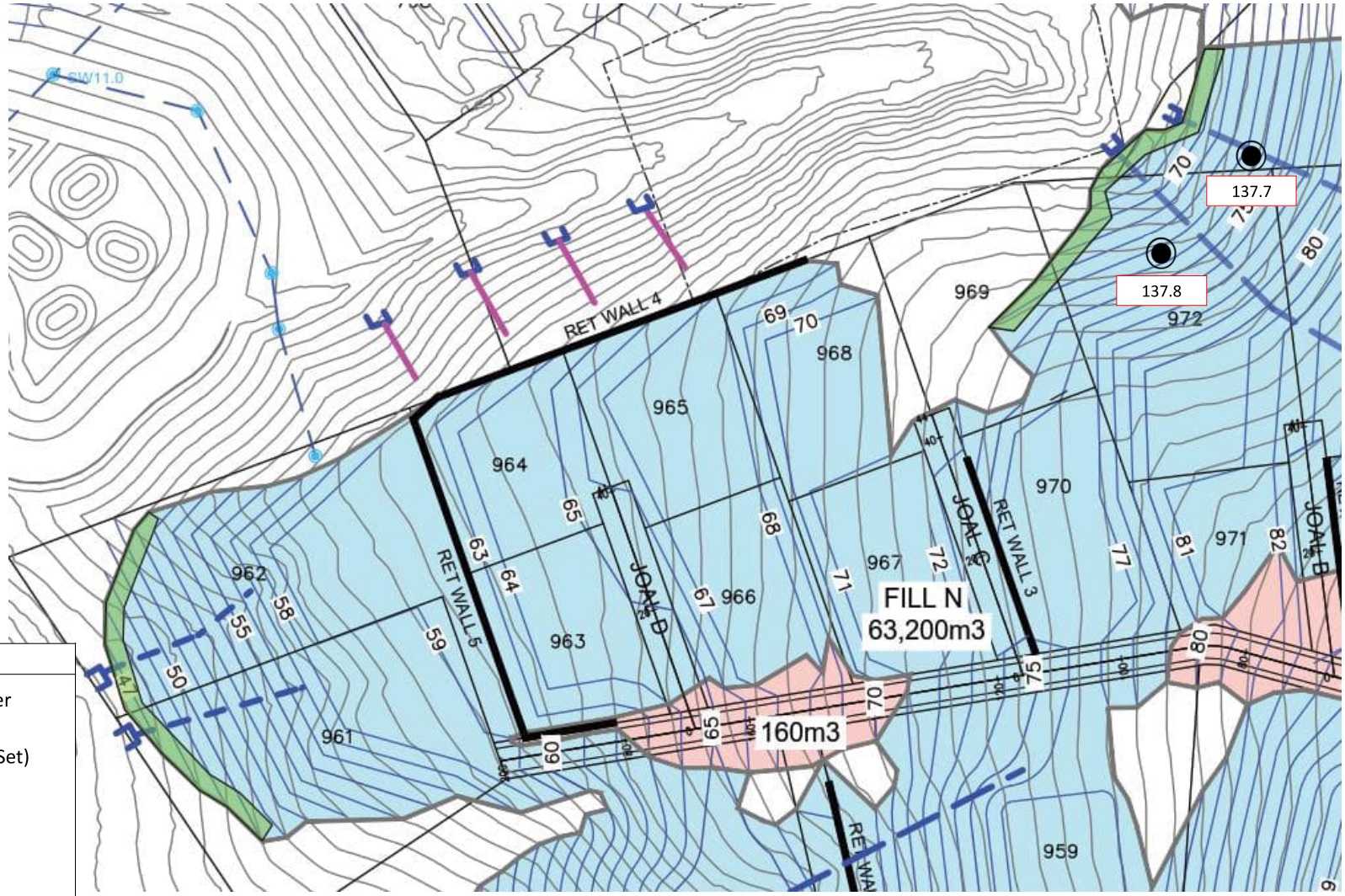

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	14/01/2022
Location:	Shearkey 1	Job No.:	2021000.0045.0.0/Rep1	URN:	137	Date:	14/01/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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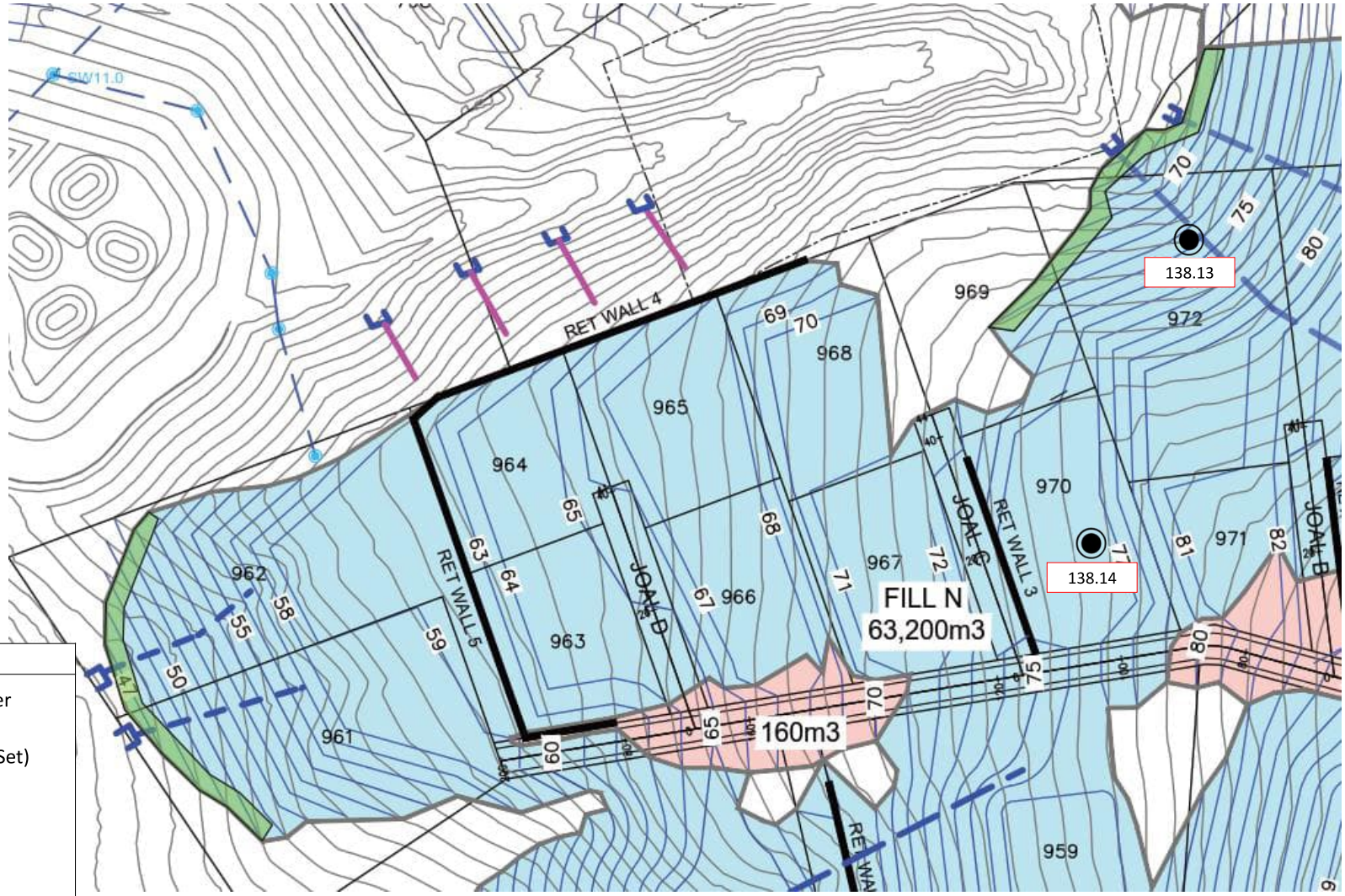

Legend:

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	18/01/2022
Location:	Shearkey 1 SRP 2	Job No.:	2021000.0045.0.0/Rep1	URN:	138	Date:	18/01/2022
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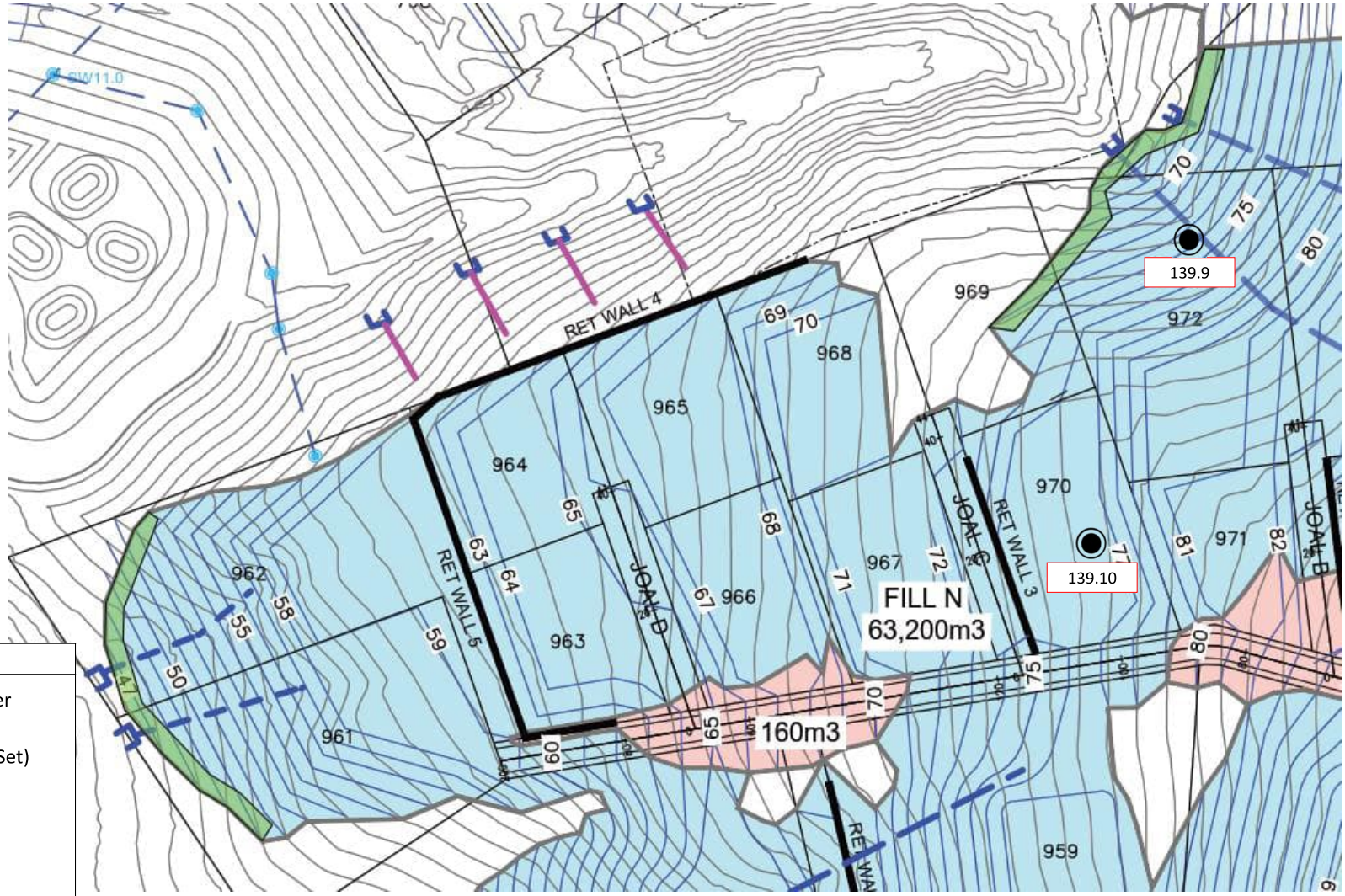

Legend:

- Impact Hammer
- NDM (DT + SV Set)
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	20/01/2022
Location:	Shearkey 1 SRP 2	Job No.:	2021000.0045.0.0/Rep1	URN:	139	Date:	20/01/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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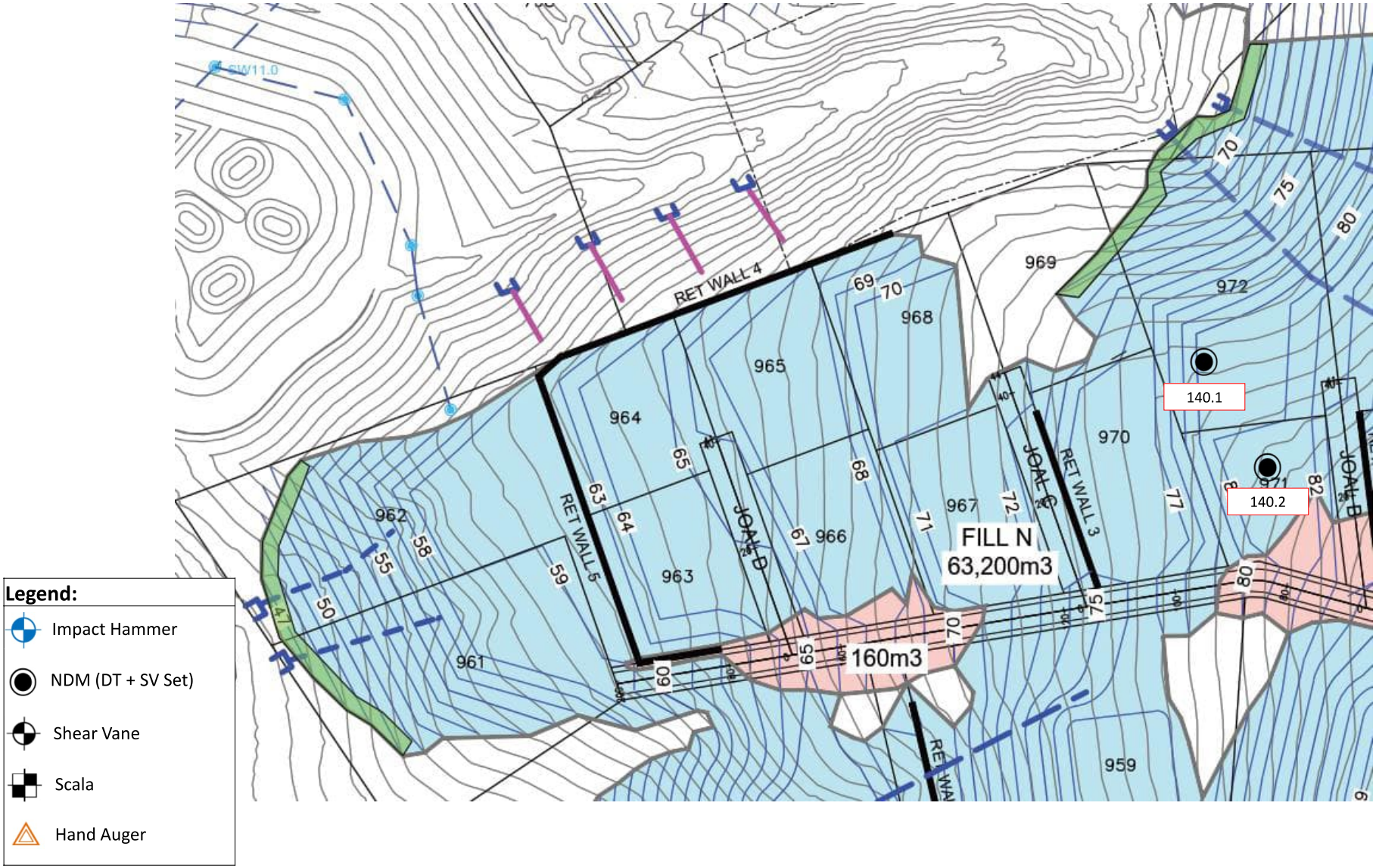

Legend:

- Impact Hammer
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	26/01/2022
Location:	Shearkey 1	Job No.:	2021000.0045.0.0/Rep1	URN:	140	Date:	26/01/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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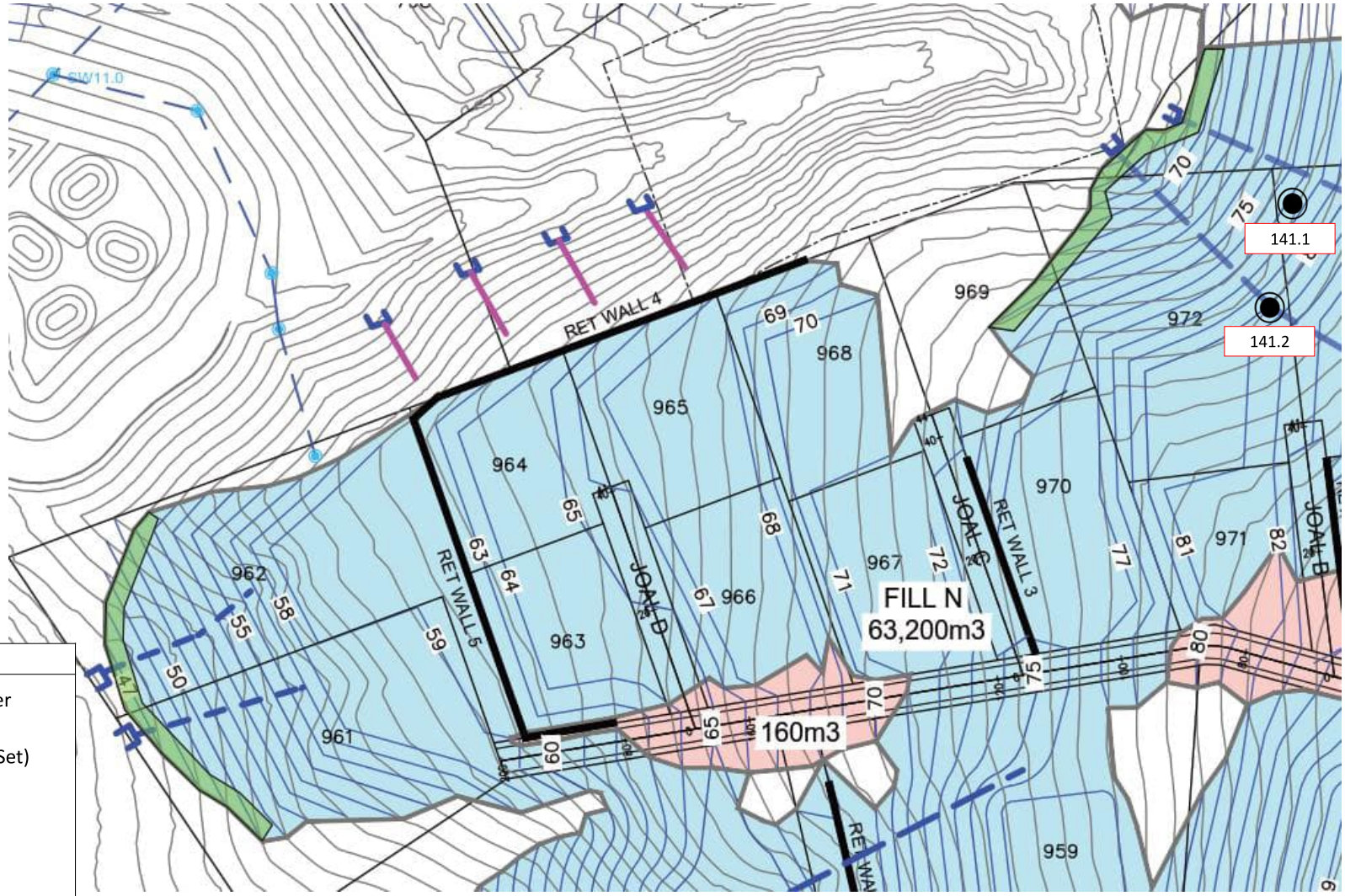

Legend:

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	28/01/2022
Location:	Shearkey 1	Job No.:	2021000.0045.0.0/Rep1	URN:	141	Date:	28/01/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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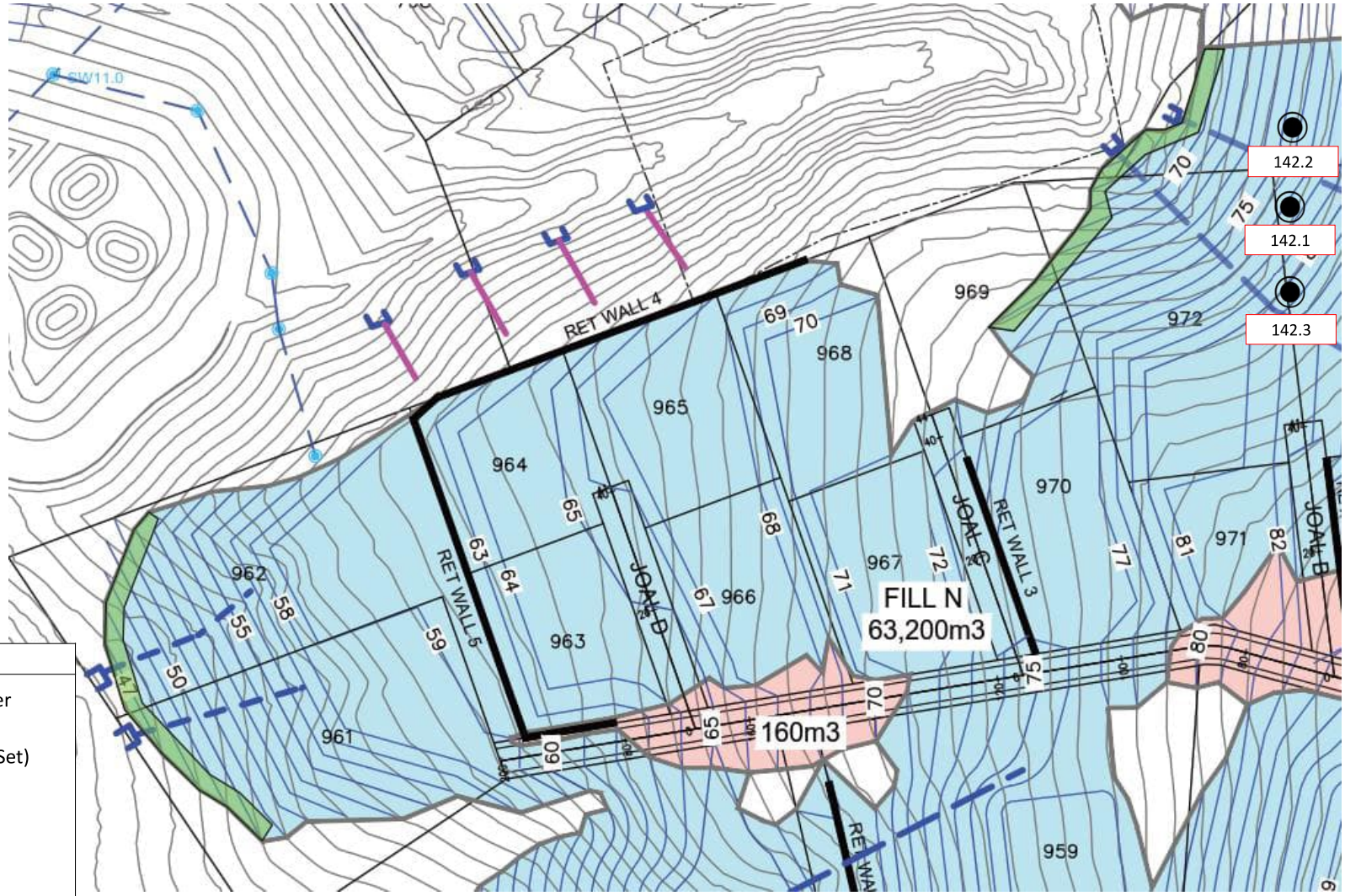

Legend:

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	01/02/2022
Location:	Shearkey 1	Job No.:	2021000.0045.0.0/Rep1	URN:	142	Date:	01/02/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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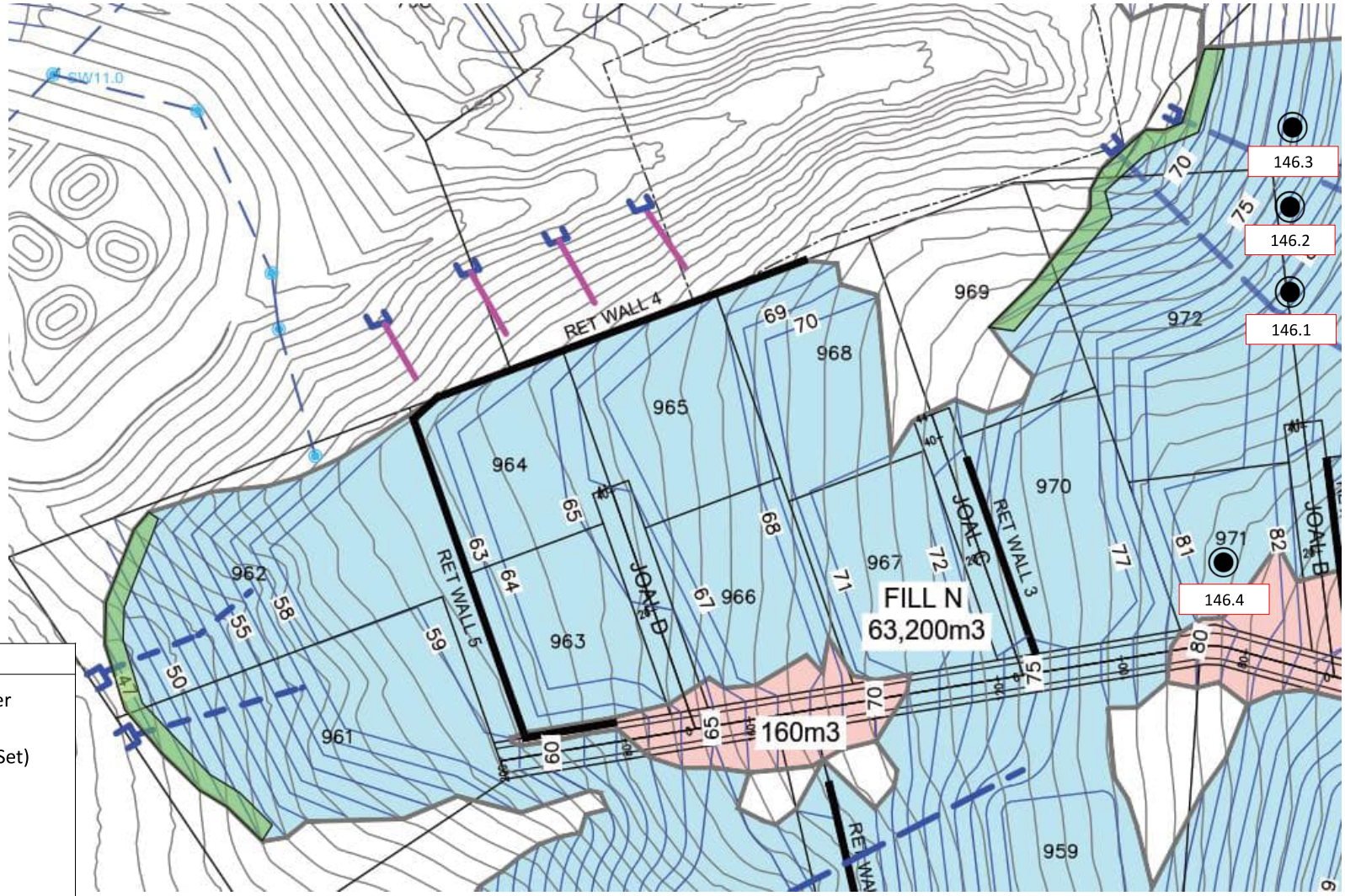

Legend:

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	15/02/2022
Location:	Shearkey 1	Job No.:	2021000.0045.0.0/Rep1	URN:	146	Date:	15/02/2022
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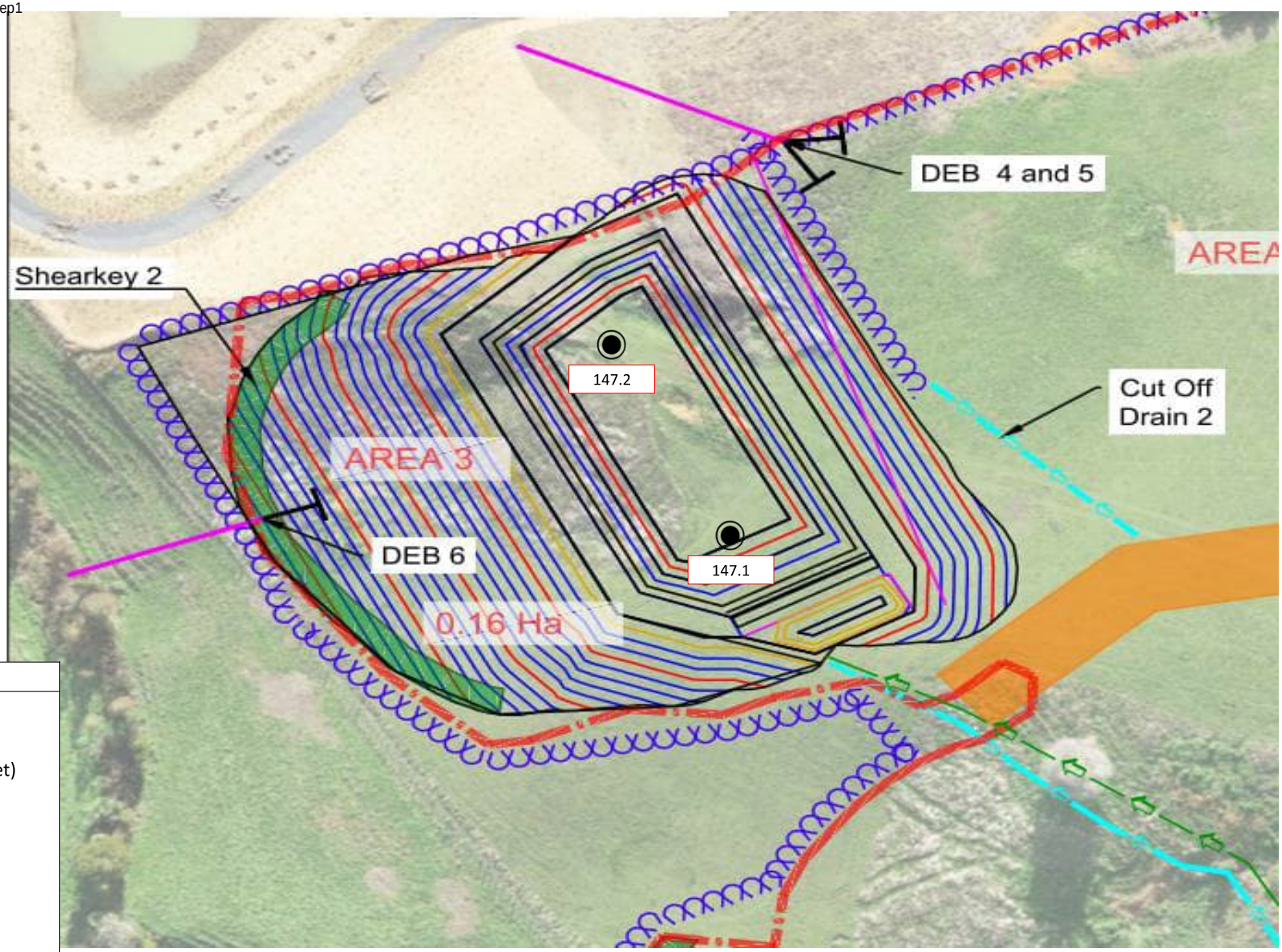

