Geotechnical Completion Report

HITCHEN BLOCK STAGE 13A

For

DFH JOINT VENTURE LIMITED

J00113 | Lander Geotechnical Consultants Limited | 16 August 2021

16 August 2021 Ref No: J00113

DFH Joint Venture Limited
PO Box 302 877
North Harbour 1330

Attention: Mr R Parkinson

Dear Russell

RE: Geotechnical Completion Report for Hitchen Block Stage 13A, Pokeno

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 undersigned.

For and on behalf of Lander Geotechnical Consultants Limited

S.G. Lander
Principal Geotechnical Engineer
CMEngNZ, CPeng, IntPE(NZ)

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1 INTRODUCTION AND DESCRIPTION OF SUBDIVISION

This Geotechnical Completion Report 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 13A of the Hitchen Block Residential Subdivision as follows:

Table 1: CivilPlan Consultants Limited As-Built Plans

Title	Reference No.	Date
As Built Contours	126701-13-AB200	June 2021
As Built Cut-Fill Contours	126701-13-AB201	June 2021
Drainage As Built	136701-13-AB400	January 2019
Stormwater As Built	126701-13-AB400	June 2021
Wastewater As Built	126701-13-AB401	June 2021

This report covers the construction period October 2019 to May 2021. It is intended to be used for certification purposes as follows:

- 67 residential lots numbered 547, 559 to 563 and 691 to 751.
- 4 new roads named Hitchen Road (part), Leathem Crescent (part), Paul Way and Aitkenhead Street.
- 4 jointly owned access lots numbered JOAL 1 to 4.
- 1 drainage reserve numbered lot 10 as located as shown on the as-built drawings. This Lot contains a stormwater pond.

This stage of the subdivision is located as shown on the attached CivilPlan Consultants Limited as-built plans. As can be seen on the As Built Cut-Fill Contours plan, approximately half of the lots have been partly or totally affected by filling, to a maximum depth of approximately 4m.

2 RELATED REPORTS

A Geotechnical Investigation Report on the subject land was prepared by this Consultancy, reference J00741 (Earthworks Stage 5), dated 29 August 2018. The conclusions and recommendations of that report have been reviewed during the preparation of this document, along with the following Geotechnical Completion Reports (prepared by Lander Geotechnical Consultants Limited) on adjacent recently completed stages of the subdivision which are tabulated below:

Table 2: Lander Geotechnical Consultants Geotechnical Completion Reports

Subdivision Title	Reference No.	Issue Date
Hitchen Block Stage 1 (Residential)	J00113	23 December 2016
Gateway Industrial Part Stage 5 (Lots 28 and 29)	J00022	27 February 2017
Hitchen Block Stage 2A and 2B (Residential)	J00113	14 July 2017
Hitchen Block Stage 2C and 3A (Residential)	J00113	27 October 2017

Subdivision 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

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 for this stage commenced in early October 2019 with topsoil stripping and bulk cut operations over the entire Stage 13A area, including the muckout of the gully passing through the drainage reserve. 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.

Following this, a toe key (undercut beneath fill batter edge) was installed along the south-western boundary of the drainage reserve and a 4m high fill batter was formed here. The purpose pf the toe key was to ‘lock in’ the filling into the underlying competent ash soils. Placement of bulk engineered clay fills (Fills E and F as shown on the compaction control test plans included in Appendix 2) progressed until May 2019, however, most work completed during this time was on surrounding stages.

By May 2021, all public services and roading was essentially complete and all lots were topsoiled.

4 QUALITY ASSURANCE AND CONTROLS

4.1 Inspections

During earthworks construction, engineering observations were undertaken on a near regular basis to assess compliance with NZS 4431 and our project specific recommendations and specifications. Project specific inspections were required on this stage of the development for:

- Topsoil stripping of earthworks areas;
- Removal of soft sediments in the gully inverts;
- Placement of the underfill drainage;
- Fill placement and plant performance upon the subgrade periodically throughout the bulk filling works.

4.2 Quality Control Criteria

4.2.1 Compaction 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:

Minimum Shear Strength and Maximum Air Voids Method

(a)	Air Voids Percentage	
	(As defined in NZS 4402)	
	Average value less than	10%
	Maximum single value	12%
(b)	Undrained Shear Strength	
	(Measured by Pilcon shear vane – calibrated using NZGS 2001 method)	
	Average value not less than	140 kPa
	Minimum single value	120 kPa
Note:	The average value shall be determined over any ten consecutive tests	

In addition to the above, a higher specification was required for the fill embankments for the stormwater pond within the drainage reserve in Stage 13A2. This specification was:

- Maximum air voids of 6%
- Minimum undrained shear strength of 140kPa.

Where hardfill was used on site as part of bulk filling operations (within the toe key in the drainage reserve), a minimum Clegg Impact Value (CIV) of 20 was specified.

4.2.2 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 (including testing some testing undertaken on adjacent stages of the subdivision) are appended in Appendix 2.

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 PROJECT EVALUATION

5.1 Bearing Capacity and Settlement of Building Foundations

Following the completion of earthworks operations, we returned to the site in February 2021 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 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 affected areas be 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.

5.2 Expansive Soils

Four sets of Shrink-Swell Index tests were carried out on samples selected from around the site 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 and were primarily intended to assess the Expansive Classes of the site materials.

The Expansive Site Class for this subdivision is M (moderate) for all residential lots, as defined in 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 expansive site class for all residential lots is as follows when

[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.

assessed in accordance with MBIE (Acceptable Solution and Verification Methods Amendment 19) and AS2870:2011 guidelines is as follows:

MBIE Acceptable Solutions and Verification Methods Amendment 19 (B1/AS1)

- Class M (moderate)
- Characteristic ground movement of up to 44mm

AS2870:2011

- Class M (Moderate)*
- Characteristic ground movement of up to 40mm*

**Note: This AS2870:2011 assessment is based on the scaling factor of the site being adjusted to a 1/500yr event to meet the recommendations of MBIE.*

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, as recommended in the MBIE document attached.

5.3 Lot Gradients

The appended as built contours plan shows areas having gradients steeper than 1(v) in 4(h) or being immediately adjacent to land having such gradients. The extent of these areas 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.

A site-specific computer slope stability analysis was completed for the stormwater ponds in Lot 10 (drainage reserve in Stage 13A2) and Lot 11 (drainage reserve in adjacent Stage 13B1) as part of our GIR and global factors of safety were found to be satisfactory. Additionally, our observations during construction found that ground conditions were consistent with the design assumptions and the as-builts show no departure from the design.

We are satisfied that these lots are not subject to the hazards described in section 71(3) of the Building Act.

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

5.4 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 (i.e. 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.

5.5 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.

5.6 Service Trenches

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

5.7 Underfill Drains

The appended fill as-built cut-fill contour plans show the alignments of a perforated underfill drain that was placed in a mucked out gully invert prior to filling to tap groundwater seepages. This drain runs beneath portions of the drainage reserve within Stage 13A2 as indicated on the As-Built Cut-Fill Contours Plan.

This drain was intended to intercept localised groundwater seepages during earthworks and/or allow engineered fill placement as required by the project specifications. The drain was installed as a precautionary measure, not as remedial works for any existing instability, and it requires no specific maintenance.

Notwithstanding, it is recommended that future site development works preserve this drain. In the event that the drain is compromised by any future development works, then the drain should be reinstated under geotechnical engineering observational guidance.

5.8 Stormwater Detention Pond

A new wet stormwater detention pond has been constructed in the vicinity of the drainage reserve in the eastern corner of the subdivision (within Stage 13A2). Where fill has been placed to form the pond walls, this was required to meet a higher fill compaction criteria as outlined in Section 4.2.1.

The base of this pond encountered cohesive soils and therefore no clay liner was required. If/where underfill drains passed beneath the base of the pond, a minimum capping layer of 1m of engineer certified clay was placed over the drain to help eliminate the possibility of future piping erosion and/or seepage from the base of the pond.

Global slope stability of the stormwater pond batters was found to be satisfactory as discussed in Section 5.3.

5.9 Topsoil

Topsoil depths in likely building platform areas were checked by the drilling of a borehole in the approximate centre of each of the lots. Our findings, which are indicative only and subject to variation at other locations, show that likely topsoil depths are between 50 mm and 250 mm.

Site specific findings are presented in the Suitability Statement Summary.

5.10 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 Lander Geotechnical Consultants Limited reports, recommendations and site instructions,

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

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

I, S.G. Lander, of Lander Geotechnical Consultants Limited, Auckland, hereby confirm that:

1. I am a Chartered Professional Engineer experienced in the field of geotechnical engineering as defined in section 1.2.3 of NZS 4404 and was retained by the Owner/Developer as the Geotechnical Engineer on Stage 13A of the Hitchen Block residential subdivision.
2. The extent of preliminary investigations carried out to date are described in Geotechnical Investigation Report reference J00741, dated 29 August 2018, and the conclusions and recommendations of that document have been re-evaluated in the preparation of this report. The results of all tests carried out under Lander Geotechnical Consultants Limited direction are appended.
3. In my professional opinion, not to be construed as a guarantee, I consider that:

   (a) The earth fills shown on the appended fill as-built plan have been placed in compliance with NZS 4431 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 contour as-built plan, lots 691, 692, 695, 709 to 711, 729 to 731, 736 to 739, 741, 742, 746 to 749 (and the drainage reserve in Stage 13A2) have gradients steeper than 1(v) in 4(h).

   Any building development and/or earthworks proposals within the areas shown to be steeper than 1(v) in 4(h) on the as-built contours plan are subject to specific geotechnical investigations and/or foundation design, and/ or adequately designed retaining walls and/ or batter slopes.

   (c) The function of the underfill drain beneath portions of the drainage reserve in Stage 13A2 should not be impaired by any future development or landscaping works.

   (d) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for foundation design on all lots (except where specific geotechnical endorsement is required on account of sloping land greater than 1(v in 4(h)).

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.

(e) The backfilling and compaction of the 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° zone of influence of drain inverts unless endorsed by specific site investigations, 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 assessed Expansive Site Class for this subdivision is Class M (moderate – with characteristic ground surface movement of up to 44mm) in terms of MBIE Acceptable Solutions and Verification Methods Amendment 19 and Class M (moderate – with characteristic ground surface movement of up to 40mm) in terms of AS2870:2011. Site specific laboratory Shrink-Swell testing and calculation of specific ys values may be undertaken by end-users to re-assess this during building consent stage.

(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 M in terms of MBIE Acceptable Solutions and Verifications Methods for NZ Building Code Clause B1 Structure, effective 28 November 2019;
- Class M in terms of AS2870:2011;
- NZS 3604 provided that a minimum footing depth below cleared ground level following topsoil removal and benching of building platform areas is 600mm; or
- 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 CBR values do vary between natural and filled ground as is to be expected.

5. Geotechnical aspects of slope stability and pond permeability within reserve the drainage reserve in stage 13A2 have been appropriately addressed and in these respects the pond is suitable for its intended use.

The professional opinion contained within this report is furnished to the Waikato District Council and DFH Joint Venture Limited for their purposes alone, with respect to the particular brief given to us. It may not be relied upon in any other context of for any other purpose without our prior review and agreement. It does not remove the necessity for the normal inspection of site conditions at the time of erection of any dwelling.

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

For and on behalf of Lander Geotechnical Consultants Limited

Prepared by:	Reviewed By:	Authorised by:
K. Meffan Engineering Geologist MEngNZ	**C.J. Edwards** Senior Engineering Geologist CMEngNZ (PEngGeol)	**S.G. Lander** Principal Geotechnical Engineer CMEngNZ, CPeng, IntPE(NZ)

Table 3: Suitability Statement Summary

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)
547	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
559	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	50	300
560	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	150	300
561	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
562	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
563	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
691	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
692	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
693	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	50	300
694	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)
695	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
696	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	50	300
697	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	150	300
698	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
699	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
700	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
701	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
702	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
703	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
704	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	50	300
705	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
706	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	50	300
707	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	50	300

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)
708	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	50	300
709	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
710	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	150	300
711	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
712	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	150	300
713	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
714	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
715	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
716	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
717	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	250	300

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)
718	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
719	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
720	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
721	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
722	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
723	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
724	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
725	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
726	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	120	300
727	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
728	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
729	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300

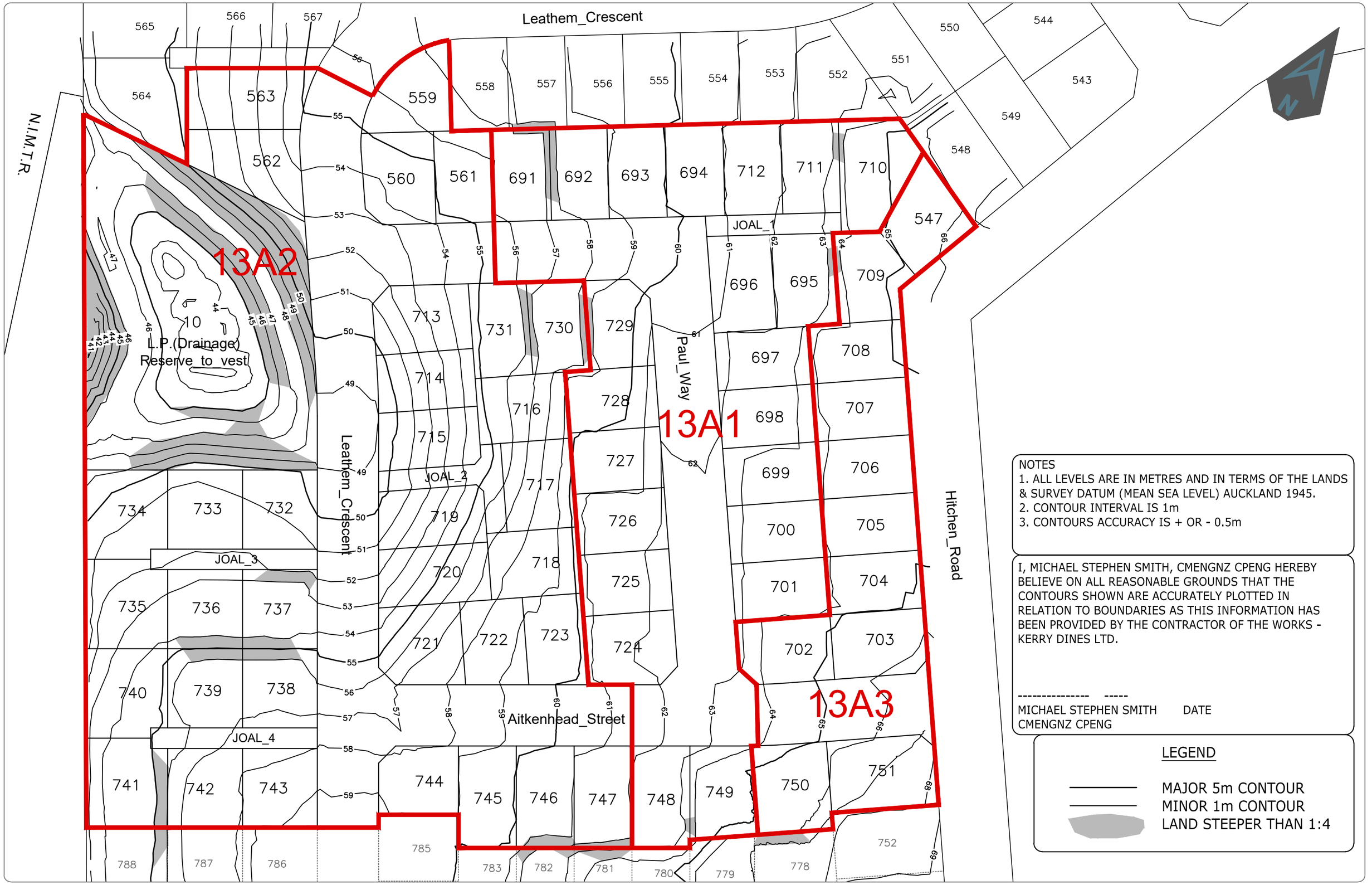
Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)
730	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
731	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
732	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	250	300
733	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
734	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
735	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
736	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	150	300
737	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)
738	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
739	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
740	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
741	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
742	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
743	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
744	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	200	300
745	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)
746	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
747	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
748	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
749	Specific site investigation, foundation design and construction inspections required in areas shown hatched on gradient as-built plan due to 1(v) in 4(h) gradient restrictions. Elsewhere, foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
750	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300
751	Foundation design in accordance with either MBIE B1/AS1 or AS2870:2011 Class M or NZS 3604 with minimum footing depth 600mm or an engineer approved alternative foundation design.	100	300

Appendix 1

CivilPlan Consultants Limited As-Built Plans



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

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
LAND STEEPER THAN 1:4

REV	REVISION DETAILS	BY	DATE

PLOTTED: RJP DATE: 06-21
DRAWN: RJP DATE: 06-21
APPROVED: MSS DATE: 06-21

CIVILPLAN CONSULTANTS
Level 3 AMI Building, 15 Osterley Way, Manukau City. Phone: 2222445

PROJECT TITLE:
DFH JOINT VENTURE
HITCHEN STAGE 13 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: 126701-13-AB200 REV: A

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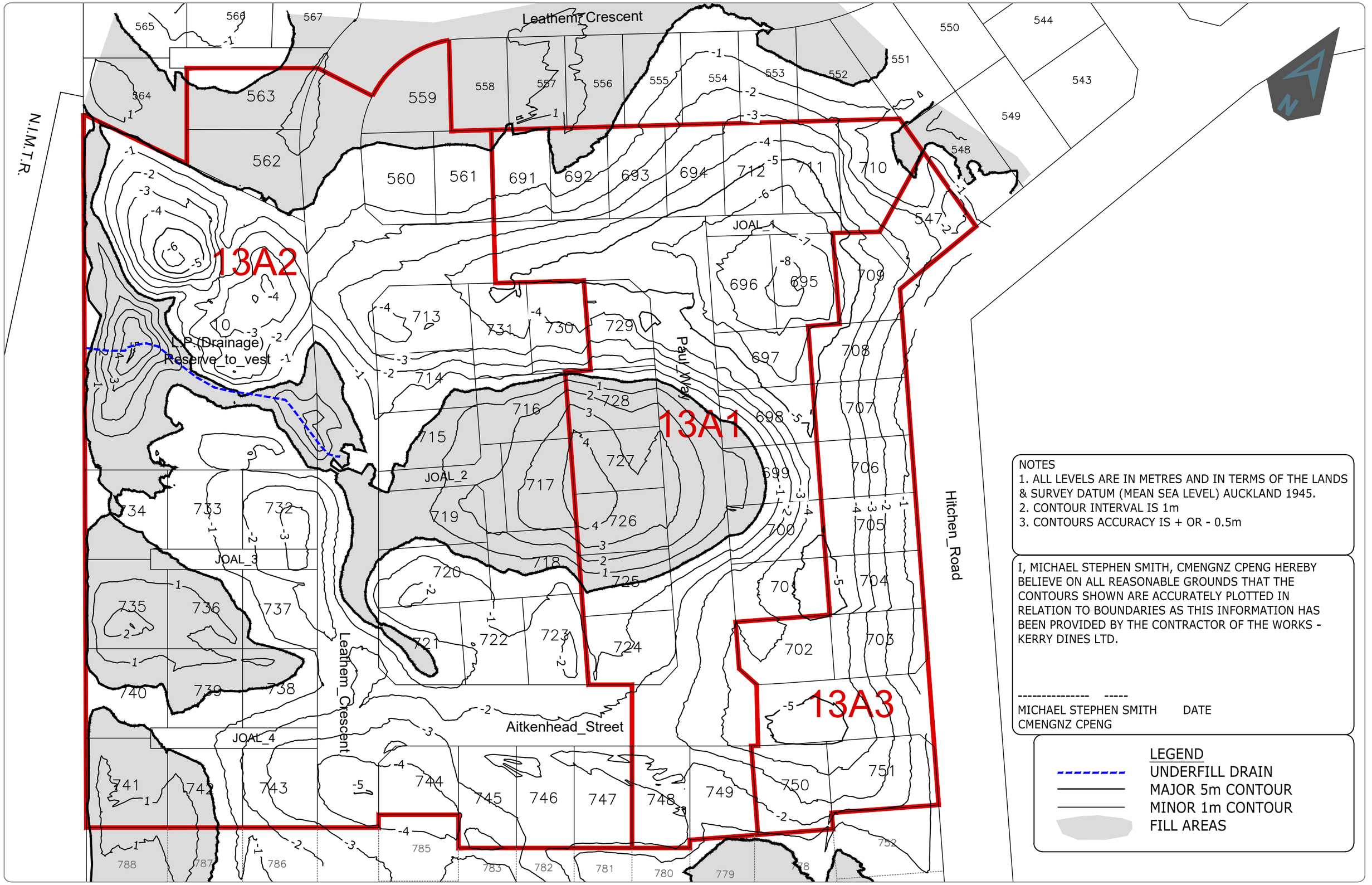


NOTES
1. ALL LEVELS ARE IN METRES AND IN TERMS OF THE LANDS & SURVEY DATUM (MEAN SEA LEVEL) AUCKLAND 1945.
2. CONTOUR INTERVAL IS 1m
3. CONTOURS ACCURACY IS + OR - 0.5m