Legend:

- Impact Hammer
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	16/02/2022
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	147	Date:	16/02/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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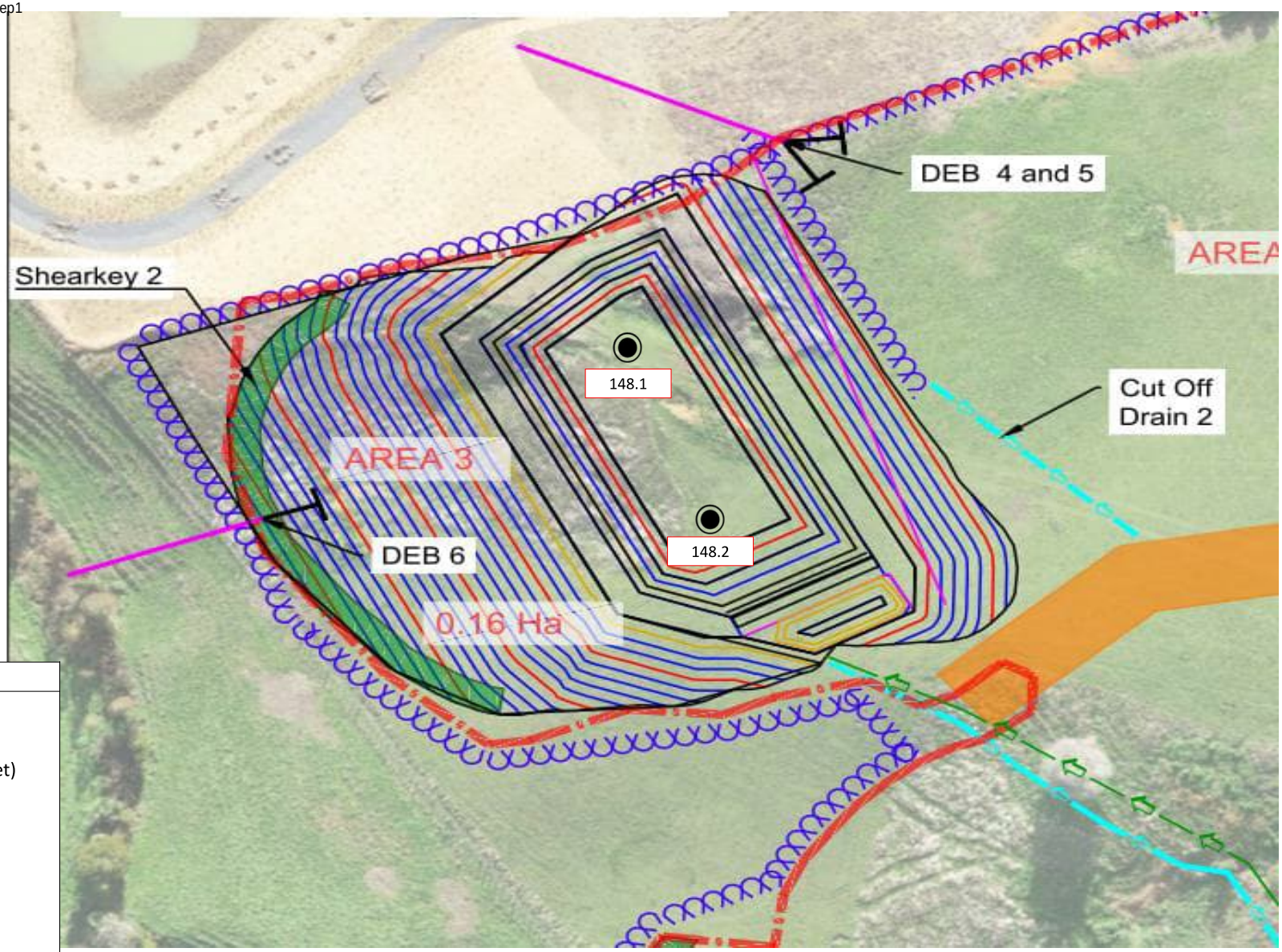

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- Scala
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	17/02/2022
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	148	Date:	17/02/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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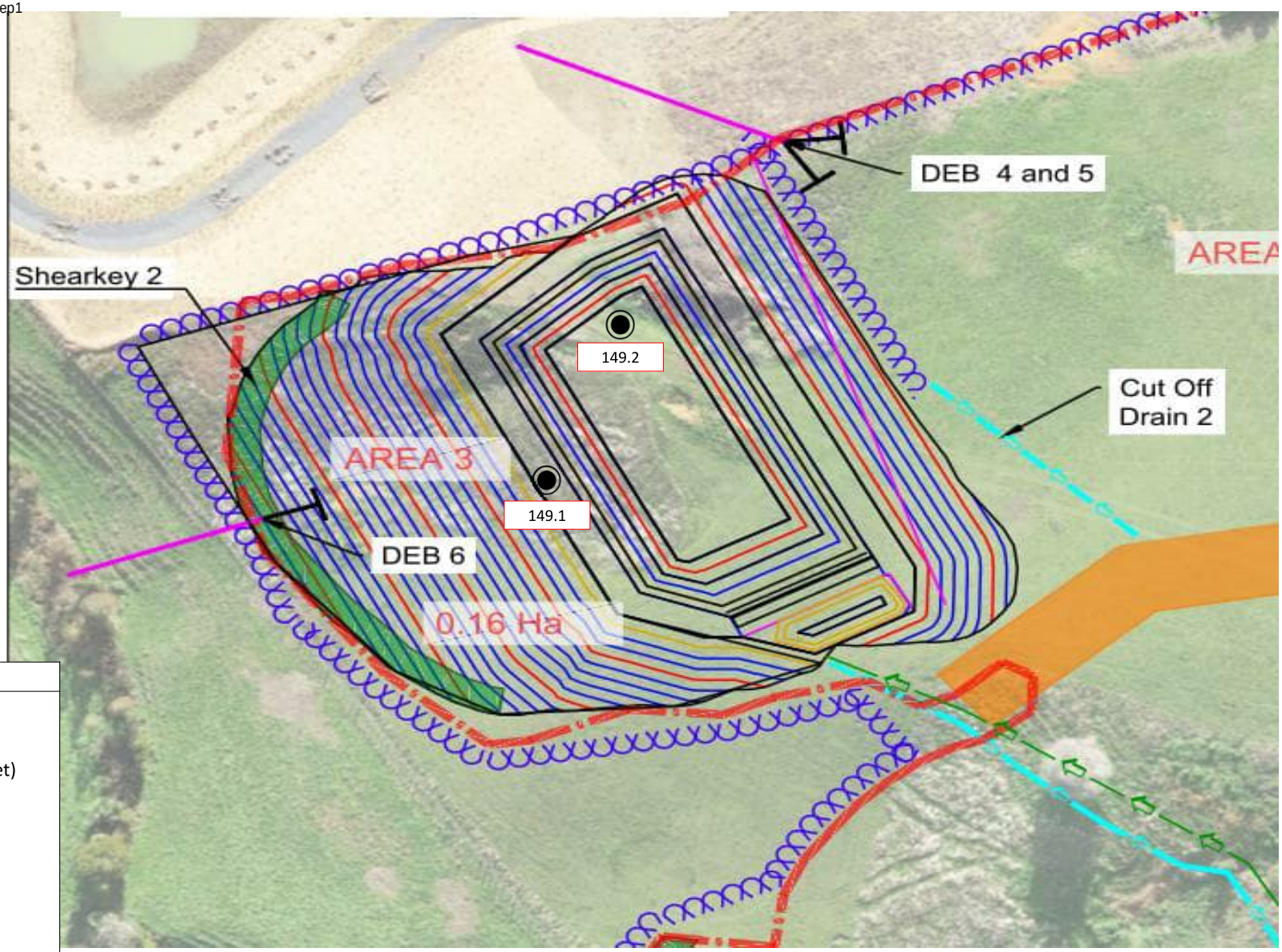

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	21/02/2022
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	149	Date:	21/02/2022
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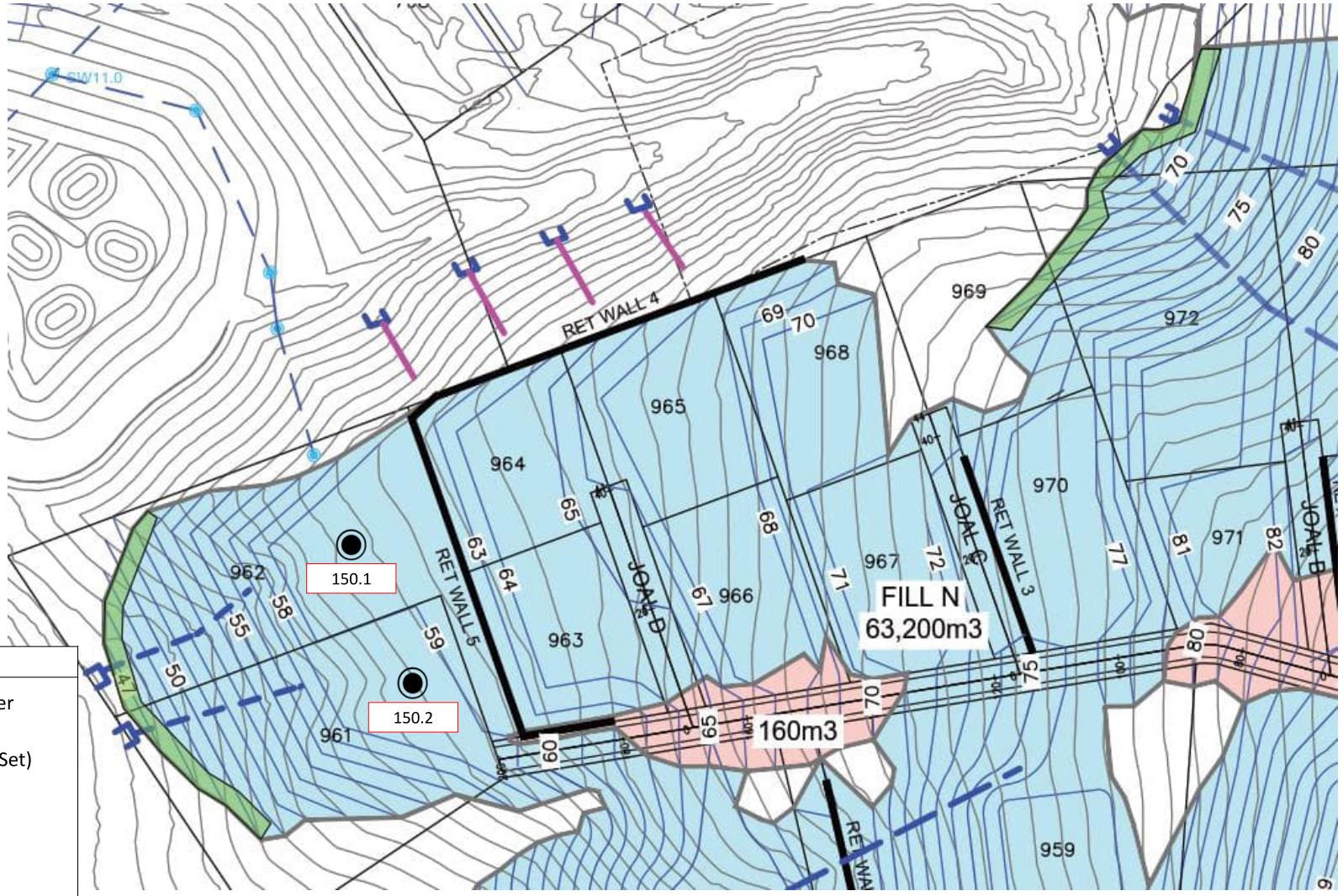
N



Legend:

- Impact Hammer
- NDM (DT + SV Set)
- Shear Vane
- Scala
- Hand Auger

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233 Manukau Road, Pukekohe
Auckland, New Zealand
ph. +64 (0)9 356 3510
e. enquiry@geotechnics.co.nz
w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	HABU	Date:	24/02/2022
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	150	Date:	24/02/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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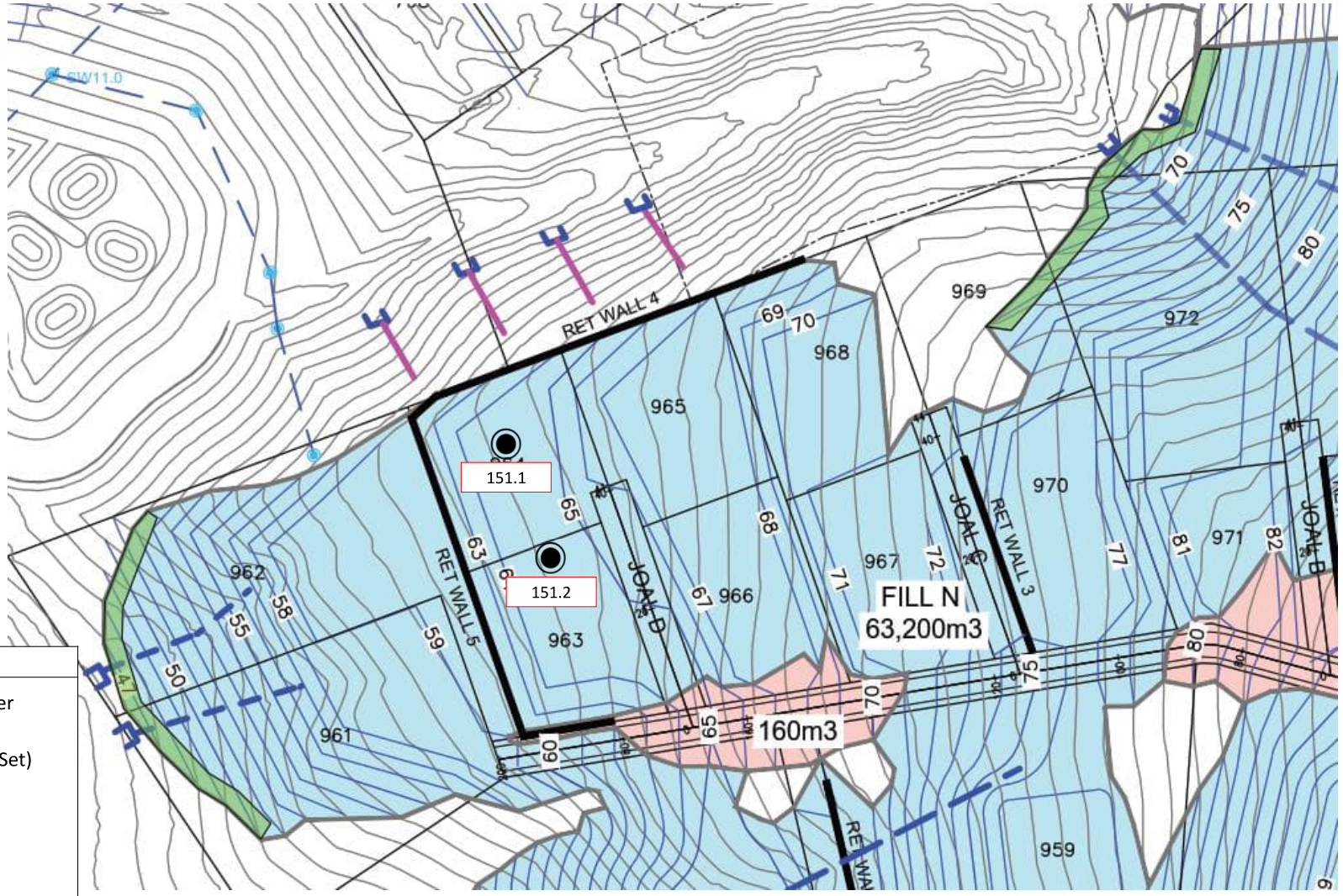

Legend:

- Impact Hammer
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- Scala
- Hand Auger

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ph. +64 (0)9 356 3510
e. enquiry@geotechnics.co.nz
w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA	Date:	1/03/2022
Location:	Shearkey 2	Job No.:	2021000.0045.0.0/Rep1	URN:	151	Date:	1/03/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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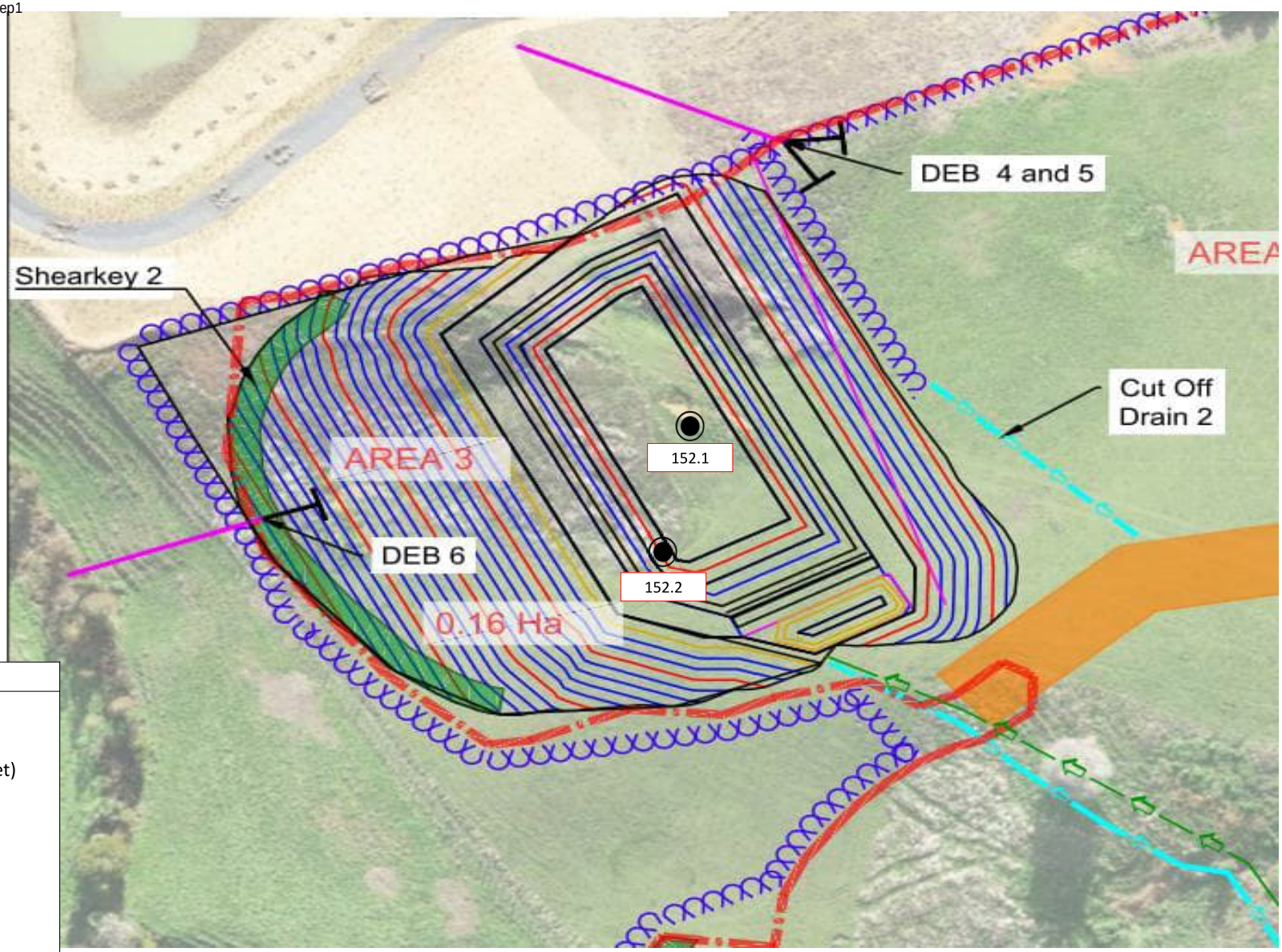

Legend:

- Impact Hammer
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- Scala
- Hand Auger

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ph. +64 (0)9 356 3510
e. enquiry@geotechnics.co.nz
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	ROSM	Date:	03/03/2022
Location:	Meadows Shearkey	Job No.:	2021000.0045.0.0/Rep1	URN:	152	Date:	03/03/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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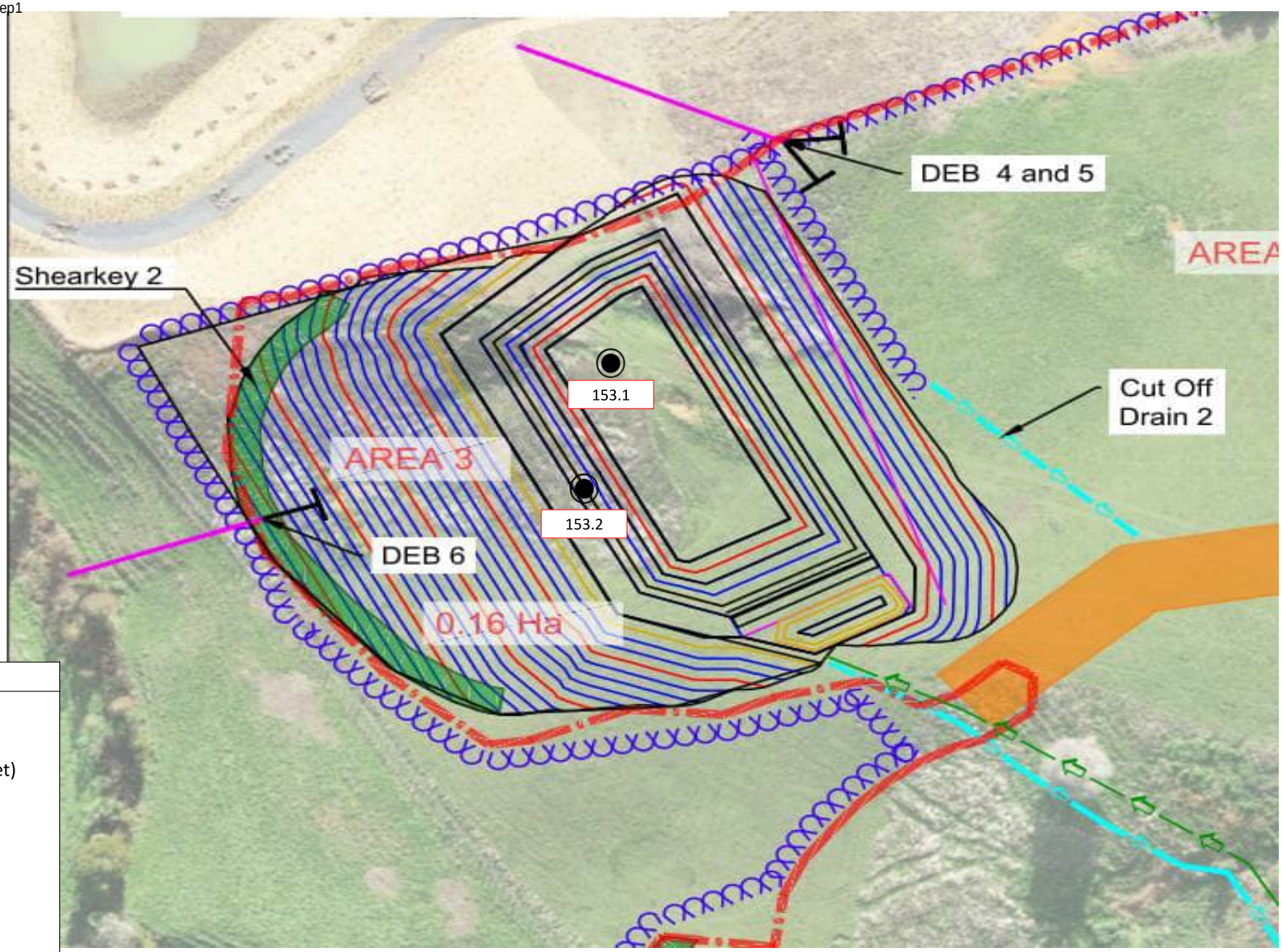

Legend:

- Impact Hammer
- NDM (DT + SV Set)
- Shear Vane
- Scala
- Hand Auger

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Auckland, New Zealand
ph. +64 (0)9 356 3510
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA	Date:	05/03/2022
Location:	Meadows Shearkey	Job No.:	2021000.0045.0.0/Rep1	URN:	153	Date:	05/03/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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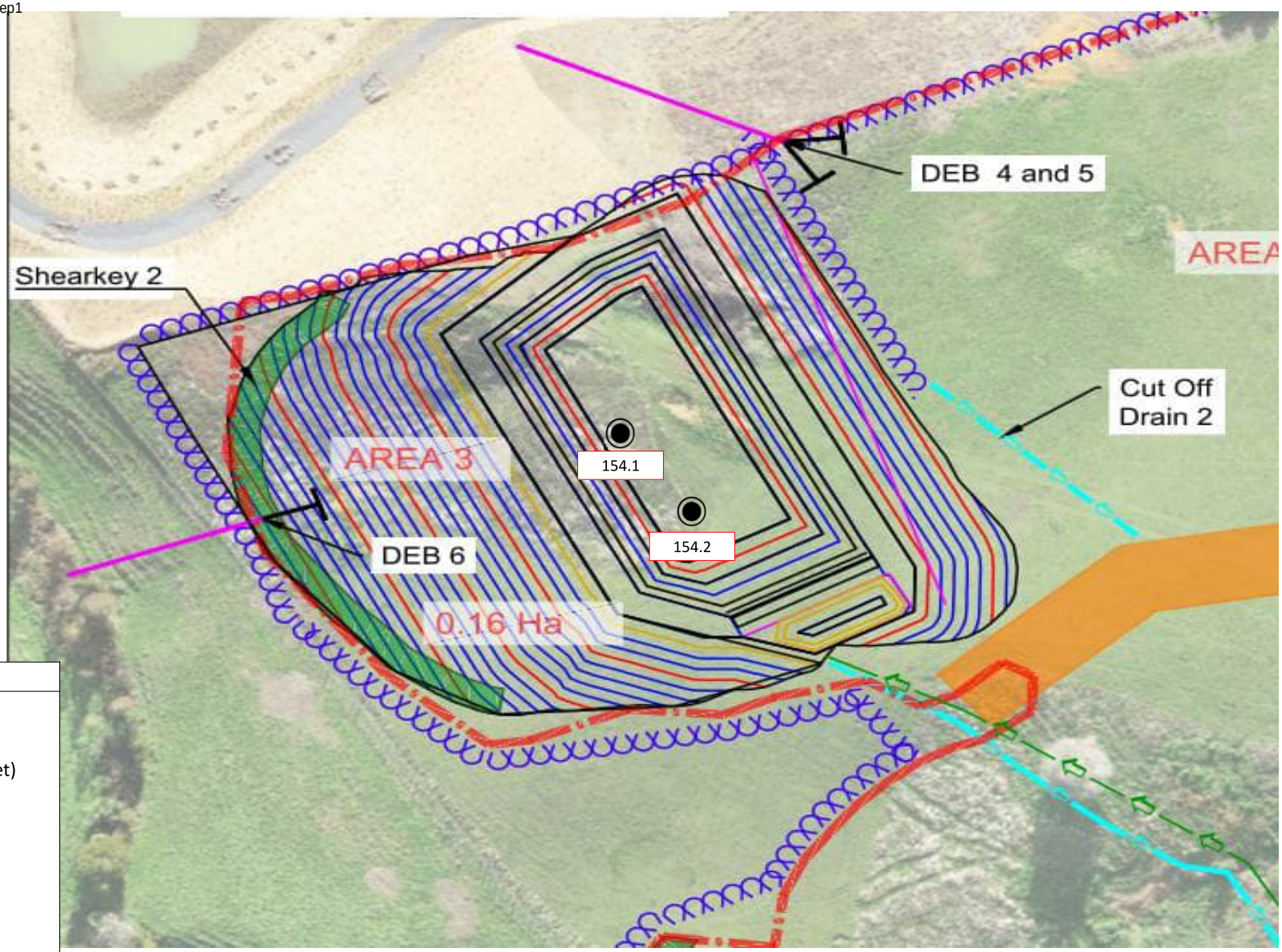

Legend:

- Impact Hammer
- NDM (DT + SV Set)
- Shear Vane
- Scala
- Hand Auger

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA	Date:	07/03/2022
Location:	Meadows Shearkey	Job No.:	2021000.0045.0.0/Rep1	URN:	154	Date:	07/03/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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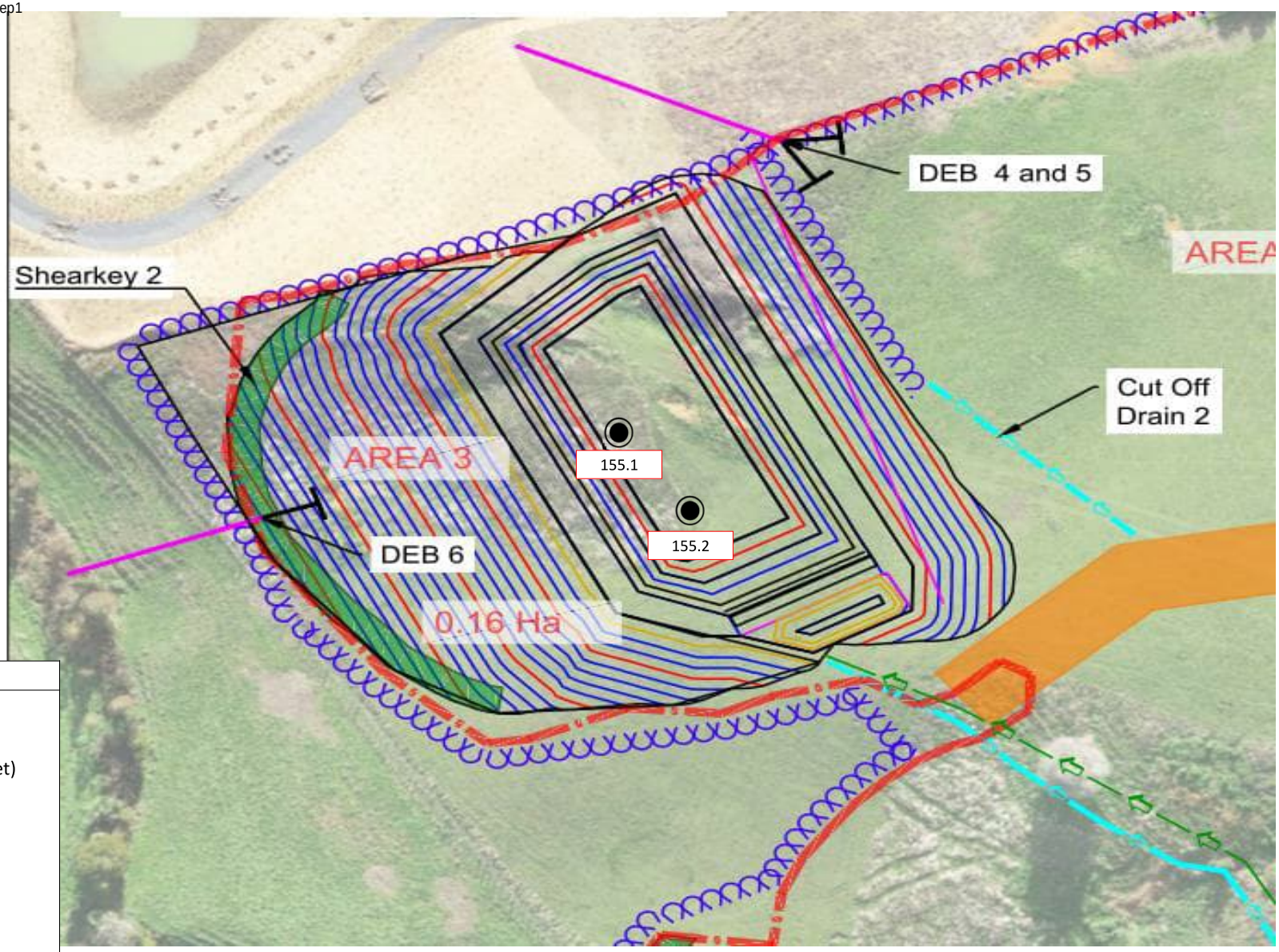

Legend:

- Impact Hammer
- NDM (DT + SV Set)
- Shear Vane
- Scala
- Hand Auger

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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA	Date:	09/03/2022
Location:	Meadows Shearkey	Job No.:	2021000.0045.0.0/Rep1	URN:	155	Date:	09/03/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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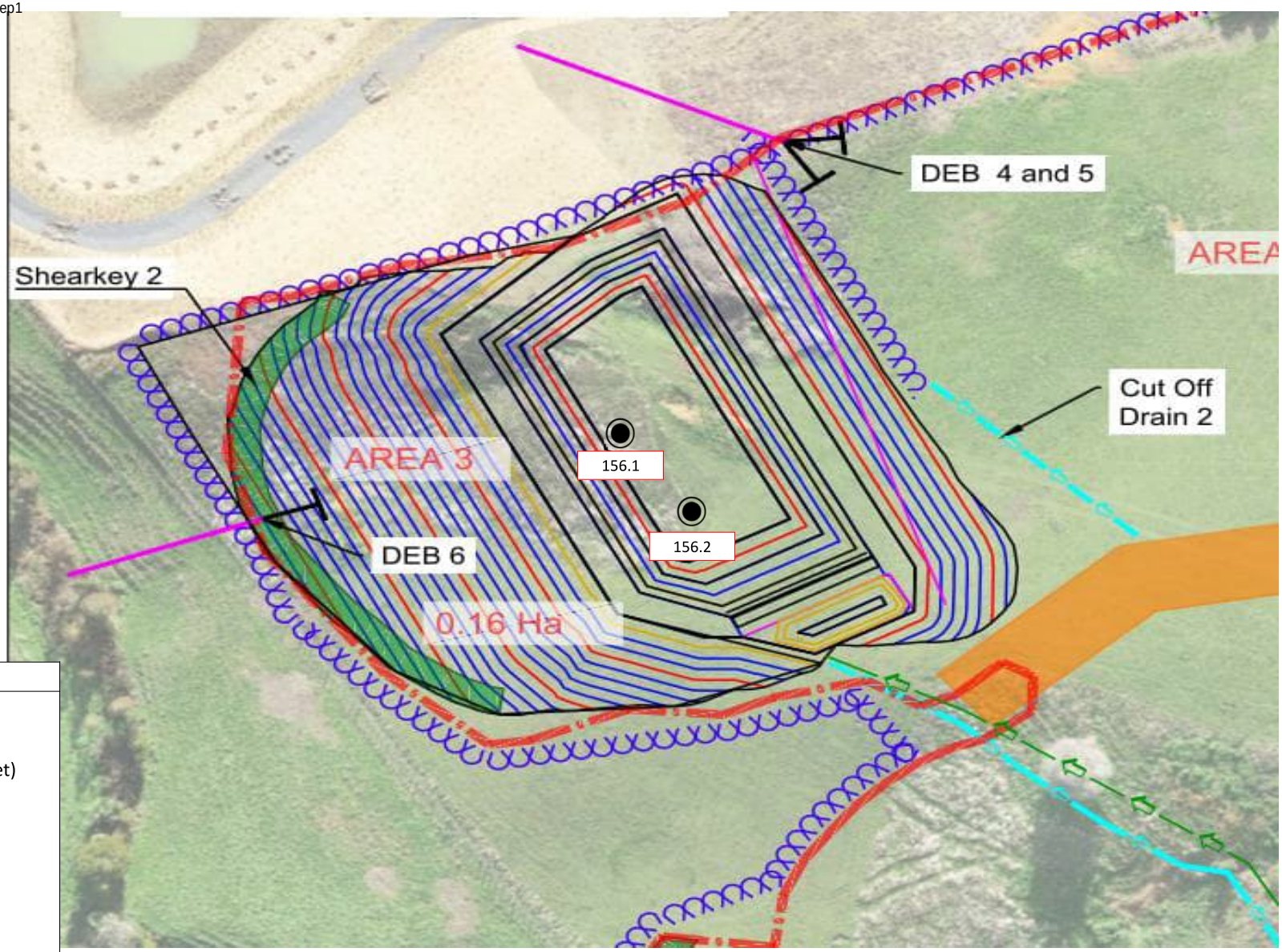

Legend:

- Impact Hammer
- NDM (DT + SV Set)
- Shear Vane
- Scala
- Hand Auger

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ph. +64 (0)9 356 3510
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Test Location Plan

Site:	Hitchen Block Stage 6	Job Name:	Hitchen Block Stage 6	Drawn:	DASA	Date:	11/03/2022
Location:	Meadows Shearkey	Job No.:	2021000.0045.0.0/Rep1	URN:	156	Date:	11/03/2022
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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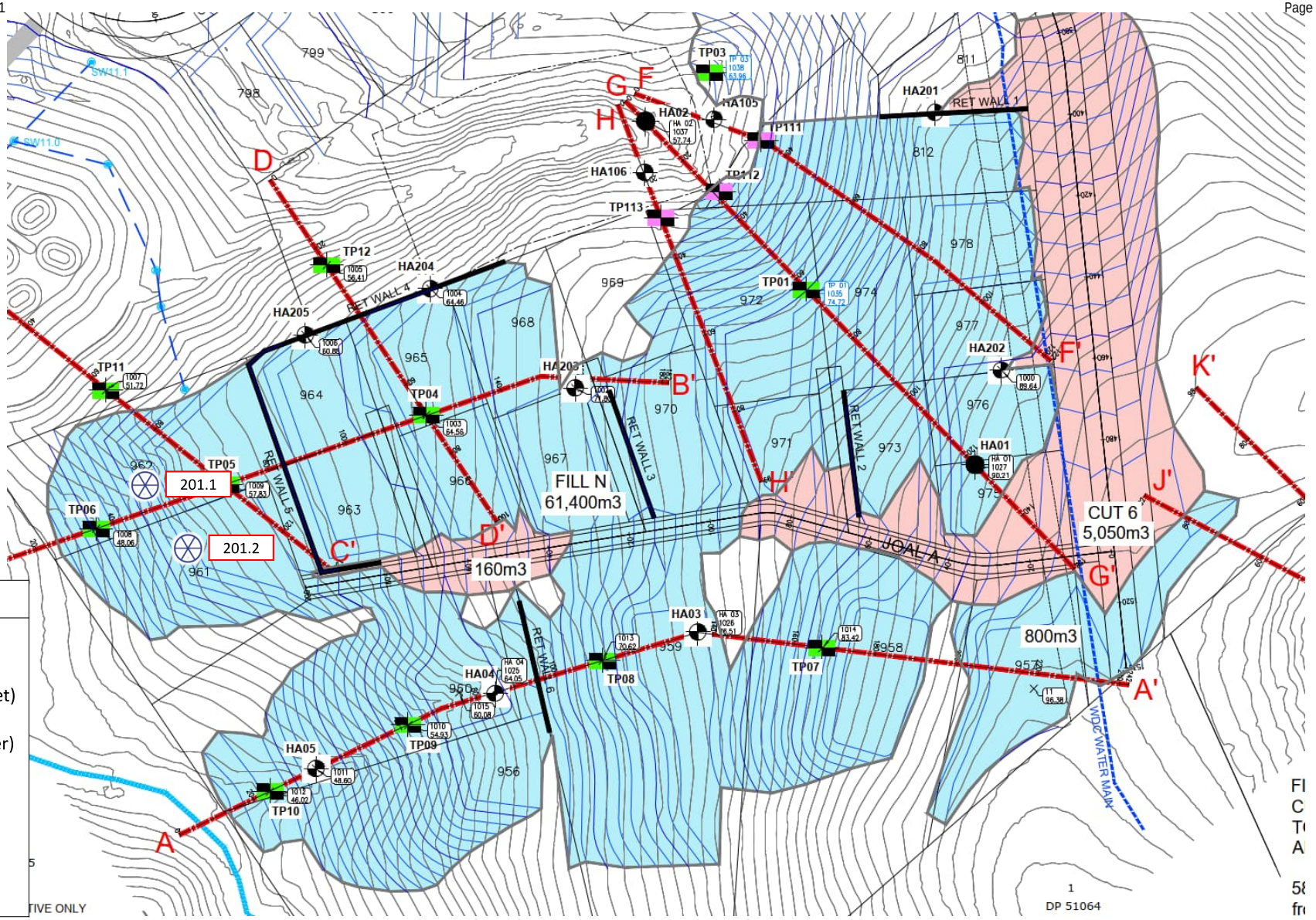

Legend:

- Impact Hammer
- NDM (DT & SV Set)
- NDM (Backscatter)
- Shear Vane
- Scala
- Hand Auger

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Auckland, New Zealand
ph. +64 (0)9 356 3510

e. enquiry@geotechnics.co.nz

w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen - Civil Stage 18	Job Name:	G-LD Hitchen - Civil Stage 18	Drawn:	MIBR		
Location:	Fill Area	Job No.:	2021000.1740	URN:	201	Date:	1/11/2024
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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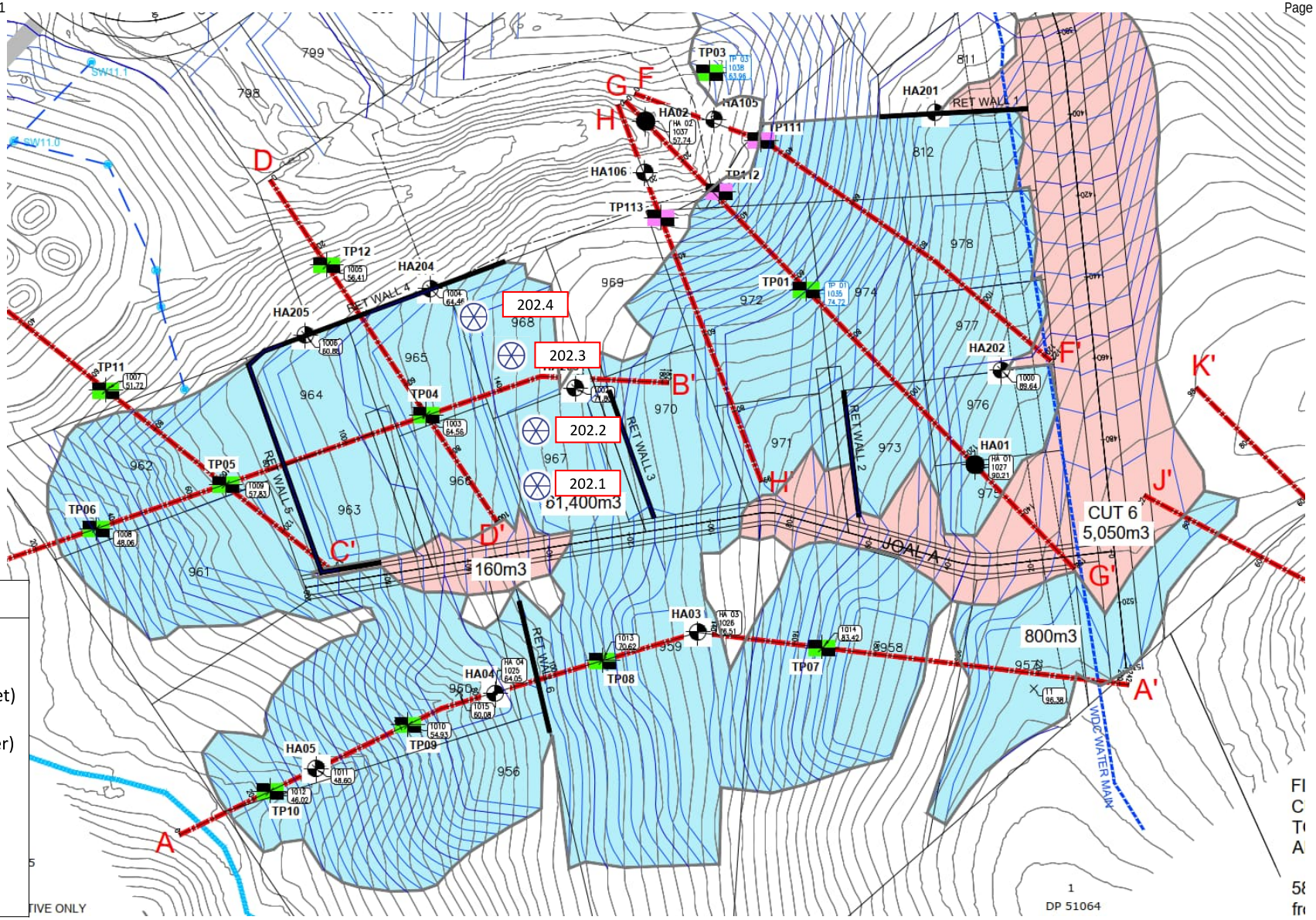

Legend:

- Impact Hammer
- NDM (DT & SV Set)
- NDM (Backscatter)
- Shear Vane
- Scala
- Hand Auger

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Auckland, New Zealand
ph. +64 (0)9 356 3510

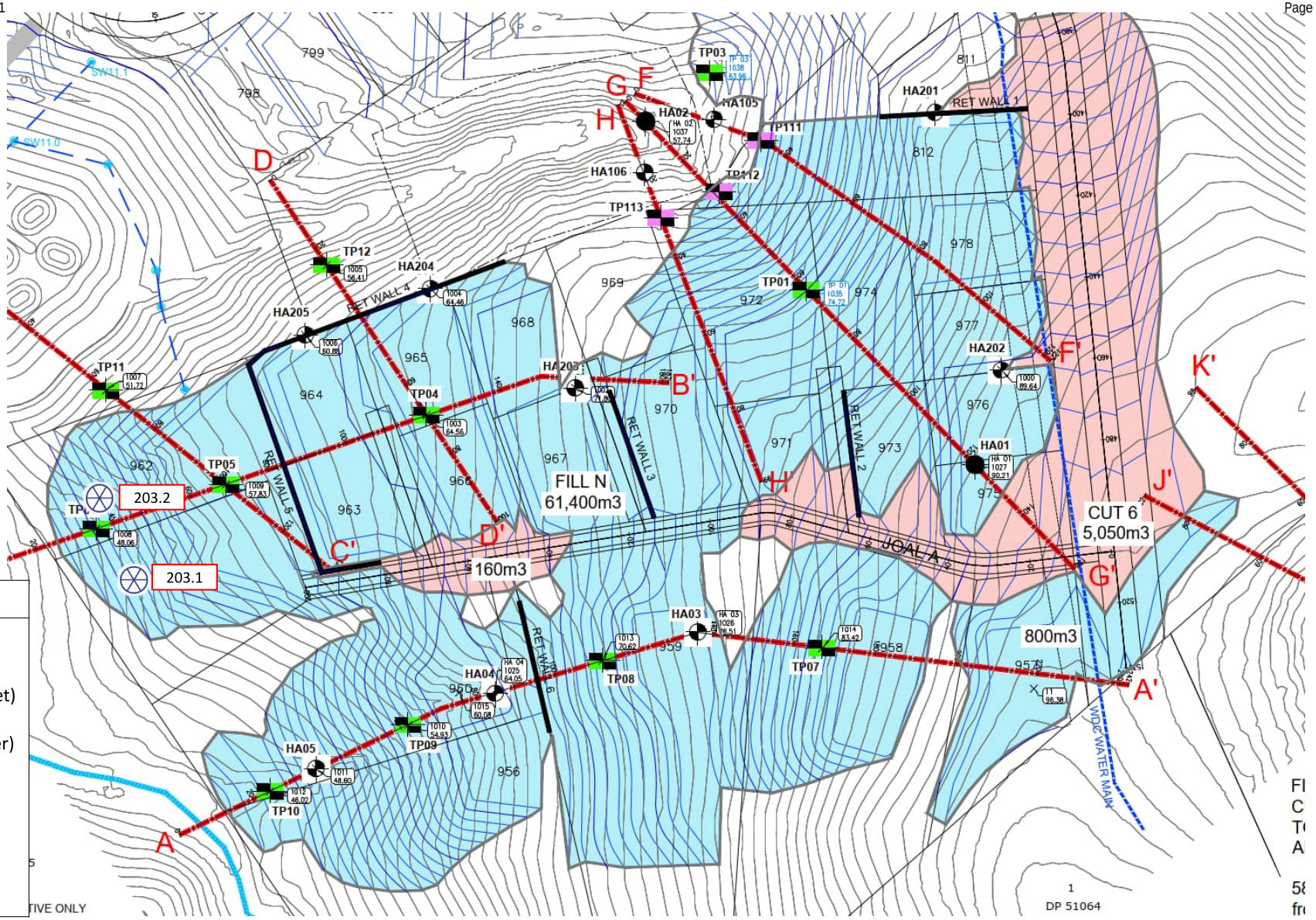
e. enquiry@geotechnics.co.nz

w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen - Civil Stage 18	Job Name:	G-LD Hitchen - Civil Stage 18	Drawn:	CCOU		
Location:	Fill Area	Job No.:	2021000.1740	URN:	202	Date:	7/11/2024
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



Legend:

- Impact Hammer
- NDM (DT & SV Set)
- NDM (Backscatter)
- Shear Vane
- Scala
- Hand Auger

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ph. +64 (0)9 356 3510

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w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen - Civil Stage 18	Job Name:	G-LD Hitchen - Civil Stage 18	Drawn:	MIBR		
Location:	Fill Area - Bund	Job No.:	2021000.1740	URN:	203	Date:	13/11/2024
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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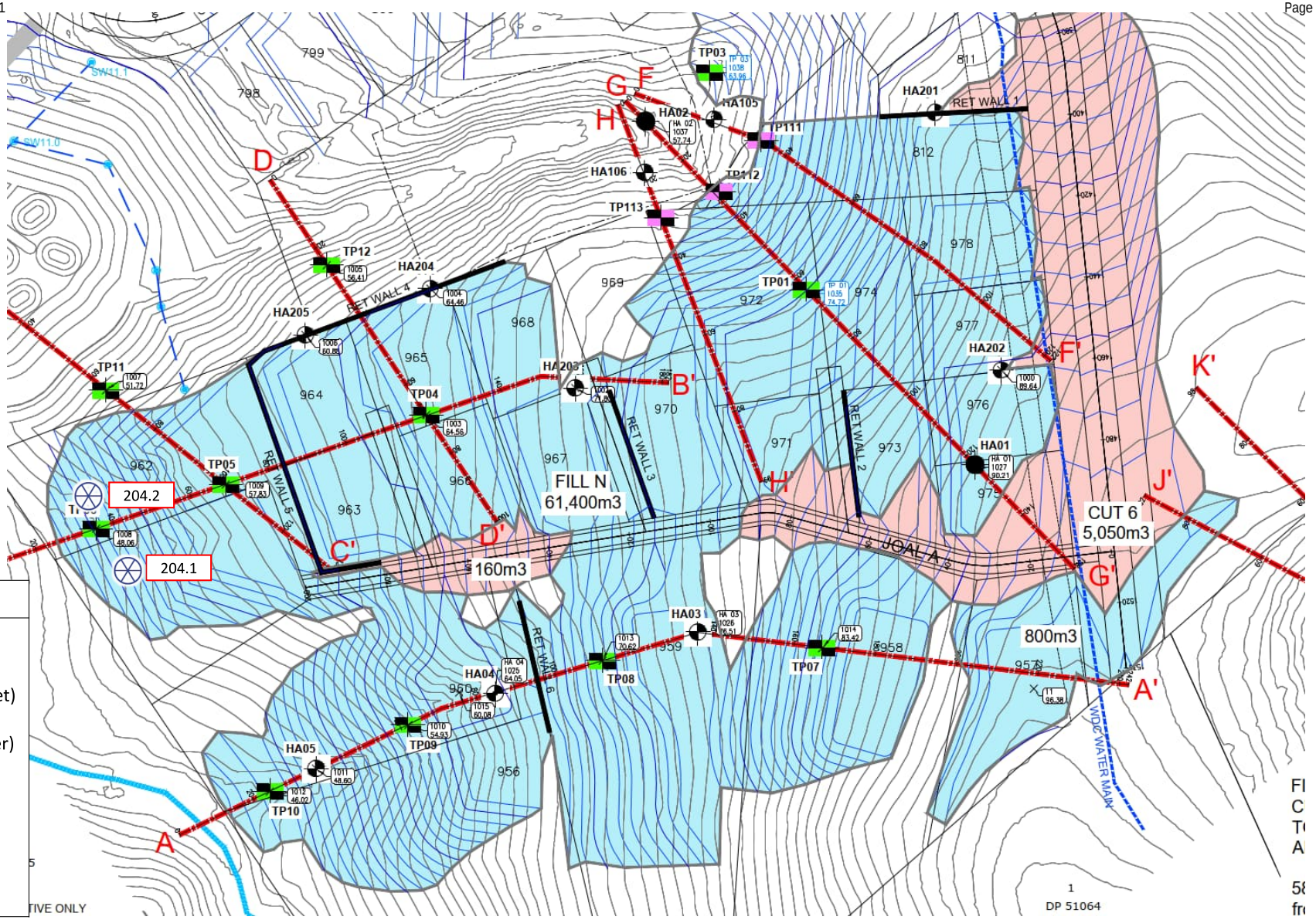

Legend:

- Impact Hammer
- NDM (DT & SV Set)
- NDM (Backscatter)
- Shear Vane
- Scala
- Hand Auger

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Auckland, New Zealand
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w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen - Civil Stage 18	Job Name:	G-LD Hitchen - Civil Stage 18	Drawn:	MIBR		
Location:	Fill Area - Bund	Job No.:	2021000.1740	URN:	204	Date:	13/11/2024
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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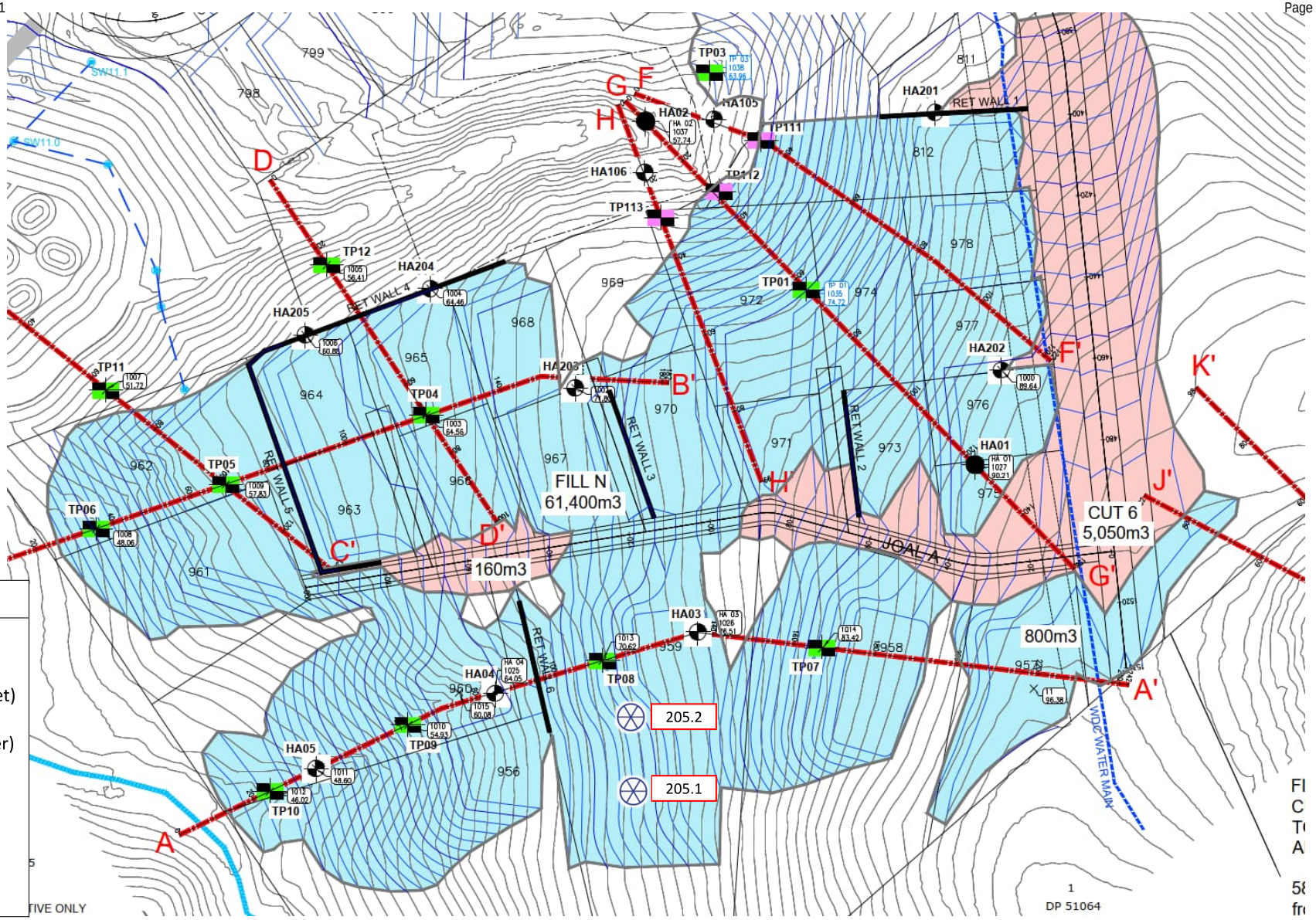

Legend:

- Impact Hammer
- NDM (DT & SV Set)
- NDM (Backscatter)
- Shear Vane
- Scala
- Hand Auger

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ph. +64 (0)9 356 3510

e. enquiry@geotechnics.co.nz

w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen - Civil Stage 18	Job Name:	G-LD Hitchen - Civil Stage 18	Drawn:	MIBR		
Location:	Fill Area	Job No.:	2021000.1740	URN:	205	Date:	26/11/2024
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N

APPENDIX C

SOIL CLASSIFICATION TEST RESULTS

20 May 2025
Our Ref: 1009479.1227.0.0/Rep1
Customer Ref: J00113

Land Development & Engineering Ltd
Level 1, Wilson James Centre
77 Peel Street
Gisborne 4040

Attention: Kyle Meffan

Dear Kyle

Hitchen - Civil Stage 18 and 19

Laboratory Test Report

The samples we collected from the above-mentioned site have been tested according to your instructions and the results are included in this report. Results apply only to the sample(s) tested. A location plan with sampling locations is also included.

Descriptions are enclosed for your information but are not covered under the IANZ endorsement of this report.

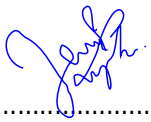
This report has been prepared for the benefit of Land Development & Engineering Ltd, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement.

This report may be reproduced only in full.

Samples not destroyed during testing will be retained for one month from the date of this report before being discarded. If we can be of any further assistance, feel free to get in touch. Contact details are provided at the bottom of this page.

GEOTECHNICS LTD

Report approved by:



.....

Jack Singh
Senior Laboratory Technician
Key Technical Person

Authorised for Geotechnics by:

.....