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
UNDERFILL DRAIN
MAJOR 5m CONTOUR
MINOR 1m CONTOUR
FILL AREAS

REV	REVISION DETAILS	BY	DATE

PLOTTED: RJP DATE: 06-21
DRAWN: RJP DATE: 06-21
APPROVED: MSS DATE: 06-21

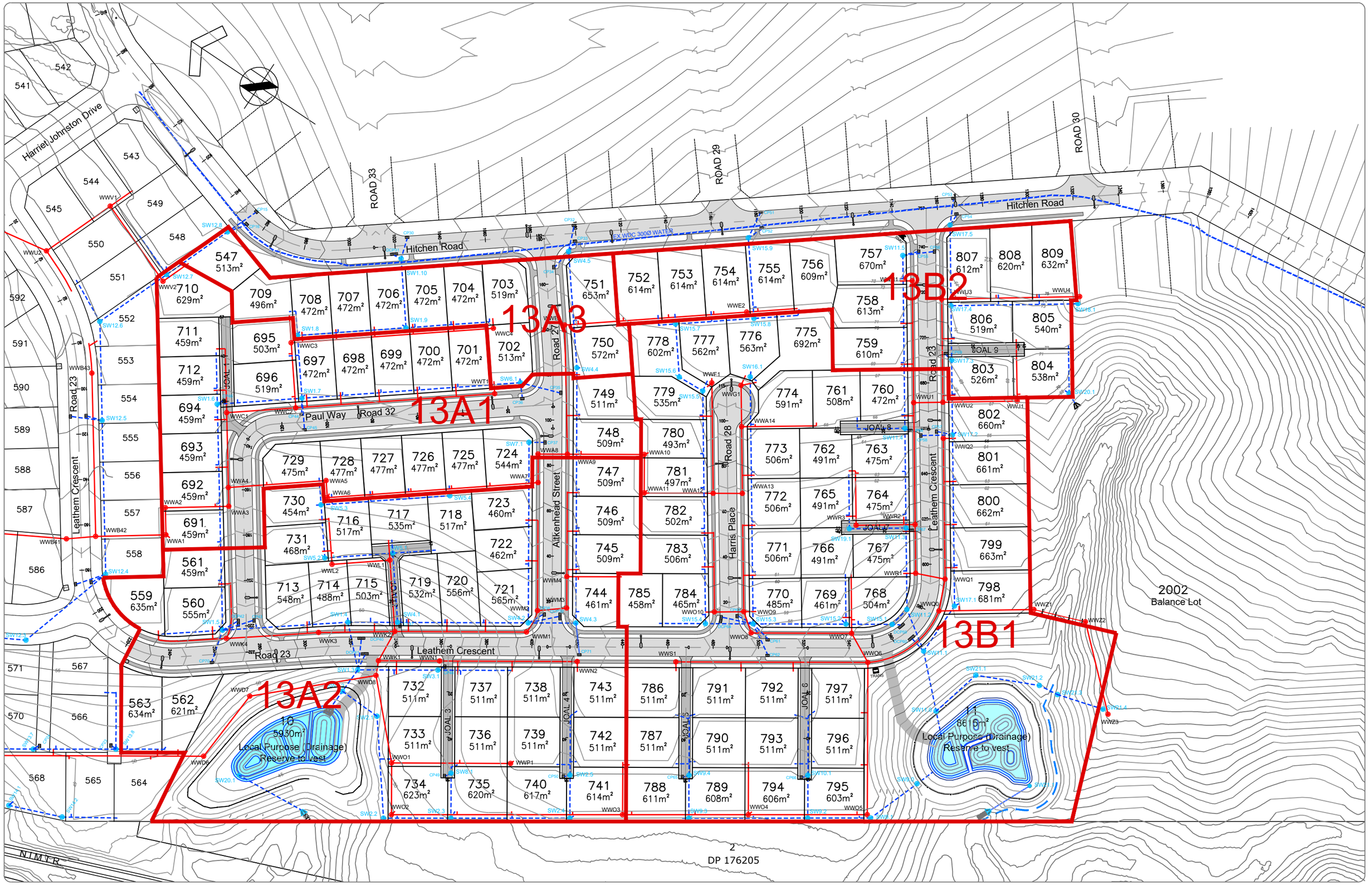
CIVILPLAN CONSULTANTS
Level 3 AMI Building, 15 Osterley Way, Manukau City. Phone: 2222445

PROJECT TITLE:
DFH JOINT VENTURE
HITCHEN STAGE 13 SUBDIVISION
POKENO

SHEET TITLE:
AS BUILT CUT-FILL 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: 126701-13-AB201 REV: A

Filepath: P:\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 13\AS BUILTS\136701-13A-AB201.DWG



REV	REVISION DETAILS	BY	DATE
G	WW LINE Z ADDED, MINOR CHANGES TO LINES Q & 17	RJP	18-2-21
F	LINE A, G, U AMENDED FOR TUFT REGRADE	RJP	16-1-21
E	LINE 21 ADDED IN POND D	RJP	11-20
D	PUMP STATION REMOVED & DRAINAGE AMENDED	RJP	15-6-20
C	WETLAND OUTLET AND INLET AMENDED	RJP	26-5-20
B	3 LOTS & REC. RES. REMOVED	RJP	13-5-19
A	ISSUED FOR CONSENT	RJP	02-19

PLOTTED: DATE:
RJP 01-19

DRAWN: DATE:
RJP 01-19

APPROVED: DATE:
MSS 01-19

CIVILPLAN CONSULTANTS
Level 3 AMI Building, 15 Osterley Way, Manukau City. Phone: 2222445

PROJECT TITLE:
DFH JOINT VENTURE
HITCHEN STAGE 13 SUBDIVISION
POKENO

SHEET TITLE:
DRAINAGE PLAN

ISSUE STATUS: ENGINEERING APPROVAL
SCALE: (A1/A3)
1:750 / 1:1500
DRAWING NUMBER: 136701-13-400 REV: G

Filepath: P:\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 13\ENGINEERING\136701-13-400.DWG

Leathem_Crescent

N.I.M.T.R.

13A2

10

L.P.(Drainage)
Reserve_to_vest

13A1

13A3

Paul_Way

Leathem_Crescent

Hitchen_Road

Aitkenhead_Street

JOAL_1

JOAL_2

JOAL_3

JOAL_4

565 566 567 564 563 562 559 558 557 556 555 554 553 552 551 550 544 543 549 548 547 560 561 691 692 693 694 712 711 710 713 731 730 729 714 716 728 715 717 727 719 726 720 718 725 721 722 723 724 696 695 709 697 708 698 707 699 706 700 705 701 704 702 703 734 733 732 735 736 737 740 739 738 741 742 743 744 745 746 747 748 749 750 751 752 788 787 786 785 783 782 781 780 779 778

CON563 IL49.93
CON562 IL49.66
BC559 IL53.37
CON559 IL54.06
150NB_PVC 27.5m
CON560 IL52.33
CON561 IL53.62
CON691 IL54.98
CON692 IL56.61
CON693 IL58.18
MH1.6 LL60.51 IL58.15 IL58.75 IL59.21 IL58.29
CON712 IL59.95
150NB_PVC 22.7m
CON711 IL61.01
BC711 IL60.46
CON710 IL63.91
MH12.7 LL65.12 IL62.33 IL63.27 IL63.69 IL63.60
CON547 IL64.71
225NB_RCRRJ 32.8m
MH12.8 LL66.76 IL64.74 IL65.31 IL65.28
225NB 15.6m
CP15 LL66.73 IL65.55
225NB 8.7m
CP16 LL66.70 IL65.50
CP70 LL53.03 IL51.73
225NB_15.0m
MH1.5 LL52.88 IL50.40 IL51.48 IL51.33 IL51.37 IL50.54 IL50.95 IL50.97
300NB 7.9m
225NB 14.6m
DCP42 LL52.32 IL51.08
CP43 LL52.24 IL51.13
375NB_RCRRJ 99.8m
CP46 LL60.81 IL59.89
225NB 3.2m
CON696 IL59.95
375NB_RCRRJ 37.8m
MH1.7 LL61.52 IL59.18 IL59.39 IL60.19 IL59.38 IL59.68 IL59.74
CON695 IL61.49
MH1.8 LL63.88 IL60.90 IL62.10 IL62.49 IL60.98
CON709 IL62.85
CP44 LL60.95 IL59.88
225NB 6.7m
CP45 LL60.99 IL59.96
225NB 14.1m
CON697 IL60.46
300NB_RCRRJ 27.8m
150NB_PVC 11.0m
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CON698 IL61.09
CON707 IL62.63
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CON699 IL61.36
MH1.9 LL63.98 IL61.51 IL62.52 IL61.58 IL61.94
CON706 IL62.83
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300NB 3.2m
225NB 9.8m
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MH1.10 LL IL61.92 IL62.55 IL62.32
CON700 IL61.69
CON705 IL62.99
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CON701 IL61.82
CON704 IL63.08
MH6.1 IL63.06 IL60.78 IL61.67 IL60.97 IL60.99
BC1.11 IL63.30
CON703 IL63.82
CON702 IL62.45
CP36 LL62.56 IL61.45
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225NB_18.4m
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CP34 LL66.33 IL65.41
MH4.5 LL67.04 IL65.04 IL65.33 IL65.74 IL65.72
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225NB 11.6m
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225NB 4.4m
CP32 LL67.60 IL66.39
225NB_RCRRJ 51.0m
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CON750 IL64.12
CON749 IL62.07
CON748 IL61.09
CON747 IL60.33
CON746 IL59.18
CON745 IL58.17
CON744 IL56.65
CON743 IL56.27
BC2.6 IL55.87
MH2.5 LL55.19 IL53.13 IL53.72 IL53.22
CON742 IL55.00
CON741 IL52.50
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225NB 14.2m
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CP37 LL61.69 IL60.37
225NB 6.5m
CP38 LL56.75 IL55.58
225NB 7.6m
300NB 14.4m
DCP39 LL56.89 IL55.73
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MH4.2 LL56.10 IL53.84 IL54.09 IL55.11 IL54.02 IL54.04
300NB RCRRJ 21.3m
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225NB 3.3m
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CON738 IL53.45
CON735 IL49.58
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CON736 IL51.19
CON737 IL50.98
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225NB_RCRRJ 52.4m
225NB_RCRRJ 20.1m
BEND IL50.75
225NB 2.5m
CP48 LL51.26 IL50.19
300NB_RCRRJ 57.7m
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CON718 IL55.82
BC718 IL55.41
MH5.4 LL60.01 IL58.08 IL58.83
CON725 IL59.55
CON721 IL52.47
CON722 IL57.21
CON723 IL58.29
CON724 IL60.04
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CON717 IL54.88
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225NB 1.2m
225NB_RCRRJ_30.6m
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CON726 IL59.41
CON729 IL57.88
BC729 IL56.71
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CON730 IL56.25
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CON731 IL54.18
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OUT1.1 IL43.96
600NB RCRRJ 10.3m
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300NB_RCRRJ 15.9m
450NB RCRRJ 11.6m
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300NB 14.0m
300NB 7.0m
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375NB_RCRRJ 21.9m
300NB_RCRRJ 45.1m
MH2.2 LL48.40 IL46.73 IL46.88
MH2.3 LL50.82 IL48.72 IL49.16 IL49.22 IL48.87
MH2.4 LL52.98 IL51.25 IL51.35 IL51.97
CON734 IL48.42
CON733 IL48.38
CON732 IL48.39
225NB_RCRRJ 29.6m
CP49 LL51.85 IL50.92
225NB 2.4m
MH3.1 LL51.14 LL49.36 LL49.85 LL49.36
225NB_RCRRJ 35.9m

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.
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

REV	REVISION DETAILS	BY	DATE

PLOTTED: RJP DATE: 06-21
DRAWN: RJP DATE: 06-21
APPROVED: MSS DATE: 06-21

CIVILPLAN CONSULTANTS
Level 3 AMI Building, 15 Osterley Way, Manukau City. Phone: 2222445

PROJECT TITLE:
DFH JOINT VENTURE
HITCHEN STAGE 13 SUBDIVISION
POKENO

SHEET TITLE:
AS BUILT STORMWATER DRAINAGE

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 126701-13-AB400 REV: A

Filepath: P:\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 13\AS BUILTS\136701-13A-AB400.DWG

Leathem_Crescent
Paul_Way
Hitchen_Road
Aitkenhead_Street
Leathem_Crescent
N.I.M.T.R.
13A2
13A1
13A3
10
L.P.(Drainage)
Reserve_to_vest
JOAL_1
JOAL_2
JOAL_3
JOAL_4
EX.MHB42
565 566 567 564 563 562 559 558 557 556 555 554 553 552 551 550 544 543 549 548 547 710 711 712 693 694 692 691 560 561 713 731 730 729 714 715 716 728 727 717 719 726 720 718 725 721 722 723 724 734 733 732 735 736 737 740 739 738 741 742 743 744 745 746 747 748 749 750 751 752 696 695 709 697 708 698 707 699 706 700 705 701 704 702 703 788 787 786 785 783 782 781 780 779 778
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CON709 IL62.60
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CON696 IL60.28
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MHA3 LL57.14 IL55.68 IL55.73
MHA4 LL57.90 IL56.20 IL56.29 IL56.32
MHA5 LL59.01 IL57.13 IL57.17
MHA6 LL58.98 IL57.28 IL57.48 IL57.34
MHA7 LL60.64 IL58.96 IL59.06
MHA8 LL61.46 IL59.65 IL59.72
MHA9 LL61.45 IL59.86 IL59.92 IL59.93
MHA10 LL63.50 IL61.14
MHB1 LL58.56 IL58.73 IL58.63
MHC2 LL60.95 IL59.34 IL59.44 IL59.38
MHC3 LL IL61.21 IL61.29 IL61.26
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MHP1 LL55.20 IL53.33 IL53.37
MHT1 LL62.50 IL60.68 IL60.71
MHV2 LL64.57 IL62.71 IL62.81 IL62.83
BCK5 IL53.30
BCK6 IL52.52
BCL3 IL55.80
BCM5 IL59.07
BCM6 IL58.21
BCC5 IL60.70
BCC5 IL62.28
BC742 IL54.76
BC785 IL57.87
BCV3 IL63.55
150NB_PVC 30.6m
150NB_PVC 39.4m
150NB_PVC 25.6m
150NB_PVC 12.0m
150NB_PVC 28.0m
150NB_PVC 28.7m
150NB_PVC 14.1m
150NB_PVC 40.8m
150NB_PVC 43.2m
150NB_PVC 30.7m
150NB_PVC 48.5m
150NB_PVC 33.6m
150NB_PVC 20.5m
150NB_PVC 25.6m
150NB_PVC 39.2m
150NB_PVC 22.8m
150NB_PVC 14.7m
150NB_PVC 31.6m
150NB_PVC 27.2m
150NB_PVC 52.5m
150NB_PVC 102.0m
150NB_PVC 56.1m
150NB_PVC 60.6m
150NB_PVC 93.2m
150NB_PVC 87.9m
150NB_PVC 89.5m
150NB_PVC 24.5m
150NB_PVC 24.9m
150NB_PVC 33.8m
150NB_PVC 80.8m
150NB_PVC_70.0m
150NB_PVC_12.6m
150NB PVC 8.2m
150NB PVC 7.8m
150NB PVC 43.2m
150NB PVC 10.7m
150NB PVC 12.7m
150NB PVC 14.0m
150NB PVC 12.2m
150NB PVC 13.1m
150NB_PVC 32.9m
150NB_PVC 57.0m

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.

LEGEND

MANHOLE
WW LINE
EX.MANHOLE
EX.WW LINE

REV	REVISION DETAILS	BY	DATE

PLOTTED: RJP DATE: 06-21
DRAWN: RJP DATE: 06-21
APPROVED: MSS DATE: 06-21

CIVILPLAN CONSULTANTS
Level 3 AMI Building, 15 Osterley Way, Manukau City. Phone: 2222445

PROJECT TITLE:
DFH JOINT VENTURE
HITCHEN STAGE 13 SUBDIVISION
POKENO

SHEET TITLE:
AS BUILT WASTE WATER DRAINAGE

ISSUE STATUS: AS BUILT
SCALE: (A1/A3) 1:500 / 1:1000
SCALE BAR 1:1000@A3 0 10 20 30 40 50m
DRAWING NUMBER: 126701-13-AB401 REV: A

Filepath: P\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 13\AS BUILTS\136701-13A-AB401.DWG

Appendix 2

Field Density Test Summary Sheets

Our Ref: 1009213.0657.0.0/3
Customer Ref: J00113
02 August 2021

Lander Geotechnical ltd
PO Box 97 385
Manukau
Auckland 2241

Attention: Shane Lander

Dear Shane

Hitchen Block, Pokeno - Stage 5

Site Report

Customer's Instructions

We were instructed to:

Complete nuclear densometer, shear vane and impact hammer testing at the above-mentioned site when requested and report the results.

Specifications

As per email from Mike (Lander Geotechnical) on the 08/01/2019 the specification for Earthwork's testing was as follows;

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

As per email from Mike (Lander Geotechnical) on 21/10/2019 the Earthworks specification for Pond Embankment areas was as follows;

- Average air voids <6% with maximum air voids 8%.
- Average shear strength >140 kPa with minimum single value 120 kPa.

As requested by Kyle (Lander Geotechnical) via email; on the 09/12/2020 the specification for hardfill testing required a minimum single density of 95% of the maximum dry density (MDD) and an impact hammer value of ≥ 20.

As confirmed by Kyle (Lander Geotechnical) via email on the 09/12/2020 an MDD of 2.09 t/m^3 was to be used for the material used on site. The MDD was determined by the Geotechnics plateau test carried out on the 12/02/2020 (Refer to Appendix C).

Laboratory Determined Parameters of Material

Material Type	Maximum Dry Density	Optimum Water Content	Solid Density Assumed	Report Reference Number/Supplier
	t/m^3	%	t/m^3	
SPR	2.09	-	-	Plateau Density Test 12/02/2020 (URN 33)

Dates of Procedures

Testing was carried out from the 17/10/2019 to 10/05/2021.

Locations

Testing was carried out as instructed by the contractor on site. Individual test locations were selected on site by the Geotechnics technician on behalf of the customer. No formal testing frequency was provided by the customer.

The attached plans provide indicative locations only and are not to scale. All other information we provide regarding location should be referenced to the asset owner.

Samples

Samples taken for moisture content verification purposes were disposed of 24 hours after testing.

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

NZS 4407:2015 Test 4.3 Method using a nuclear surface moisture density-gauge (Backscatter mode) - NDM

ASTM D 5874-16 - Standard test method for determination of the impact value (IV) of a soil – Impact Test

Material Description

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

Results

The following is attached:

Appendix A - Earthworks testing results.

Appendix B - Hardfill testing results.

Appendix C - Plateau density test.

Appendix D- Test location plans.

Test Remarks

Shear Vane

Shear Vane tests are potentially unsuitable for material described in the Earthworks summary as ‘Clay SILT with Gravels, ‘Sandy SILT with Clay and Gravels’, ‘Clay SILT with Sand’. Tests in these materials may not be compliant with the stated test method and results are therefore not covered under the IANZ endorsement of this report. Results are provided for your own interpretation and inference.

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.

An assumed solid density value of 2.70 t/$m^3$was agreed with the customer. We do not take responsibility for misrepresentation or misinterpretation arising from the use of this assumed 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 sampled in conjunction with nuclear densometer testing and disposed of after 24 hours.

NDM – Backscatter

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

The wet density and moisture content were measured by the nuclear densometer.

The calculation of percentage compaction is obtained from NDM density values and customer provided maximum dry density (MDD) target.

Impact Value

Field procedure A was used. The test method is appropriate for materials having a maximum particle size of less than 37.5 mm. Results of tests that were performed on materials containing larger particle sizes, are not covered under the IANZ endorsement of this report.

Calculations of equivalent CBR are based on CBR = IV^2x0.07. This calculation is not covered under the IANZ endorsement of this report.

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 Lander Geotechnical, 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 included for information only and are not covered under the IANZ endorsement of this report.

Sample(s) not destroyed during testing will be retained for one month from the date of this report before being discarded.

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 prepared by:

.....

David Sayers
CMT Field Technician

Authorised for Geotechnics by:

.....

Steven Anderson
Project Director
Approved Signatory

Report checked by:

.....

Daniel Brasting
Project Manager

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

3-Aug-21
\\ttgroup.local\corporate\GeotechnicsGroup\Projects\1009213\1009213.0657 - Hitchen Block, Pokeno\IssuedDocuments\Stage 5 Report\20210728 Hitchen block, Pokeno Stage 5 Site Report.docx

Appendix A: Earthworks testing results

GEOTECHNICS

Job: Hitchens Block Stage 5

Client: Lander Geotechnical Ltd.