Vic O'Connor
Project Director

ACCREDITED TESTING LABORATORY

All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

20-May-25
\\ttgroup.local\corporate\geotechnicsgroup\projects\1009479\1009479.1227\workingmaterial\20250520.jasi.1009479.1227.0.0.rep1.docx

GEOTECHNICS

45A Parkhouse Road
Wigram
Christchurch 8042
New Zealand
p. +64 3 361 0300

Geotechnics Project ID	1009479.1227.0.0
Customer Project ID	J00113

Determination of the Shrink - Swell Index - AS 1289 Test 7.1.1 - 2003

TEST DETAILS

LOCATION	ID	Hitchen - Civil Stage 18 and 19		
	Description	Hitchen - Civil Stage 18 and 19		
SAMPLE	Geotechnics ID	CHCH202521-1	Top Depth	0.5m
	Reference	Lot 20	Bottom Depth	1.0m
	Description	SILT with minor clay and trace sand, brown. Moist.		
SPECIMEN	Reference	N/A	Depth	N/A
	Description	N/A		

TEST RESULTS

Applied pressure	25 kPa

Swell Test

Initial water content	30.1 %
Bulk density	1.77 t/m³
Dry density	1.36 t/m³
Final water content	33.5 %
Swelling strain	-0.12 %

Shrinkage Test

Initial water content	33.9 %
Shrinkage strain	7.0 %
Inert material estimate in the soil specimen	None
Soil crumbling during shrinkage	Moderate
Cracking of the shrinkage specimen	Moderate

Shrink - Swell Index	3.9 %

TEST REMARKS

- The material used for testing was natural

Date tested: 15/05/2025

This test result is IANZ accredited.

Approved by KTP	JASI	Date	20/05/2025

GEOTECHNICS

45A Parkhouse Road
Wigram
Christchurch 8042
New Zealand
p. +64 3 361 0300

Geotechnics Project ID 1009479.1227.0.0
Customer Project ID J00113

Determination of the Shrink - Swell Index - AS 1289 Test 7.1.1 - 2003

TEST DETAILS

LOCATION	ID	Hitchen - Civil Stage 18 and 19		
	Description	Hitchen - Civil Stage 18 and 19		
SAMPLE	Geotechnics ID	CHCH202521-2	Top Depth	0.5m
	Reference	Lot 1	Bottom Depth	1.0m
	Description	SILT with minor clay and trace sand, brown.Moist.		
SPECIMEN	Reference	N/A	Depth	N/A
	Description	N/A		

TEST RESULTS

Applied pressure	25 kPa

Swell Test

Initial water content	35.5 %
Bulk density	1.84 t/m³
Dry density	1.36 t/m³
Final water content	37.5 %
Swelling strain	-0.12 %

Shrinkage Test

Initial water content	34.7 %
Shrinkage strain	6.0 %
Inert material estimate in the soil specimen	None
Soil crumbling during shrinkage	Moderate
Cracking of the shrinkage specimen	Moderate

Shrink - Swell Index	3.3 %

TEST REMARKS

- The material used for testing was natural

Date tested: 16/05/2025

This test result is IANZ accredited.

Approved by KTP JASI Date 20/05/2025

GEOTECHNICS

45A Parkhouse Road
Wigram
Christchurch 8042
New Zealand
p. +64 3 361 0300

Geotechnics Project ID	1009479.1227.0.0
Customer Project ID	J00113

Determination of the Shrink - Swell Index - AS 1289 Test 7.1.1 - 2003

TEST DETAILS

LOCATION	ID	Hitchen - Civil Stage 18 and 19		
	Description	Hitchen - Civil Stage 18 and 19		
SAMPLE	Geotechnics ID	CHCH202521-3	Top Depth	0.5m
	Reference	Lot 983	Bottom Depth	1.0m
	Description	SILT with trace clay and minor sand, brown.Moist.		
SPECIMEN	Reference	N/A	Depth	N/A
	Description	N/A		

TEST RESULTS

Applied pressure	25 kPa

Swell Test

Initial water content	18.2 %
Bulk density	2.02 t/m³
Dry density	1.71 t/m³
Final water content	18.9 %
Swelling strain	-0.20 %

Shrinkage Test

Initial water content	21.6 %
Shrinkage strain	1.5 %
Inert material estimate in the soil specimen	None
Soil crumbling during shrinkage	Moderate
Cracking of the shrinkage specimen	Moderate

Shrink - Swell Index	0.9 %

TEST REMARKS

- The material used for testing was natural

Date tested: 15/05/2025

This test result is IANZ accredited.

Approved by KTP	JASI	Date	20/05/2025

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45A Parkhouse Road
Wigram
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p. +64 3 361 0300

Geotechnics Project ID	1009479.1227.0.0
Customer Project ID	J00113

Determination of the Shrink - Swell Index - AS 1289 Test 7.1.1 - 2003

TEST DETAILS

LOCATION	ID	Hitchen - Civil Stage 18 and 19		
	Description	Hitchen - Civil Stage 18 and 19		
SAMPLE	Geotechnics ID	CHCH202521-4	Top Depth	0.5m
	Reference	Lot 11	Bottom Depth	1.0m
	Description	SILT with minor clay and trace sand and trace gravel, brown.Moist.		
SPECIMEN	Reference	N/A	Depth	N/A
	Description	N/A		

TEST RESULTS

Applied pressure	25 kPa

Swell Test

Initial water content	33.8 %
Bulk density	1.86 t/m³
Dry density	1.39 t/m³
Final water content	34.8 %
Swelling strain	-0.24 %

Shrinkage Test

Initial water content	34.9 %
Shrinkage strain	5.7 %
Inert material estimate in the soil specimen	<5 %
Soil crumbling during shrinkage	Moderate
Cracking of the shrinkage specimen	Moderate

Shrink - Swell Index	3.2 %

TEST REMARKS

- The material used for testing was natural

Date tested: 15/05/2025

This test result is IANZ accredited.

Approved by KTP	JASI	Date	20/05/2025

APPENDIX D

POST-CONSTRUCTION BOREHOLE RECORDS

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 1**				
Project ID:	J00113				
Sheet:	1 of 1				
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**		**Test Date:**	13/05/2025
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM	**Logged By:**	BS
Location:	Stage 17	**Elevation:**	Ground	**Checked By:**	ZS
Test Site:	Refer to site plan	**Located By:**	Site plan/map	**Vane ID:**	2784

Depth (m)	Material Description	Geology
	TOPSOIL.	Topsoil
	Silty CLAY, with trace sand; light brown and orange mottledbrown. Very stiff; moist; high plasticity; sand, fine.	Engineered Fill
0.5	Clayey SILT, with some sand; orange mottled light brown. Very stiff; moist; sand, fine; low to medium plasticity.	
1.0	Silty CLAY, with trace sand; orange and brown mottled brown/orange. Very stiff; moist; sand, fine; medium to high plasticity.	
1.5	Clayey SILT, with some sand; light brown and orange mottled brown. Hard; moist; sand, fine; low to medium plasticity. 1.7m: becoming orange mottled light brown	
2.0		
2.5		

Groundwater Not Encountered

In-situ Testing

Dynamic Cone Penetrometer (blows / 50mm): 2, 4, 6, 8

Shear Vane, Su (kPa): 50, 100, 150, 200

Test Values (peak / remoulded (sensitivity))	Depth (m)
158 / 51 (3.1)	
192+	-1.0
UTP	
UTP	-2.0

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 3**		
Project ID:	J00113		
Sheet:	1 of 1		
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map
Test Date:	13/05/2025		
Logged By:	BS		
Checked By:	ZS		
Vane ID:	2784		

Depth (m)	Material Description	Geology
0.0	TOPSOIL.	Topsoil
	Silty CLAY, with trace sand; dark orange streaked brown mottled orange. Very stiff; moist; high plasticity; sand, fine.	Engineered Fill
0.5	0.5m: becoming pink/red light grey mottled orange; moist to wet	
1.0	1.0m: becoming light yellow/brown streaked light brown/grey	
1.4	1.4m: becoming grey and orange mottled brown	
1.6	1.6m: becoming light grey and brown/grey mottled orange	
2.0	2.0m: becoming hard	
2.5		

Water: Groundwater Not Encountered

In-situ Testing

Dynamic Cone Penetrometer (blows / 50mm): 2, 4, 6, 8

Shear Vane, Su (kPa): 50, 100, 150, 200

Test Values (peak / remoulded (sensitivity))	Depth (m)
192+	0.5
140 / 88 (1.6)	1.0
192+	1.5
UTP	2.0

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 5**
Project ID:	J00113
Sheet:	1 of 1

Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map

Test Date:	13/05/2025
Logged By:	BS
Checked By:	ZS
Vane ID:	2784

Depth (m)	Material Description	Geology	Water	In-situ Testing: Dynamic Cone Penetrometer (blows / 50mm)	In-situ Testing: Shear Vane, Su (kPa)	Test Values: peak / remoulded (sensitivity)
0.0	TOPSOIL.	Topsoil				
	Clayey SILT, with trace sand and gravel; light brown/orange mottled brown. Hard; moist; sand, fine to coarse, gravel, fine; medium plasticity.	Engineered Fill				
0.5	0.5m: with minor fine gravel					UTP
	0.8m: becoming brown/orange speckled brown mottled orange; without gravel inclusions					
1.0	1.0m: becoming very stiff					192+
	1.4m: becoming dark brown speckled light brown; low plasticity; with some fine to coarse sand					192+
2.0	Silty CLAY, with trace sand; light brown mottled orange. Very stiff; moist; sand, fine; medium to high plasticity.	South Auckland Volcanic Field				192+
2.5						

Groundwater Not Encountered

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 6**		
Project ID:	J00113		
Sheet:	1 of 1		
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map
Test Date:	13/05/2025		
Logged By:	BS		
Checked By:	ZS		
Vane ID:	2784		

Depth (m)	Material Description	Geology
	Clayey TOPSOIL.	Topsoil
	Clayey SILT, with trace sand; orange and grey mottled brown. Very stiff; moist; sand, fine to coarse; medium plasticity. 0.3m: becoming light brown and pink/orange mottled orange	Engineered Fill
0.5	Silty CLAY, with trace sand; light brown and pink/orange mottled orange. Very stiff; moist; sand, fine to coarse; medium to high plasticity.	
	Clayey SILT, with some sand; light yellow/brown and brown/orange mottled orange. Very stiff; moist; sand, fine to coarse; low to medium plasticity.	
1.0	1.3m: becoming brown/orange mottled orange; without limonite inclusions 1.4m: becoming orange mottled brown/orange	
1.5	1.6m: becoming dark grey streaked orange mottled brown/orange	
2.0		
2.5		

Water: Groundwater Not Encountered

In-situ Testing

Dynamic Cone Penetrometer (blows / 50mm) — 2, 4, 6, 8

Shear Vane, Su (kPa) — 50, 100, 150, 200

Test Values (peak / remoulded (sensitivity))	Depth (m)
192+	-0.5
173 / 102 (1.7)	-1.0
170 / 121 (1.4)	-1.5
192+	-2.0

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 8**		
Project ID:	J00113		
Sheet:	1 of 1		
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map
Test Date:	13/05/2025		
Logged By:	BS		
Checked By:	ZS		
Vane ID:	2784		

Depth (m)	Material Description	Geology
	TOPSOIL.	Topsoil
	Silty CLAY, with trace sand; brown mottled orange. Very stiff; moist; high plasticity; sand, fine.	Engineered Fill
0.5	Clayey SILT, with some sand; dark brown speckled light brown. Very stiff; moist; sand, fine; low to medium plasticity.	South Auckland Volcanic Field
1.0	1.0m: with trace limonite inclusions	
1.5		
2.0		
2.5		

Water: Groundwater Not Encountered

In-situ Testing

Dynamic Cone Penetrometer (blows / 50mm): 2, 4, 6, 8

Shear Vane, Su (kPa): 50, 100, 150, 200

Test Values (peak / remoulded (sensitivity))	Depth (m)
UTP	
192+	-1.0
UTP	
192+	-2.0

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 10**		
Project ID:	J00113		
Sheet:	1 of 1		
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map
Test Date:	13/05/2025		
Logged By:	BS		
Checked By:	ZS		
Vane ID:	2784		

Depth (m)	Material Description	Geology	Water	In-situ Testing: Dynamic Cone Penetrometer (blows / 50mm) 2 4 6 8 / Shear Vane, Su (kPa) 50 100 150 200	Test Values: peak / remoulded (sensitivity)	Depth (m)
0.0	TOPSOIL.	Topsoil	Groundwater Not Encountered			
	Silty CLAY, with trace sand and gravel; orange and light grey mottled brown/orange. Very stiff; moist; high plasticity; sand, fine, gravel, fine.	Engineered Fill				
0.5	0.5m: becoming light brown mottled brown/orange; without gravel inclusions				192+	
1.0					192+	-1.0
1.5	1.5m: with trace fine gravel				176 / 132 (1.3)	
2.0					192+	-2.0
2.5						

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 11**		
Project ID:	J00113		
Sheet:	1 of 1		
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map
Test Date:	13/05/2025		
Logged By:	ZS		
Checked By:	ZS		
Vane ID:	835		

Depth (m)	Material Description	Geology	Water	In-situ Testing	Test Values (peak / remoulded (sensitivity))
0.0	Clayey SILT, with trace gravel; orange mottled brown. Very stiff; moist; gravel, fine to medium; medium plasticity.	Engineered Fill	Groundwater Not Encountered	Dynamic Cone Penetrometer (blows / 50mm) 2 4 6 8; Shear Vane, Su (kPa) 50 100 150 200	
0.5	0.4m: becoming orange and light grey streaked light brown; with trace fine gravel				166 / 83 (2)
1.0	1.1m: becoming orange streaked light grey; with trace fine to medium sand				191 / 80 (2.4)
1.5	1.5m: becoming hard				213 / 134 (1.6)
	1.8m: without gravel 2.0m: becoming very stiff				
2.0					191 / 115 (1.7)
2.5					

-1.0

-2.0

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 13**		
Project ID:	J00113		
Sheet:	1 of 1		
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map
Test Date:	13/05/2025		
Logged By:	ZS		
Checked By:	ZS		
Vane ID:	835		

Depth (m)	Material Description	Geology
0.0	TOPSOIL.	Topsoil
0.5	Clayey SILT; pink streaked orange. Very stiff; moist; medium plasticity; moderately sensitive.	South Auckland Volcanic Field
	0.8m: becoming light grey mottled light brown	
1.0	1.0m: becoming insensitive	
	1.2m: becoming light grey	
1.5		
	1.8m: with minor fine to medium gravel 2.0m: becoming hard	
2.0		
2.5		

Groundwater Not Encountered

In-situ Testing

Dynamic Cone Penetrometer (blows / 50mm): 2, 4, 6, 8

Shear Vane, Su (kPa): 50, 100, 150, 200

Test Values (peak / remoulded (sensitivity))	Depth (m)
159 / 80 (2)	-0.5
156 / 99 (1.6)	-1.0
162 / 108 (1.5)	-1.5
223+ -	-2.0

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 14**		
Project ID:	J00113		
Sheet:	1 of 1		
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map
Test Date:	13/05/2025		
Logged By:	ZS		
Checked By:	ZS		
Vane ID:	835		

Depth (m)	Material Description	Geology
0.0	TOPSOIL.	Topsoil
	Clayey SILT; orange streaked brown. Hard; moist; medium plasticity.	Engineered Fill
0.5	0.5m: becoming light brown mottled brown	
1.0	Clayey SILT, with trace sand; light grey/white streaked light brown. Hard; moist; sand, fine to coarse; medium plasticity; with trace limonite inclusions.	South Auckland Volcanic Field
1.5	1.5m: becoming brown; very stiff; insensitive	
	2.0m: becoming moderately sensitive	
2.0		
2.5		

Water: Groundwater Not Encountered

In-situ Testing

Dynamic Cone Penetrometer (blows / 50mm): 2, 4, 6, 8

Shear Vane, Su (kPa): 50, 100, 150, 200

Depth (m)	Test Values (peak / remoulded (sensitivity))
0.5	UTP
1.0	UTP
1.5	159 / 92 (1.7)
2.0	159 / 57 (2.8)

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 16**				
Project ID:	J00113				
Sheet:	1 of 1				
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**		**Test Date:**	13/05/2025
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM	**Logged By:**	ZS
Location:	Stage 17	**Elevation:**	Ground	**Checked By:**	ZS
Test Site:	Refer to site plan	**Located By:**	Site plan/map	**Vane ID:**	835

Depth (m)	Material Description	Geology	Water	In-situ Testing: Dynamic Cone Penetrometer (blows / 50mm)	In-situ Testing: Shear Vane, Su (kPa)	Test Values: peak / remoulded (sensitivity)	Depth (m)
0.0	TOPSOIL.	Topsoil	Groundwater Not Encountered	2 4 6 8	50 100 150 200		0.0
	Clayey SILT; red/orange streaked brown. Hard; moist; medium plasticity.	Engineered Fill					
0.5	0.5m: with trace fine sand inclusions					191 / 96 (2)	
1.0	Clayey SILT; light grey streaked orange. Very stiff; moist; medium plasticity; insensitive.	South Auckland Volcanic Field				194 / 112 (1.7)	-1.0
1.5	1.5m: becoming hard					223+	
2.0						223+	-2.0
2.5							

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 18**		
Project ID:	J00113		
Sheet:	1 of 1		
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map
Test Date:	13/05/2025		
Logged By:	ZS		
Checked By:	ZS		
Vane ID:	835		

Depth (m)	Material Description	Geology
0.0	TOPSOIL.	Topsoil
	Clayey SILT; light grey streaked pink/red. Hard; moist; medium plasticity.	Engineered Fill
0.5	0.7m: becoming brown/orange mottled brown; with minor fine sand	
1.0	Clayey SILT, with trace sand; orange streaked brown. Hard; moist; sand, fine; medium plasticity.	South Auckland Volcanic Field
1.5	1.4m: becoming orange streaked light brown	
2.0		
2.5		

Water: Groundwater Not Encountered

In-situ Testing

Dynamic Cone Penetrometer (blows / 50mm): 2, 4, 6, 8

Shear Vane, Su (kPa): 50, 100, 150, 200

Test Values (peak / remoulded (sensitivity))	Depth (m)
223+	
223+	-1.0
223+	
223+	-2.0

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 20**		
Project ID:	J00113		
Sheet:	1 of 1		
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map
Test Date:	13/05/2025		
Logged By:	ZS		
Checked By:	ZS		
Vane ID:	835		

Depth (m)	Material Description	Geology
0.0	TOPSOIL.	Topsoil
0.5	Clayey SILT, with trace sand; orange. Hard; moist; sand, fine; medium plasticity.	Engineered Fill
1.0		
1.5	1.4m: becoming light brown; with trace manganese oxide and some fine to medium sand inclusions	
2.0		
2.5		

Water: Groundwater Not Encountered

In-situ Testing

Dynamic Cone Penetrometer (blows / 50mm): 2, 4, 6, 8

Shear Vane, Su (kPa): 50, 100, 150, 200

Depth (m)	Test Values (peak / remoulded (sensitivity))
0.5	215 / 67 (3.2)
1.0	223+
1.5	UTP
2.0	UTP

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 22**				
Project ID:	J00113				
Sheet:	1 of 1				
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**		**Test Date:**	13/05/2025
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM	**Logged By:**	ZS
Location:	Stage 17	**Elevation:**	Ground	**Checked By:**	ZS
Test Site:	Refer to site plan	**Located By:**	Site plan/map	**Vane ID:**	835

Depth (m)	Material Description	Geology
0.0	TOPSOIL.	Topsoil
	Clayey SILT, with minor sand; orange mottled light brown. Hard; moist; sand, fine to coarse; medium plasticity.	Engineered Fill
1.1	1.1m: becoming light orange mottled light brown	
1.5	1.5m: with trace manganese oxide	
2.0		
2.5		

Water: Groundwater Not Encountered

In-situ Testing

Dynamic Cone Penetrometer (blows / 50mm) 2 4 6 8

Shear Vane, Su (kPa) 50 100 150 200

Test Values (peak / remoulded (sensitivity))	Depth (m)
223+	
223+	-1.0
UTP	
223+	-2.0

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

Hand Auger Borehole Log

Method: 50mm Hand Auger

Test ID:	**Lot 24**		
Project ID:	J00113		
Sheet:	1 of 1		
Client:	DFH JOINT VENTURE LIMITED	**Coordinates:**	
Project:	Geotechnical Investigation for Subdivision	**System:**	NZTM
Location:	Stage 17	**Elevation:**	Ground
Test Site:	Refer to site plan	**Located By:**	Site plan/map
Test Date:	13/05/2025		
Logged By:	ZS		
Checked By:	ZS		
Vane ID:	835		

Depth (m)	Material Description	Geology
0.0	TOPSOIL.	Topsoil
0.5	Clayey SILT; orange and light grey mottled light brown. Hard; moist; medium plasticity.	Engineered Fill
	0.8m: with minor fine to coarse sand and trace fine gravel inclusions	
1.0	1.0m: becoming very stiff	
	1.1m: becoming light brown streaked light grey	
1.5		
	2.0m: becoming hard	
2.0		
2.5		

Water: Groundwater Not Encountered

In-situ Testing

Dynamic Cone Penetrometer (blows / 50mm): 2, 4, 6, 8

Shear Vane, Su (kPa): 50, 100, 150, 200

Test Values (peak / remoulded (sensitivity))

Depth (m)	Test Values
0.5	223+
1.0	175 / 112 (1.6)
1.5	182 / 86 (2.1)
2.0	223+

Hole Depth: 2.00m

Termination: Reached target depth

Remarks:

Materials described in general accordance with NZGS Field Description of Soil and Rock (2005) . No correlation is implied between shear vane and DCP values.

- Vane peak
- Vane residual
- Vane UTP
- Standing water level
- Groundwater inflow
- Groundwater outflow

UTP = Unable to Penetrate

APPENDIX E

CONSTRUCTION OBSERVATION RECORDS

29/09/21 - Stage 6 begins

Wednesday, 29 September 2021 3:40 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	29/09/21 - 9:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

- Visited site to discuss Stage 6 earthworks with Trevor and Simon (new foreman for Dines). Items discussed were:
    - Nominal toe keys required at toe of proposed fills. 1m depth minimum into very stiff soils.
    - Nominal underfill drains will be required, must keep 2m of fill cover wherever possible. Some drains will likely need to be trenched in 0.5m. Drains will outlet over the top of the toe keys into the gullies.
    - Counterfort drains: 4x required below proposed retaining wall. Will discuss flush point with Chris. Dines may have to bench the slope to get the drains in as the slopes are very steep.
    - Retaining walls will be constructed by Dines as part of the civil works. Drain outlets will be directed to the public reticulation network.


HITACHI

06/10/21 - Site Walkover

Wednesday, 6 October 2021 2:25 p.m.

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	06/10/21 - 11:00am
Author:	RG
Plant Operating:	
Weather:	Sunny

Site Observations and Instructions:

Attended site for a site walkover/ handover from KM to RG. Observed the beginning of works (forming of drainage) within Stage 6. The beginning site strip was occurring within stiff to very stiff natural Ash soils.

11/10/21

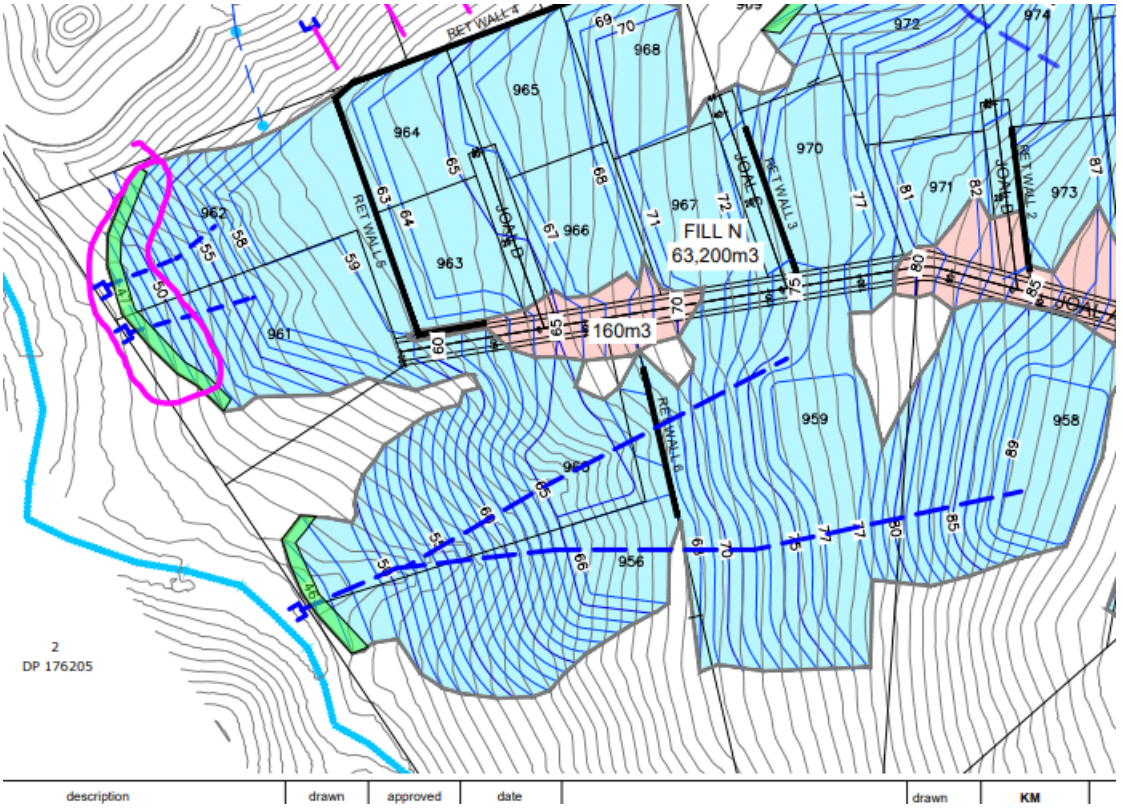
Monday, 11 October 2021 2:45 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	11/10/21 - 12:15pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Observed excavation of toe key at least 1m below original ground level as per purple outline on the annotated plan below. Advised contractor to bench the sides and then fill compaction with clay can commence. Also advised that the underfill drains be installed as per our detail and should not extend beyond the lower retaining wall.



30/11/21

Tuesday, 30 November 2021 1:09 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	30/11/21 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Earthworks continuing in Stage 6.

Counterfort drains in are mostly complete, the final drain is still being constructed - loose materials have been undercut, benched out and clay fill placed. Drain depth to digger reach.

05/11/21

Friday, 5 November 2021 3:45 p.m.

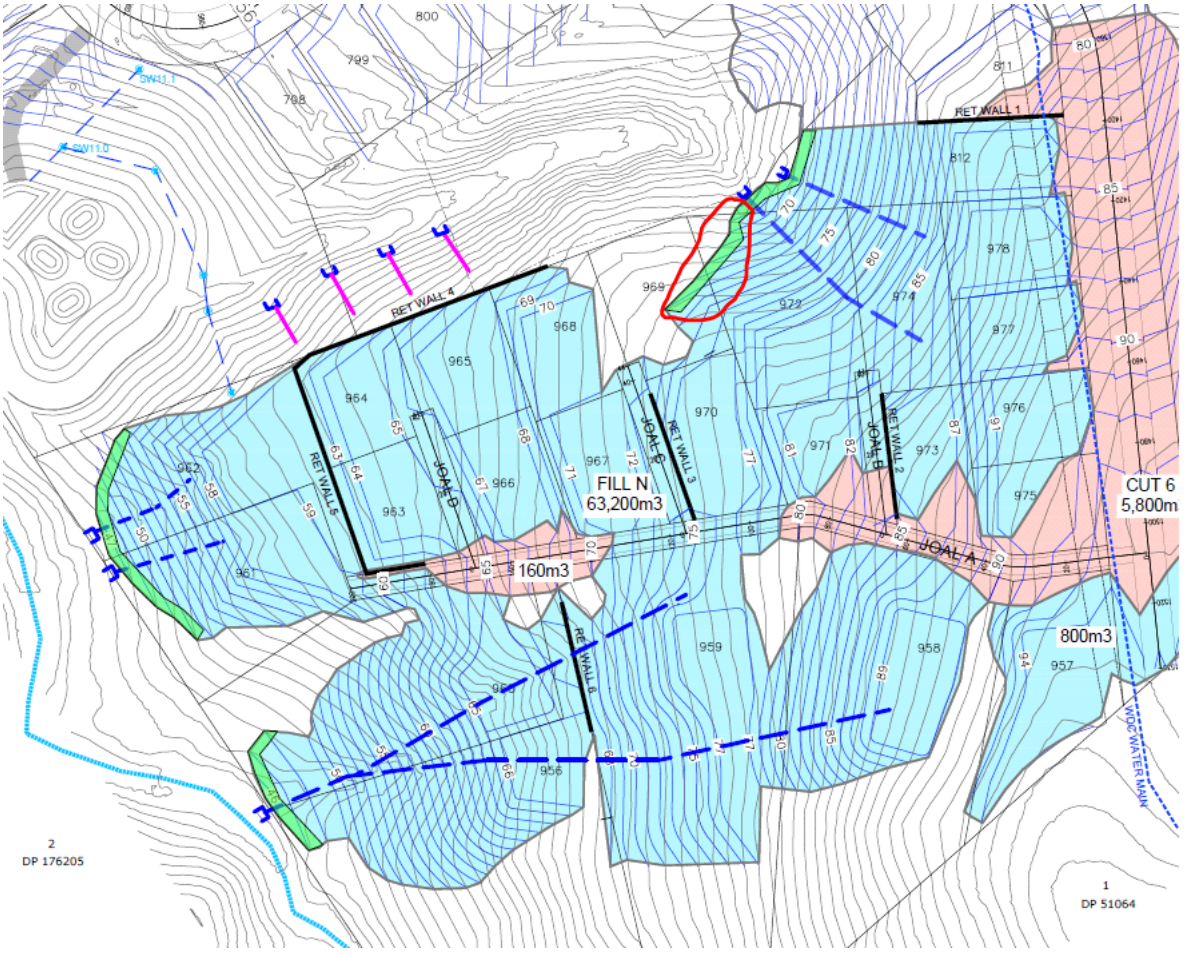
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	05/11/21 - 1pm
Author:	RG
Plant Operating:	Digger
Weather:	Overcast

Site Observations and Instructions:

Observed excavation of toe key at least 1m below original ground level as per purple outline on the annotated plan below.

- Base of the toes key returned shear vanes of greater than 217kPa, with the vane blade unable to penetrate the soil in some instances.
- Discussed with contractor that they would bench the sides and then fill compaction with clay can commence.



08/11/21

Monday, 8 November 2021 8:51 p.m.

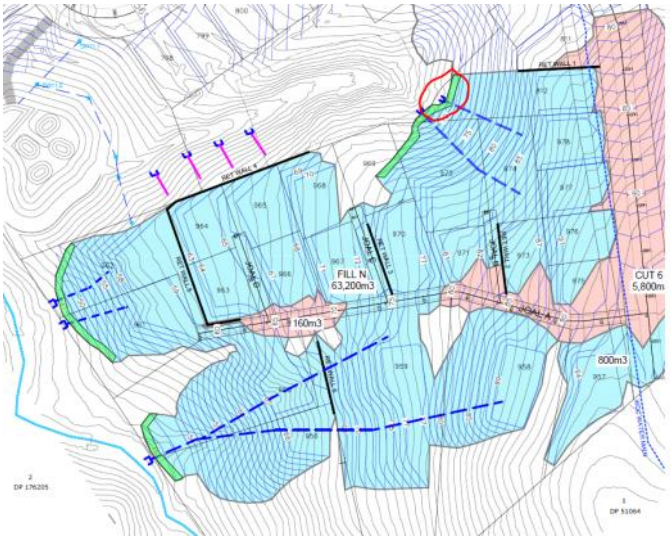
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	08/11/21 - 10am
Author:	RG
Plant Operating:	Digger
Weather:	Overcast

Site Observations and Instructions:

Observed excavation of toe key at least 1m below original ground level as per red and blue outline on the annotated plan below.

- Base of the red circled toe key returned shear vanes of greater than 217kPa, with the vane blade unable to penetrate the soil in several instances.
- Base of the blue circled toe key was into tuff and the shear vane blade was unable to penetrate.
- Discussed with contractor that they would bench the sides and then fill compaction with clay can commence. Drain outlet to be placed once filling completed.



09/11/21

Wednesday, 10 November 2021 4:34 p.m.

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	08/11/21 - 10am
Author:	RG
Plant Operating:	Digger
Weather:	Sun

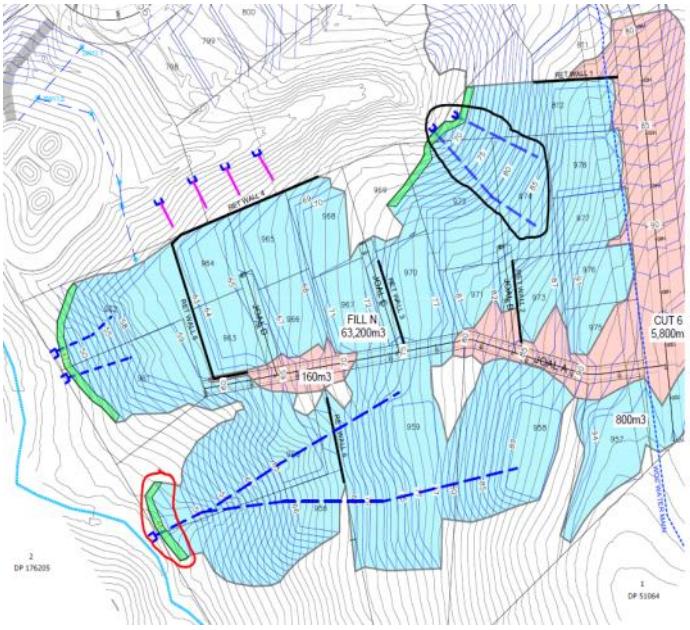
Site Observations and Instructions:

Observed toe key circled in red on the below site plan:

- Toe key was around 3m deep, founding on stiff to very stiff natural clays.
- Some water seepage from the creek was noted within the base of the toe key, this was scraped off by the digger and then capped with compacted clay. We will return tomorrow to check the fill.

Also observed the underfill drains circled in black below:

- Drains consisted of cloth wrapping around 160mm heavy duty novocoil, covered by hardfill and were in the positions indicated on the below plan.



10/11/21

Wednesday, 10 November 2021 4:45 p.m.

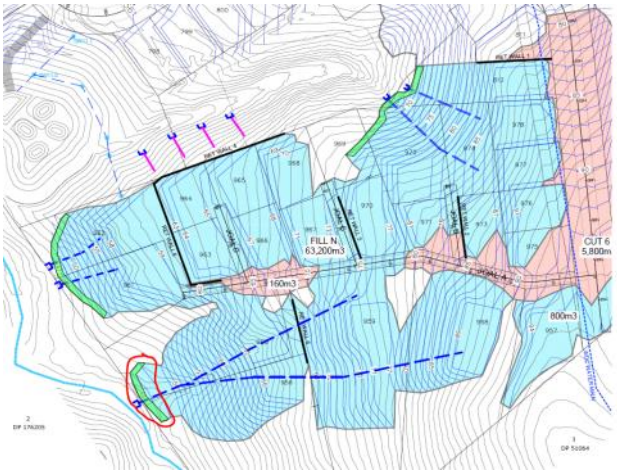
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	10/11/21 - 8:30am
Author:	RG
Plant Operating:	Digger
Weather:	Sun

Site Observations and Instructions:

Attended site to observe the first lift of fill placed within the toe key circled red on the below site plan.

- Fill consisted of hard, highly plastic clays.
- A 1m deep hand auger was drilled and found no wet or saturated soils. Satisfactory to continue placing fills.



11/11/21

Thursday, 11 November 2021 3:29 p.m.

Site Inspection Record

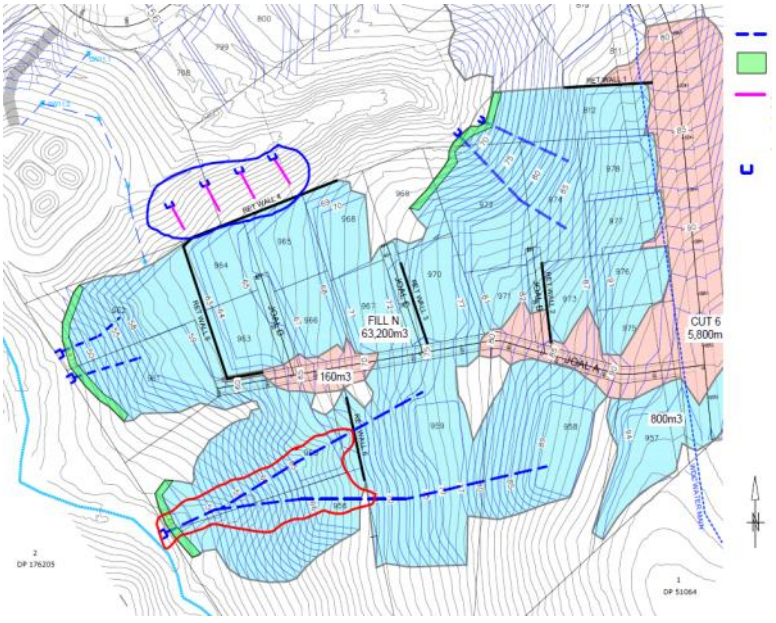
Project # & Name:	J00113 - Hitchen Block
Date & Time:	11/11/21 - 8:30AM
Author:	RG
Plant Operating:	Diggers and Moxys
Weather:	Sun

Site Observations and Instructions:

Attended site to observe to underfill drains (circled red) and counterfort drain locations (circled blue).

- Underfill drains were located within the low points of the slope and consisted of 160mm heavy duty novocoil, covered with 20/7 fill and wrapped with bidim cloth.
- The drains will be continued further up the slope once filling near the toe of the slope has been completed.

- The location of the counterfort drains had been pegged out. The counterfort on the west end is to be moved around 1m to the east to be located within a natural low point in the slope.
- From the top of the slope, these were set around 1.5m away from the approximate retaining wall location.
- Each counterfort was spaced by 15m.
- Contractor brining in scoria backfill today, drain construction to start next week.



19/11/21 - AM

Friday, 19 November 2021 5:08 p.m.

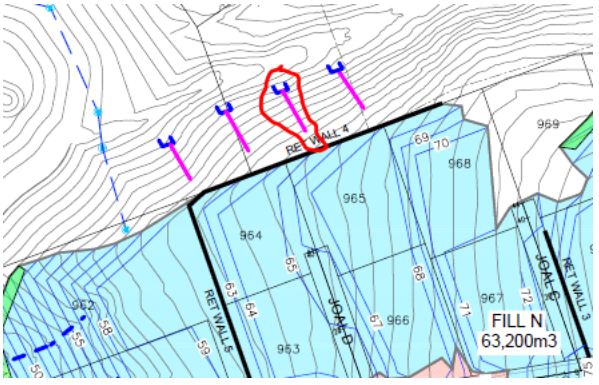
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	19/11/21 - 8:30AM
Author:	RG
Plant Operating:	Digger and moxies
Weather:	Sun

Site Observations and Instructions:

Attended site with KM to observe the construction of the first counterfort drain, circled red below.

- A 160mm heavy duty novocoil drain had been placed at the base of the trench and backfilled already with scoria.
- Contractor advised that trench was 6m deep and the base of the trench has been as-built.
- Construction of the eastern most drain to begin today, will return later to observe.



19/11/21 - PM

Friday, 19 November 2021 5:55 p.m.

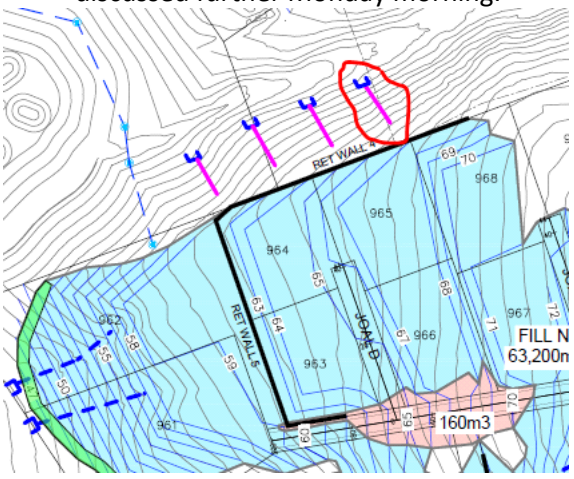
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	19/11/21 - 2PM
Author:	RG
Plant Operating:	Digger, moxies, dump truck, padfoot
Weather:	Sun

Site Observations and Instructions:

Attended site to observe construction of counterfort drain circled red below.

- Drain was constructed to approximately halfway up the slope and was 6m deep, in accordance with our design.
- Contacted by contractor around 1.5 hrs later to say the drain had collapsed. This is to be discussed further Monday morning.



22/11/21

Wednesday, 24 November 2021 9:03 a.m.

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	22/11/21 - 10:30AM
Author:	RG
Plant Operating:	
Weather:	Light rain/sun

Site Observations and Instructions:

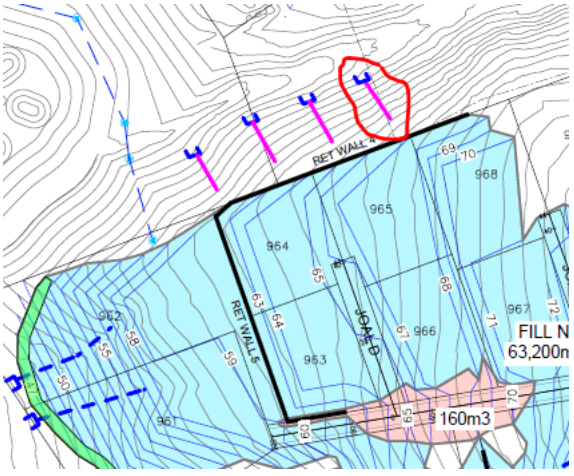
Attended site with KM to observe the collapsed drain excavation (circled red below) and discuss with contractor the next steps.

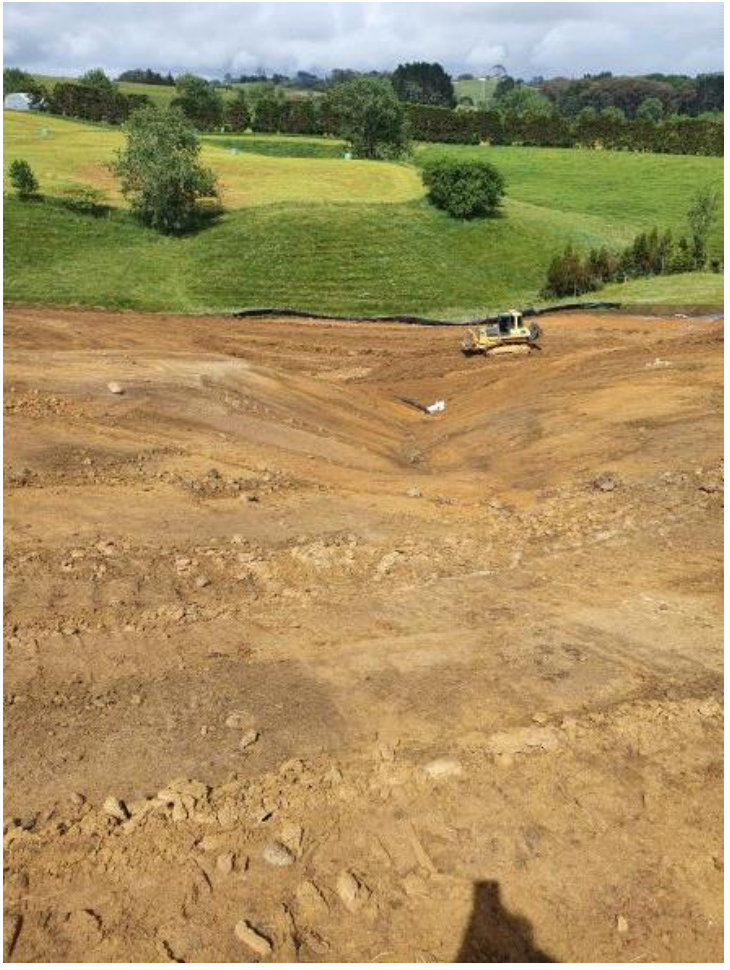
A block of material has failed along a plane on the eastern wall of the excavations. Decided that:

- Collapsed excavation to be cleared (inspected by us) and then backfilled and compacted (too dangerous for compaction testing).
- Re-excavate drain approx. 1m to the west in sections using trench shields.
- If space allows batter out the edges.

CAN to follow.

Also observed construction of underfill drains and discussed with contractor where the drains are to extend up to (approx. pink pegs in final image below).





13/01/22 PM

Monday, 17 January 2022 5:39 p.m.

Site Inspection Record

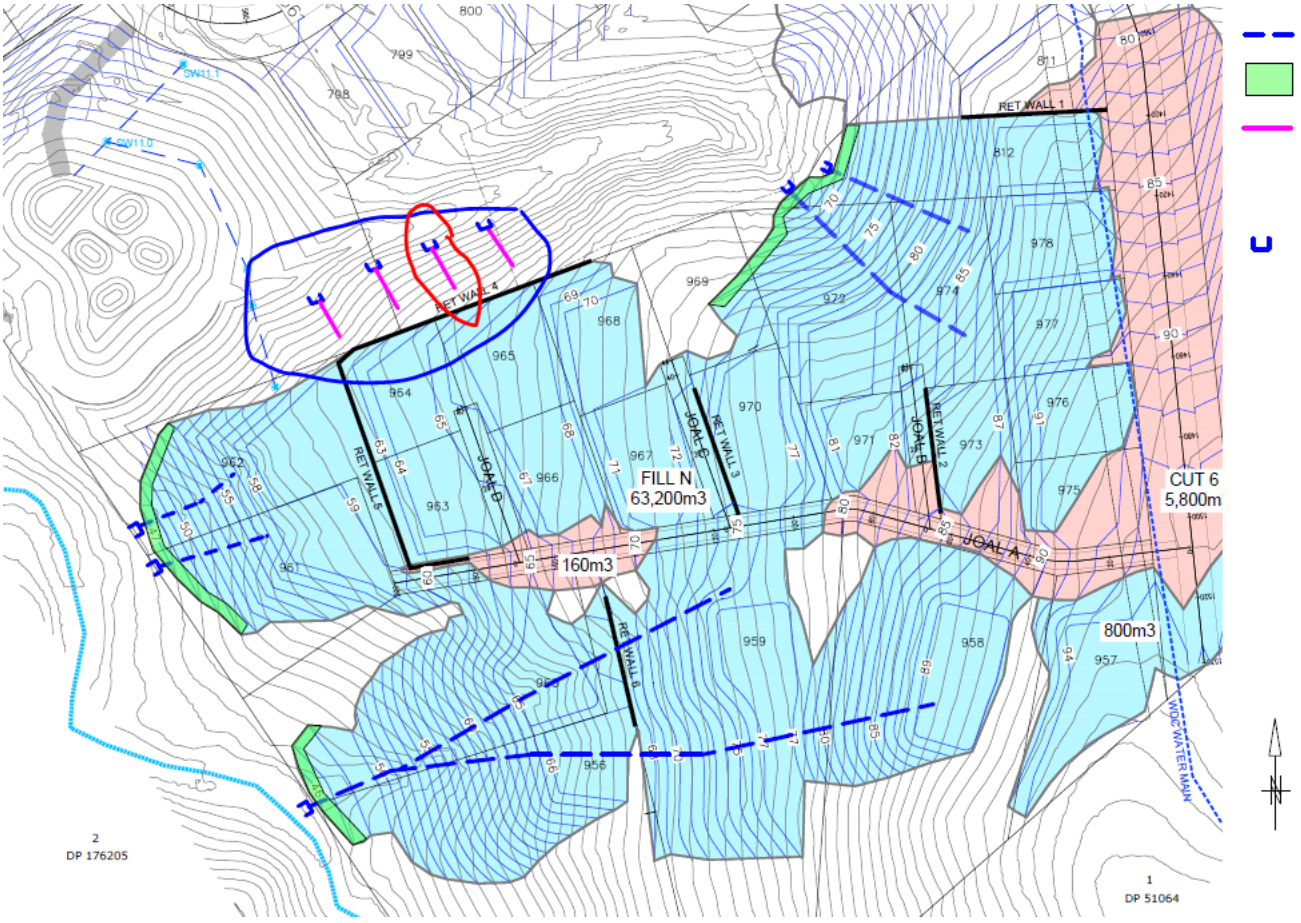
Project # & Name:	J00113 - Hitchen Block
Date & Time:	13/01/22
Author:	RG
Plant Operating:	Digger, water truck
Weather:	Sun

Site Observations and Instructions:

Attended site with KM to observe the placement of the geogrid within the Meadows shear key and flushing of the 4x counterfort drains circled below.

Grid was not yet ready to be placed.

Observed flushing of 1 x drain (circled red below) - remaining drains to be flushed tomorrow following pre-soaking.



14/01/22

Monday, 17 January 2022 8:35 p.m.

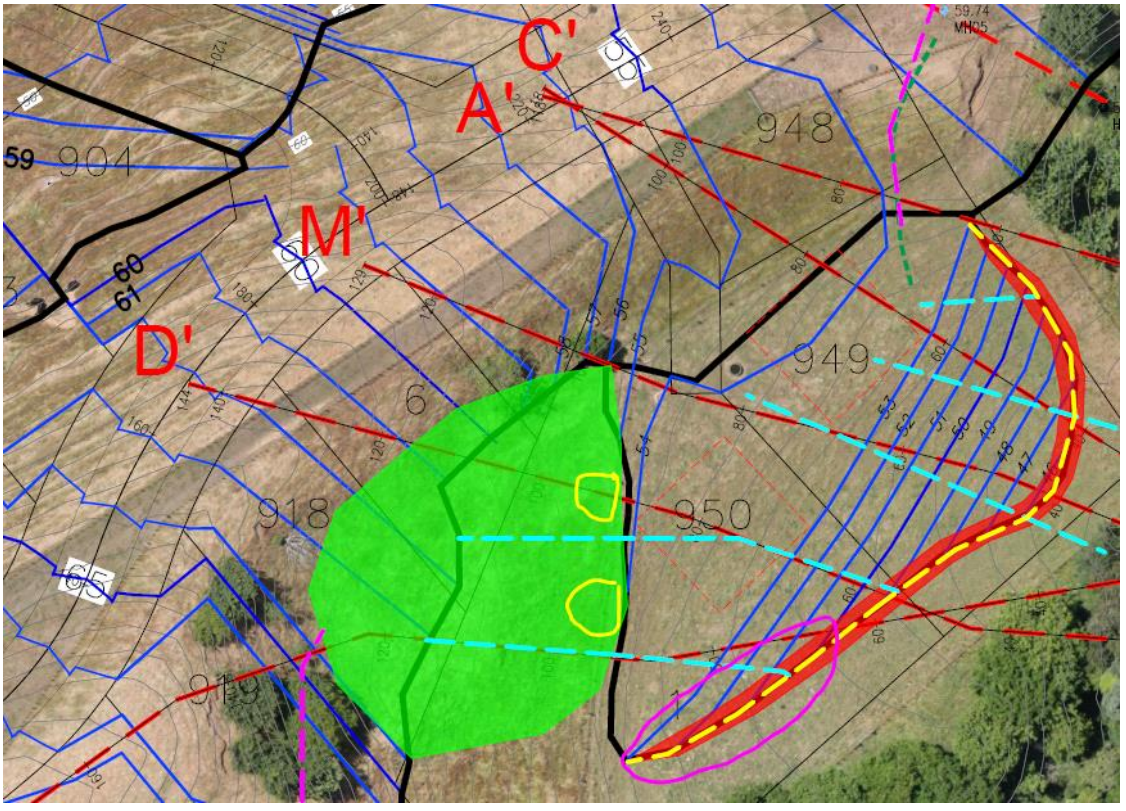
Site Inspection Record

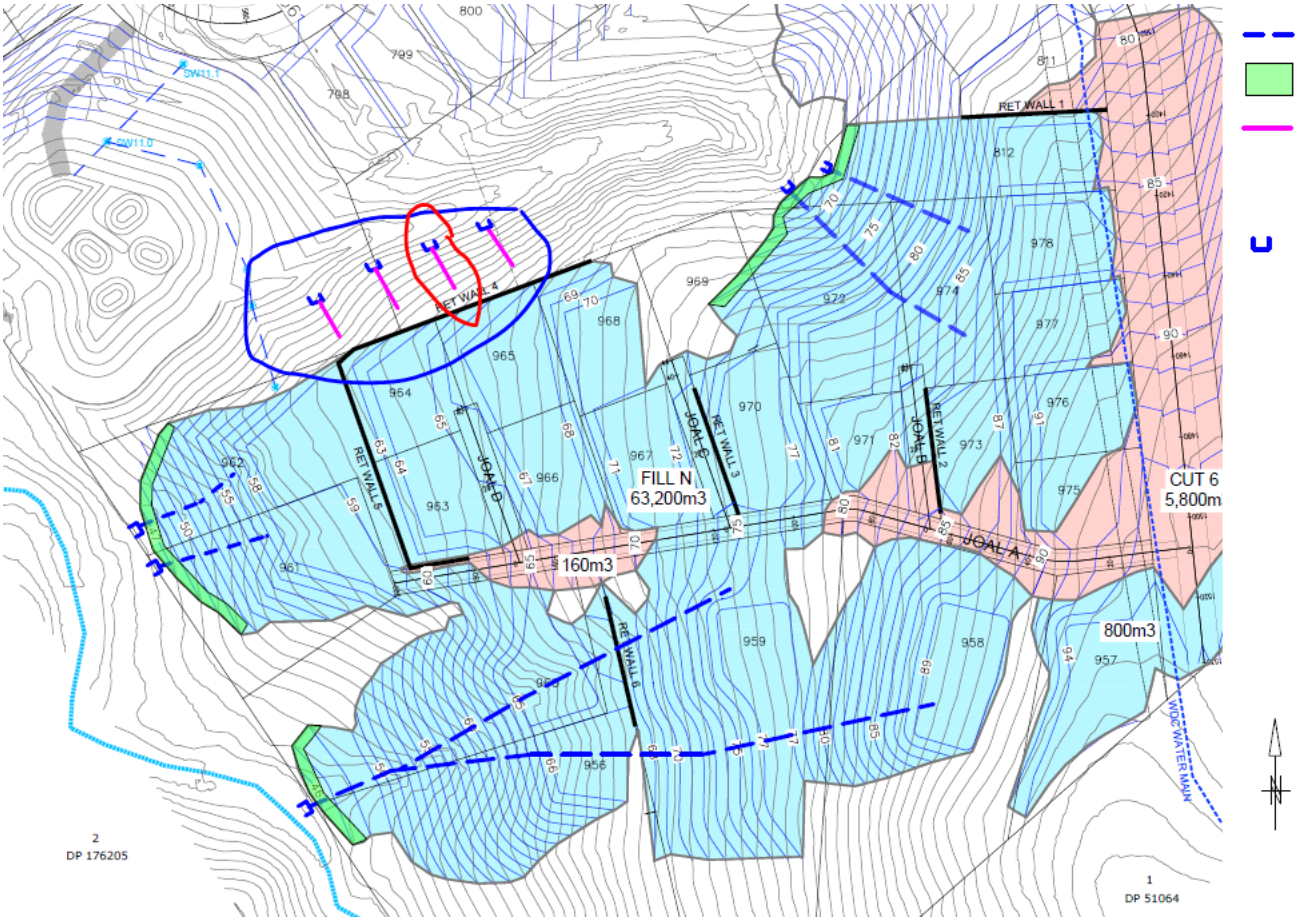
Project # & Name:	J00113 - Hitchen Block
Date & Time:	14/01/22 - 2PM
Author:	RG
Plant Operating:	Digger
Weather:	Sun

Site Observations and Instructions:

Attended site with CE and KM to observe the shear key within the meadows (circled pink) area, trial pits (approx locations circled yellow)within the future batter locations and future Stage 5 counterfort drain locations. Also completed flushing of remaining 3 x counterfort within Stage 6 (not circled red below).

Observed hardfill placed within the shear key to half height.
Trial pits within the batter area showed tuff at around 1.5m to 2m depth below the current surface levels. Discussed with Simon (Dines) that this is the layer which the batters should be founded.
Walked over the counterfort drain alignments. All drains were spaced at approximately 15m spacings.
Stage 6 counterforts all flushed, with clear water observed coming out of the outlet.