Job #	1009213.0657.0.0/3
Entered By	DASA/JRA/SEBA/FRHA
Checked By	JRA/DASA/SEBA
Approved By	SJA

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	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	
3.1	JRA	21/10/2019	Fill F - Pond Area	~0.5m Above Underfill Drain	Clay SILT	NDM / SV	1.74	45.3	1.6	1.75	42.7	1.9	1.75	44.0	1.8	2.70	41.2	1.24	3.3	-	124	121	121	124	123	-	-	P	
3.2						NDM / SV	1.80	40.6	0.6	1.79	40.1	1.2	1.80	40.4	0.9	2.70	35.8	1.32	3.6	-	135	124	145	161	141	-	-	P	
4.1	JRA	30/10/2019	Fill F - Pond Area	~1m below FL	Clay SILT	NDM / SV	1.82	37.2	1.5	1.82	36.9	1.7	1.82	37.1	1.6	2.70	36.1	1.34	2.2	-	150	148	150	145	148	-	-	P	
4.2				~FL		NDM / SV	1.82	32.4	4.5	1.82	32.1	4.7	1.82	32.3	4.6	2.70	32.0	1.38	4.7	-	185	185	174	142	172	-	-	P	
5.1	JRA	1/11/2019	Fill E - See Site Plan	~0.5 - 1m placed	Clay SILT	SV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	87	95	113	106	100	-	6.1	F	
5.2						SV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	103	119	95	79	99	-	6.2	F	
6.1	JRA	2/11/2019	Fill E - See Site Plan	~0.5 - 1m placed	Clay SILT w gravels	NDM / SV	1.89	28.6	3.5	1.90	27.3	4.1	1.89	28.0	3.8	2.70	30.5	1.45	2.0	-	>191	>191	>191	>191	>191	-	-	P	Retest of URN 5.1
6.2						NDM / SV	1.84	32.0	3.9	1.83	32.3	4.0	1.84	32.2	3.9	2.70	34.1	1.37	2.7	-	>191	174	180	>191	>184	-	-	P	Retest of URN 5.2
7.1	JRA	4/11/2019	Fill E - See Site Plan	~RL 54.70	Clay SILT	NDM / SV	1.88	34.1	0.2	1.89	35.2	0.0	1.88	34.7	0.0	2.70	35.3	1.39	0.0	-	>191	161	166	177	174	-	-	P	
7.2				~RL 55.20		NDM / SV	1.73	42.1	3.7	1.73	41.3	3.9	1.73	41.7	3.8	2.70	44.5	1.20	2.3	-	147	155	>191	150	>160	149	-	P	
8.1	JRA	7/11/2019	Fill E - See Site Plan	~RL 55.50	Clay SILT	NDM / SV	1.78	35.9	4.3	1.78	35.5	4.7	1.78	35.7	4.5	2.70	30.9	1.36	7.6	-	>191	122	133	150	>149	151	-	P	
8.2				~RL 57.00		NDM / SV	1.83	36.0	1.9	1.82	38.6	0.7	1.82	37.3	1.3	2.70	33.0	1.37	4.0	3.2	125	133	>191	139	>147	152.	-	P	
9.1	JRA	13/11/2019	Fill K - Pond Bund Embankment	~0.5m Below FL of Pond Bund	Clay SILT	NDM / SV	1.76	35.6	5.9	1.76	33.3	7.1	1.76	34.5	6.5	2.70	34.3	1.31	6.6	3.6	>191	>191	>191	>191	>191	157	-	P	Air Void Average for 2 x tests @ Pond Embankment = 5.6%
9.2						NDM / SV	1.80	36.3	3.3	1.80	36.5	3.1	1.80	36.4	3.2	2.70	34.1	1.34	4.6	3.7	152	169	161	150	158	155	-	P	
11.1	JRA	22/11/2019	Fill E - See Site Plan	~1m Below FL	Clay SILT	NDM / SV	1.85	32.2	3.3	1.85	32.3	2.8	1.85	32.3	3.1	2.70	30.4	1.42	4.3	3.9	171	>187	>187	>187	183	164	-	P	
11.2						NDM / SV	1.87	28.9	4.2	1.87	27.7	5.0	1.87	28.3	4.6	2.70	23.6	1.52	8.1	4.2	128	147	166	144	146	168	-	P	
12.1	JRA	25/11/2019	Fill E - See Site Plan	~0.5m Below FL	Clay SILT	NDM / SV	1.84	30.6	4.9	1.84	29.1	5.9	1.84	29.9	5.4	2.70	34.9	1.36	2.0	4.2	>187	>187	>187	>187	>187	168	-	P	
12.2						NDM / SV	1.87	30.8	3.1	1.87	29.7	4.0	1.87	30.3	3.5	2.70	29.8	1.44	3.8	4.3	>187	>187	>187	>187	>187	168	-	P	
13.1	JRA	27/11/2019	Fill E - See Site Plan	~FL	Clay SILT	NDM / SV	1.93	31.7	0.0	1.93	32.6	0.0	1.93	32.2	0.0	2.70	31.3	1.47	0.0	4.3	>187	>187	>187	>187	>187	170	-	P	
13.2						NDM / SV	1.88	32.5	1.5	1.88	32.9	1.2	1.88	32.7	1.3	2.70	28.4	1.46	4.3	4.5	>187	>187	>187	>187	>187	172	-	P	
13.3			Fill O - Pond Bund Embankment	~1m Below FL	Clay SILT w Gravels	NDM / SV	1.86	31.4	3.0	1.86	31.6	3.1	1.86	31.5	3.1	2.70	25.4	1.48	7.4	4.5	131	176	158	160	156	173	-	P	
13.4						NDM / SV	1.78	37.4	3.5	1.78	34.6	5.1	1.78	36.0	4.3	2.70	32.8	1.34	6.3	4.7	176	>187	150	142	164	175	-	P	
14.1	JRA	29/11/2019	Fill O - Pond Bund Embankment	~FL	Clay SILT	NDM / SV	1.72	34.6	8.6	1.81	34.6	3.7	1.76	34.6	6.1	2.70	33.9	1.32	6.6	4.7	>187	>187	>187	>187	>187	174	-	P	
14.2						NDM / SV	1.82	34.9	2.8	1.82	34.7	3.1	1.82	34.8	2.9	2.70	33.5	1.36	3.7	4.7	>187	171	182	>187	182	177	-	P	
15.1	JRA	2/12/2019	Fill H - See Site Plan	~FL	Clay SILT	NDM / SV	1.76	40.7	2.7	1.76	39.6	3.3	1.76	40.2	3.0	2.70	43.2	1.23	1.3	4.4	>187	>187	>187	>187	>187	177	-	P	
15.2						NDM / SV	1.76	39.7	3.2	1.75	40.3	3.5	1.76	40.0	3.4	2.70	39.8	1.26	3.5	3.9	>187	>187	>187	>187	>187	181	-	P	
15.3			Fill O - Pond Floor Area			NDM / SV	1.81	35.0	3.4	1.81	34.6	3.5	1.81	34.8	3.5	2.70	36.1	1.33	2.7	4.0	123	147	163	139	143	177	-	P	
15.4						NDM / SV	1.79	34.5	4.8	1.79	35.5	4.3	1.79	35.0	4.6	2.70	33.7	1.34	5.4	4.1	150	136	139	131	139	172	-	P	
16.1	FRHA	13/12/2019	Fill A - See site plan	~3m placed	Clay SILT w gravels	NDM / SV	1.87	32.3	2.2	1.87	31.9	2.2	1.87	32.1	2.2	2.70	32.1	1.41	2.2	4.3	147	147	184	>187	166	170	-	P	
16.2						NDM / SV	1.82	34.3	3.1	1.84	32.6	3.4	1.83	33.5	3.2	2.70	33.5	1.37	3.2	4.2	158	176	>187	>187	177	169	-	P	
17.1	FRHA	6/01/2020	Fill A - See site plan	~4m placed	Clay SILT	NDM / SV	1.77	37.9	3.7	1.78	35.6	4.8	1.78	36.8	4.2	2.70	42.4	1.25	1.0	3.6	>187	>187	UTP	UTP	>187	172	-	P	
17.2						NDM / SV	1.83	34.5	2.5	1.84	35.3	1.5	1.84	34.9	2.0	2.70	33.2	1.38	3.1	3.3	>187	>187	>187	UTP	>187	174	-	P	
17.3						NDM / SV	1.82	35.1	2.6	1.83	35.2	2.5	1.82	35.2	2.5	2.70	32.6	1.38	4.2	3.0	>187	>187	>187	>187	>187	174	-	P	
17.4						NDM / SV	1.85	33.9	2.0	1.85	35.7	0.8	1.85	34.8	1.4	2.70	33.0	1.39	2.6	2.9	158	147	>187	>187	170	173	-	P	
18.1	FRHA	8/01/2020	Fill A - See site plan	~4.5m placed	Clay SILT w gravels	NDM / SV	1.80	36.8	2.8	1.81	37.1	2.2	1.80	37.0	2.5	2.70	33.8	1.35	4.5	3.2	147	>191	169	>191	175	172	-	P	
18.2						NDM / SV	1.82	37.1	1.8	1.83	34.7	2.7	1.82	35.9	2.2	2.70	37.3	1.33	1.4	3.0	139	147	150	>191	157	169	-	P	
19.1	FRHA	10/01/2020	Fill A - See site plan	~5m placed	Clay SILT w gravels	NDM / SV	1.90	26.5	4.8	1.89	25.6	5.9	1.89	26.1	5.3	2.70	24.4	1.52	6.6	3.4	>191	>191	UTP	>191	>191	174	-	P	
19.2						NDM / SV	1.88	26.2	5.8	1.89	25.8	5.8	1.88	26.0	5.8	2.70	26.4	1.49	5.5	3.4	'>191	122	>191	>191	168	176	-	P	
20.1	FRHA	13/01/2020	Fill A - See site plan	~5.5m placed	Clay SILT w gravels	NDM / SV	1.84	28.1	6.7	1.83	30.0	5.6	1.83	29.1	6.1	2.70	35.8	1.35	1.7	3.4	180	>191	>191	>191	188	179	-	P	
20.2						NDM / SV	1.79	22.6	12.9	1.80	22.4	12.8	1.79	22.5	12.9	2.70	27.0	1.41	9.6	4.0	>191	>191	>191	>191	>191	180	21.1	F	Dylan informed of fail and a retest was scheduled after he has put some damper fill in and reworked.

GEOTECHNICS

Job: Hitchens Block Stage 5

Client: Lander Geotechnical Ltd.

Job #	1009213.0657.0.0/3
Entered By	DASA/JRA/SEBA/FRHA
Checked By	JRA/DASA/SEBA
Approved By	SJA

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	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	
21.1	FRHA	14/01/2020	Fill A - See site plan	~5.5m placed	Clay SILT	NDM / SV	1.73	40.5	4.5	1.73	39.6	4.8	1.73	40.1	4.7	2.70	37.4	1.26	6.2	4.5	150	'>191	'>191	'>191	150	176	-	P	Retest of URN 20.2
21.2						NDM / SV	1.71	37.6	7.1	1.71	38.5	6.6	1.71	38.1	6.8	2.70	39.8	1.23	5.9	4.8	180	147	'>191	'>191	164	174	-	P	
22.1	FRHA	20/01/2020	Fill A - See site plan	~0.5m Placed	Clay SILT	NDM / SV	1.81	34.1	3.9	1.80	36.2	3.4	1.80	35.2	3.7	2.70	39.4	1.29	1.1	4.5	180	>191	177	166	179	173	-	P	
22.2						NDM / SV	1.82	35.0	3.1	1.82	35.4	2.6	1.82	35.2	2.9	2.70	37.0	1.33	1.8	4.4	>191	>191	>191	>191	>191	175	-	P	
23.1	FRHA	22/01/2020	Fill A - See site plan	~1m Placed	Clay SILT	NDM / SV	1.79	32.5	5.9	1.81	30.8	6.3	1.80	31.7	6.1	2.70	31.8	1.37	6.0	4.6	150	>191	>191	>191	181	176	-	P	
23.2						NDM / SV	1.81	36.4	2.5	1.82	36.6	1.9	1.82	36.5	2.2	2.70	35.8	1.34	2.6	4.7	163	174	>191	>191	180	178	-	P	
24.1	FRHA	24/01/2020	Fill A - See site plan	~1.5m Placed	Clay SILT	NDM / SV	1.76	31.0	8.5	1.77	32.7	6.8	1.77	31.9	7.6	2.70	35.6	1.30	5.3	4.6	>191	>191	>191	>191	>191	178	-	P	
24.2						NDM / SV	1.73	33.6	8.4	1.74	35.1	7.1	1.74	34.4	7.8	2.70	32.2	1.31	9.1	4.9	>191	>191	>191	>191	>191	180	-	P	
25.1	FRHA	29/01/2020	Fill A - See site plan	RL 57.8	Clay SILT	NDM / SV	1.79	29.4	8.0	1.79	30.3	7.4	1.79	29.9	7.7	2.70	29.8	1.38	7.7	5.5	>191	>191	>191	>191	>191	181	-	P	
25.2				RL 50.04		NDM / SV	1.81	35.2	3.1	1.81	36.6	2.2	1.81	35.9	2.6	2.70	34.0	1.35	3.8	5.0	>191	>191	>191	>191	>191	181	-	P	
26.1	FRHA	31/01/2020	Fill A - See site plan	~RL 50.54	Clay SILT	NDM / SV	1.93	29.4	0.8	1.93	24.4	4.7	1.93	26.9	2.7	2.70	23.2	1.57	5.6	4.9	>191	>191	>191	>191	>191	185	-	P	
26.2				~6m Placed		NDM / SV	1.88	26.0	6.0	1.88	25.5	6.6	1.88	25.8	6.3	2.70	25.5	1.5	6.5	5.0	>191	>191	>191	>191	>191	187	-	P	
27.1	FRHA	3/02/2020	Fill A - See site plan	~RL 51.04	Clay SILT	NDM / SV	1.78	32.8	6.2	1.78	33.8	5.9	1.78	33.3	6.0	2.70	35.4	1.3	4.7	5.3	>191	>191	>191	>191	>191	189	-	P	
27.2				~RL 58.3		NDM / SV	1.77	28.7	9.4	1.77	31.1	8.0	1.77	29.9	8.7	2.70	38.3	1.3	3.5	5.5	>191	>191	>191	>191	>191	189	-	P	
28.1	FRHA	5/02/2020	Fill A - See site plan	RL 56.10	Clay SILT	NDM / SV	1.76	30.6	8.8	1.76	29.8	9.4	1.76	30.2	9.1	2.70	29.3	1.4	9.7	5.9	>191	>191	>191	>191	>191	190	-	P	
28.2				RL 51.85		NDM / SV	1.90	24.6	5.8	1.89	29.0	3.3	1.90	26.8	4.5	2.70	24.8	1.5	6.0	6.2	>191	>191	>191	>191	>191	191	-	P	
29.1	FRHA	10/02/2020	Fill A - See site plan	RL 50.17	Clay SILT	NDM / SV	1.84	31.9	4.0	1.84	32.4	3.6	1.84	32.2	3.8	2.70	28.6	1.4	6.2	6.3	150	>191	188	166	174	189	-	P	
29.2				RL 58.35		NDM / SV	1.82	33.8	3.4	1.84	33.1	2.9	1.83	33.5	3.2	2.70	39.3	1.3	0.0	5.4	>191	>191	>191	>191	>191	189	-	P	
30.1	FRHA	12/02/2020	Fill A - See site plan	~RL 56.15	Clay SILT	NDM / SV	1.90	28.8	3.0	1.9	29.9	1.7	1.90	29.4	2.4	2.70	28.5	1.5	3.0	4.9	120	>191	128	188	157	186	-	P	
30.2				~RL 50.22		NDM / SV	1.88	29.7	3.4	1.87	30.0	3.5	1.87	29.9	3.4	2.70	32.9	1.4	1.4	4.7	150	>191	>191	163	174	184	-	P	
31.1	FRHA	14/02/2020	Fill A - See site plan	~RL 58.55	Clay SILT	NDM / SV	1.78	29.7	8.2	1.79	28.2	9.1	1.79	29.0	8.6	2.70	31.8	1.4	6.7	4.8	UTP	UTP	UTP	>191	>191	184	-	P	
31.2				~RL 50.67		NDM / SV	1.85	31.9	3.3	1.86	31.5	3.2	1.85	31.7	3.2	2.70	31.2	1.4	3.6	4.5	128	174	>191	150	161	181	-	P	
32.1	FRHA	17/02/2020	Fill A - See site plan	~RL 58.55	Clay SILT	NDM / SV	1.83	33.4	3.4	1.82	32.4	4.3	1.83	32.9	3.8	2.70	31.7	1.4	4.6	4.5	>191	>191	>191	>191	>191	181	-	P	
32.2				~RL 58.00		NDM / SV	1.90	21.2	8.6	1.89	22.7	8.0	1.90	22.0	8.3	2.70	37.2	1.4	0.0	4.1	139	122	152	>191	151	177	-	P	
33.1	FRHA	19/02/2020	Fill A - See site plan	~RL 59.00	Clay SILT	NDM / SV	1.79	30.0	7.7	1.77	28.9	9.4	1.78	29.5	8.6	2.70	32.0	1.3	6.9	3.8	>191	>191	>191	>191	>191	177	-	P	
33.2				~RL 58.50		NDM / SV	1.83	29.0	6.3	1.82	29.1	6.7	1.83	29.1	6.5	2.70	30.4	1.4	5.6	3.8	>191	>191	>191	>191	>191	177	-	P	
35.9	FRHA	21/02/2020	Fill A - See site plan	~RL 50.85	Clay SILT	NDM / SV	1.80	35.9	3.6	1.79	34.6	4.9	1.79	35.3	4.3	2.70	32.8	1.3	5.8	3.8	>191	>191	>191	>191	>191	179	-	P	
35.10						NDM / SV	1.89	26.5	4.9	1.90	25.7	5.2	1.90	26.1	5.0	2.70	31.7	1.4	1.0	3.9	133	150	174	152	152	175	-	P	
39.1	FRHA	26/02/2020	Fill A - See site plan	~RL 51.35	Clay SILT	NDM / SV	1.81	31.6	5.6	1.80	32.3	5.8	1.80	32.0	5.7	2.70	35.5	1.3	3.4	3.9	136	>191	>191	>191	177	177	-	P	
39.2						NDM / SV	1.80	36.2	3.3	1.80	37.8	2.2	1.80	37.0	2.7	2.70	38.8	1.3	1.7	3.9	177	>191	>191	>191	>187.5	178	-	P	
42.9	FRHA	2/03/2020	Fill A - See site plan	RL 63.65	Clay SILT	NDM / SV	1.95	30.6	0.0	1.95	31.4	0.0	1.95	31.0	0.0	2.70	37.3	1.4	0.0	3.3	>191	>191	>191	>191	>191	178	-	P	
42.10				RL 61.82		NDM / SV	1.90	35.1	0.0	1.90	34.6	0.0	1.90	34.9	0.0	2.70	34.7	1.4	0.0	2.9	>191	>191	>191	>191	>191	181	-	P	
43.1	FRHA	9/03/2020	Fill A - See site plan	RL 59.16	Clay SILT	NDM / SV	1.86	28.7	5.2	1.86	29.2	4.7	1.86	29.0	4.9	2.70	36.4	1.4	0.0	2.4	106	95	95	120	104	173	-	F	Shear Vanes < 120, Kyle and Dylan informed, no retest requested.
43.2				RL 57.56		NDM / SV	1.87	30.3	3.6	1.86	30.2	4.1	1.86	30.3	3.8	2.70	32.4	1.4	2.4	2.7	>191	188	>191	180	>187.5	181	-	P	
44.9	FRHA	13/03/2020	Fill A - See site plan	RL 58.94	Clay SILT	NDM / SV	1.79	26.5	9.9	1.79	27.3	9.6	1.79	26.9	9.8	2.70	32.4	1.4	6.1	2.6	>191	>191	>191	>191	>191	185	-	P	
44.10				RL 47.90		NDM / SV	1.83	29.4	6.1	1.81	34.0	4.0	1.82	31.7	5.1	2.70	36.0	1.3	2.3	2.3	>191	>191	>191	>191	>191	185	-	P	
45.11	FRHA	16/03/2020	Fill A - See site plan	~RL 48.40	Clay SILT	NDM / SV	1.88	27.4	5.1	1.87	28.6	4.6	1.87	28.0	4.9	2.70	30.5	1.4	3.1	2.0	>191	>191	>191	>191	>191	185	-	P	
45.12				~RL 59.44		NDM / SV	1.88	24.5	7.0	1.88	23.7	7.7	1.88	24.1	7.3	2.70	22.1	1.54	8.9	2.8	180	139	128	120	142	180	-	P	
46.1	FRHA	18/03/2020	Fill A - See site plan	~RL 48.30	Clay SILT	NDM / SV	1.84	31.8	3.9	1.84	31.7	4.2	1.84	31.8	4.0	2.70	32.6	1.39	3.4	2.8	>191	>191	>191	>191	>191	184	-	P	
46.2				~RL 48.90		NDM / SV	1.86	32.1	2.6	1.86	29.7	4.2	1.86	30.9	3.4	2.70	32.2	1.41	2.5	2.9	>191	>191	>191	161	184	184	-	P	

GEOTECHNICS

Job: Hitchens Block Stage 5

Client: Lander Geotechnical Ltd.