RET WALL 1
RET WALL 2
RET WALL 3
RET WALL 4
RET WALL 5
RET WALL 6
JOAL A
JOAL B
JOAL C
JOAL D
FILL N
63,200m3
CUT 6
5,800m
160m3
800m3
WDC WATER MAIN
2
DP 176205
1
DP 51064

15/02/22

Tuesday, 15 February 2022 3:46 pm

Site Inspection Record

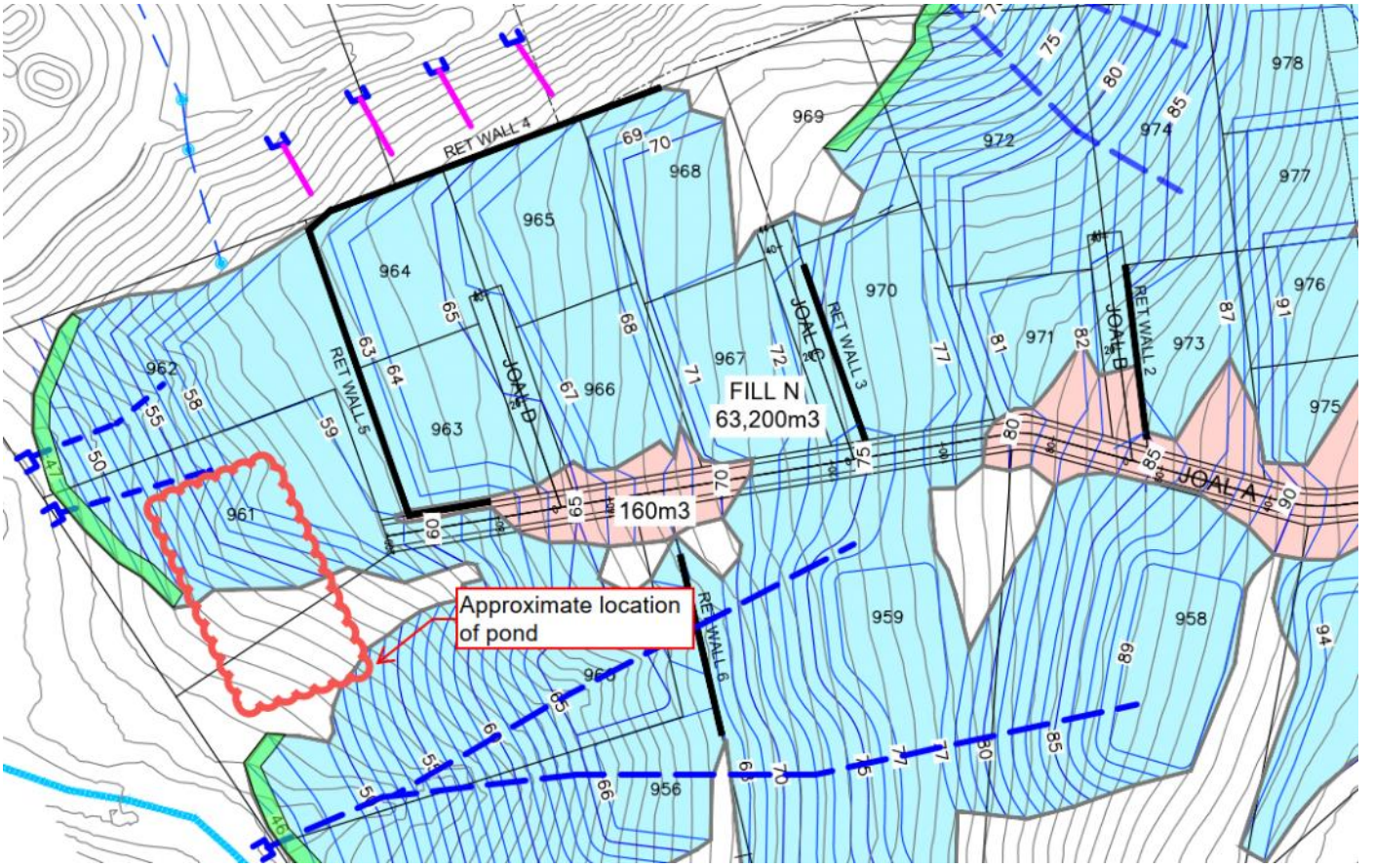
Project # & Name:	J00113 - Hitchen Block
Date & Time:	15/02/22 - 1:30PM
Author:	AT
Plant Operating:	
Weather:	Sun

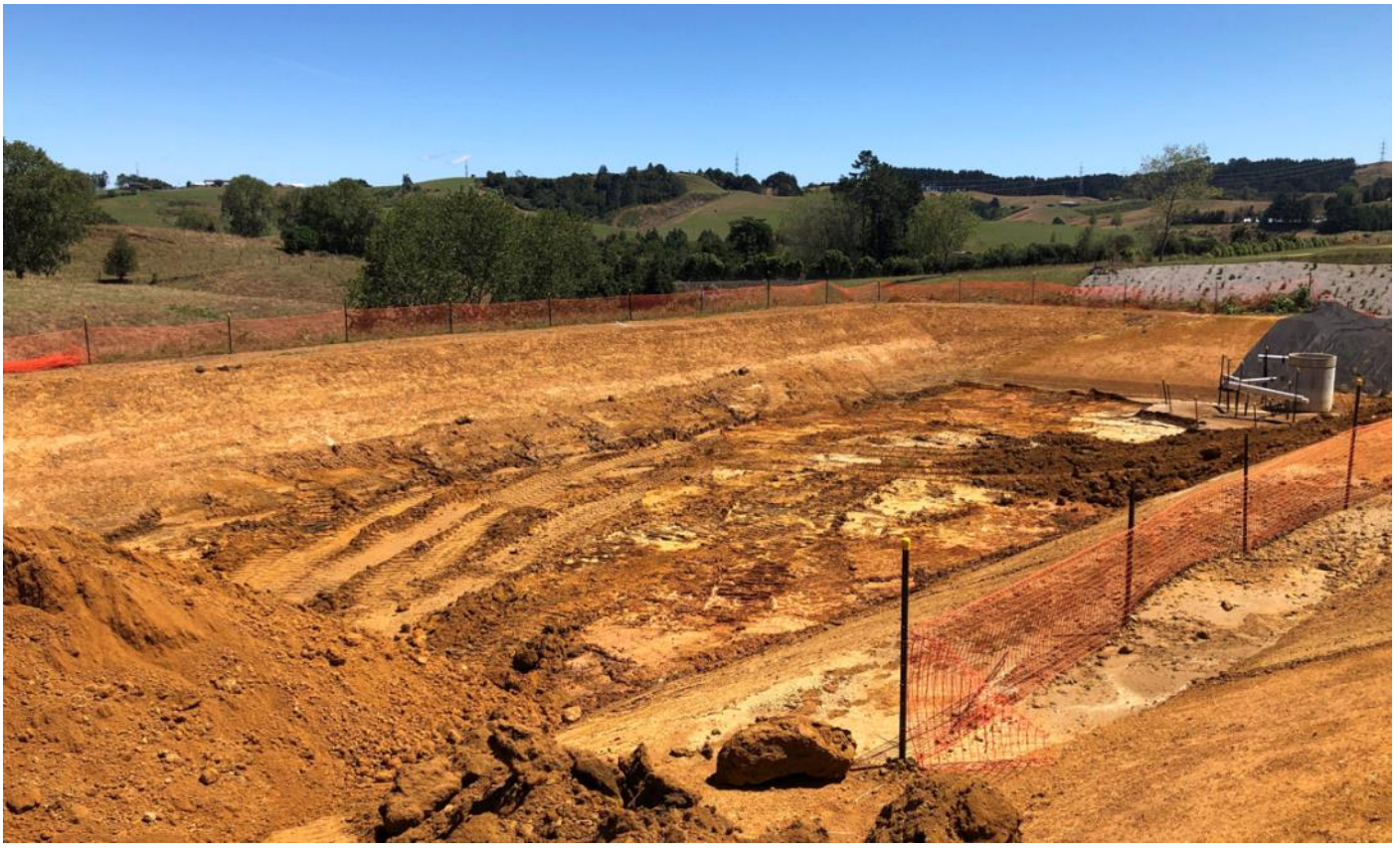
Site Observations and Instructions:

Attended site to inspect pond muck out (Circled red below).

- Base of pond consisted of natural, inorganic material.
- Shear strengths greater than 100 kPa
- Satisfactory to place fill
- Minor vegetation was noted on pond batters. Recommended to remove prior to fill.

Visual Inspection of meadows shear key construction. Hardfill at final height (observed being rolled). Drainage to be placed tomorrow.






HITACHI

16/02/22

Wednesday, 16 February 2022 3:59 pm

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	16/02/22 - 11AM
Author:	AT
Plant Operating:	
Weather:	Sun

Site Observations and Instructions:

Attended site with KM to inspect stage 17 shear key progress and counterfort drains 1-7 mark outs.

Inspected shear key collector drain (shown in images below). Drain is compliant with drainage detail. Spoke to contractor about achieving full coverage of drains by either overlaying an additional lift of aggregate or trenching into the existing level.

Inspected Counterfort drain mark outs. Compliant with 15m spacing detail. CFD5 course change detail marked out.


CF DRAIN

Site Inspection Record

Date:	16/03/2022	**Time:**	10AM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project Address:	Hitchen Block Stage 2, Pokeno		
Site Hazard Form Completed:	**Yes ☒** **No☐**	**Weather**	**Sun**

Inspection Notes:

Attended site to observe beginning of meadows shear key underfill drain trenching. Observed stripping of topsoil for Counterfort Drain 01. Drainage aggregate stockpiled near Counterfort Drains is SAP50.

Recommendations to Contractor:

NA

Site Photos:

Site Inspection Record

Date:	17/03/2022	**Time:**	1PM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project Address:	Hitchen Block Stage 2, Pokeno		
Site Hazard Form Completed:	**Yes ☒ No☐**	**Weather**	**Sun**

Inspection Notes:

Attended site to observe underfill drain excavations in stage 17.

- Drainage trenches have been excavated in accordance with the design discussed on 15/03/22.
- Connection points along rear shear key collector drain have been exposed.

Recommendations to Contractor:

N/A

Site Photos:

Site Inspection Record

Date:	18/03/2022	**Time:**	1PM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner, Kyle Meffan, Chris Edwards
Project Address:	Hitchen Block Stage 2, Pokeno		
Site Hazard Form Completed:	**Yes ☒ No☐**	**Weather**	**Overcast**

Inspection Notes:

Attended site with KM and CE for a site walkover.

- Observed construction of underfill drainage installation in stage 17 meadows.
- Observed collector drain outlet point from stage 17.
- Observed outlet drains on REB walls.
- Observed rain garden geotextile materials.

Recommendations to Contractor:

N/A

Site Photos:


CIRTEX
GAIN MORE GROUND
55861
PW-PROD/21/19068-1
56007
Roll Gross Weight:
1029kg
5m
Roll Length:
40m

Site Inspection Record

Date:	1/04/2022	**Time:**	11AM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project Address:	Hitchen Block Stage 2, Pokeno		
Site Hazard Form Completed:	**Yes ☒ No☐**	**Weather**	**Sun**

Inspection Notes:

Attended site to observe installation of underfill drains within stage 17.

- Upper bench underfill drain has been installed and backfilled.
- Lower bench underfill drain trench has been excavated and Geocloth has been laid along its extent.

Recommendations to Contractor:

N/A.

Site Photos:

Site Inspection Record

Date:	20/04/2022	**Time:**	11AM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project Address:	Hitchen Block Stage 2, Pokeno		
Site Hazard Form Completed:	**Yes ☒ No☐**	**Weather**	**Overcast / Showers**

Inspection Notes:

Attended site to observe construction of counterfort drains.

- Contractor advised that trench collapse was occurring once the trench reached 6 metres below existing ground level.
- Single 160mm nova coil placed in base of trench, backfilled with SAP50, compliant with design.
- Observed Stage 17 Meadows shear key completion. Underfill drainage has been backfilled and connected into collector drains.

Recommendations to Contractor:

Counterfort trench progress to be inspected frequently. Contractor advised that alternate excavation methodology (ie benching) may be required to address trench collapse issues.

Site Photos:

Site Inspection Record

Date:	21/04/2022	**Time:**	1PM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project Address:	Hitchen Block Stage 2, Pokeno		
Site Hazard Form Completed:	**Yes ☒** **No☐**	**BC Drawings on site and sighted:**	**Yes ☒** **No☐**

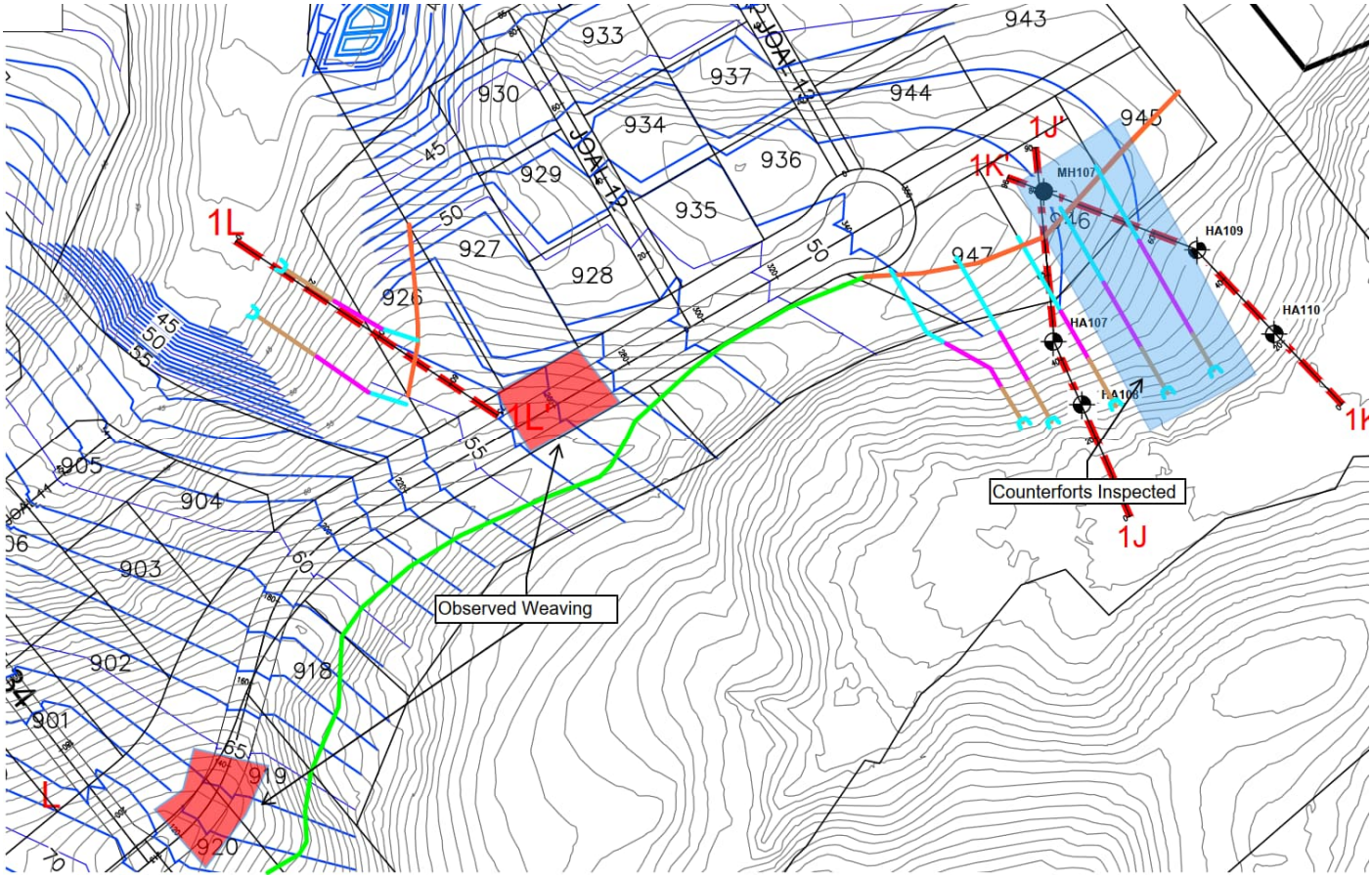
Inspection Notes:

Attended site to observe construction of counterfort drains highlighted in plan below. Additionally observed two areas of weaving along Road 30 with Ali (Dines).

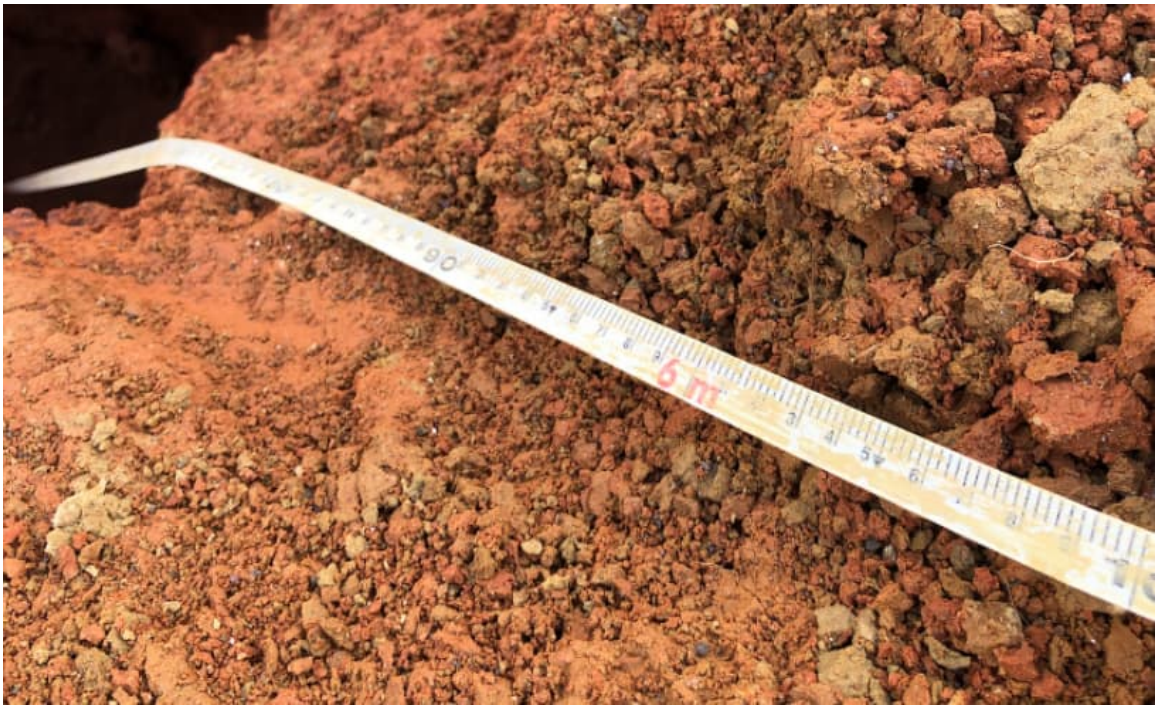
- Counterfort drains appear compliant with design.
- Two areas of weaving/soft material were observed between chainage 120-140, and 250-270. Test pits revealed very stiff, natural material at a depth of approximately 0.3m below current ground level. CAN to follow regarding remediation recommendations.

Recommendations to Contractor:

Counterforts to be inspected regularly until completed. CAN to follow regarding road subgrade.



Site Photos:



Site Inspection Record

Date:	26/04/2022	**Time:**	12PM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project Address:	Hitchen Block Stage 2, Pokeno		
Site Hazard Form Completed:	**Yes** ☒ **No**☐	**BC Drawings on site and sighted:**	**Yes** ☒ **No**☐

Inspection Notes:

Attended site to observe construction of counterfort drains. Construction appears to be compliant with design.

Recommendations to Contractor:

N/A.

Site Photos:

Site Inspection Record

Date:	28/04/2022	**Time:**	12PM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project Address:	Hitchen Block Stage 2, Pokeno		
Site Hazard Form Completed:	**Yes ☒ No☐**	**BC Drawings on site and sighted:**	**Yes ☒ No☐**

Inspection Notes:

Attended site to observe continuation of counterfort drain installation.

- Contractor advised that excavations were going well with no trench stability issues on the current trench.
- Contractor advised that additional scoria required for backfill is expected to be delivered to site in 5-7 days time.
- Observed topsoil being spread across stage 17 meadows.

Recommendations to Contractor:

N/A. Counterforts to be inspected once additional scoria is delivered.

Site Photos:


HITACHI

Site Inspection Record

Date:	10/05/2022	**Time:**	11AM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project Address:	Hitchen Block Stage 2, Pokeno		
Site Hazard Form Completed:	**Yes ☒ No☐**	**Weather**	**Overcast / Showers**

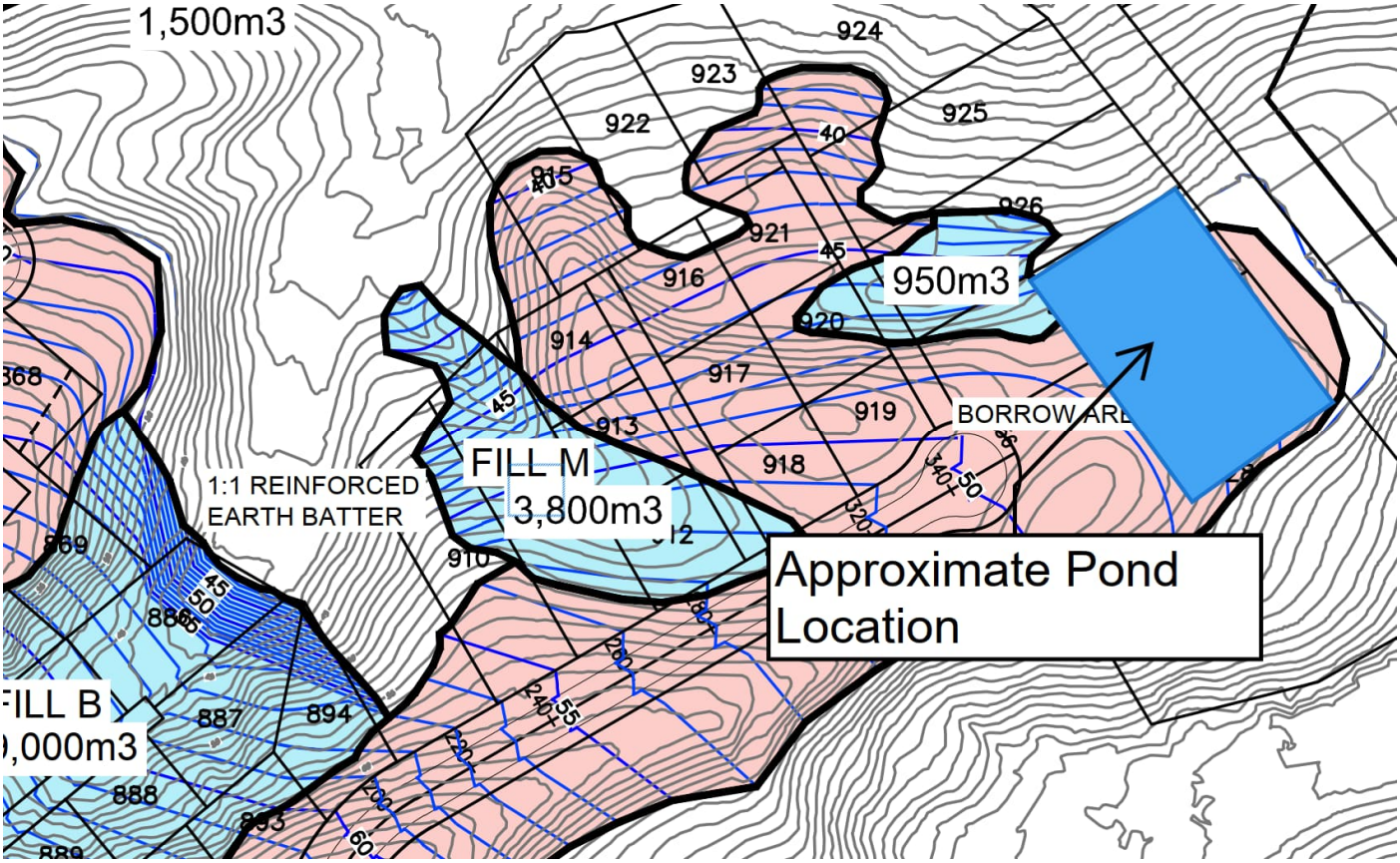
Inspection Notes:

Attended site to observe pond muck out highlighted in annotation below. Additionally observed construction of counterfort drains.

- Pond base comprised very stiff, inorganic, natural material, with the shear vane unable to penetrate across the base.
- Minor vegetation was observed on north-western batter.
- Counterforts 4 & 5 Intersection point observed.

Recommendations to Contractor:

Recommended to Contractor (Ali) to trim off vegetation on north-western batter. Otherwise, pond satisfactory for backfill.



Site Photos:

Site Inspection Record

Date:	23/05/2022	**Time:**	1PM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project Address:	Hitchen Block Stage 2, Pokeno		
Site Hazard Form Completed:	**Yes ☒ No☐**	**BC Drawings on site and sighted:**	**Yes ☒ No☐**

Inspection Notes:

Attended site with Kyle Meffan for a walkover to observe current state of works.

- Counterfort Drains 2-5 completed, counterfort drain 1 yet to be fully excavated.
- Observed topsoil spread over meadows area.

Site Photos:

Site Inspection Record

Date:	16/11/2022	**Time:**	2PM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project:	J00113 - Hitchen Block Stage 2, Pokeno		

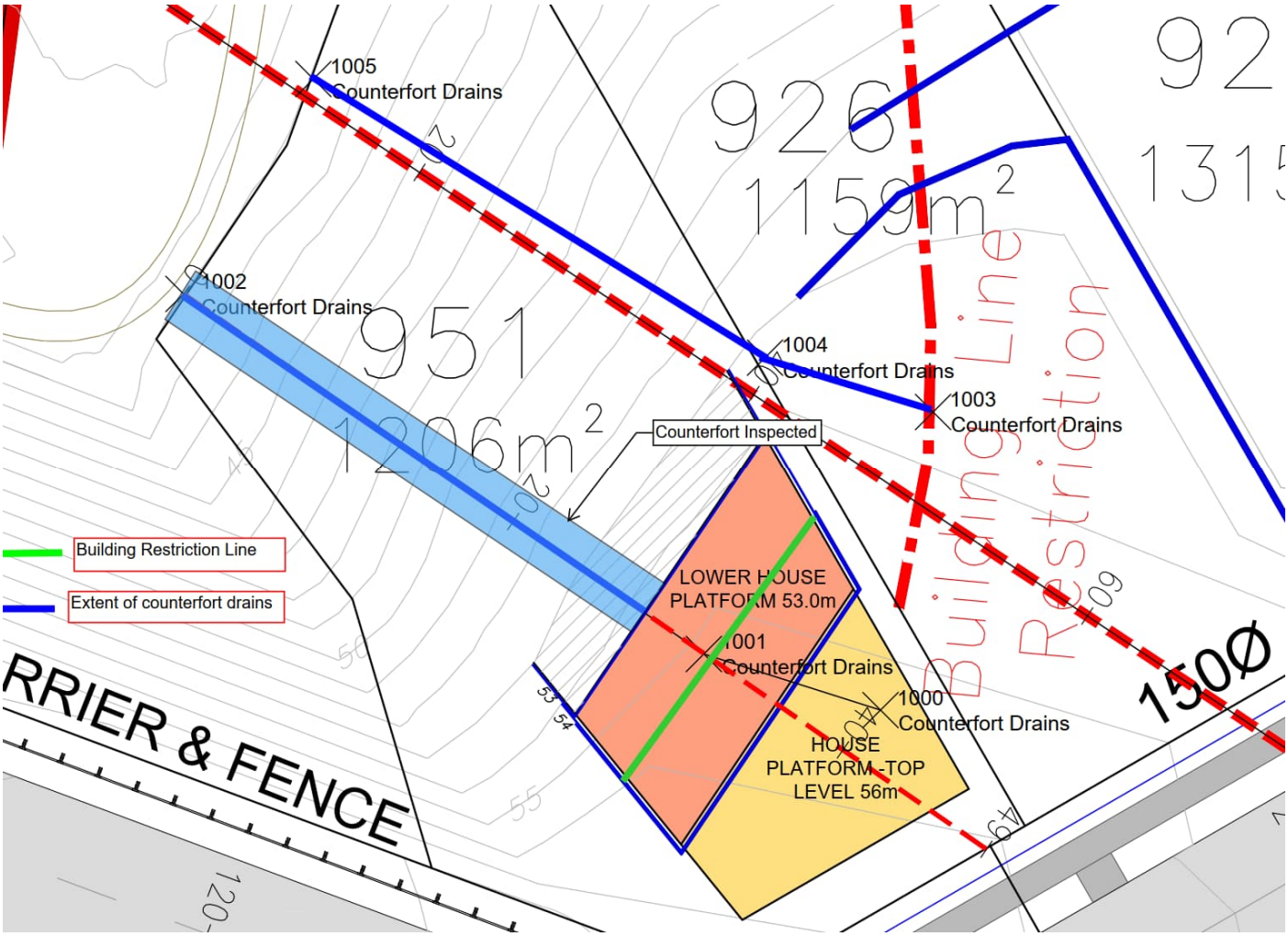
Inspection Notes:

Attended site to observe the counterfort drain installation within Lot 951 as highlighted in the site plan below.

- Counterfort drain was excavated to approximately chainage 35 (edge of lower house platform) with a maximum depth of 6 meters below cleared ground level.
- Discussed construction methodology with Dines and Kyle Meffan.
- Additionally inspected further sections of WWN1. Subgrade was very stiff, natural materials.
- Backfill of counterfort trench comprised SAP 50 Scoria.

Recommendations to Contractor:

Recommended that contractor should cut building platform and temporary batters first before continuing counterfort trenching to achieve the maximum counterfort depth beneath the building platform. Counterfort trench completed thus far in accordance with our design.




HITACHI
DINES
ZAXIS200Lc


HITACHI

Site Inspection Record

Date:	28/11/2022	**Time:**	9AM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner, Kyle Meffan
Project:	J00113 - Hitchen Block Stage 2, Pokeno		

Inspection Notes:

Attended site with Kyle Meffan for a walkover, details are as follows:

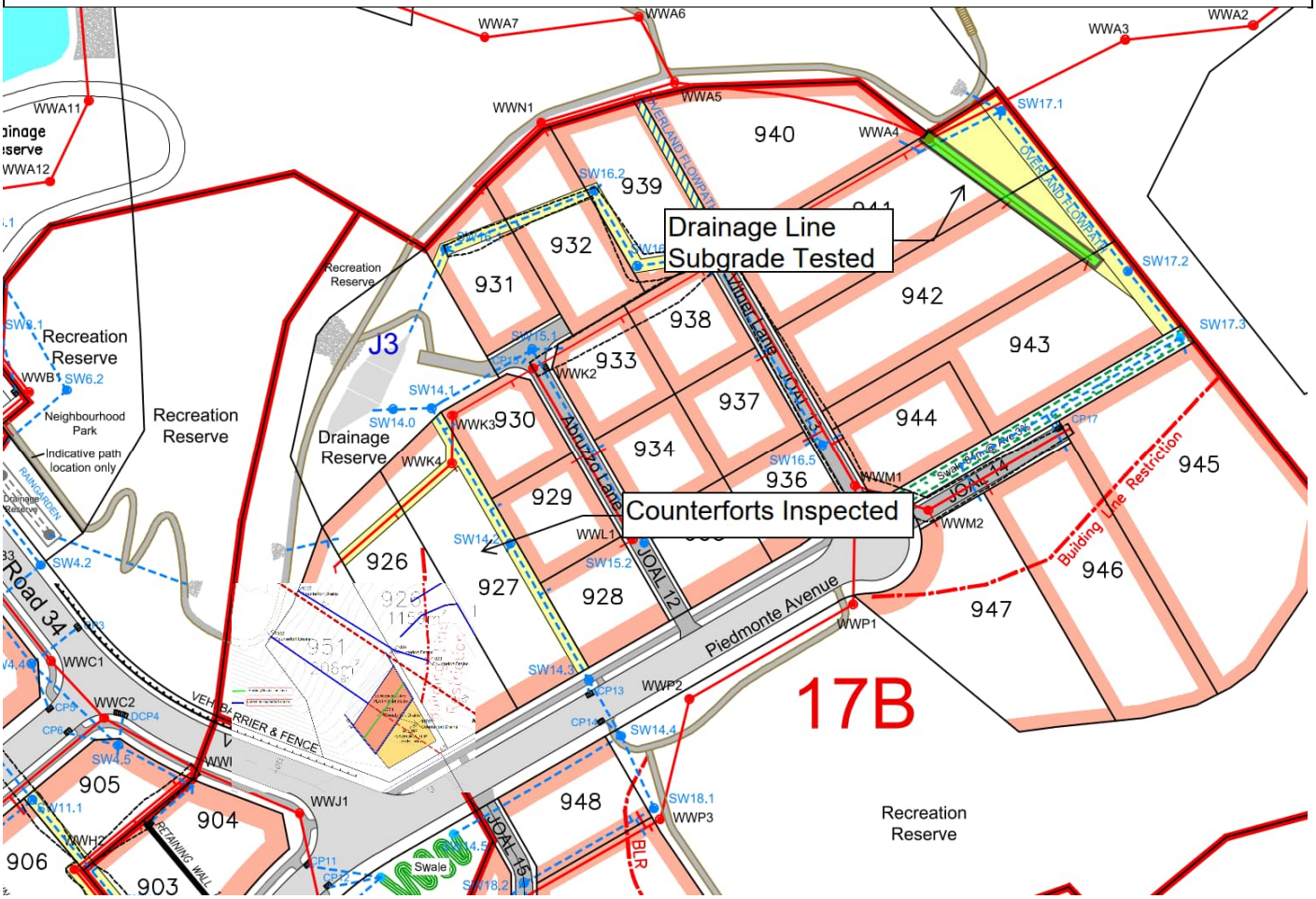
- REB 1 appears to have new vegetation growth within the face of the slope. Contractor advised that the face will be hydroseeded during the next fine weather window. They are aiming for today or tomorrow.
- Inspected the existing slip behind Lot 945. No additional movement appears to have happened since this was originally observed and assessed in September 2022. Groundwater was noted to be seeping from several points within the exposed transition materials.
- Contractor awaiting fine weather window to continue work on cutting the building platform within Lot 951.
- Inspected backfill along WWN1, which returned shear vanes in excess of 150kPa.
- Observed set out of 3x counterfort drains below Lot 925 with set out in accordance with our recommendations. Contractor advised a maximum distance between these drains of 7.5m applies at the upslope extent of the drains.

Site Inspection Record

Date:	6/12/2022	**Time:**	8AM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project:	J00113 - Hitchen Block Stage 2, Pokeno		

Inspection Notes:
Attended site to inspect the construction progression of the counterfort drain shown in the diagram below. Contractor additionally provided photos of section of counterfort drain not yet excavated during the time of our inspection. Additionally inspected the drainage line highlighted on the site plan below. - Counterfort inspected appear in accordance with our design detail. - Drainage line inspected comprised hard, inorganic, natural materials, with the shear vane unable to penetrate along the base of the trench. - Contractor advised that counterfort flushing will be completed once roading construction begins to allow for easy access for a water cart.

Recommendations to Contractor:
Counterfort construction in accordance with our design. Drainage line subgrade suitable for pipe placement.



Site Inspection Record

Date:	7/12/2022	**Time:**	4pm
LDE Project Ref:	J00113	**Inspected by:**	Chris Edwards
Project:	J00113 - Hitchen Block Stage 2, Pokeno		

Inspection Notes:

Attended site, details are as follows:

- REB 1 has been hydroseeded again. There has been some slumping beneath the matting again (but is minor visually).
- The side check dams appear ok, but there is erosion occurring along the edge of the matting where the water is getting beneath the matt. Need to fix this and plan out the sides in due course.
- Counterfort drains appear to be being installed. See photos.

Site Inspection Record

Date:	8/12/2022	**Time:**	10AM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project:	J00113 - Hitchen Block Stage 2, Pokeno		

Inspection Notes:

Attended site to inspect several items as listed below:

Counterfort Drain within Lot 926:

- Inspected current excavation progression for counterfort drain. Depth of drain was approximately 6 metres below cleared ground level. Contractor advised that the side walls of the trench were stiff, with no instability / failures during excavation progress. Drain appears in accordance with our design.

Drainage Line Subgrade and backfill:

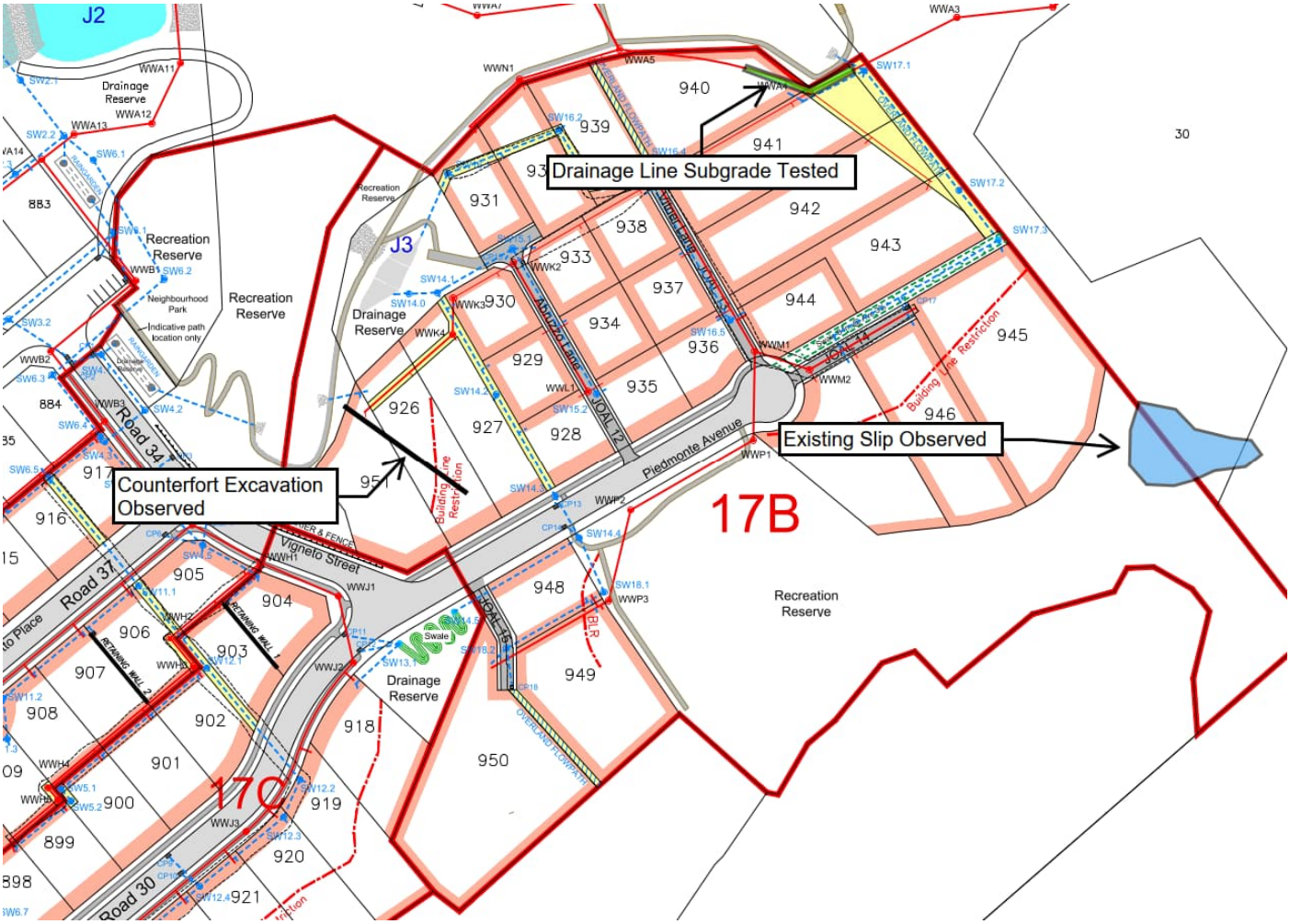
- Inspected drainage line surrounding WWA4. Subgrade within trench comprised very stiff, inorganic, natural materials. Backfill of other section of lines appeared very stiff to hard, with measured shear vanes in excess of 150kPa.

Existing Slip behind Lot 945:

- Slip behind Lot 945 appears to remain unchanged since our last inspection (28/11/22). Recommended to contractor to monitor the face for movement. Recommended to hold meeting between LDE and Dines to confirm remediation methodology during earthworks season.

REB1 Inspection

- Observed topsoil slumping beneath matting at base of REB. Inspection beneath matting revealed an area (roughly 2x2m in size) where recently placed topsoil has slipped, exposing the geogrid and fill behind. Recommended to contractor to bury long edge of check dam matting into the slope to prevent overland flows from eroding beneath the matting. Recommended to remediate topsoil slumping and re-hydroseed during the next fine weather window.



Site Inspection Record

Date:	13/12/2022	**Time:**	11AM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project:	J00113 - Hitchen Block Stage 2, Pokeno		

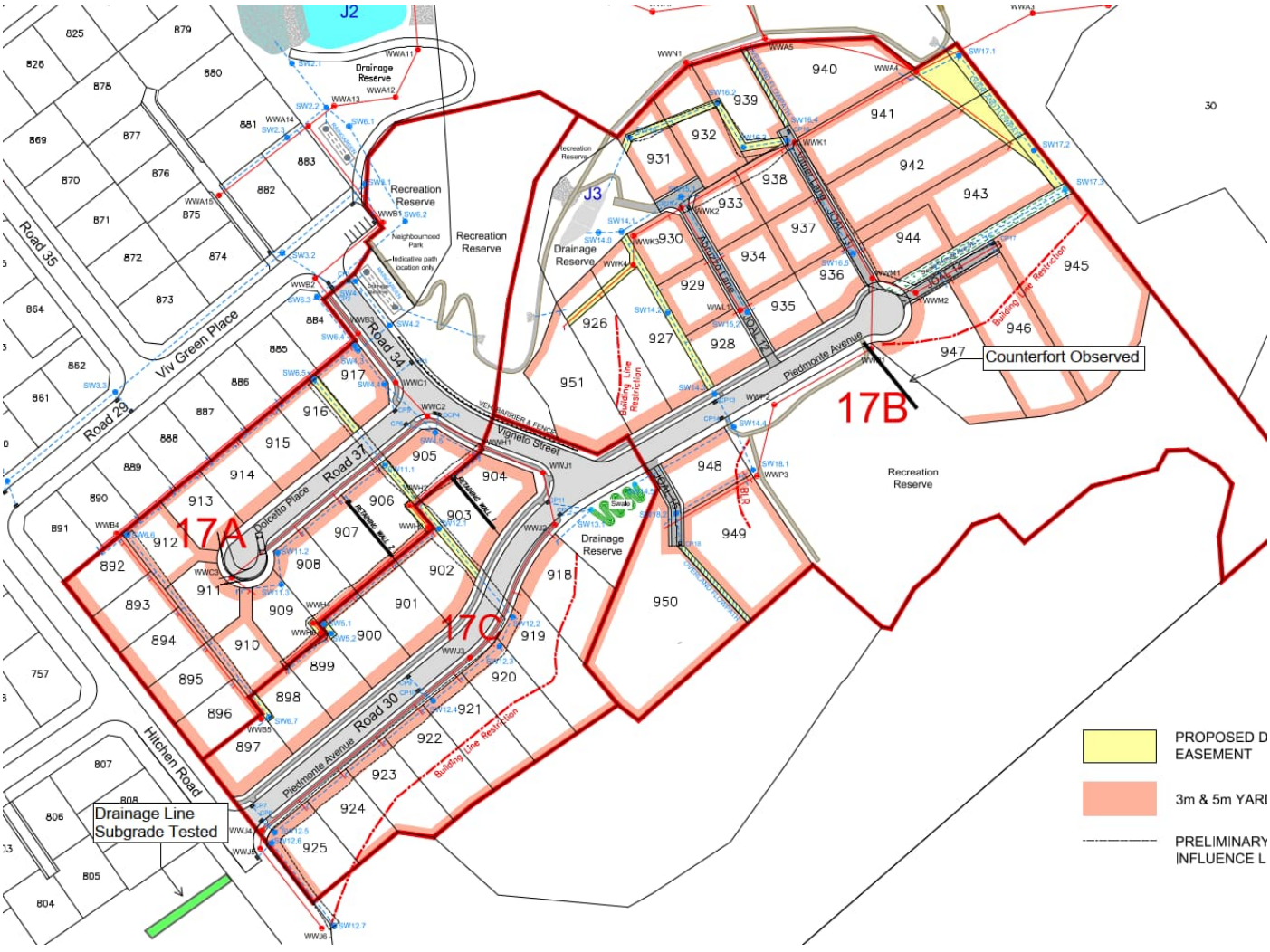
Inspection Notes:

Attended site to observe the continuation of the counterfort excavation as highlighted in the site plan below. Additionally inspected a section of Wastewater line 22 with Stage 18.

- Counterfort excavation was approximately 6 metres in depth, and was founded in natural materials. Drainage coil and backfill material in accordance with our design.
- Drainage line inspected was founded in very stiff, inorganic, natural materials with measured shear vanes in excess of 100kPa.

Recommendations to Contractor:

Counterfort in accordance with design. Drainage subgrade satisfactory for pipe placement.



Site Inspection Record

Date:	16/01/2023	**Time:**	10AM
LDE Project Ref:	J00113	**Inspected by:**	Alex Tanner
Project:	J00113 - Hitchen Block Stage 2, Pokeno		

Inspection Notes:
Attended site for a walkover with Kyle Meffan. - Observed that contractor has completed Counterfort Drain 8. Contractor to provide photos for us to review. - Observed that permanent outlets have not yet been formed for the counterfort drains, not solid pipes installed at the outlet position. Contractor advised these will be completed nearer to completion of the stage.

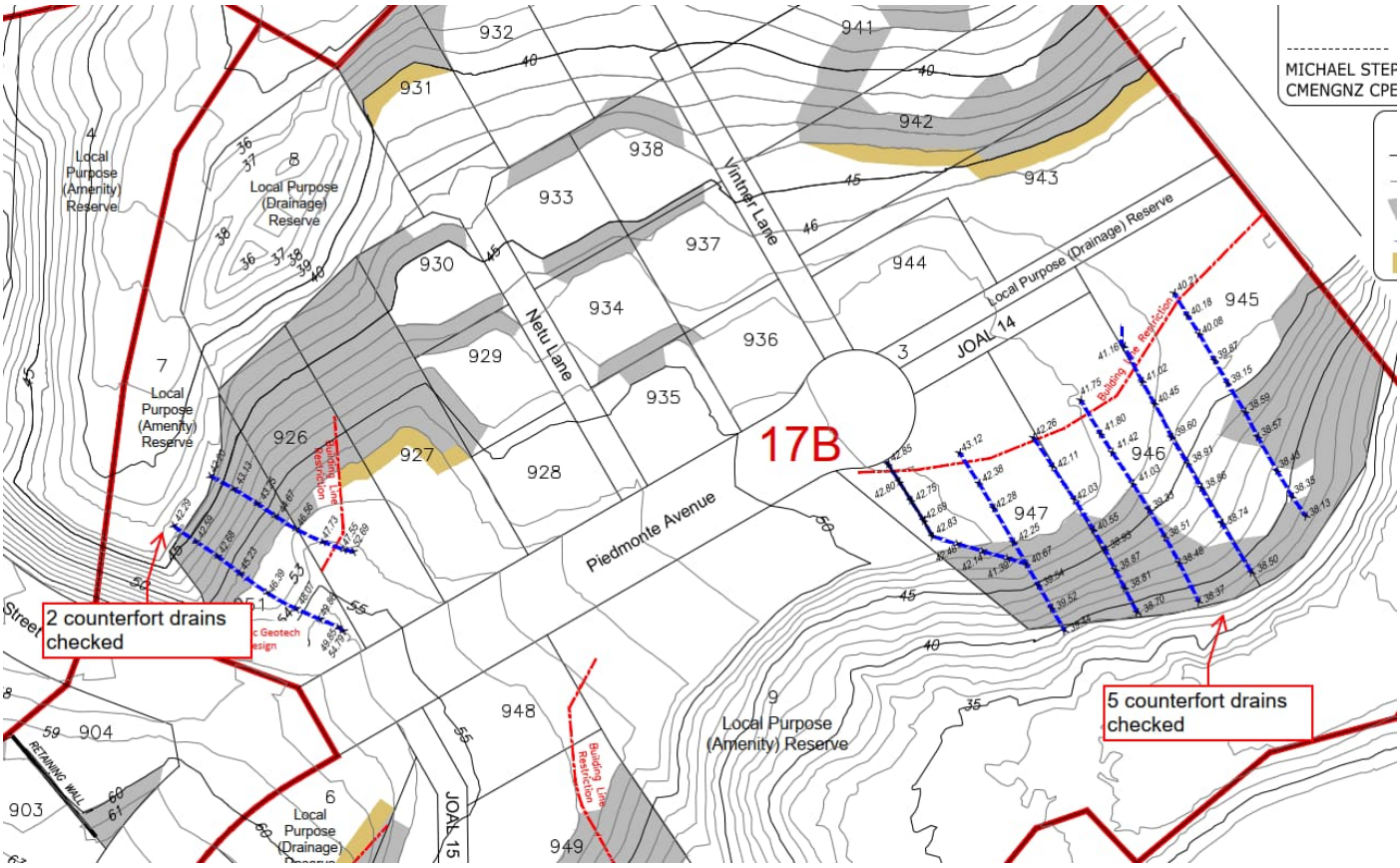
Site Inspection Record

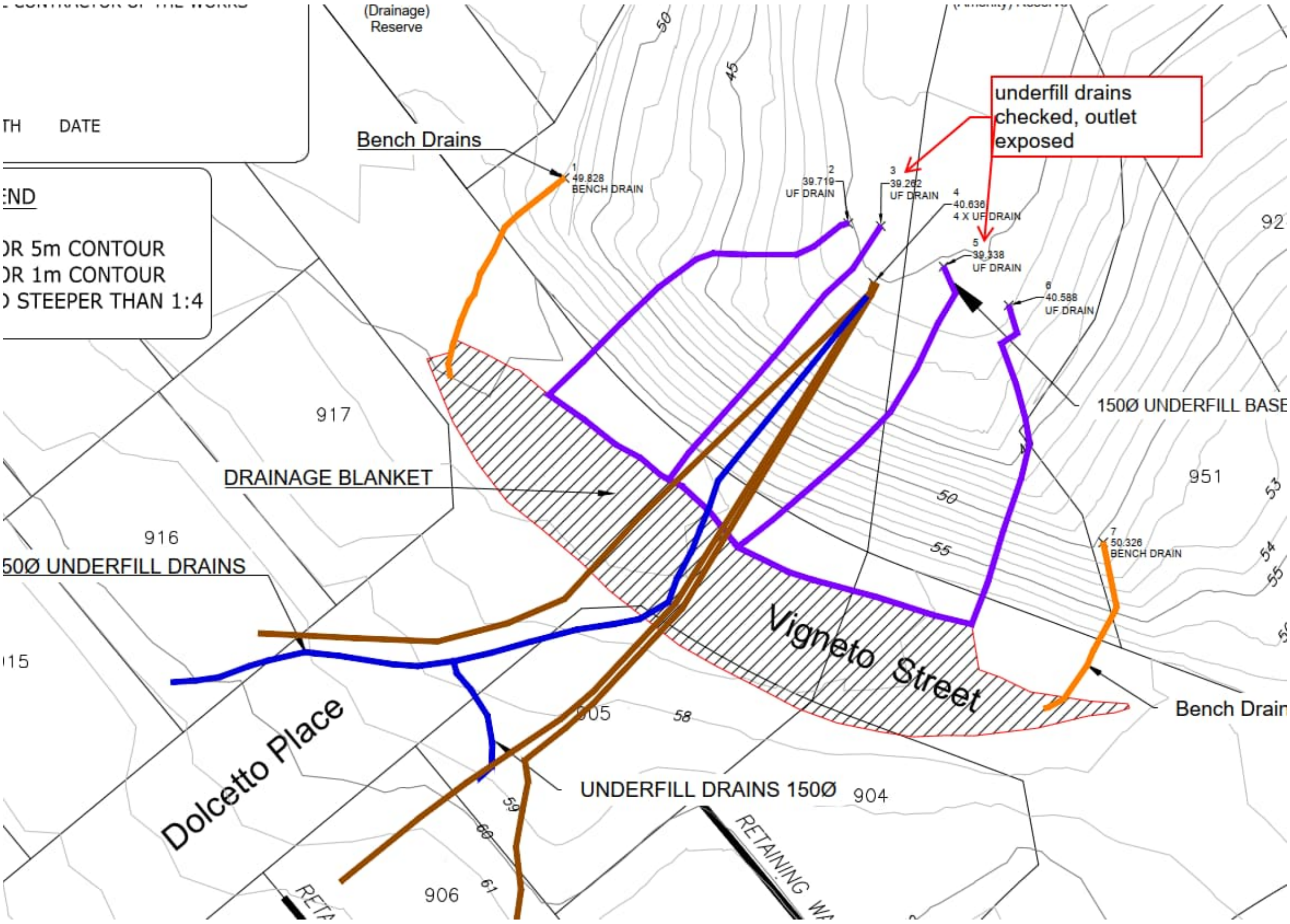
Date:	13/06/2023	**Time:**	10.30am
LDE Project Ref:	J00113	**Inspected by:**	Alan Huang
Project:	J00113 - Hitchen Block Stage 2, Pokeno		
Weather:	fine		
Contactor:	Dines		

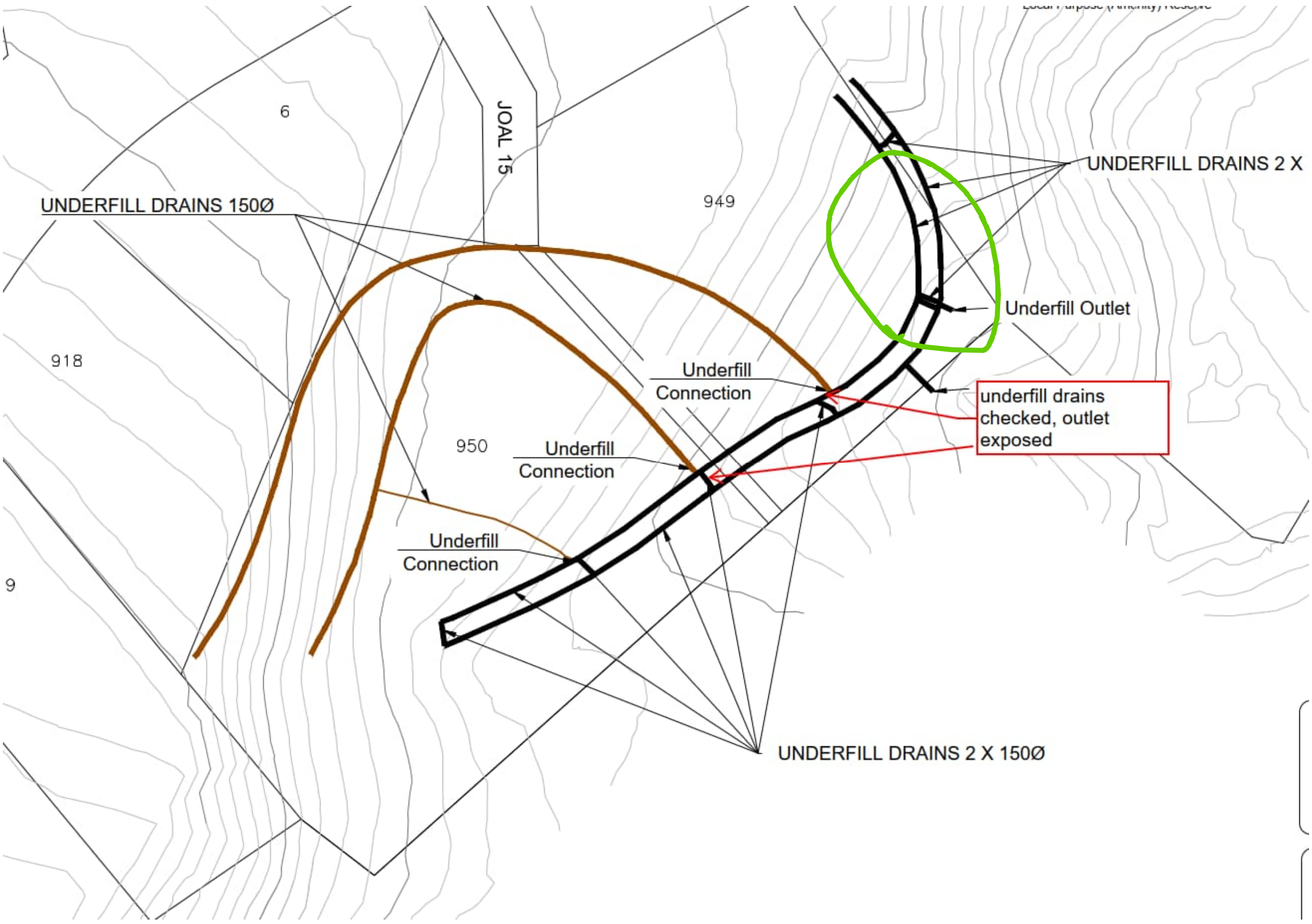
Inspection Notes:

Inspected 7 counterfort drains flushing at above site (refer to plan below).

- All counterfort drains function properly as per design. Water outlet observed at the end of the drains.
- Checked underfill drain at the toe of REB1, contractor exposed the outlets and cleared debris
- Checked underfill drain in lots 949 and 950, contractor exposed the outlets and placed boulders at the outlet.




(Drainage)
Reserve
DATE
Bench Drains
BENCH DRAIN
UF DRAIN
4 X UF DRAIN
underfill drains
checked, outlet
exposed
5m CONTOUR
1m CONTOUR
STEEPER THAN 1:4
917
DRAINAGE BLANKET
916
150Ø UNDERFILL BASE
951
Vigneto Street
Dolcetto Place
UNDERFILL DRAINS 150Ø
904
906
Bench Drain


6
JOAL 15
949
UNDERFILL DRAINS 150Ø
UNDERFILL DRAINS 2 X
918
Underfill Outlet
Underfill
Connection
950
Underfill
Connection
underfill drains
checked, outlet
exposed
Underfill
Connection
UNDERFILL DRAINS 2 X 150Ø

The 5 counterdrain fort drains along lots 945-947

2 counterfort drains adjacent to lot 926

Contractor exposed underfill drain (toe of REB1) that was previously covered in vege mat

Underfill drain outlets at Lot 950 and 949

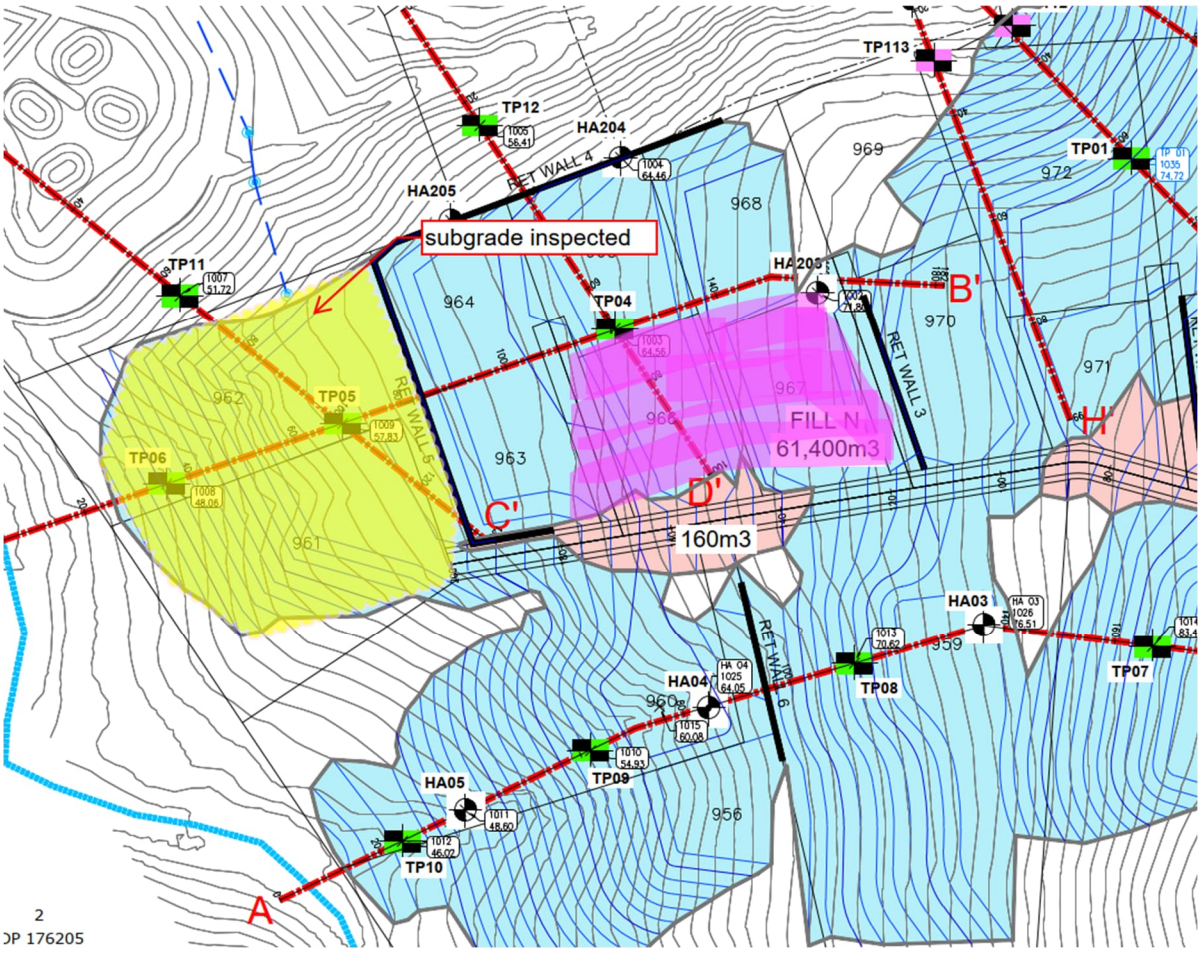
Site Inspection Record

Date:	24/10/2024	**Time:**	10am
LDE Project Ref:	J00113	**Inspected by:**	Alan Huang
Project:	J00113 - Hitchen Block Stage 2, Pokeno		
Weather:	fine		
Contactor:	Dines		

Inspection Notes:

Visited site to inspect subgrade prior to fill placement and topsoil placement.

- Area highlighted in pink:
  - Ground revealed engineered fill. Contractor noted this area is near finished level and will be ready for topsoil placement once the minor trimming is completed. We consider the ground conditions are suitable for topsoil placement.
- Area highlighted in yellow:
  - Contractor has placed clay fill prior to our stripped subgrade inspection.
  - Several shallow hand augers were conducted, the ground revealed 400-500mm of clay fill and competent natural ground is found below.
  - Shear vane readings within the natural ground were in excess of 100kPa.
  - We consider the clay fill is suitable to remain. Recommended the contractor to contact us prior to bulk filling.



Subgrade near finished level

Clay fill area

Contractor provided photos: prior to filling

Site Inspection Record

Date:	6/11/2024	**Time:**	
LDE Project Ref:	J00113	**Inspected by:**	Alan Huang
Project:	J00113 - Hitchen Block Stage 2, Pokeno		
Weather:	fine		
Contactor:	Dines		

Inspection Notes:

Visited site as requested by Cole (Dines) to inspect finished subgrade ground conditions and discuss about future work areas (circled in red on below plan).