Job #	1009213.0657.0.0/3
Entered By	DASA/JRA/SEBA/FRHA
Checked By	JRA/DASA/SEBA
Approved By	SJA

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	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	
47.1	FRHA	1/05/2020	Fill A - See site plan	~RL 59.45	Clay SILT	NDM / SV	1.78	33.1	6.1	1.8	36.2	4.9	1.77	34.7	5.5	2.70	41.4	1.26	1.5	3.0	125	122	131	131	127	180	-	P	
47.2				~RL 49.00		NDM / SV	1.81	31.9	5.3	1.8	32.9	4.4	1.81	32.4	4.9	2.70	31.0	1.38	5.8	3.6	147	136	174	133	148	176	-	P	
47.3			Fill F - Drainage line	~0.5m to FL		NDM / SV	1.78	32.9	6.4	1.78	29.9	8.4	1.78	31.4	7.4	2.70	28.8	1.38	9.1	4.5	>191	>191	>191	>191	>191	176	-	P	Testing requested along filled in trench line where drainage has been installed
49.1	FRHA	15/05/2020	Fill E - Storm water Line	~FL	Clay SILT	NDM / SV	1.92	20.3	8.6	1.92	20.0	8.9	1.92	20.2	8.8	2.70	23.4	1.55	6.1	4.9	152	122	161	163	150	165	-	P	
49.2			Fill E - Sewer line			NDM / SV	1.95	26.8	1.9	1.94	28.6	1.0	1.94	27.7	1.5	2.70	20.0	1.62	7.6	5.0	122	120	139	150	133	159	-	P	
52.1	JRA	4/09/2020	Fill A - REB	~1m above Shear Key Hardfill	Clay SILT w Gravels	NDM / SV	1.88	35.8	0.0	1.88	35.8	0.0	1.88	35.8	0.0	2.70	38.3	1.36	0.0	4.8	163	176	174	174	172	165	-	P	
52.1						NDM / SV	1.92	30.7	0.7	1.92	30.1	0.7	1.92	30.4	0.7	2.70	29.4	1.48	1.4	4.6	>187	163	158	>187	174	159	-	P	
53.1	JRA	22/09/2020	Fill A - REB	~5m above Shear Key Hardfill - 1st Bench	Clay SILT w Gravels	NDM / SV	1.87	29.5	4.1	1.87	31.1	2.6	1.87	30.3	3.4	2.70	33.1	1.40	1.5	3.9	171	123	131	147	143	165	-	P	
53.2						NDM / SV	1.84	39.3	0.0	1.85	31.4	3.8	1.84	35.4	1.5	2.70	32.0	1.40	3.7	3.9	126	144	>187	171	157	156	-	P	
54.1	SEBA	5/10/2020	Fill A - REB	~5m above Shear Key Hardfill - 1st Bench	Clay SILT w Gravels	NDM / SV	1.90	31.3	1.1	1.89	31.6	1.5	1.89	31.5	1.3	2.70	28.9	1.47	3.1	4.3	189	189	189	189	189	158	-	P	
54.2						NDM / SV	1.91	32.2	0.0	1.90	31.5	1.1	1.90	31.9	0.5	2.70	28.9	1.48	2.6	3.9	189	189	189	189	189	164	-	P	
55.1	STFB	7/10/2020	Fill A - REB	Lower Shear Key RL 43.00	Clay SILT w Gravels	NDM / SV	1.84	32.8	3.0	1.85	28.4	5.8	1.85	30.6	4.4	2.70	33.1	1.39	2.7	2.7	156	184	170	173	171	167	-	P	
55.2				Upper Shear Key RL 56.37		NDM / SV	1.86	25.4	7.5	1.86	27.2	5.9	1.86	26.3	6.7	2.70	27.8	1.46	5.6	4.2	178	161	156	167	166	164	-	P	
56.1	PEFE	9/10/2020	Fill A - REB	Lower Shear Key RL 43.8	Clay SILT w Gravels	NDM / SV	1.83	33.3	3.3	1.80	32.8	5.1	1.82	33.1	4.2	2.70	30.2	1.40	6.1	3.4	172	164	160	156	163	166	-	P	
56.2						NDM / SV	1.85	34.3	1.6	1.84	35.4	1.6	1.85	34.9	1.6	2.70	30.6	1.41	4.4	3.1	164	174	200	170	177	170	-	P	
57.1	JRA	23/10/2020	Fill A - REB	RL 45.40	Clay SILT w Gravels	NDM / SV	1.83	37.3	0.9	1.83	35.6	1.9	1.83	36.5	1.4	2.70	34.1	1.36	2.9	3.4	144	126	160	131	140	167	-	P	
57.2						NDM / SV	1.92	29.8	1.3	1.92	28.6	2.0	1.92	29.2	1.6	2.70	27.9	1.50	2.6	3.5	>187	>187	>187	>187	>187	168	-	P	
58.1	JRA	28/10/2020	Fill A - REB	RL 46.20	Clay SILT w Gravels	NDM / SV	1.81	32.6	4.9	1.81	32.4	5.1	1.81	32.5	5.0	2.70	38.2	1.31	1.4	3.5	136	134	147	144	140	168	-	P	
58.2						NDM / SV	1.90	29.3	2.4	1.91	28.9	2.2	1.91	29.1	2.3	2.70	27.8	1.49	3.2	3.5	>187	>187	>187	>187	>187	171	-	P	
59.1	JRA	30/10/2020	Fill A - REB	RL 47.00	Clay SILT w Gravels	NDM / SV	1.84	31.9	3.7	1.85	35.3	1.3	1.84	33.6	2.5	2.70	34.7	1.37	1.8	3.3	>187	>187	>187	>187	>187	171	-	P	
59.2						NDM / SV	1.73	36.4	7.0	1.74	36.4	6.2	1.73	36.4	6.6	2.70	34.2	1.29	7.9	3.9	144	163	158	136	150	167	-	P	
60.1	JRA	4/11/2020	Fill A - REB	RL 48.20	Sandy SILT w clay and gravels	NDM / SV	1.75	31.9	8.6	1.75	31.9	8.7	1.75	31.9	8.6	2.70	39.1	1.26	4.3	4.0	>187	>187	131	128	158	166	-	P	
60.2				RL 48.50		NDM / SV	1.75	28.7	10.8	1.77	29.6	8.8	1.76	29.2	9.8	2.70	44.5	1.22	0.7	3.5	174	123	126	126	137	163	-	P	
61.1	JRA	16/11/2020	Fill A - REB	RL 49.20	Sandy SILT w clay and gravels	NDM / SV	1.80	37.1	2.9	1.81	39.2	0.9	1.80	38.2	1.9	2.70	44.6	1.25	0.0	2.9	170	126	151	151	150	161	-	P	
61.2						NDM / SV	1.76	42.1	2.0	1.76	43.9	0.9	1.76	43.0	1.4	2.70	45.8	1.21	0.0	2.5	188	>216	166	182	188	162	-	P	
62.1	JRA	4/12/2020	Fill A - REB	RL 52.60	Sandy SILT w clay and gravels	NDM / SV	1.88	29.9	3.3	1.88	32.1	1.8	1.88	31.0	2.5	2.70	30.9	1.43	2.6	2.5	182	130	139	159	153	164	-	P	
62.2						NDM / SV	1.90	28.5	3.0	1.92	27.3	3.1	1.91	27.9	3.0	2.70	31.7	1.45	0.3	2.2	139	139	159	153	148	160	-	P	
62.3						NDM / SV	1.90	27.8	3.6	1.90	27.3	3.9	1.90	27.6	3.7	2.70	29.0	1.47	2.7	2.4	133	179	184	170	167	162	-	P	
62.4						NDM / SV	1.89	28.0	3.9	1.89	27.1	4.6	1.89	27.6	4.3	2.70	31.2	1.44	1.7	2.2	>199	>199	>199	>199	>199	164	-	P	
63.1	JRA	7/12/2020	Fill A - REB	RL 50.90	Sandy SILT w clay and gravels	NDM / SV	1.95	24.3	3.8	1.95	23.6	4.4	1.95	24.0	4.1	2.70	20.9	1.61	6.6	2.7	>199	>199	>199	>199	>199	165	-	P	Test Pits Dug by Dines to test missed layers as requested by Kyle (Lander) / Trevor (Dines) - Testing conducted behind area of Geo Grid.
63.2				RL 51.90		NDM / SV	1.86	34.7	1.2	1.86	34.6	0.8	1.86	34.7	1.0	2.70	30.6	1.42	3.7	2.3	176	>199	153	156	171	167	-	P	
63.3				RL 52.00		NDM / SV	1.91	28.7	2.6	1.91	28.3	2.9	1.91	28.5	2.7	2.70	25.4	1.52	5.0	2.3	156	122	125	139	136	165	-	P	
63.4				RL 51.00		NDM / SV	1.90	29.7	2.4	1.89	30.4	2.4	1.89	30.1	2.4	2.70	28.9	1.47	3.2	2.6	128	153	>199	133	153	166	-	P	
63.5				RL 53.40		NDM / SV	1.86	24.4	8.2	1.87	25.7	6.9	1.86	25.1	7.5	2.70	23.8	1.50	8.5	3.4	>199	>199	153	>199	>187	170	-	P	
63.6				RL 52.90		NDM / SV	1.86	23.1	9.1	1.86	23.9	8.6	1.86	23.5	8.8	2.70	27.5	1.46	5.9	4.0	>199	>187	184	>187	189	170	-	P	
64.1	JRA / DASA	9/12/2020	Fill A - REB	RL 53.0	Clay SILT w gravels	NDM / SV	1.90	26.7	4.6	1.90	28.4	3.3	1.90	27.6	3.9	2.70	25.2	1.52	5.7	4.3	>199	>199	UTP	UTP	>199	175	-	P	
64.2						NDM / SV	1.86	31.9	2.6	1.80	29.9	7.0	1.83	30.9	4.8	2.70	36.7	1.34	1.1	4.4	136	139	>199	156	158	176	-	P	
64.3			Fill Area - 415/422	~1.5m below FL		NDM / SV	1.85	35.2	1.3	1.85	34.1	1.6	1.85	34.7	1.5	2.70	37.5	1.35	0.0	4.1	139	136	153	159	147	174	-	P	Dylan Provided Area tested Reference of 415/422 - See Site plan for approximate testing location.
64.4						NDM / SV	1.83	28.3	7.0	1.80	33.7	4.6	1.81	31.0	5.7	2.70	37.3	1.32	1.7	4.1	133	139	145	139	139	168	-	P	

GEOTECHNICS

Job: Hitchens Block Stage 5

Client: Lander Geotechnical Ltd.

Job #	1009213.0657.0.0/3
Entered By	DASA/JRA/SEBA/FRHA
Checked By	JRA/DASA/SEBA
Approved By	SJA

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	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	
65.1	JRA / DASA	14/12/2020	Fill A - REB	RL 54.0	Clay SILT w gravels	NDM / SV	1.82	29.5	6.3	1.81	30.6	6.1	**1.82**	**30.1**	**6.2**	2.70	37.8	**1.32**	**1.2**	**3.6**	156	133	170	184	161	164	-	**P**	
65.2						NDM / SV	1.96	26.8	1.4	1.98	24.8	1.9	**1.97**	**25.8**	**1.7**	2.70	28.0	**1.54**	**0.0**	**3.2**	UTP	UTP	184	>199	>191.5	166	-	**P**	
65.3				RL 53.0		NDM / SV	1.90	26.4	4.6	1.90	28.2	3.3	**1.90**	**27.3**	**3.9**	2.70	31.3	**1.45**	**1.1**	**2.8**	142	156	>199	184	170	169	-	**P**	
65.4			Fill Area - 415/422	~1m below FL		NDM / SV	1.91	22.0	7.7	1.94	20.4	7.3	**1.93**	**21.2**	**7.5**	2.70	20.7	**1.60**	**7.9**	**3.3**	UTP	>199	UTP	193	196	174	-	**P**	
65.5						NDM / SV	1.99	24.3	1.6	1.99	23.9	2.2	**1.99**	**24.1**	**1.9**	2.70	25.6	**1.59**	**0.7**	**2.5**	UTP	>199	>199	UTP	>199	175	-	**P**	
66.1	JRA	16/12/2020	Fill Area - 415/422	~0.5m below FL	Clay SILT w gravels	NDM / SV	1.93	25.4	4.1	1.93	25.0	4.1	**1.93**	**25.2**	**4.1**	2.70	31.2	**1.47**	**0.0**	**1.9**	>199	>199	>199	>199	>199	176	-	**P**	
66.2						NDM / SV	1.93	28.2	1.6	1.94	28.6	0.8	**1.94**	**28.4**	**1.2**	2.70	29.9	**1.49**	**0.1**	**1.4**	>199	>199	>199	>199	>199	176	-	**P**	
66.3			Fill A - REB	RL 53.20		NDM / SV	1.90	25.6	5.0	1.90	27.2	3.9	**1.90**	**26.4**	**4.4**	2.70	32.9	**1.43**	**0.0**	**1.3**	182	>187	>199	>199	>191	179	-	**P**	
66.4				RL 53.80		NDM / SV	1.99	27.8	0.0	1.98	29.0	0.0	**1.99**	**28.4**	**0.0**	2.70	28.8	**1.54**	**0.0**	**1.3**	>199	>199	>199	>199	>199	185	-	**P**	
68.1	DASA	6/01/2021	Fill A - See Site Plan	~RL 65.00	Clay SILT w gravels	NDM / SV	1.82	32.9	4.3	1.80	33.2	5.3	**1.81**	**33.1**	**4.8**	2.70	37.5	**1.31**	**2.0**	**1.3**	151	>216	151	170	172	187	-	**P**	
68.2				~RL 60.00		NDM / SV	1.75	36.2	6.0	1.75	35.8	6.1	**1.75**	**36.0**	**6.0**	2.70	34.9	**1.30**	**6.7**	**1.9**	>216	>216	>216	UTP	>216	193	-	**P**	
68.3				~RL 53.00		NDM / SV	1.91	32.6	0.0	1.91	34.4	0.0	**1.91**	**33.5**	**0.0**	2.70	33.0	**1.43**	**0.0**	**1.9**	>216	>216	170	185	197	194	-	**P**	
68.4				~RL 53.00		NDM / SV	1.87	29.6	4.1	1.87	29.0	4.1	**1.87**	**29.3**	**4.1**	2.70	32.5	**1.41**	**1.9**	**1.9**	>216	>216	UTP	UTP	>216	198	-	**P**	
70.5	DASA	11/01/2021	Fill A - See Site Plan	~ RL 63	Sandy SILT w some Clay	NDM / SV	1.85	26.0	7.5	1.86	25.2	7.5	**1.85**	**25.6**	**7.5**	2.70	22.3	**1.52**	**10.0**	**2.1**	46	65	62	92	66	185	**74.8**	**F**	SV < 120 kPa & AV > 12% - Dines informed material would be removed and replaced
70.6				~ RL 63		NDM / SV	1.80	22.4	12.6	1.75	22.9	14.5	**1.78**	**22.7**	**13.5**	2.70	23.8	**1.44**	**12.7**	**3.3**	52	46	43	46	47	170	**74.9**	**F**	
70.7			Fill A - REB	~ RL 53	Clay SILT w Gravels	NDM / SV	1.77	32.5	7.2	1.77	34.0	6.1	**1.77**	**33.3**	**6.6**	2.70	31.4	**1.35**	**7.8**	**4.1**	170	154	185	173	171	167	-	**P**	
72.1	DASA	12/01/2021	Fill A - REB	~ RL 54	Clay SILT some Sand	NDM / SV	1.79	38.4	2.6	1.80	37.3	2.6	**1.79**	**37.9**	**2.6**	2.70	32.8	**1.35**	**5.7**	**4.7**	170	154	185	185	174	165	-	**P**	
72.2				~ RL 55		NDM / SV	1.80	30.5	6.8	1.81	32.4	5.0	**1.81**	**31.5**	**5.9**	2.70	23.3	**1.46**	**11.6**	**5.8**	170	173	157	170	168	162	-	**P**	
74.8	JRA	13/01/2021	Fill A - See Site Plan	~0.3m Below FL	Clay SILT some Sand	NDM / SV	1.81	36.0	2.6	1.81	36.0	2.6	**1.81**	**36.0**	**2.6**	2.70	35.0	**1.34**	**3.2**	**6.2**	>199	>199	>199	>199	>199	162	-	**P**	Retest of URN 70.5
74.9				~FL		NDM / SV	1.83	23.5	10.4	1.83	23.4	10.3	**1.83**	**23.5**	**10.3**	2.70	25.8	**1.45**	**8.6**	**6.8**	>199	>199	>199	>199	>199	165	-	**P**	Retest of URN 70.6
75.5	DASA	14/01/2021	Fill A - REB	~RL 54.5	Clay SILT some Sand	NDM / SV	1.86	34.4	1.3	1.86	34.3	1.1	**1.86**	**34.4**	**1.2**	2.70	32.1	**1.41**	**2.6**	**6.4**	>216	>216	>216	200	212	165	-	**P**	
75.6						NDM / SV	1.77	44.3	0.2	1.78	42.3	0.9	**1.77**	**43.3**	**0.6**	2.70	46.7	**1.21**	**0.0**	**6.4**	170	185	185	200	185	164	-	**P**	
77.1	DASA	15/01/2021	Fill A - REB	RL 54.0	Clay SILT w Gravels	NDM / SV	1.82	37.9	1.1	1.83	36.6	1.6	**1.82**	**37.3**	**1.4**	2.70	43.9	**1.27**	**0.0**	**6.2**	154	139	142	154	147	157	-	**P**	
77.2				RL 56.40		NDM / SV	1.82	31.5	5.0	1.82	33.3	4.0	**1.82**	**32.4**	**4.5**	2.70	34.9	**1.35**	**2.9**	**5.5**	>216	>216	>216	>216	>216	172	-	**P**	
79.10	JRA	18/01/2021	Fill A - REB	~RL 56.7	Clay SILT w Gravels	NDM / SV	1.70	37.0	7.9	1.70	38.4	7.2	**1.70**	**37.7**	**7.5**	2.70	45.7	**1.17**	**3.2**	**4.6**	>199	>199	>199	>199	>199	187	-	**P**	
79.11						NDM / SV	1.78	36.9	3.8	1.77	36.1	4.6	**1.78**	**36.5**	**4.2**	2.70	41.8	**1.25**	**1.2**	**3.9**	139	159	>199	>199	174	187	-	**P**	
83.1	DASA	27/01/2021	Fill A - REB	~RL 56	Clay SILT w Gravels	NDM / SV	1.82	41.1	0.0	1.82	38.5	0.9	**1.82**	**39.8**	**0.0**	2.70	41.0	**1.29**	**0.0**	**3.3**	>216	>216	>216	>216	>216	191	-	**P**	
83.2						NDM / SV	1.75	41.5	3.1	1.75	41.0	3.1	**1.75**	**41.3**	**3.1**	2.70	35.5	**1.29**	**6.4**	**2.8**	200	185	188	185	190	194	-	**P**	
84.1	DASA	29/01/2021	Fill A - REB	~RL 56.5	Clay SILT w Gravels	NDM / SV	1.91	28.9	2.2	1.91	30.0	1.3	**1.91**	**29.5**	**1.7**	2.70	**25.9**	**1.52**	**4.4**	**2.9**	123	126	139	126	129	187	-	**P**	
84.2						NDM / SV	1.68	52.2	1.6	1.68	49.4	2.8	**1.68**	**50.8**	**2.2**	2.70	40.2	**1.20**	**7.5**	**2.8**	>216	>216	185	200	204	187	-	**P**	
85.1	DASA	2/02/2021	Fill B	RL 44.6	Clay SILT	NDM / SV	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**	**3.0**	170	185	173	188	179	184	-	**P**	
85.2				RL 46.6		NDM / SV	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**	**3.6**	185	188	>216	>216	201	185	-	**P**	
85.3				RL 48.9		NDM / SV	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**	**4.5**	>216	188	200	200	201	191	-	**P**	
86.1	DASA	3/02/2021	Fill C	~ FL	Clay SILT	NDM / SV	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**	**4.5**	>216	>216	>216	>216	>216	191	-	**P**	
86.2				~ RL 78		NDM / SV	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**	**4.6**	>216	>216	>216	>216	>216	193	-	**P**	
88.11	DASA	5/02/2021	Fill C	1m placed	Clay SILT	NDM / SV	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**	**4.8**	>216	>216	>216	>216	>216	197	-	**P**	
88.12						NDM / SV	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**	**5.3**	>216	>216	>216	>216	>216	197	-	**P**	
91.1	DASA	12/02/2021	Fill B	1m placed	Clay SILT	NDM / SV	1.75	32.5	8.4	1.75	31.6	8.7	**1.75**	**32.1**	**8.6**	2.70	30.8	**1.34**	**9.4**	**5.6**	>216	>216	>216	UTP	>216	199	-	**P**	
91.2				0.5m placed		NDM / SV	1.61	28.6	17.8	1.61	26.0	19.4	**1.61**	**27.3**	**18.6**	2.70	27.9	**1.26**	**18.2**	**7.0**	>216	>216	>216	>216	>216	208	**93.1**	**F**	

GEOTECHNICS

Job: Hitchens Block Stage 5

Client: Lander Geotechnical Ltd.

Job #	1009213.0657.0.0/3
Entered By	DASA/JRA/SEBA/FRHA
Checked By	JRA/DASA/SEBA
Approved By	SJA

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	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	
92.1	DASA	17/02/2021	Fill B	2m placed	Clay SILT	NDM / SV	1.72	34.1	8.8	1.73	32.1	9.5	1.72	33.1	9.2	2.70	35.1	1.28	8.0	7.1	154	170	157	173	164	204	-	P	
92.2				1.5m placed		NDM / SV	1.57	31.9	17.9	1.57	34.3	16.6	1.57	33.1	17.2	2.70	29.1	1.22	19.5	8.5	>216	>216	>216	>216	>216	208	93.1	F	
92.3				1.5m placed		NDM / SV	1.70	38.3	7.1	1.70	35.9	8.7	1.70	37.1	7.9	2.70	37.1	1.24	7.9	8.8	170	188	173	176	177	205	-	P	
92.4				2m placed		NDM / SV	1.79	38.3	2.3	1.80	28.6	8.3	1.80	33.5	5.2	2.70	24.2	1.45	11.5	9.0	170	173	176	173	173	203	-	P	
93.1	DASA	18/02/2021	Fill B	2.5m placed	Clay SILT	NDM / SV	1.81	31.9	5.3	1.81	34.6	3.6	1.81	33.3	4.4	2.70	32.0	1.37	5.2	9.3	>216	>216	203	185	205	201	-	P	Retest of URN 91.2, 92.2
94.1	DASA	19/02/2021	Fill B	~RL 45.2	Clay SILT	NDM / SV	1.69	35.7	9.3	1.70	34.7	9.5	1.70	35.2	9.4	2.70	34.1	1.26	10.0	9.8	185	>191	>216	185	194	199	-	P	
94.2				~REL 45.2		NDM / SV	1.79	38.4	2.5	1.78	39.1	2.6	1.78	38.8	2.6	2.70	38.7	1.29	2.6	9.7	170	173	173	182	175	195	-	P	
94.3				~RL 48		NDM / SV	1.80	38.3	1.7	1.80	37.5	2.3	1.80	37.9	2.0	2.70	48.6	1.21	0.0	9.2	>216	>216	>216	>216	>216	195	-	P	
94.4				~RL 53		NDM / SV	1.75	39.4	3.9	1.76	40.6	2.8	1.76	40.0	3.4	2.70	37.0	1.28	5.1	8.8	170	185	173	>191	180	191	-	P	
95.1	DASA	22/02/2021	Fill B	RL 54.2	Clay SILT	NDM / SV	1.79	32.0	6.6	1.79	33.4	5.5	1.79	32.7	6.1	2.70	33.0	1.34	5.9	7.6	154	173	170	154	163	186	-	P	
95.2				RL 53.0		NDM / SV	1.81	38.0	1.7	1.81	37.4	2.0	1.81	37.7	1.9	2.70	51.7	1.19	0.0	6.8	>216	>216	>216	>216	>216	191	-	P	
95.3				RL 51.0		NDM / SV	1.86	33.1	2.2	1.85	33.2	2.3	1.85	33.2	2.2	2.70	49.2	1.24	0.0	4.8	188	154	154	173	167	187	-	P	
96.1	DASA	23/02/2021	REB 1	600mm placed	Clay SILT	NDM / SV	1.74	31.5	9.1	1.76	31.0	8.6	1.75	31.3	8.9	2.70	31.0	1.34	9.0	4.9	>216	>216	>216	>216	>216	190	-	P	
97.1	DASA	24/02/2021	REB 2	RL 56.6	Clay SILT	NDM / SV	1.82	39.3	0.1	1.81	39.5	0.5	1.82	39.4	0.3	2.70	38.1	1.32	1.1	3.9	>216	>216	>216	>216	>216	195	-	P	
97.2				RL 54.5		NDM / SV	1.85	30.0	4.7	1.86	26.5	6.5	1.86	28.3	5.6	2.70	37.4	1.35	0.0	3.4	>216	>216	>216	>216	>216	196	-	P	
97.3				RL 46.6		NDM / SV	1.83	35.5	2.2	1.83	37.7	0.9	1.83	36.6	1.6	2.70	32.4	1.38	4.2	2.8	>216	>216	>216	208	214	198	-	P	
97.4				RL 46.6		NDM / SV	1.86	32.2	2.6	1.86	32.5	2.5	1.86	32.4	2.6	2.70	36.7	1.36	0.0	2.5	>216	>216	>216	>216	>216	202	-	P	
98.1	DASA	26/02/2021	REB 2	RL 57.1	Clay SILT	NDM / SV	1.85	39.1	0.0	1.86	35.7	0.3	1.86	37.4	0.0	2.70	36.7	1.36	0.0	2.5	185	170	185	170	178	198	-	P	
98.2				RL 56.0		NDM / SV	1.84	40.0	0.0	1.83	43.4	0.0	1.84	41.7	0.0	2.70	43.1	1.28	0.0	2.0	>216	>216	188	200	205	201	-	P	
98.3				RL 46.8		NDM / SV	1.69	39.0	7.6	1.69	40.9	6.3	1.69	40.0	7.0	2.70	38.0	1.23	8.0	2.2	>216	>216	>216	>216	>216	206	-	P	
99.1	DASA	1/03/2021	REB 2	RL 56.5	Clay SILT	NDM / SV	1.92	34.9	0.0	1.92	35.3	0.0	1.92	35.1	0.0	2.70	34.6	1.43	0.0	2.2	170	173	>216	>216	194	204	-	P	
99.2						NDM / SV	1.71	38.4	6.7	1.71	37.3	7.3	1.71	37.9	7.0	2.70	40.5	1.22	5.5	2.8	>216	>216	>216	>216	>216	209	-	P	
99.3				RL 47.6		NDM / SV	1.80	34.2	4.5	1.79	33.0	5.5	1.80	33.6	5.0	2.70	46.9	1.22	0.0	1.9	170	173	>216	>216	194	206	-	P	
99.4						NDM / SV	1.79	33.2	5.5	1.77	31.3	8.0	1.78	32.3	6.8	2.70	41.0	1.26	1.5	1.9	>216	>216	>216	>216	>216	206	-	P	
100.1	DASA	8/03/2021	REB 2	RL 48.4	Clay SILT	NDM / SV	1.75	40.1	3.6	1.73	41.7	4.0	1.74	40.9	3.8	2.70	45.2	1.20	1.5	2.1	62	74	92	99	82	193	101.2	F	SV < 120 kPa
100.2				RL 49.20		NDM / SV	1.66	44.0	6.9	1.64	46.1	6.6	1.65	45.1	6.7	2.70	43.6	1.15	7.5	2.4	>216	>216	>216	>216	>216	193	-	P	
100.3				RL 48.4		NDM / SV	1.66	46.1	5.3	1.67	46.7	4.7	1.67	46.4	5.0	2.70	46.2	1.14	5.1	2.9	170	173	170	182	174	189	-	P	
100.4				RL 48.4		NDM / SV	1.72	46.3	2.1	1.72	48.0	1.4	1.72	47.2	1.8	2.70	37.3	1.25	7.0	3.6	170	173	170	182	174	189	-	P	
100.5				RL 58		NDM / SV	1.76	42.0	2.1	1.77	41.8	1.6	1.76	41.9	1.9	2.70	42.2	1.24	1.7	3.8	>216	216	>216	>216	167	185	-	P	
100.6				RL 58.5		NDM / SV	1.76	37.4	4.6	1.75	38.7	4.5	1.76	38.1	4.5	2.70	40.0	1.25	3.4	3.3	170	166	173	185	174	181	-	P	
101.1	JRA	10/03/2021	REB 2	RL 50	Clay SILT	NDM / SV	1.77	37.8	3.7	1.78	37.9	3.4	1.78	37.9	3.5	2.70	44.4	1.23	0.0	3.3	173	167	170	196	177	179	-	P	
101.2				RL 48.4		NDM / SV	1.77	38.1	3.7	1.78	37.4	3.5	1.78	37.8	3.6	2.70	38.1	1.29	3.4	3.1	>199	>199	>199	>199	>199	177	-	P	Retest of URN 100.1
101.2			Slip" Area above Pond	RL 48.8 (~FL)		NDM / SV	1.74	37.8	5.6	1.72	41.3	4.4	1.73	39.6	5.0	2.70	35.6	1.28	7.3	3.8	156	>199	179	>199	183	176	-	P	
102.1	DASA	12/03/2021	REB 2	RL 50.40	Clay SILT	NDM / SV	1.79	35.1	4.6	1.78	34.4	5.3	1.78	34.8	4.9	2.70	33.9	1.33	5.5	4.2	>216	>216	>216	>216	>216	176	-	P	
102.2						NDM / SV	1.80	31.6	6.1	1.81	30.4	6.4	1.81	31.0	6.2	2.70	39.6	1.29	0.9	4.2	>216	>216	>216	>216	>216	190	-	P	
102.3				RL 57.20		NDM / SV	1.84	35.4	1.3	1.82	36.8	2.0	1.83	36.1	1.7	2.70	42.8	1.28	0.0	3.4	>216	>216	>216	>216	>216	190	-	P	
102.4				RL 59.00		NDM / SV	1.82	38.2	0.9	1.78	37.7	3.4	1.80	38.0	2.1	2.70	37.3	1.31	2.5	3.2	>216	UTP	>216	UTP	>216	194	-	P	
103.1	DASA	16/03/2021	REB 2	RL 51.60	Clay SILT	NDM / SV	1.87	33.8	1.2	1.87	33.8	1.1	1.87	33.8	1.2	2.70	39.1	1.34	0.0	2.5	154	170	166	163	163	193	-	P	
103.2						NDM / SV	1.67	47.6	4.4	1.65	47.7	5.2	1.66	47.7	4.8	2.70	52.5	1.09	2.5	2.6	>216	>216	>216	>216	>216	198	-	P	
104.1	DASA	18/03/2021	REB2	RL 51.59	Clay SILT	NDM / SV	1.78	34.2	5.5	1.78	34.2	5.7	1.78	34.2	5.6	2.70	37.3	1.30	3.7	2.6	170	173	>216	>216	194	199	-	P	
104.2				RL 51.93		NDM / SV	1.76	33.4	7.1	1.76	32.1	8.1	1.76	32.8	7.6	2.70	38.9	1.26	3.9	3.0	108	111	99	108	107	193	105.1	F	
104.3				~RL 58.75		NDM / SV	1.80	36.6	2.9	1.79	37.8	2.8	1.80	37.2	2.9	2.70	42.8	1.26	0.0	2.6	108	92	111	114	106	183	105.2	F	
104.4						NDM / SV	1.84	28.6	6.3	1.84	30.5	4.9	1.84	29.6	5.6	2.70	33.6	1.38	2.9	2.2	154	>216	>216	188	194	184	-	P	

GEOTECHNICS

Job: Hitchens Block Stage 5

Client: Lander Geotechnical Ltd.

Job #	1009213.0657.0.0/3
Entered By	DASA/JRA/SEBA/FRHA
Checked By	JRA/DASA/SEBA
Approved By	SJA

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	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	
105.1	DASA	19/03/2021	REB2	RL 51.93	Clay SILT	NDM / SV	1.53	23.0	25.3	1.55	23.8	23.9	**1.54**	**23.4**	**24.6**	2.70	24.3	**1.24**	**24.0**	-	154	166	157	170	162	179	**106.1**	**F**	Retest of URN 104.2
105.2				RL 51.38		NDM / SV	1.82	37.0	1.5	1.81	35.5	2.9	**1.82**	**36.3**	**2.2**	2.70	38.1	**1.32**	**1.1**	**4.1**	>216	>216	>216	>216	>216	179	-	**P**	Retest of URN 105.1
105.3				RL 58.75		NDM / SV	1.74	46.9	0.7	1.74	44.7	1.9	**1.74**	**45.8**	**1.3**	2.70	52.2	**1.14**	**0.0**	**4.1**	170	166	157	160	163	174	-	**P**	
106.1	JRA	22/03/2021	REB 2	RL 51.6	Clay SILT	NDM / SV	1.82	35.1	2.6	1.82	36.1	2.2	**1.82**	**35.6**	**2.4**	2.70	33.2	**1.37**	**3.9**	**4.2**	159	>199	173	167	175	169	-	**P**	
107.1	DASA	24/03/2021	REB2	RL ~53.2	Clay SILT	NDM / SV	1.78	35.8	4.3	1.77	34.0	6.2	**1.78**	**34.9**	**5.2**	2.70	39.8	**1.27**	**2.3**	**4.4**	185	182	170	>191	182	171	-	P	
107.2						NDM / SV	1.75	42.7	2.3	1.74	43.2	2.8	**1.74**	**43.0**	**2.5**	2.70	37.8	**1.26**	**5.4**	**4.7**	>216	>216	>216	>216	>216	171	-	P	
109.1	DASA	26/03/2021	REB2	RL 54.10	Clay SILT	NDM / SV	1.78	36.4	4.0	1.77	36.4	4.7	**1.78**	**36.4**	**4.3**	2.70	33.2	**1.33**	**6.3**	**5.0**	>216	>216	>216	>216	>216	174	-	P	
109.2				RL 54.00		NDM / SV	1.80	33.4	5.1	1.80	31.7	6.3	**1.80**	**32.6**	**5.7**	2.70	45.2	**1.24**	**0.0**	**4.6**	166	170	148	163	162	179	-	P	
110.1	DASA	7/04/2021	REB2	~RL 54.70	Clay SILT	NDM / SV	1.73	35.0	7.5	1.74	36.1	6.3	**1.74**	**35.6**	**6.9**	2.70	37.1	**1.27**	**6.0**	**5.2**	>216	>216	>216	>216	>216	190	-	P	
110.2						NDM / SV	1.77	31.2	7.7	1.76	31.3	8.4	**1.77**	**31.3**	**8.1**	2.70	39.1	**1.27**	**3.3**	**5.2**	>216	>216	>216	>216	>216	192	-	P	
110.3				~RL 57.40		NDM / SV	1.67	41.0	7.6	1.64	41.4	9.0	**1.66**	**41.2**	**8.3**	2.70	47.3	**1.12**	**5.2**	**3.4**	>216	>216	170	173	194	196	-	P	
110.4						NDM / SV	1.77	38.6	3.4	1.747	37.6	5.2	**1.76**	**38.1**	**4.3**	2.70	42.1	**1.24**	**2.0**	**3.4**	>216	>216	>216	>216	>216	196	-	P	
111.1	DASA	9/04/2021	REB2	~1m placed	Clay SILT	NDM / SV	1.78	29.9	8.2	1.761	29.5	9.5	**1.77**	**29.7**	**8.8**	2.70	42.7	**1.24**	**1.0**	**3.5**	>216	>216	>216	>216	>216	201	-	P	
111.2						NDM / SV	1.87	32.4	2.0	1.861	33.0	2.0	**1.87**	**32.7**	**2.0**	2.70	48.5	**1.26**	**0.0**	**3.2**	>216	>216	>216	>216	>216	205	-	P	
111.3						NDM / SV	1.79	27.6	9.5	1.871	26.0	6.4	**1.83**	**26.8**	**7.9**	2.70	32.2	**1.38**	**4.2**	**3.3**	185	188	200	197	193	206	-	P	
111.4			Pond Fill	~FL	Clay SILT	NDM / SV	1.80	27.5	8.9	1.81	27.3	8.5	**1.80**	**27.4**	**8.7**	2.70	46.1	**1.24**	**0.0**	**2.8**	>216	>216	>216	>216	>216	206	-	P	
111.5						NDM / SV	1.86	29.4	4.7	1.822	28.3	7.2	**1.84**	**28.9**	**6.0**	2.70	40.9	**1.31**	**0.0**	**2.2**	>216	>216	>216	>216	>216	206	-	P	
112.1	DASA	19/04/2021	REB2	~800mm from FL	Clay SILT	NDM / SV	1.92	30.7	0.4	1.92	31.2	0.1	**1.92**	**31.0**	**0.3**	2.70	**33.1**	**1.44**	**0.0**	**2.2**	>216	>216	>216	>216	>216	211	-	P	
112.2						NDM / SV	1.90	31.4	1.0	1.877	30.4	2.9	**1.89**	**30.9**	**1.9**	2.70	**33.0**	**1.42**	**0.5**	**1.6**	>216	>216	>216	>216	>216	211	-	P	
113.1	DASA	23/04/2021	REB2	~RL 64	Clay SILT	NDM / SV	1.80	31.0	6.6	1.80	30.6	7.0	**1.80**	**30.8**	**6.8**	2.70	**38.0**	**1.30**	**2.3**	**1.5**	185	188	>216	>216	201	210	-	P	
113.2				~RL 62		NDM / SV	1.88	31.6	1.8	1.89	31.5	1.6	**1.89**	**31.6**	**1.7**	2.70	**35.2**	**1.39**	**0.0**	**1.0**	>216	>216	>216	>216	>216	212	-	P	
114.1	DASA	30/04/2021	Pond Embankment	~RL 61.0	Clay SILT	NDM / SV	1.76	33.9	6.7	1.76	31.7	8.3	**1.76**	**32.8**	**7.5**	2.70	**36.2**	**1.29**	**5.4**	**1.3**	185	173	>216	>216	198	210	-	P	Pond embankment specification provided by Chris (Lander) requires maximum air voids <8%, average less than 6%, Shear strength average >140 kPa with a minimum single value of >120 kPa.
114.2				~RL 56.0		NDM / SV	1.78	34.3	5.7	1.78	31.6	7.3	**1.78**	**33.0**	**6.5**	2.70	**36.8**	**1.30**	**4.1**	**1.7**	170	154	173	185	171	206	-	P	
115.1	DASA	4/05/2021	REB2	RL 48.68	Clay SILT	NDM / SV	1.72	35.5	7.7	1.74	33.3	8.4	**1.73**	**34.4**	**8.0**	2.70	**39.3**	**1.24**	**5.2**	**2.2**	170	188	191	200	>187	203	-	P	
115.2				~ RL 47		NDM / SV	1.84	32.7	3.4	1.80	31.9	5.8	**1.82**	**32.3**	**4.6**	2.70	**45.2**	**1.25**	**0.0**	**1.8**	216	216	188	197	204	204	-	P	

Appendix B: Hardfill testing results

GEOTECHNICS

Job : Hitchens Block Stage 5

Customer: Lander Geotechnical Ltd

Job #	**1009213.0657.0.0/3**
Entered By	**DASA/JRA/FRHA**
Checked By	**SEBA/DASA/JRA**
Approved By	**SJA**

URN	Tech.	Date	Material Type	Location	Layer	Chainage	Offset	Nuclear Density (Backscatter)								Impact Value 1	Retest URN	PASS / FAIL	Comments
								Wet Density	Dry Density (t/m^3)	Moisture Content (%)	Maximum Dry Density (t/m^3)	% Maximum Dry Density	Solid Density (t/m^3)	% Solid Density	% Total Voids			(P) Pass (F) Fail	
1.1	JRA	17/10/2019	SPR	Fill F Toe Key - Hardfill	RL 40.78	-	-	-	-	-	-	-	-	-	-	**10**	**2.1**	**F**	Specification of CIV ≥ 20 provided by Kyle (Lander). CIV < 20 - Fail. Hardfill had only been track rolled - Kyle Informed & to be retested tomorrow.
1.2						-	-	-	-	-	-	-	-	-	-	**11**	**2.2**	**F**	
1.3						-	-	-	-	-	-	-	-	-	-	**10**	**2.3**	**F**	
1.4						-	-	-	-	-	-	-	-	-	-	**12**	**2.4**	**F**	
1.5						-	-	-	-	-	-	-	-	-	-	**10**	**2.5**	**F**	
1.6						-	-	-	-	-	-	-	-	-	-	**10**	**2.6**	**F**	
2.1	JRA	18/10/2019	SPR	Fill F Toe Key - Hardfill	RL 40.78	-	-	-	-	-	-	-	-	-	-	**22**	-	**P**	Retest of URN 1.1 once compacted with plate compactor
2.2						-	-	-	-	-	-	-	-	-	-	**21**	-	**P**	Retest of URN 1.2 once compacted with plate compactor
2.3						-	-	-	-	-	-	-	-	-	-	**22**	-	**P**	Retest of URN 1.3 once compacted with plate compactor
2.4						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	Retest of URN 1.4 once compacted with plate compactor
2.5						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	Retest of URN 1.5 once compacted with plate compactor
2.6						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	Retest of URN 1.6 once compacted with plate compactor
10.1	JRA	21/11/2019	SPR	Fill 0 Pond Toe Key - Hardfill	Top of Hardfill	-	-	-	-	-	-	-	-	-	-	**31**	-	**P**	
10.2						-	-	-	-	-	-	-	-	-	-	**25**	-	**P**	
10.3						-	-	-	-	-	-	-	-	-	-	**21**	-	**P**	
10.4						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
10.5						-	-	-	-	-	-	-	-	-	-	**29**	-	**P**	
10.6						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
34.1	FRHA	20/02/2020	SPR	Fill A - Shear Key	0.6m Placed	-	-	**2.26**	**2.14**	**5.8**	**2.09**	**102.2%**	-	-	-	**55**	-	**P**	Backscatter specification of 95% MDD provided by Kyle (Lander)
34.2						-	-	**2.20**	**2.12**	**4.1**	**2.09**	**101.2%**	-	-	-	**48**	-	**P**	
34.3						-	-	**2.20**	**2.09**	**5.1**	**2.09**	**99.9%**	-	-	-	**28**	-	**P**	
34.4						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	
34.5						-	-	-	-	-	-	-	-	-	-	**43**	-	**P**	
34.6						-	-	-	-	-	-	-	-	-	-	**37**	-	**P**	
35.1	FRHA	21/02/2020	SPR	Fill A - Shear Key	1.2m Placed	-	-	**2.21**	**2.06**	**7.3**	**2.09**	**98.7%**	-	-	-	**28**	-	**P**	
35.2						-	-	**2.28**	**2.12**	**7.1**	**2.09**	**101.6%**	-	-	-	**23**	-	**P**	
35.3						-	-	**2.20**	**2.10**	**4.7**	**2.09**	**100.5%**	-	-	-	**45**	-	**P**	
35.4						-	-	**2.25**	**2.15**	**4.9**	**2.09**	**102.8%**	-	-	-	**50**	-	**P**	
35.5						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
35.6						-	-	-	-	-	-	-	-	-	-	**37**	-	**P**	
35.7						-	-	-	-	-	-	-	-	-	-	**37**	-	**P**	
35.8						-	-	-	-	-	-	-	-	-	-	**41**	-	**P**	

GEOTECHNICS

Job : Hitchens Block Stage 5

Customer: Lander Geotechnical Ltd

Job #	**1009213.0657.0.0/3**
Entered By	**DASA/JRA/FRHA**
Checked By	**SEBA/DASA/JRA**
Approved By	**SJA**

URN	Tech.	Date	Material Type	Location	Layer	Chainage	Offset	Nuclear Density (Backscatter)								Impact Value 1	Retest URN	PASS / FAIL	Comments
								Wet Density	Dry Density (t/m^3)	Moisture Content (%)	Maximum Dry Density (t/m^3)	% Maximum Dry Density	Solid Density (t/m^3)	% Solid Density	% Total Voids			(P) Pass (F) Fail	
36.1	FRHA	24/02/2020	SPR	Fill A - Shear Key	1.8m Placed	-	-	**2.12**	**2.02**	**5.2**	**2.09**	**96.6%**	-	-	-	**36**	-	**P**	
36.2						-	-	**2.15**	**2.05**	**5.0**	**2.09**	**98.0%**	-	-	-	**31**	-	**P**	
36.3						-	-	**2.13**	**2.02**	**5.0**	**2.09**	**96.9%**	-	-	-	**48**	-	**P**	
36.4						-	-	**2.12**	**2.03**	**4.3**	**2.09**	**97.3%**	-	-	-	**28**	-	**P**	
36.5						-	-	-	-	-	-	-	-	-	-	**52**	-	**P**	
36.6						-	-	-	-	-	-	-	-	-	-	**61**	-	**P**	
36.7						-	-	-	-	-	-	-	-	-	-	**42**	-	**P**	
36.8						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
37.1	FRHA	25/02/2020	SPR	Fill A - Shear Key	2.4m Placed	-	-	**2.16**	**2.04**	**5.7**	**2.09**	**97.6%**	-	-	-	**26**	-	**P**	
37.2						-	-	**2.20**	**2.06**	**6.6**	**2.09**	**98.6%**	-	-	-	**30**	-	**P**	
37.3						-	-	**2.19**	**2.07**	**5.7**	**2.09**	**98.9%**	-	-	-	**32**	-	**P**	
37.4						-	-	**2.20**	**2.05**	**7.6**	**2.09**	**97.9%**	-	-	-	**31**	-	**P**	
37.5						-	-	-	-	-	-	-	-	-	-	**32**	-	**P**	
37.6						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
37.7						-	-	-	-	-	-	-	-	-	-	**41**	-	**P**	
37.8						-	-	-	-	-	-	-	-	-	-	**38**	-	**P**	
38.1	FRHA	25/02/2020	SPR	Fill A - Shear Key	3.0m Placed	-	-	**2.24**	**2.11**	**6.2**	**2.09**	**101.0%**	-	-	-	**36**	-	**P**	
38.2						-	-	**2.26**	**2.12**	**6.9**	**2.09**	**101.3%**	-	-	-	**31**	-	**P**	
38.3						-	-	**2.21**	**2.10**	**5.5**	**2.09**	**100.3%**	-	-	-	**40**	-	**P**	
38.4						-	-	**2.13**	**2.02**	**5.2**	**2.09**	**96.7%**	-	-	-	**28**	-	**P**	
38.5						-	-	-	-	-	-	-	-	-	-	**29**	-	**P**	
38.6						-	-	-	-	-	-	-	-	-	-	**33**	-	**P**	
38.7						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
38.8						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
40.1	FRHA	26/02/2020	SPR	Fill A - Shear Key	3.6m Placed	-	-	**2.13**	**2.01**	**5.6**	**2.09**	**96.4%**	-	-	-	**49**	-	**P**	
40.2						-	-	**2.21**	**2.08**	**6.2**	**2.09**	**99.4%**	-	-	-	**57**	-	**P**	
40.3						-	-	**2.09**	**2.01**	**4.4**	**2.09**	**95.9%**	-	-	-	**60**	-	**P**	
40.4						-	-	**2.16**	**2.05**	**5.3**	**2.09**	**98.2%**	-	-	-	**30**	-	**P**	
40.5						-	-	-	-	-	-	-	-	-	-	**36**	-	**P**	
40.6						-	-	-	-	-	-	-	-	-	-	**34**	-	**P**	
40.7						-	-	-	-	-	-	-	-	-	-	**40**	-	**P**	
40.8						-	-	-	-		-	-	-	-	-	**41**	-	**P**	

GEOTECHNICS

Job : Hitchens Block Stage 5

Customer: Lander Geotechnical Ltd

Job #	1009213.0657.0.0/3
Entered By	DASA/JRA/FRHA
Checked By	SEBA/DASA/JRA
Approved By	SJA

URN	Tech.	Date	Material Type	Location	Layer	Chainage	Offset	Nuclear Density (Backscatter)								Impact Value 1	Retest URN	PASS / FAIL	Comments
								Wet Density	Dry Density (t/m^3)	Moisture Content (%)	Maximum Dry Density (t/m^3)	% Maximum Dry Density	Solid Density (t/m^3)	% Solid Density	% Total Voids			(P) Pass (F) Fail	
41.1	FRHA	27/02/2020	SPR	Fill A - Shear Key	4.2m Placed	-	-	2.19	2.08	5.7	2.09	99.3%	-	-	-	27	-	P	
41.2						-	-	2.22	2.05	8.5	2.09	98.0%	-	-	-	27	-	P	
41.3						-	-	2.24	2.13	5.1	2.09	102.0%	-	-	-	51	-	P	
41.4						-	-	2.21	2.08	6.4	2.09	99.4%	-	-	-	38	-	P	
41.5						-	-	-	-	-	-	-	-	-	-	40	-	P	
41.6						-	-	-	-	-	-	-	-	-	-	40	-	P	
41.7						-	-	-	-	-	-	-	-	-	-	36	-	P	
41.8						-	-	-	-	-	-	-	-	-	-	37	-	P	
42.1	FRHA	2/03/2020	SPR	Fill A - Shear Key	4.8m Placed	-	-	2.14	2.01	6.2	2.09	96.4%	-	-	-	32	-	P	
42.2						-	-	2.12	2.01	5.5	2.09	96.2%	-	-	-	20	-	P	
42.3						-	-	2.23	2.08	7.1	2.09	99.5%	-	-	-	23	-	P	
42.4						-	-	2.22	2.09	6.2	2.09	99.9%	-	-	-	28	-	P	
42.5						-	-	-	-	-	-	-	-	-	-	28	-	P	
42.6						-	-	-	-	-	-	-	-	-	-	29	-	P	
42.7						-	-	-	-	-	-	-	-	-	-	27	-	P	
42.8						-	-	-	-	-	-	-	-	-	-	29	-	P	
44.1	FRHA	13/03/2020	SPR	Fill A - Shear Key	3.6m Placed	-	-	2.23	2.07	7.6	2.09	99.3%	-	-	-	26	-	P	
44.2						-	-	2.20	2.06	6.9	2.09	98.3%	-	-	-	29	-	P	
44.3						-	-	2.15	2.02	6.8	2.09	96.5%	-	-	-	21	-	P	
44.4						-	-	2.12	2.00	6.3	2.09	95.6%	-	-	-	20	-	P	
44.5						-	-	-	-	-	-	-	-	-	-	24	-	P	
44.6						-	-	-	-	-	-	-	-	-	-	37	-	P	
44.7						-	-	-	-	-	-	-	-	-	-	24	-	P	
44.8						-	-	-	-	-	-	-	-	-	-	20	-	P	
45.1	FRHA	16/03/2020	SPR	Fill A - Shear Key	5.4m Placed	-	-	2.16	2.03	6.2	2.09	97.3%	-	-	-	32	-	P	
45.2						-	-	2.19	2.07	5.6	2.09	99.2%	-	-	-	42	-	P	
45.3						-	-	2.16	2.03	6.3	2.09	97.2%	-	-	-	35	-	P	
45.4						-	-	2.18	2.04	6.8	2.09	97.8%	-	-	-	30	-	P	
45.5						-	-	2.18	2.02	7.5	2.09	96.8%	-	-	-	43	-	P	
45.6						-	-	2.23	2.13	4.8	2.09	101.9%	-	-	-	42	-	P	
45.7						-	-	-	-	-	-	-	-	-	-	27	-	P	
45.8						-	-	-	-	-	-	-	-	-	-	35	-	P	
45.9						-	-	-	-	-	-	-	-	-	-	32	-	P	
45.10						-	-	-	-	-	-	-	-	-	-	40	-	P	

GEOTECHNICS

Job : Hitchens Block Stage 5

Customer: Lander Geotechnical Ltd

Job #	**1009213.0657.0.0/3**
Entered By	**DASA/JRA/FRHA**
Checked By	**SEBA/DASA/JRA**
Approved By	**SJA**

URN	Tech.	Date	Material Type	Location	Layer	Chainage	Offset	Nuclear Density (Backscatter)								Impact Value 1	Retest URN	PASS / FAIL	Comments
								Wet Density	Dry Density (t/m^3)	Moisture Content (%)	Maximum Dry Density (t/m^3)	% Maximum Dry Density	Solid Density (t/m^3)	% Solid Density	% Total Voids			(P) Pass (F) Fail	
48.1						-	-	**2.17**	**2.04**	**6.5**	**2.09**	**97.5%**	-	-	-	**27**	-	**P**	
48.2						-	-	**2.34**	**2.15**	**8.7**	**2.09**	**103.1%**	-	-	-	**35**	-	**P**	
48.3						-	-	**2.13**	**2.03**	**4.7**	**2.09**	**97.1%**	-	-	-	**23**	-	**P**	
48.4						-	-	**2.16**	**2.00**	**7.6**	**2.09**	**95.9%**	-	-	-	**25**	-	**P**	
48.5	FRHA	13/05/2020	SPR	Fill A - Shear Key	6.0m Placed	-	-	**2.21**	**2.04**	**8.5**	**2.09**	**97.4%**	-	-	-	**20**	-	**P**	
48.6						-	-	**2.31**	**2.11**	**9.6**	**2.09**	**100.8%**	-	-	-	**22**	-	**P**	
48.7						-	-	-	-	-	-	-	-	-	-	**23**	-	**P**	
48.8						-	-	-	-	-	-	-	-	-	-	**21**	-	**P**	
48.9						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	
50.1						-	-	**2.12**	**2.02**	**4.8**	**2.09**	**96.8%**	-	-	-	**28**	-	**P**	
50.2						-	-	**2.28**	**2.16**	**5.5**	**2.09**	**103.5%**	-	-	-	**28**	-	**P**	
50.3						-	-	**2.21**	**2.13**	**4.0**	**2.09**	**101.7%**	-	-	-	**38**	-	**P**	
50.4						-	-	**2.15**	**2.06**	**4.0**	**2.09**	**98.8%**	-	-	-	**36**	-	**P**	
50.5						-	-	**2.09**	**2.00**	**4.2**	**2.09**	**95.9%**	-	-	-	**24**	-	**P**	
50.6						-	-	**2.19**	**2.08**	**5.0**	**2.09**	**99.6%**	-	-	-	**28**	-	**P**	
50.7						-	-	-	-	-	-	-	-	-	-	**25**	-	**P**	
50.8	FRHA	18/05/2020	SPR	Fill A - Shear Key	6.4m placed	-	-	-	-	-	-	-	-	-	-	**43**	-	**P**	
50.9						-	-	-	-	-	-	-	-	-	-	**36**	-	**P**	
50.1						-	-	-	-	-	-	-	-	-	-	**32**	-	**P**	
50.11						-	-	-	-	-	-	-	-	-	-	**24**	-	**P**	
50.12						-	-	-	-	-	-	-	-	-	-	**36**	-	**P**	
50.13						-	-	-	-	-	-	-	-	-	-	**33**	-	**P**	
50.14						-	-	-	-	-	-	-	-	-	-	**33**	-	**P**	
50.15						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
51.1						-	-	-	-	-	-	-	-	-	-	**34**	-	**P**	
51.2	FRHA	17/06/2020	GAP65	Fill A - Shear Key	~7.4m placed	-	-	-	-	-	-	-	-	-	-	**38**	-	**P**	CIV Value of >20 requested by Kyle (Lander) on the 16/06/2020
51.3						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
51.4						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
67.1					~1m placed	-	-	**2.23**	**2.07**	**7.9**	**2.09**	**99.0%**	-	-	-	**23**	-	**P**	
67.2						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	
67.3	JRA	17/12/2020	SPR	Fill B - REB Shear Key		-	-	**2.18**	**2.02**	**7.7**	**2.09**	**96.8%**	-	-	-	**26**	-	**P**	
67.4					~2m placed	-	-	**2.24**	**2.10**	**6.7**	**2.09**	**100.5%**	-	-	-	**34**	-	**P**	
67.5						-	-	**2.24**	**2.07**	**8.5**	**2.09**	**98.9%**	-	-	-	**31**	-	**P**	

GEOTECHNICS

Job : Hitchens Block Stage 5

Customer: Lander Geotechnical Ltd

Job #	**1009213.0657.0.0/3**
Entered By	**DASA/JRA/FRHA**
Checked By	**SEBA/DASA/JRA**
Approved By	**SJA**

URN	Tech.	Date	Material Type	Location	Layer	Chainage	Offset	Nuclear Density (Backscatter)								Impact Value 1	Retest URN	PASS / FAIL	Comments
								Wet Density	Dry Density (t/m^3)	Moisture Content (%)	Maximum Dry Density (t/m^3)	% Maximum Dry Density	Solid Density (t/m^3)	% Solid Density	% Total Voids			(P) Pass (F) Fail	
69.1	DASA	11/01/2021	SPR	Fill B - REB Shear Key	~3m placed	-	-	**2.30**	**2.16**	**6.4**	**2.09**	**103.3%**	-	-	-	**21**	-	**P**	
69.2						-	-	**2.23**	**2.05**	**8.6**	**2.09**	**98.2%**	-	-	-	**23**	-	**P**	
69.3						-	-	-	-	-	-	-	-	-	-	**27**	-	**P**	
69.4						-	-	-	-	-	-	-	-	-	-	**18**	**70.1 - 70.4**	**F**	
69.5						-	-	-	-	-	-	-	-	-	-	**16**		**F**	
69.6						-	-	-	-	-	-	-	-	-	-	**14**		**F**	
69.7						-	-	-	-	-	-	-	-	-	-	**14**		**F**	
69.8						-	-	-	-	-	-	-	-	-	-	**22**	-	**P**	
69.9						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
69.10						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
70.1	DASA	11/01/2021	SPR	Fill B - REB Shear Key	~3m placed	-	-	**2.24**	**2.07**	**8.0**	**2.09**	**99.3%**	-	-	-	**25**	-	**P**	Retest of URN 69.4 - 69.7
70.2						-	-	**2.35**	**2.17**	**8.3**	**2.09**	**103.9%**	-	-	-	**30**	-	**P**	
70.3						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
70.4						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
71.1	DASA	12/01/2021	SPR	Fill B - REB Shear Key	~2.6 below FL	-	-	**2.09**	**1.92**	**8.9**	**2.09**	**91.7%**	-	-	-	-	**71.2**	**F**	
71.2						-	-	**2.23**	**2.05**	**8.7**	**2.09**	**98.1%**	-	-	-	-	-	**P**	Retest of URN 71.1
71.3						-	-	**2.22**	**2.03**	**9.8**	**2.09**	**96.9%**	-	-	-	-	-	**P**	
71.4						-	-	**2.13**	**1.95**	**9.3**	**2.09**	**93.3%**	-	-	-	-	**71.5**	**F**	
71.5						-	-	**2.23**	**2.06**	**8.2**	**2.09**	**98.7%**	-	-	-	-	-	**P**	Retest of URN 71.4
72.3	DASA	12/01/2021	SPR	Fill B - REB Shear Key	~0.5m placed (Hardfill extension where old sump was)	-	-	**2.03**	**1.87**	**8.8**	**2.09**	**89.4%**	-	-	-	**21**		**F**	
72.4						-	-	**2.10**	**1.91**	**9.8**	**2.09**	**91.5%**	-	-	-	**22**	**72.6 - 72.8**	**F**	
72.5						-	-	**2.08**	**1.92**	**8.0**	**2.09**	**91.9%**	-	-	-	**21**		**F**	
72.6						-	-	**1.70**	**1.52**	**11.8**	**2.09**	**72.8%**	-	-	-	**24**		**F**	
72.7						-	-	**1.79**	**1.63**	**10.0**	**2.09**	**77.9%**	-	-	-	**27**	**73.1 - 73.2**	**F**	
72.8						-	-	**1.83**	**1.68**	**8.9**	**2.09**	**80.3%**	-	-	-	**21**		**F**	
72.9						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
72.10						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
72.11						-	-	-	-	-	-	-	-	-	-	**27**	-	**P**	
72.12						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	

GEOTECHNICS

Job : Hitchens Block Stage 5

Customer: Lander Geotechnical Ltd

Job #	**1009213.0657.0.0/3**
Entered By	**DASA/JRA/FRHA**
Checked By	**SEBA/DASA/JRA**
Approved By	**SJA**

URN	Tech.	Date	Material Type	Location	Layer	Chainage	Offset	Nuclear Density (Backscatter)								Impact Value 1	Retest URN	PASS / FAIL	Comments
								Wet Density	Dry Density (t/m^3)	Moisture Content (%)	Maximum Dry Density (t/m^3)	% Maximum Dry Density	Solid Density (t/m^3)	% Solid Density	% Total Voids			(P) Pass (F) Fail	
73.1	DASA	13/01/2021	SPR	Fill B - REB Shear Key	~0.5m placed (Hardfill extension where old sump was)	-	-	**2.17**	**2.04**	**6.7**	**2.09**	**97.4%**	-	-	-	**22**	-	**P**	Retest of URN 72.3 - 72.8
73.2						-	-	**2.17**	**2.04**	**6.6**	**2.09**	**97.4%**	-	-	-	**24**	-	**P**	
73.3						-	-	-	-	-	-	-	-	-	-	**22**	-	**P**	
73.4						-	-	-	-	-	-	-	-	-	-	**27**	-	**P**	
73.5					~2.1m below FL	-	-	**2.18**	**2.05**	**6.5**	**2.09**	**98.1%**	-	-	-	**30**	-	**P**	
73.6						-	-	**2.32**	**2.16**	**7.4**	**2.09**	**103.5%**	-	-	-	**28**	-	**P**	
73.7						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
73.8						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
74.1	JRA	13/01/2021	SPR	Fill B - REB Shear Key	~2.1m below FL	-	-	**2.28**	**2.10**	**8.2**	**2.09**	**100.7%**	-	-	-	**34**	-	**P**	
74.2						-	-	**2.40**	**2.24**	**7.3**	**2.09**	**107.2%**	-	-	-	**40**	-	**P**	
74.3						-	-	**2.35**	**2.16**	**9.1**	**2.09**	**103.2%**	-	-	-	**36**	-	**P**	
74.4					~1m placed (lower extension area)	-	-	**2.35**	**2.20**	**7.0**	**2.09**	**105.2%**	-	-	-	**36**	-	**P**	
74.5						-	-	**2.23**	**2.06**	**8.3**	**2.09**	**98.6%**	-	-	-	**30**	-	**P**	
74.6					~1.5m placed (lower extension area)	-	-	**2.31**	**2.14**	**7.8**	**2.09**	**102.5%**	-	-	-	**32**	-	**P**	
74.7						-	-	**2.36**	**2.21**	**7.1**	**2.09**	**105.5%**	-	-	-	**39**	-	**P**	
75.1	DASA	14/01/2021	SPR	Fill B - REB Shear Key	~2.6m below FL (Extension area)	-	-	**2.22**	**2.07**	**7.4**	**2.09**	**99.1%**	-	-	-	**28**	-	**P**	
75.2						-	-	**2.24**	**2.05**	**9.1**	**2.09**	**98.0%**	-	-	-	**30**	-	**P**	
75.3						-	-	-	-	-	-	-	-	-	-	**27**	-	**P**	
75.4						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
76.1	DASA	14/01/2021	SPR	Fill B - REB Shear Key	~2.1m below FL (Extension Area)	-	-	**2.31**	**2.14**	**7.8**	**2.09**	**102.4%**	-	-	-	**32**	-	**P**	
76.2						-	-	**2.29**	**2.10**	**9.1**	**2.09**	**100.6%**	-	-	-	**28**	-	**P**	
76.3						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
76.4						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
78.1	JRA	18/01/2021	SPR	Fill B - REB Shear Key	~1m Placed (Ex Ramp Extension Area)	-	-	**2.32**	**2.10**	**10.5**	**2.09**	**100.3%**	-	-	-	**23**	-	**P**	
78.2						-	-	**2.21**	**2.02**	**9.7**	**2.09**	**96.5%**	-	-	-	**20**	-	**P**	
78.3						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	
78.4						-	-	-	-	-	-	-	-	-	-	**21**	-	**P**	
79.1	JRA	18/01/2021	SPR	Fill B - REB Shear Key	~1.5m Placed (Ex Ramp Extension Area)	-	-	**2.24**	**2.05**	**9.0**	**2.09**	**98.2%**	-	-	-	**25**	-	**P**	
79.2						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
79.3						-	-	**2.24**	**2.06**	**8.6**	**2.09**	**98.5%**	-	-	-	**30**	-	**P**	
79.4						-	-	-	-	-	-	-	-	-	-	**25**	-	**P**	
79.5					~0.7m below Hardfill FL	-	-	**2.21**	**2.03**	**8.8**	**2.09**	**97.0%**	-	-	-	**32**	-	**P**	
79.6						-	-	-	-	-	-	-	-	-	-	**32**	-	**P**	
79.7					~0.5m below Hardfill FL	-	-	**2.22**	**2.05**	**8.6**	**2.09**	**97.9%**	-	-	-	**36**	-	**P**	
79.8						-	-	-	-	-	-	-	-	-	-	**22**	-	**P**	
79.9						-	-	**2.23**	**2.03**	**9.8**	**2.09**	**97.2%**	-	-	-	**32**	-	**P**	

GEOTECHNICS

Job : Hitchens Block Stage 5

Customer: Lander Geotechnical Ltd

Job #	**1009213.0657.0.0/3**
Entered By	**DASA/JRA/FRHA**
Checked By	**SEBA/DASA/JRA**
Approved By	**SJA**

URN	Tech.	Date	Material Type	Location	Layer	Chainage	Offset	Nuclear Density (Backscatter)								Impact Value 1	Retest URN	PASS / FAIL	Comments
								Wet Density	Dry Density (t/m^3)	Moisture Content (%)	Maximum Dry Density (t/m^3)	% Maximum Dry Density	Solid Density (t/m^3)	% Solid Density	% Total Voids			(P) Pass (F) Fail	
80.1	JRA	19/01/2021	SPR	Fill B - REB Shear Key	~2m Placed (Ex Ramp Extension Area)	-	-	**2.31**	**2.09**	**10.5**	**2.09**	**100.1%**	-	-	-	**21**	-	**P**	
80.2						-	-	**2.56**	**2.35**	**9.0**	**2.09**	**112.3%**	-	-	-	**25**	-	**P**	
80.3						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
80.4						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
81.1	DASA	21/01/2021	SPR	Fill B - REB Shear Key	0.5m below hardfill FL	-	-	**2.24**	**2.06**	**8.6**	**2.09**	**98.6%**	-	-	-	**24**	-	**P**	
81.2						-	-	**2.22**	**2.05**	**8.2**	**2.09**	**98.2%**	-	-	-	**25**	-	**P**	
81.3						-	-	-	-	-	-	-	-	-	-	**27**	-	**P**	
81.4						-	-	-	-	-	-	-	-	-	-	**21**	-	**P**	
81.5						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
82.1	DASA	22/01/2021	SPR	Fill B - REB Shear Key	FL	-	-	**2.22**	**2.04**	**8.6**	**2.09**	**97.6%**	-	-	-	**28**	-	**P**	
82.2						-	-	**2.23**	**2.04**	**9.0**	**2.09**	**97.7%**	-	-	-	**30**	-	**P**	
82.3						-	-	**2.24**	**2.06**	**8.9**	**2.09**	**98.6%**	-	-	-	**33**	-	**P**	
82.4						-	-	**2.25**	**2.06**	**9.0**	**2.09**	**98.8%**	-	-	-	**34**	-	**P**	
82.5						-	-	**2.24**	**2.05**	**9.2**	**2.09**	**97.9%**	-	-	-	**27**	-	**P**	
82.6						-	-	-	-	-	-	-	-	-	-	**31**	-	**P**	
82.7						-	-	-	-	-	-	-	-	-	-	**32**	-	**P**	
82.8						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
82.9						-	-	-	-	-	-	-	-	-	-	**24**	-	**P**	
82.10						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
82.11						-	-	-	-	-	-	-	-	-	-	**32**	-	**P**	
82.12						-	-	-	-	-	-	-	-	-	-	**34**	-	**P**	
87.1	DASA	4/02/2021	GAP65	Fill B - REB Shear Key	500mm placed	-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	
87.2						-	-	-	-	-	-	-	-	-	-	**21**	-	**P**	
87.3						-	-	-	-	-	-	-	-	-	-	**24**	-	**P**	
87.4						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
87.5						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
87.6						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
87.7						-	-	-	-	-	-	-	-	-	-	**24**	-	**P**	
87.8						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
87.9						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
87.10						-	-	-	-	-	-	-	-	-	-	**24**	-	**P**	
87.11						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
87.12						-	-	-	-	-	-	-	-	-	-	**25**	-	**P**	
87.13						-	-	-	-	-	-	-	-	-	-	**22**	-	**P**	
87.14						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	
87.15						-	-	-	-	-	-	-	-	-	-	**21**	-	**P**	
87.16						-	-	-	-	-	-	-	-	-	-	**24**	-	**P**	

GEOTECHNICS

Job : Hitchens Block Stage 5

Customer: Lander Geotechnical Ltd

Job #	**1009213.0657.0.0/3**
Entered By	**DASA/JRA/FRHA**
Checked By	**SEBA/DASA/JRA**
Approved By	**SJA**

URN	Tech.	Date	Material Type	Location	Layer	Chainage	Offset	Nuclear Density (Backscatter)								Impact Value 1	Retest URN	PASS / FAIL	Comments
								Wet Density	Dry Density (t/m³)	Moisture Content (%)	Maximum Dry Density (t/m³)	% Maximum Dry Density	Solid Density (t/m³)	% Solid Density	% Total Voids			(P) Pass (F) Fail	
88.1	DASA	5/02/2021	GAP65	Fill B - REB Shear Key	500mm placed	-	-	-	-	-	-	-	-	-	-	**22**	-	**P**	
88.2						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
88.3						-	-	-	-	-	-	-	-	-	-	**24**	-	**P**	
88.4						-	-	-	-	-	-	-	-	-	-	**27**	-	**P**	
88.5						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	
88.6						-	-	-	-	-	-	-	-	-	-	**21**	-	**P**	
88.7						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	
88.8						-	-	-	-	-	-	-	-	-	-	**27**	-	**P**	
88.9						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
88.10						-	-	-	-	-	-	-	-	-	-	**32**	-	**P**	
89.1	DASA	9/02/2021	GAP65	Fill B - REB Shear Key	FL	-	-	-	-	-	-	-	-	-	-	**22**	-	**P**	
89.2						-	-	-	-	-	-	-	-	-	-	**24**	-	**P**	
89.3						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
89.4						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
89.5						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
89.6						-	-	-	-	-	-	-	-	-	-	**24**	-	**P**	
89.7						-	-	-	-	-	-	-	-	-	-	**18**	**90.1**	**F**	
89.8						-	-	-	-	-	-	-	-	-	-	**16**	**90.2**	**F**	
89.9						-	-	-	-	-	-	-	-	-	-	**14**	**90.3**	**F**	
89.10						-	-	-	-	-	-	-	-	-	-	**14**	**90.4**	**F**	
90.1	DASA	10/02/2021	GAP65	Fill B - REB Shear Key	FL	-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	Retest of 89.7
90.2						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	Retest of 89.8
90.3						-	-	-	-	-	-	-	-	-	-	**32**	-	**P**	Retest of 89.9
90.4						-	-	-	-	-	-	-	-	-	-	**26**	-	**P**	Retest of 89.10
90.5						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
90.6						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
90.7						-	-	-	-	-	-	-	-	-	-	**32**	-	**P**	
90.8						-	-	-	-	-	-	-	-	-	-	**34**	-	**P**	
90.9						-	-	-	-	-	-	-	-	-	-	**30**	-	**P**	
90.10						-	-	-	-	-	-	-	-	-	-	**28**	-	**P**	
108.1	DASA	25/03/2021	SPR	Pond Fill	FL	-	-	**2.21**	**2.00**	**10.6**	**2.09**	**95.7%**	-	-	-	**20**	-	**P**	
108.2						-	-	-	-	-	-	-	-	-	-	**20**	-	**P**	
108.3						-	-	-	-	-	-	-	-	-	-	**29**	-	**P**	
108.4						-	-	-	-	-	-	-	-	-	-	**32**	-	**P**	

Appendix C: Plateau density test results

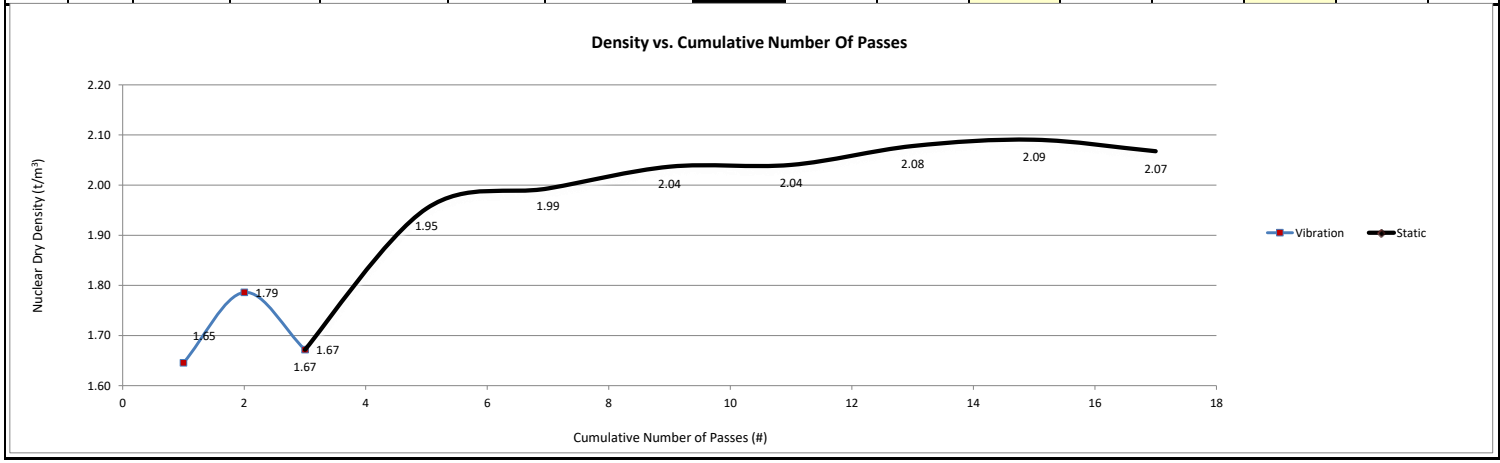
GEOTECHNICS

Job Name: Hitchen Block Stage 5
Client: Lander Geotechnical

Test: Plateau Density Test

Job #	1009213.0657.0.0/3
Entered By:	FRHA
Checked By:	SEBA
Approved By:	SJA

URN	Tech.	Date	Location	Location (A / B)	Layer	Material Type	Number of Passes (Cumulative)		Nuclear Wet Density (t/m³)	Nuclear Dry Density (t/m³)	Nuclear water content (%)	Field Maximum Dry Density (MDD) (t/m³)	Percentage maximum Dry Density MDD (%)	Percentage of Solid Density (%)	Impact Value 1 (IV)	Pass / Fail	Retest URN	Comments
							VIBE	STATIC										
33.3	FRHA	19/02/2020	Shear Key	Location A	~300mm placed	SPR	1		**1.77**	**1.65**	**7.4**	**2.09**	78.7%	-	20	-	-	
33.5							2		**1.89**	**1.79**	**5.7**	**2.09**	85.5%	-	13	-	-	
33.7							3		**1.78**	**1.67**	**6.2**	**2.09**	80.0%	-	14	-	-	
33.9								5	**2.09**	**1.95**	**7.1**	**2.09**	93.5%	-	23	-	-	
33.1								7	**2.13**	**1.99**	**6.7**	**2.09**	95.4%	-	28	-	-	
33.13								9	**2.15**	**2.04**	**5.5**	**2.09**	97.5%	-	31	-	-	
33.15								11	**2.17**	**2.04**	**6.4**	**2.09**	97.6%	-	35	-	-	
33.17								13	**2.19**	**2.08**	**5.2**	**2.09**	99.4%	-	35	-	-	
33.19								15	**2.21**	**2.09**	**5.7**	**2.09**	100.0%	-	35	-	-	Maximum field dry density achieved of 2.09 t/m³
33.21								17	**2.21**	**2.07**	**7.0**	**2.09**	98.9%	-	34	-	-	



Plateau Test Details

Plant	17 Tonne Single Drum Roller
Material Type	SPR
Supplier	Smythe's Quarry
Layer Thickness	~300mm
Subgrade Type	Unknown
Definition of # of Passes	1 Pass = 2 passes above the test area with plant (i.e.. there & back)
Comments	

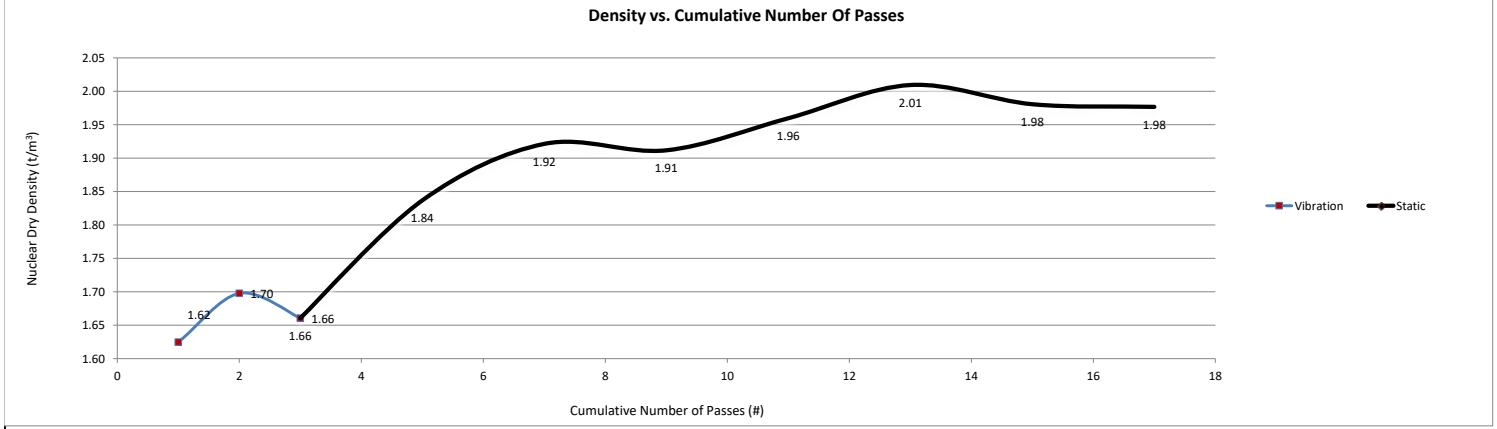
GEOTECHNICS

Job Name: Hitchens Block Stage 5
Client: Lander Geotechnical

Test: Plateau Density Test

Job #	1009213.0657.0.0/3
Entered By:	FRHA
Checked By:	SEBA
Approved By:	SJA

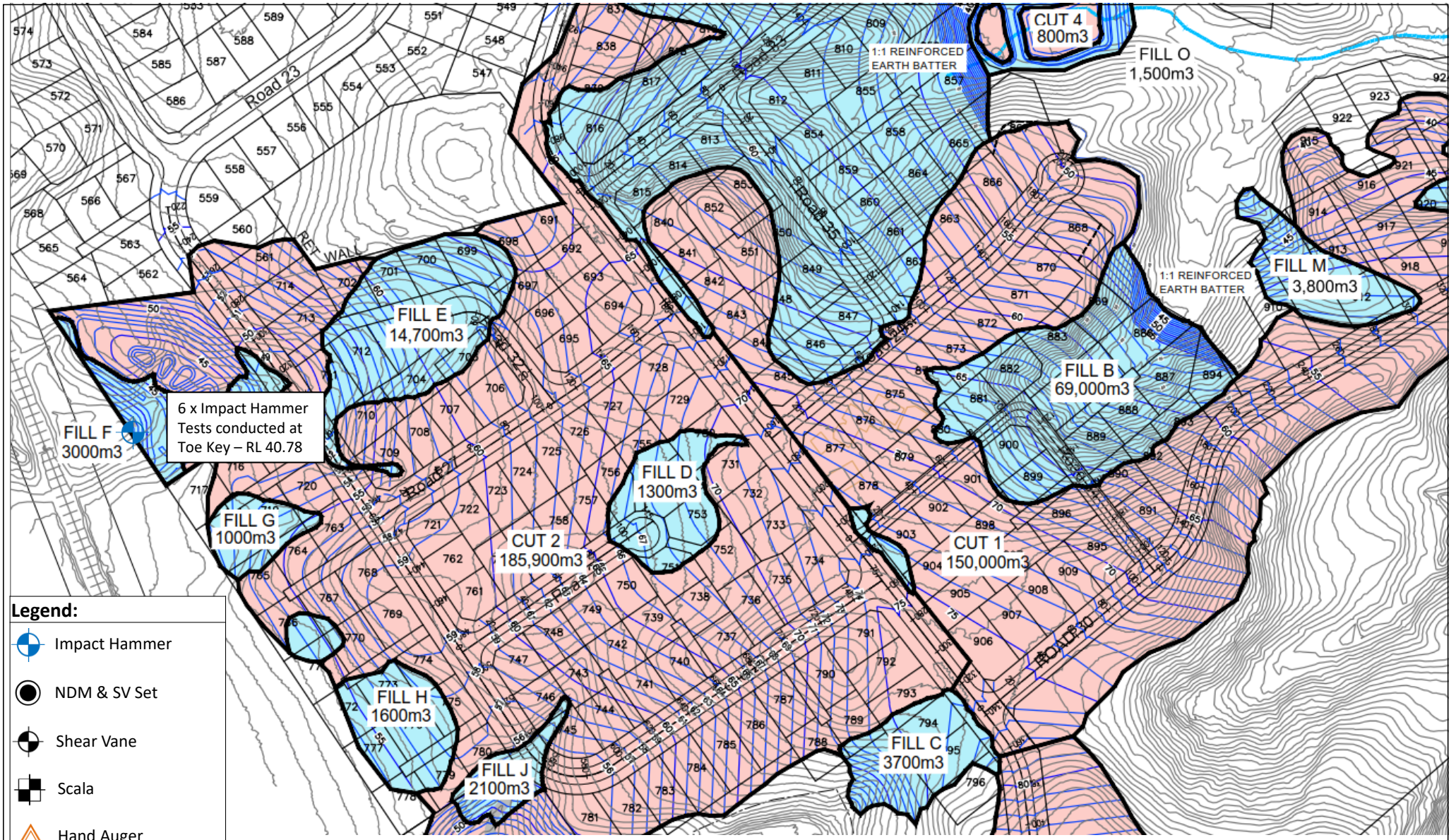
URN	Tech.	Date	Location	Location (A / B)	Layer	Material Type	Number of Passes (Cumulative)		Nuclear Wet Density (t/m^3)	Nuclear Dry Density (t/m^3)	Nuclear water content (%)	Field Maximum Dry Density (MDD) (t/m^3)	Percentage maximum Dry Density MDD (%)	Percentage of Solid Density (%)	Impact Value 1 (IV)	Pass / Fail	Retest URN	Comments
							VIBE	STATIC										
33.4	FRHA	19/02/2020	Shear Key	Location B	~300mm placed	SPR	1		**1.70**	**1.62**	**4.9**	**2.09**	77.7%	-	11	-	-	
33.6							2		**1.78**	**1.70**	**4.9**	**2.09**	81.2%	-	14	-	-	
33.8							3		**1.75**	**1.66**	**5.4**	**2.09**	79.5%	-	16	-	-	
33.10								5	**1.94**	**1.84**	**5.5**	**2.09**	87.9%	-	24	-	-	
33.12								7	**2.01**	**1.92**	**4.6**	**2.09**	91.9%	-	23	-	-	
33.14								9	**2.03**	**1.91**	**6.2**	**2.09**	91.5%	-	24	-	-	
33.16								11	**2.06**	**1.96**	**4.9**	**2.09**	93.8%	-	27	-	-	
33.18								13	**2.10**	**2.01**	**4.6**	**2.09**	96.1%	-	28	-	-	
33.20								15	**2.07**	**1.98**	**4.7**	**2.09**	94.8%	-	27	-	-	
33.22								17	**2.07**	**1.98**	**4.7**	**2.09**	94.6%	-	27	-	-	



Plateau Test Details

Plant	17 Tonne Single Drum Roller
Material Type	SPR
Supplier	Smythe's Quarry
Layer Thickness	~300mm
Subgrade Type	Unknown
Definition of # of Passes	1 Pass = 2 passes above the test area with plant (i.e.. there & back)
Comments	

Appendix D: Testing location plans



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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	17/10/19
Location:	Fill F – Toe Key Hardfill	Job No.:	1009213.0657.0.0/3	URN:	1	Date:	17/10/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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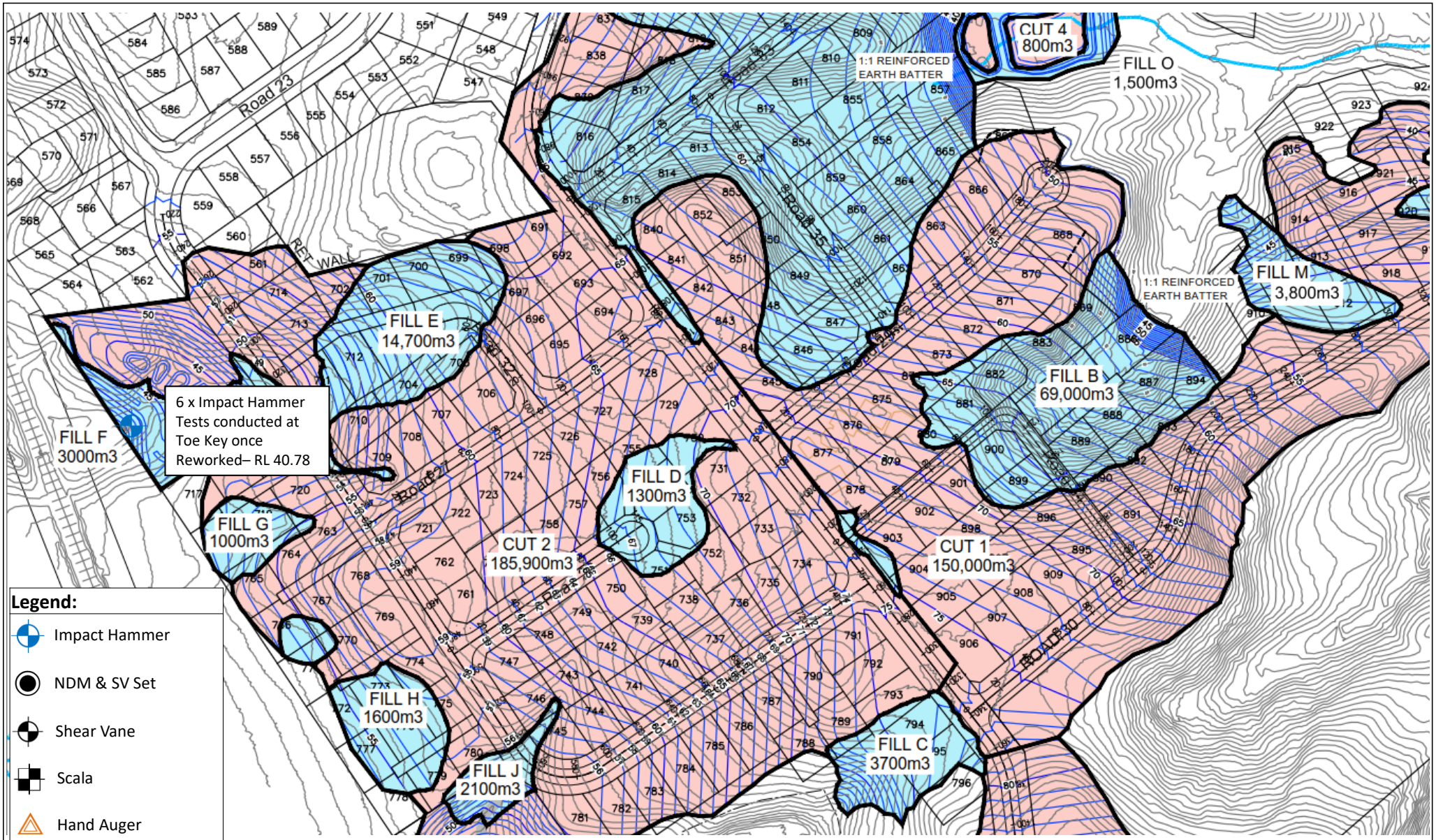

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	18/10/19
Location:	Fill F – Toe Key Hardfill	Job No.:	1009213.0657.0.0/3	URN:	2	Date:	18/10/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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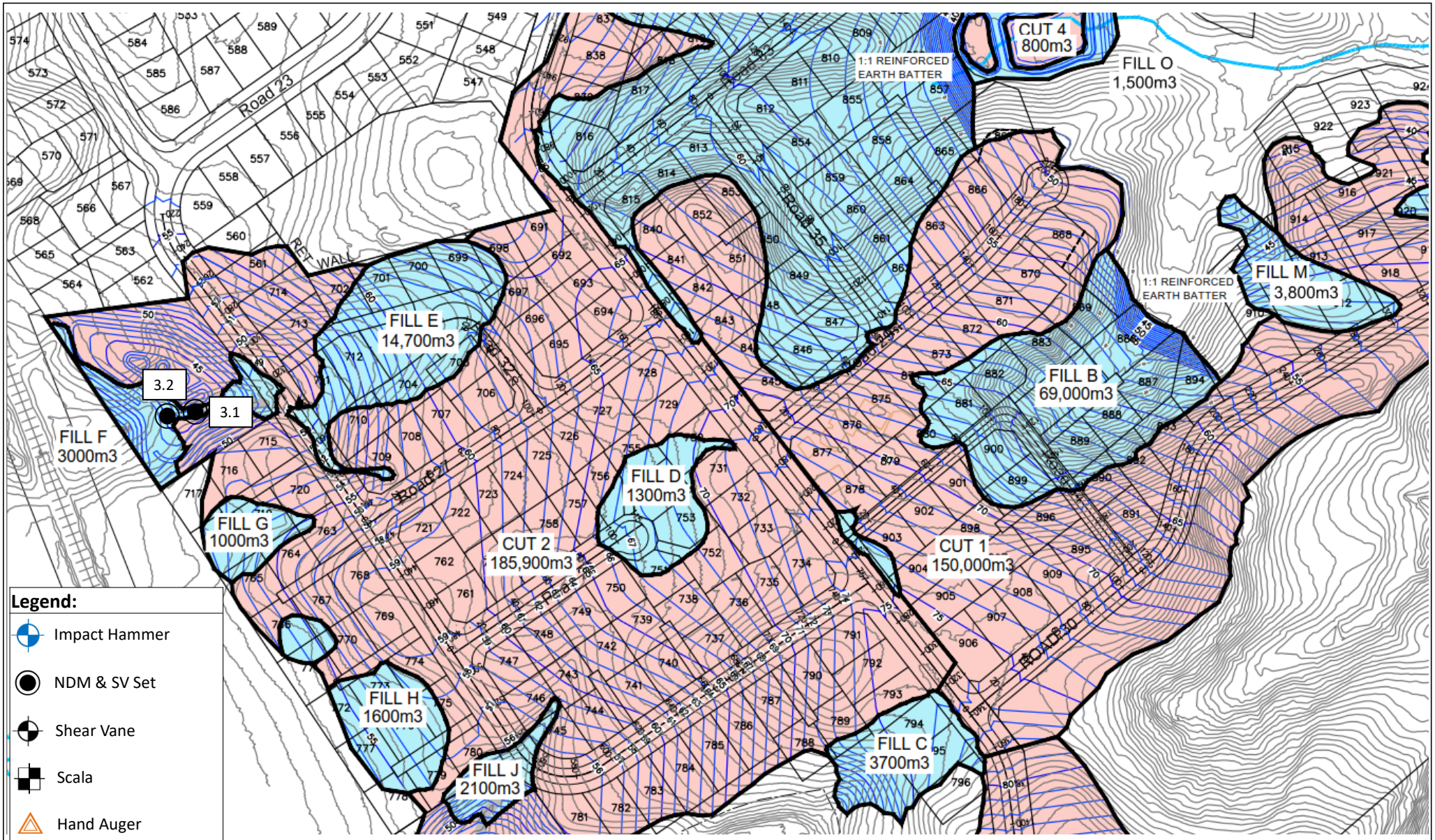

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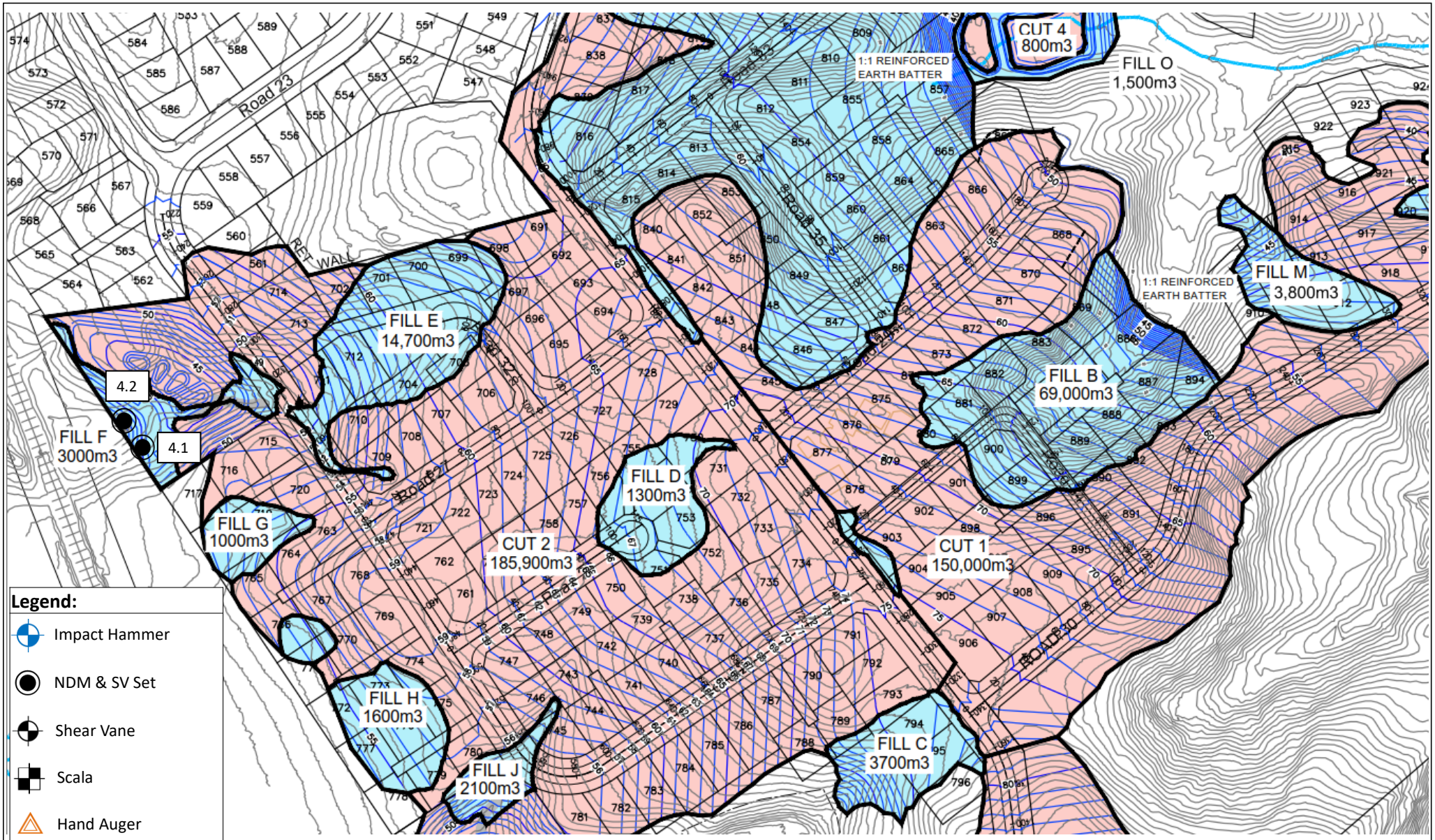
Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	21/10/19
Location:	Fill F – Pond Fill	Job No.:	1009213.0657.0.0/3	URN:	3	Date:	21/10/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	30/10/19
Location:	Fill F – Pond Fill	Job No.:	1009213.0657.0.0/3	URN:	4	Date:	30/10/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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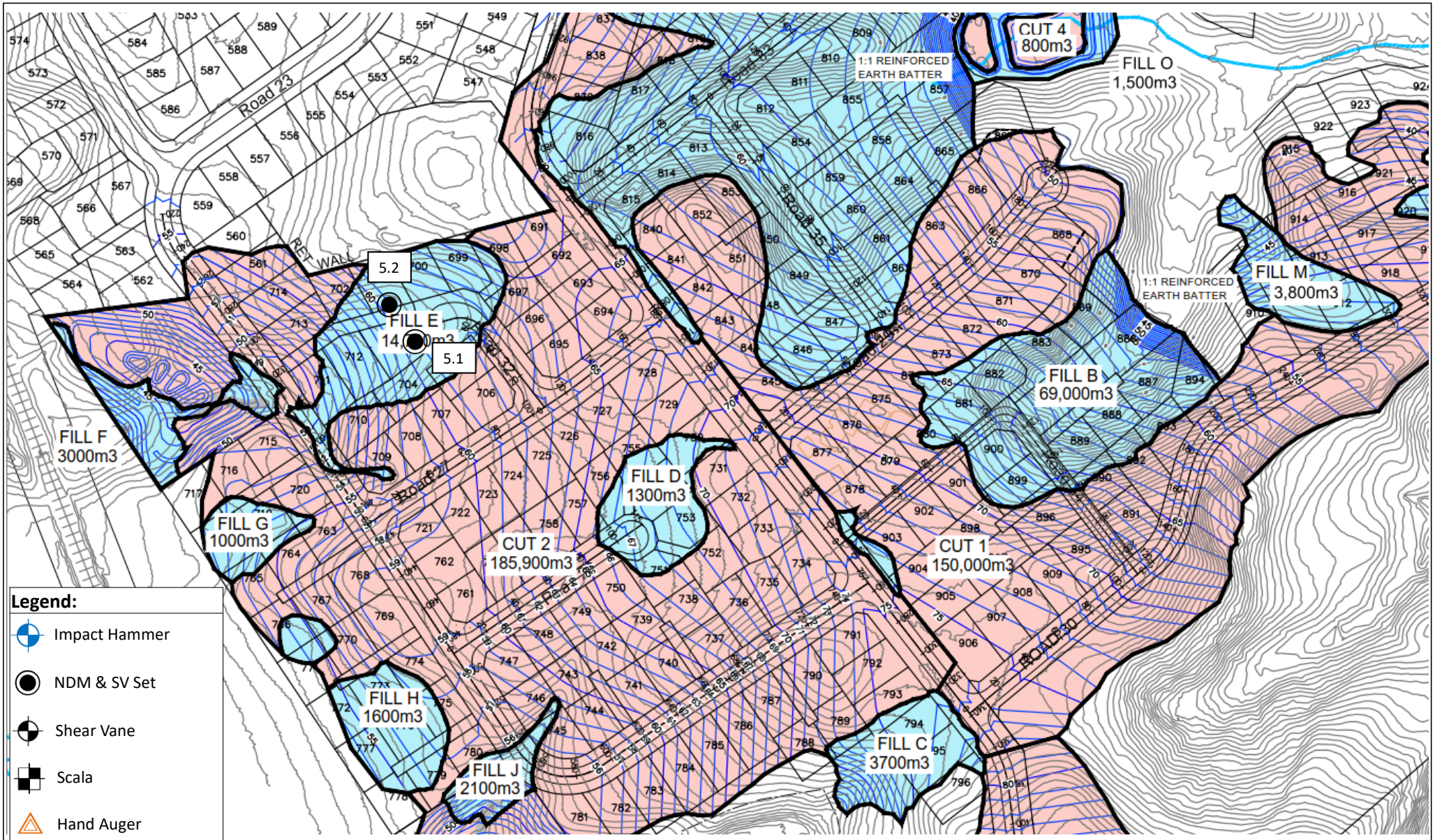

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	1/11/19
Location:	Fill E – Pond Fill	Job No.:	1009213.0657.0.0/3	URN:	5	Date:	1/11/19
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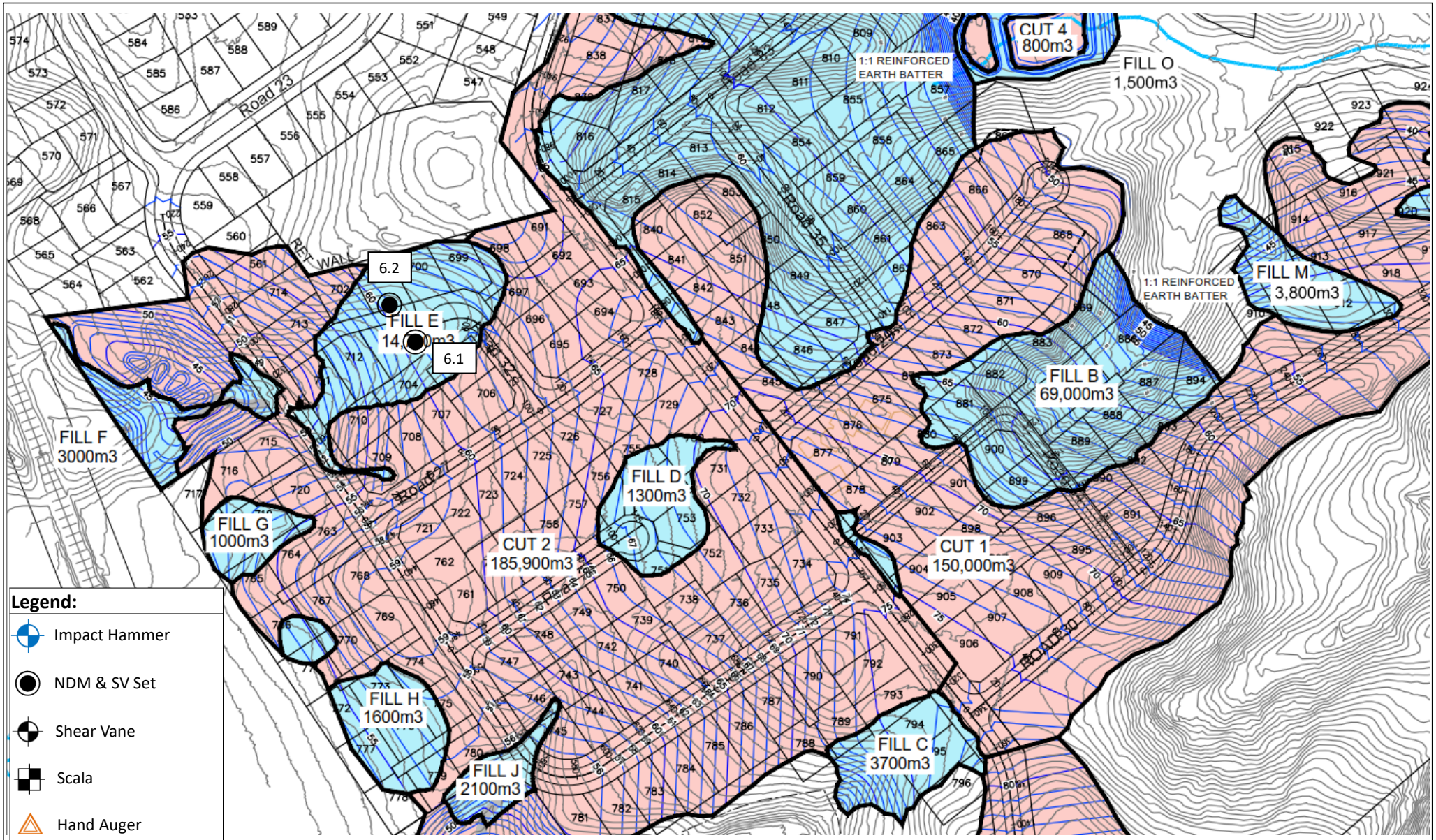

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	2/11/19
Location:	Fill E	Job No.:	1009213.0657.0.0/3	URN:	6	Date:	2/11/19
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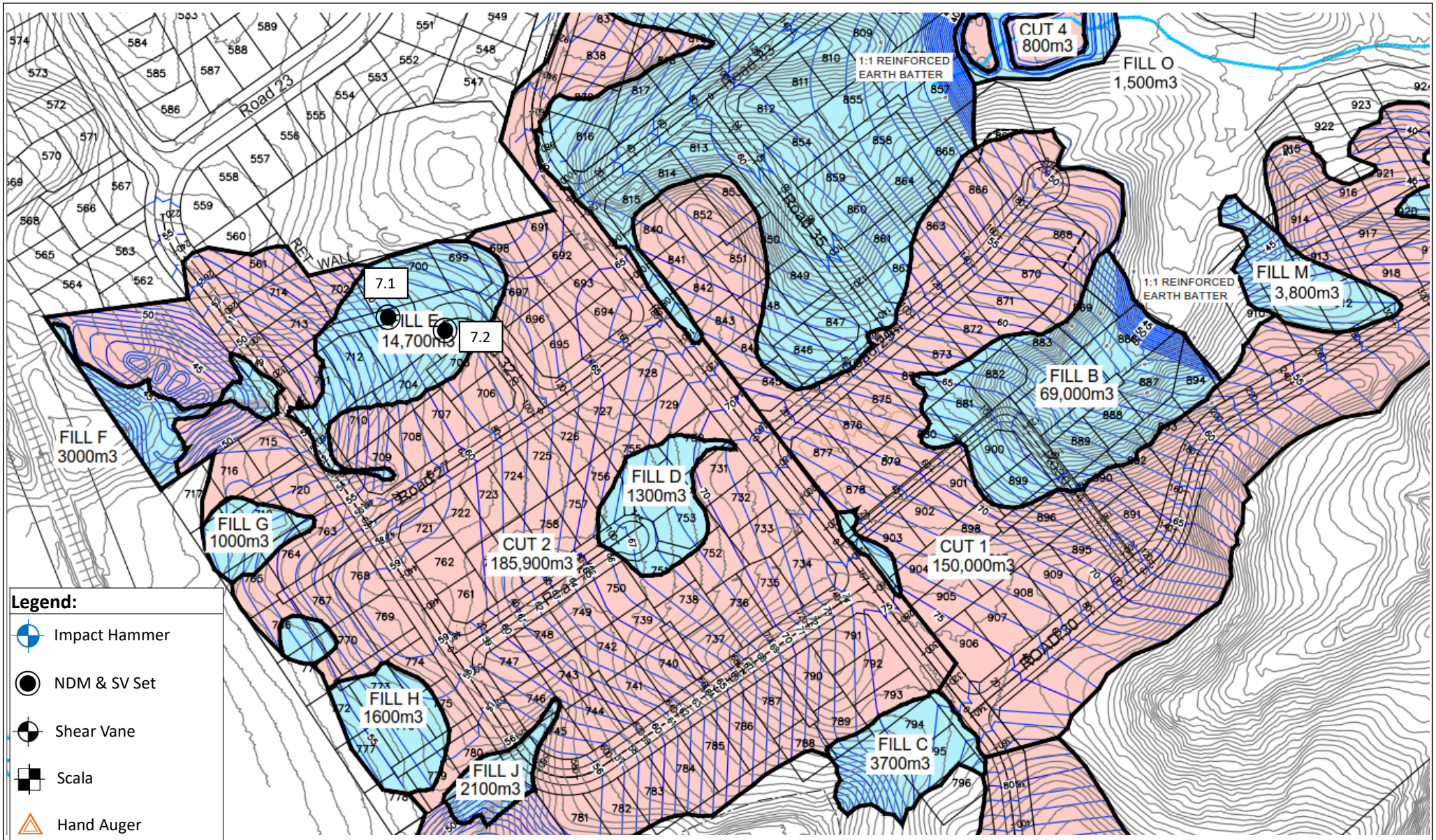

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	4/11/19
Location:	Fill E	Job No.:	1009213.0657.0.0/3	URN:	7	Date:	4/11/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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