- Finished subgrade
  - Ground revealed engineered fill. Shear vane readings were mostly in excess of 200+kPa or UTP. Contractor noted they are planning to place minor fill to shape and extend the batter. We understand it will be less than 600mm high and consider the ground is suitable to place fill upon.
- Proposed earthwork areas (circled in red on below plan)
  - Contractor noted they have excess fill and propose to lose the fill in these areas.
  - The site profile is steep (greater than 1v in 4h), we requested the contractor to provide the proposed long section of the area for our stability check.
  - Update 8 Nov 24: Contractor noted they do not plan to open up the area at this stage. The only filling involved will be within the area circled in blue. This is to make the ground level with the adjacent area. The fill depth is no more than 300mm. We consider this area is appropriate to place fill upon.

Finished subgrade

Proposed earthwork areas:

Area 1 – up to 300mm of fill proposed to be placed in this corner, we consider is it appropriate.

Area 2 – contractor put the work on hold.

Site Inspection Record

Date:	12/11/2024	**Time:**	1pm
LDE Project Ref:	J00113	**Inspected by:**	Kyle Meffan
Project:	J00113 - Hitchen Block Stage 2, Pokeno		

Inspection Notes:

- Inspected fills being placed in the lower portions of Stage 18 where a permanent bund in being formed.
- Fill compaction and contractors operations appear suitable. Contractor advised that fills have been benched in and some of the batter will be trimmed back to final proposed grade.
- Requested compaction control testing be completed on the existing surface and also on the finished bund once formed.

Site Inspection Record

Date:	31/01/2025	**Time:**	10:20AM
LDE Project Ref:	J00113	**Inspected by:**	Marina Houston
Project:	J00113 - Hitchen Block Stage 2, Pokeno		
Weather:	Fine, sunny		
Contractor:	Dines / ICB		

Inspection Notes:

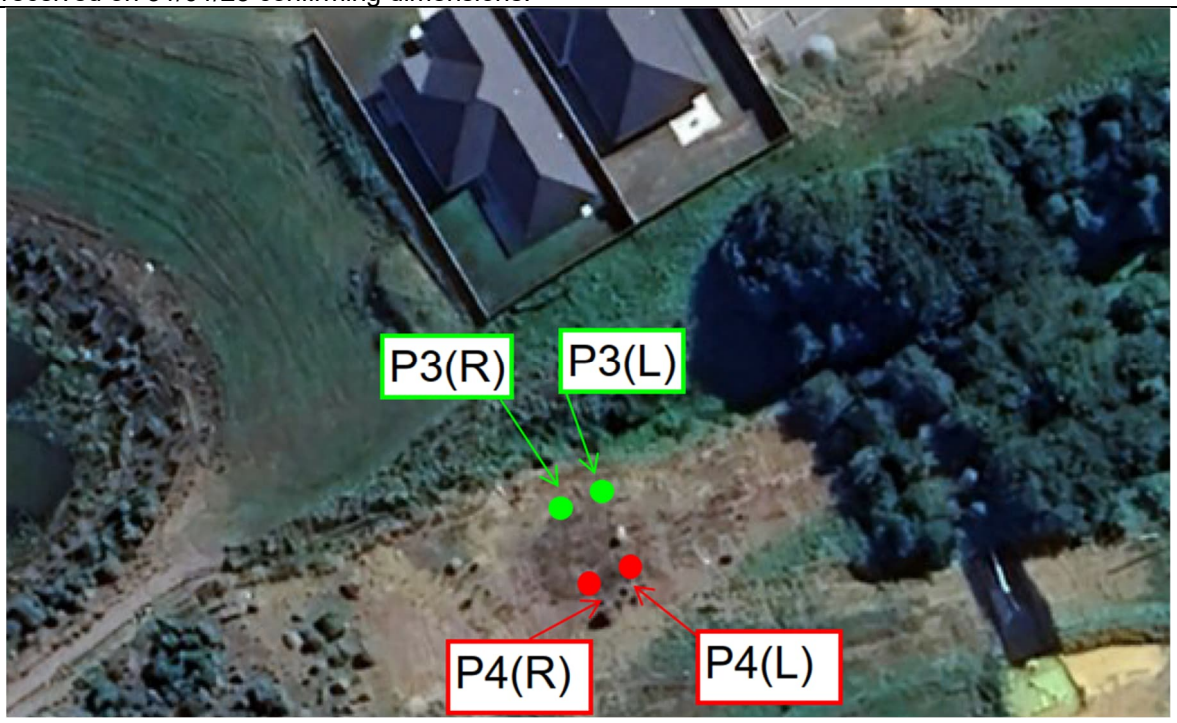
Visited the site at the request of the contractor to inspect two sets of pipe bridging pile holes (approx. locations marked up in green and red in inset below).

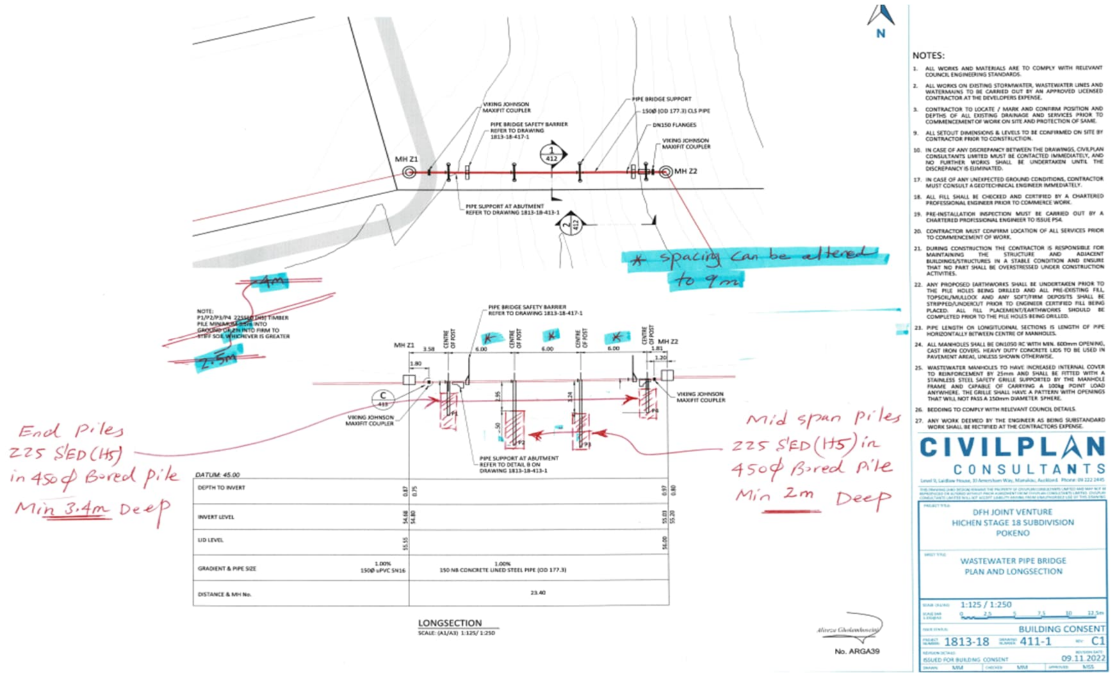
Our observations follow:

- The spoil observed and ground within the pile holes confirmed the presence of natural volcanic ash and weathered tuff deposits. The ground comprised of hard brown/orange and grey clayey silts and sandy silts with traces of gravel consistent with ash to approximately 1.5m to 2.0m depth and transitioned to sandy silt with trace fine gravel consistent with tuff deposits to the end of the hole. The contractor advised that during drilling, the ground generally became harder at approx. 1.5m depth, continuing to the bottom of the holes and this was confirmed with spoil observed from the base of pile hole 'P4(L)'. The shear vane was unable to penetrate the base of sides of the holes (UTP).
- Pile holes were drilled using a 450mm auger and pile holes were approx. 500mm dia.
- The P3 pile holes were between 2.1m and 2.2m depth with a centre to centre span of approx. 1.6m
- The P4(L) pile hole was measured at 3.4m depth.
- Due to machinery break down, P4(R) was partially drilled to approx. 1m depth. Centre to centre span was approx. 1.6m
- Contractor requested inspection for the remaining pile holes on other side of gully on Monday.

Recommendation to contractor:

- Ground conditions are satisfactory.
- Advised contractor (ICB) to send photo of pile hole P3(R) confirming depth when drilled is completed. Photo received on 31/01/25 confirming dimensions.




N
NOTES:
1. ALL WORKS AND MATERIALS ARE TO COMPLY WITH RELEVANT COUNCIL ENGINEERING STANDARDS.
2. ALL WORKS ON EXISTING STORMWATER, WASTEWATER LINES AND WATERMAINS TO BE CARRIED OUT BY AN APPROVED LICENSED CONTRACTOR AT THE DEVELOPERS EXPENSE.
3. CONTRACTOR TO LOCATE / MARK AND CONFIRM POSITION AND DEPTHS OF ALL EXISTING DRAINAGE AND SERVICES PRIOR TO COMMENCEMENT OF WORK ON SITE AND PROTECTION OF SAME.
9. ALL SETOUT DIMENSIONS & LEVELS TO BE CONFIRMED ON SITE BY CONTRACTOR PRIOR TO CONSTRUCTION.
10. IN CASE OF ANY DISCREPANCY BETWEEN THE DRAWINGS, CIVILPLAN CONSULTANTS LIMITED MUST BE CONTACTED IMMEDIATELY, AND NO FURTHER WORKS SHALL BE UNDERTAKEN UNTIL THE DISCREPANCY IS ELIMINATED.
17. IN CASE OF ANY UNEXPECTED GROUND CONDITIONS, CONTRACTOR MUST CONSULT A GEOTECHNICAL ENGINEER IMMEDIATELY.
18. ALL FILL SHALL BE CHECKED AND CERTIFIED BY A CHARTERED PROFESSIONAL ENGINEER PRIOR TO COMMERCE WORK.
19. PRE-INSTALLATION INSPECTION MUST BE CARRIED OUT BY A CHARTERED PROFESSIONAL ENGINEER TO ISSUE PS4.
20. CONTRACTOR MUST CONFIRM LOCATION OF ALL SERVICES PRIOR TO COMMENCEMENT OF WORK.
21. DURING CONSTRUCTION THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING THE STRUCTURE AND ADJACENT BUILDINGS/STRUCTURES IN A STABLE CONDITION AND ENSURE THAT NO PART SHALL BE OVERSTRESSED UNDER CONSTRUCTION ACTIVITIES.
22. ANY PROPOSED EARTHWORKS SHALL BE UNDERTAKEN PRIOR TO THE PILE HOLES BEING DRILLED AND ALL PRE-EXISTING FILL, TOPSOIL/MULLOCK AND ANY SOFT/FIRM DEPOSITS SHALL BE STRIPPED/UNDERCUT PRIOR TO ENGINEER CERTIFIED FILL BEING PLACED. ALL FILL PLACEMENT/EARTHWORKS SHOULD BE COMPLETED PRIOR TO THE PILE HOLES BEING DRILLED.
23. PIPE LENGTH ON LONGITUDINAL SECTIONS IS LENGTH OF PIPE HORIZONTALLY BETWEEN CENTRE OF MANHOLES.
24. ALL MANHOLES SHALL BE DN1050 RC WITH MIN. 600mm OPENING, CAST IRON COVERS. HEAVY DUTY CONCRETE LIDS TO BE USED IN PAVEMENT AREAS, UNLESS SHOWN OTHERWISE.
25. WASTEWATER MANHOLES TO HAVE INCREASED INTERNAL COVER TO REINFORCEMENT BY 25mm AND SHALL BE FITTED WITH A STAINLESS STEEL SAFETY GRILLE SUPPORTED BY THE MANHOLE FRAME AND CAPABLE OF CARRYING A 100kg POINT LOAD ANYWHERE. THE GRILLE SHALL HAVE A PATTERN WITH OPENINGS THAT WILL NOT PASS A 150mm DIAMETER SPHERE.
26. BEDDING TO COMPLY WITH RELEVANT COUNCIL DETAILS.
27. ANY WORK DEEMED BY THE ENGINEER AS BEING SUBSTANDARD WORK SHALL BE RECTIFIED AT THE CONTRACTORS EXPENSE.
VIKING JOHNSON MAXIFIT COUPLER
PIPE BRIDGE SAFETY BARRIER REFER TO DRAWING 1813-18-417-1
PIPE BRIDGE SUPPORT
150Ø (OD 177.3) CL5 PIPE
DN150 FLANGES
VIKING JOHNSON MAXIFIT COUPLER
MH Z1
MH Z2
PIPE SUPPORT AT ABUTMENT REFER TO DRAWING 1813-18-413-1
* spacing can be altered to 9m
4m
2.5m
PIPE SUPPORT AT ABUTMENT REFER TO DETAIL B ON DRAWING 1813-18-413-1
VIKING JOHNSON MAXIFIT COUPLER
End Piles 225 S'ED (H5) in 450φ Bored Pile Min 3.4m Deep
Mid span piles 225 S'ED (H5) in 450φ Bored Pile Min 2m Deep
DATUM: 45.00
DEPTH TO INVERT
INVERT LEVEL
LID LEVEL
GRADIENT & PIPE SIZE
1.00% 150Ø uPVC SN16
1.00% 150 NB CONCRETE LINED STEEL PIPE (OD 177.3)
DISTANCE & MH No.
23.40
LONGSECTION
SCALE: (A1/A3) 1:125/ 1:250
No. ARGA39
CIVILPLAN CONSULTANTS
DFH JOINT VENTURE
HICHEN STAGE 18 SUBDIVISION
POKENO
WASTEWATER PIPE BRIDGE
PLAN AND LONGSECTION
1:125 / 1:250
BUILDING CONSENT
1813-18
411-1
C1
ISSUED FOR BUILDING CONSENT
09.11.2022

Photos below received from contractor confirming pile hole depth and dimensions (31/01/2025):

LDE
engineers • scientists

Site Inspection Record

Date:	03/02/2025	**Time:**	10:00AM
LDE Project Ref:	J00113	**Inspected by:**	Marina Houston
Project:	J00113 - Hitchen Block Stage 2, Pokeno		
Weather:	Fine		
Contractor:	Dines / ICB		

Inspection Notes:

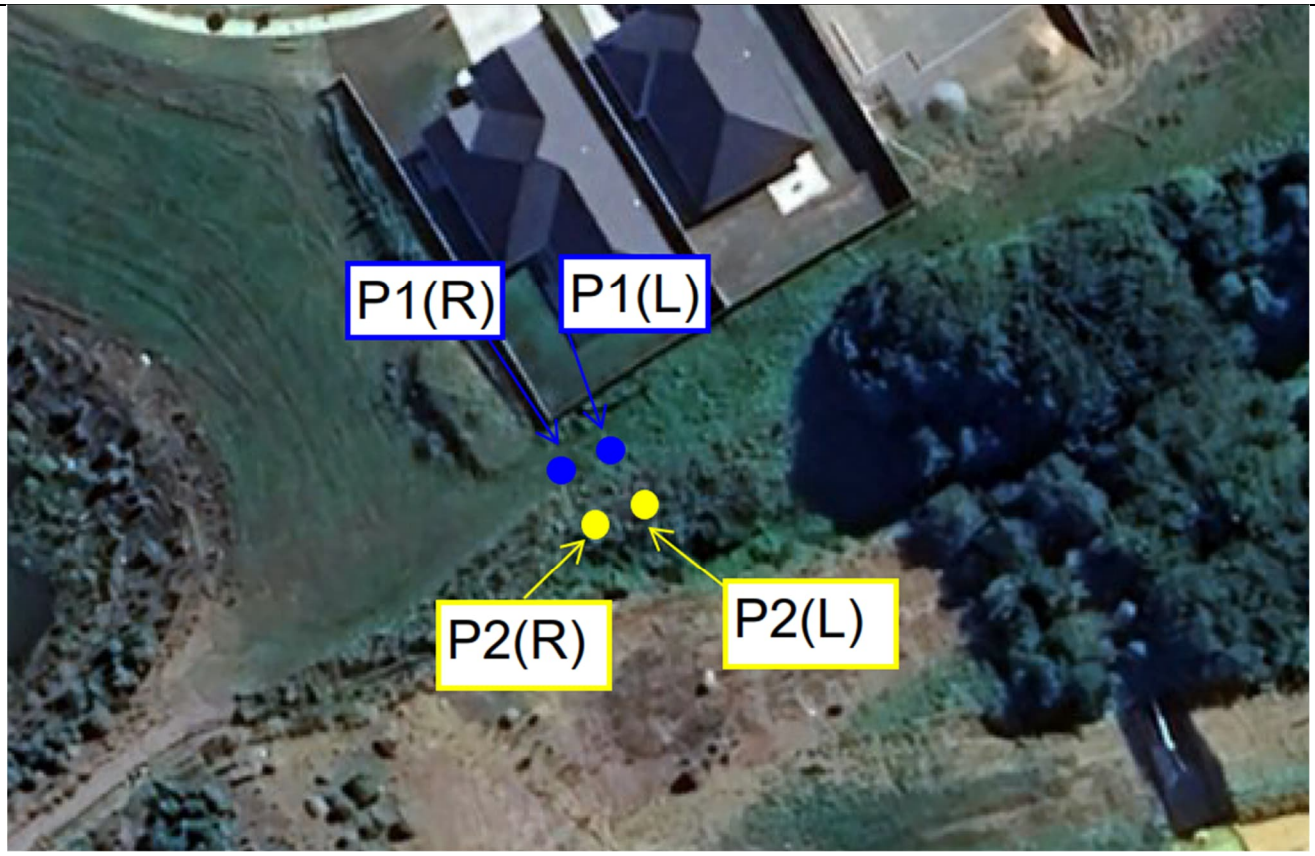
Visited the site at the request of Dines to inspect ground conditions in pipe bridging pile holes (approx. locations marked up in blue and yellow in inset below).

Our observations follow:

- Only P1 (blue) pile holes were inspected.
- The ground within the pile holes confirmed the presence of natural volcanic ash and weathered tuff deposits. The ground comprised of 200mm to 300mm topsoil overlying hard brown/orange clay clayey silts consistent with ash to approx. 1.5m depth and this was underlain by brown/grey sandy silts with traces of fine gravel fragments consistent with weathered tuff deposits. The shear vane was unable to penetrate the sides and base of the holes (UTP).
- Pile holes were drilled using a 450mm auger and pile holes were approx. 500mm dia.
- The pile holes were between 3.6 and 3.7m deep with a centre to centre span of approx. 1.6m.
- Minor spoil was seen at the base of the holes. Contractor advised to remove spoil prior to pouring concrete.
- On site, Ali (structural engineer) advised P2 (yellow) piles to be drilled at least another 2m depth, currently approx. 2m depth. Zeph (Dines) confirmed that these pile holes would be drilled an additional 3m depth and inspection required at 12:30PM.

Recommendations to contractor:

- Ground conditions are satisfactory, providing spoil is removed from base of holes.



Site Inspection Record

Date:	03/02/2025	**Time:**	12:30PM
LDE Project Ref:	J00113	**Inspected by:**	Marina Houston
Project:	J00113 - Hitchen Block Stage 2, Pokeno		
Weather:	Overcast		
Contactor:	Dines / ICB		

Inspection Notes:

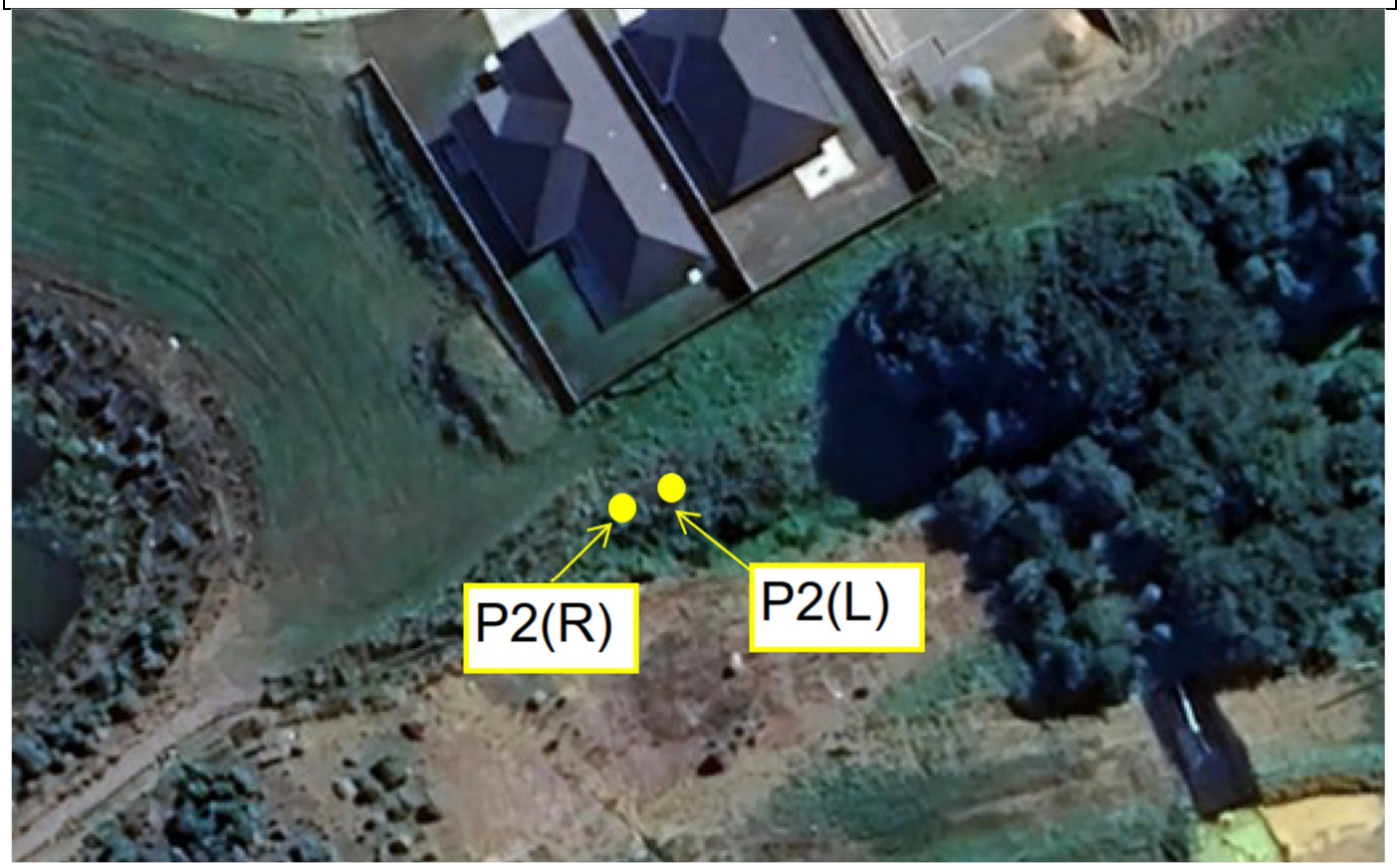
Visited the site at the request of Dines to inspect ground conditions in pipe bridging pile holes (approx. locations marked in yellow in inset below).

Our observations follow:

- Only P2 pile holes were inspected.
- The ground within the pile holes and observations of spoil confirmed the presence of natural volcanic ash and weathered tuff deposits. The ground comprised of 200mm to 300mm topsoil overlying hard brown/orange clay clayey silts consistent with ash to approx. 1.5m depth and this was underlain by grey/brown sandy silts with traces of fine gravel fragments consistent with weathered tuff deposits. The shear vane was unable to penetrate the sides and base of the holes (UTP).
- Pile holes were drilled using a 450mm auger and pile holes were approx. 500mm dia.
- The pile holes were between 5.1 and 5.4m deep with a centre to centre span of approx. 1.6m.
- Minor water had pooled at the base of the holes. Contractor advised to pump out prior to pouring concrete.

Recommendations to contractor:

- Ground conditions are satisfactory.



Kyle Meffan

From: Kyle Meffan
Sent: Tuesday, 27 May 2025 11:51 am
To: Russell Parkinson; Zeph Patterson
Subject: Stages 18 and 19 - outstanding GCR items
Attachments: Page 105 from J00113-GEO-Assessment Report-Stage 6 Earthworks {2} Stage 18 Civils-260663 (ID 260663).pdf

Hi Russell and Zeph,

We attended site last week to walk over Stages 18 and 19 and have the following items to discuss with you across these stages. Please let us know your comments once you have reviewed.

Stockpiles:

There are various stockpiles present in Stage 19 and we will just need to sight the area once those are removed in due course.

Drain outlets:

There should be some underfill drain outlets in Stage 18, however, we could not site these (approximately as per the attached plan; dashed blue lines). We also observed the counterfort drain outlets which look in good condition. We recommend the following, for discussion with you:

- Can you please check your as-built records to see if there are as-builts for the drains shown on the attached plan? We have only sighted the outlets for the counterfort drains.

- Underfill drain outlets should be exposed so we can site these and confirm they are suitable prior to geotechnical sign-off.

- We also recommend some large rocks be placed below the outlets to the counterfort drains to avoid any scour that may develop here (similar to what was done in Stage 17). An example of where these would go is outlined in red below – just below the pipe outlet.

Slope gradients:

Below the topsoil bund in Stage 18 there is a vertical face of soil that looks to be held up with a silt fence currently (just below the red line shown below, near the farm fence). This should be trimmed back to the design gradient if possible to avoid long-term failure?

There is also a section of slope above this which appears to be steeper than 1(v) in 3(h) – marked in green below. We will check this as part of our slope stability verification, but just wanted to double check this was the proposed profile through this area?

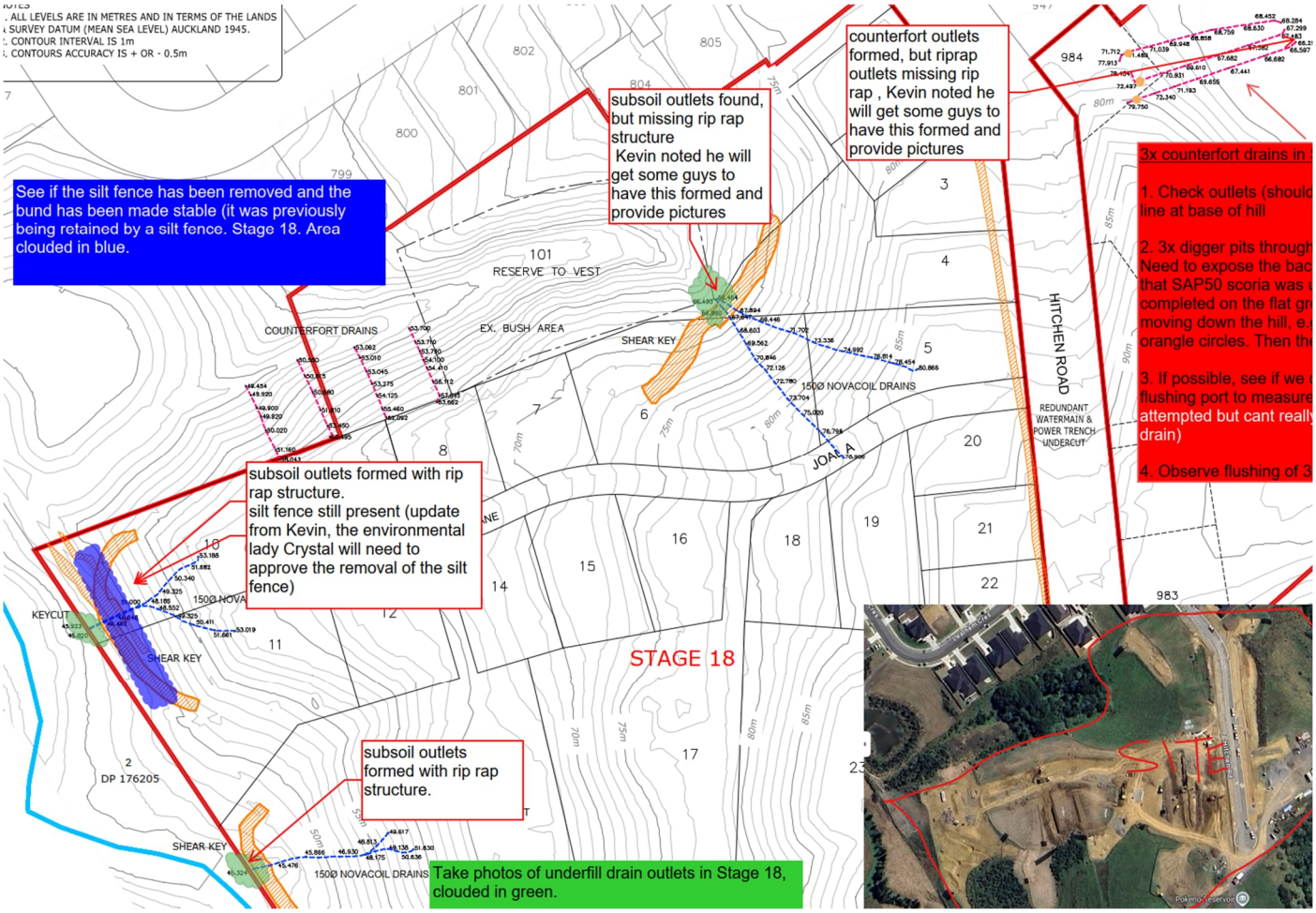
Site Inspection Record

Date:	24/07/2025	**Time:**	11am
LDE Project Ref:	J00113	**Inspected by:**	Alan Huang
Project:	J00113 - Hitchen Block Stage 2, Pokeno		

Inspection Notes:

Visited site with Kevin to inspect the counterfort flushing and identifying the subsoil drain outlets. Refer to below site plan annotation.

- Three pits were conducted to expose the caps. Scoria was present below the cloth.
- All three counterforts flushed.
- Riprap structures are required at the outlets for all counterfort drains and the subsoil within lot 4.
- Contractor advised the silt fence installed will require environmental engineer approval prior to removal.



Most southern subsoil outlet (lot 13 subsoil outlet): located behind the silt fence with riprap formed. The outlet is currently sitting behind the silt fence. Kevin noted the outlet may need to be reformed once the silt fence is removed.

3 Pits opened up to locate the capping of the 3 counterfort drains.

Scoria present below the cloth

3x Counterfort drain flushing

Stage 18 & 19 drain outlets, provided by the contractor on 23/07/25: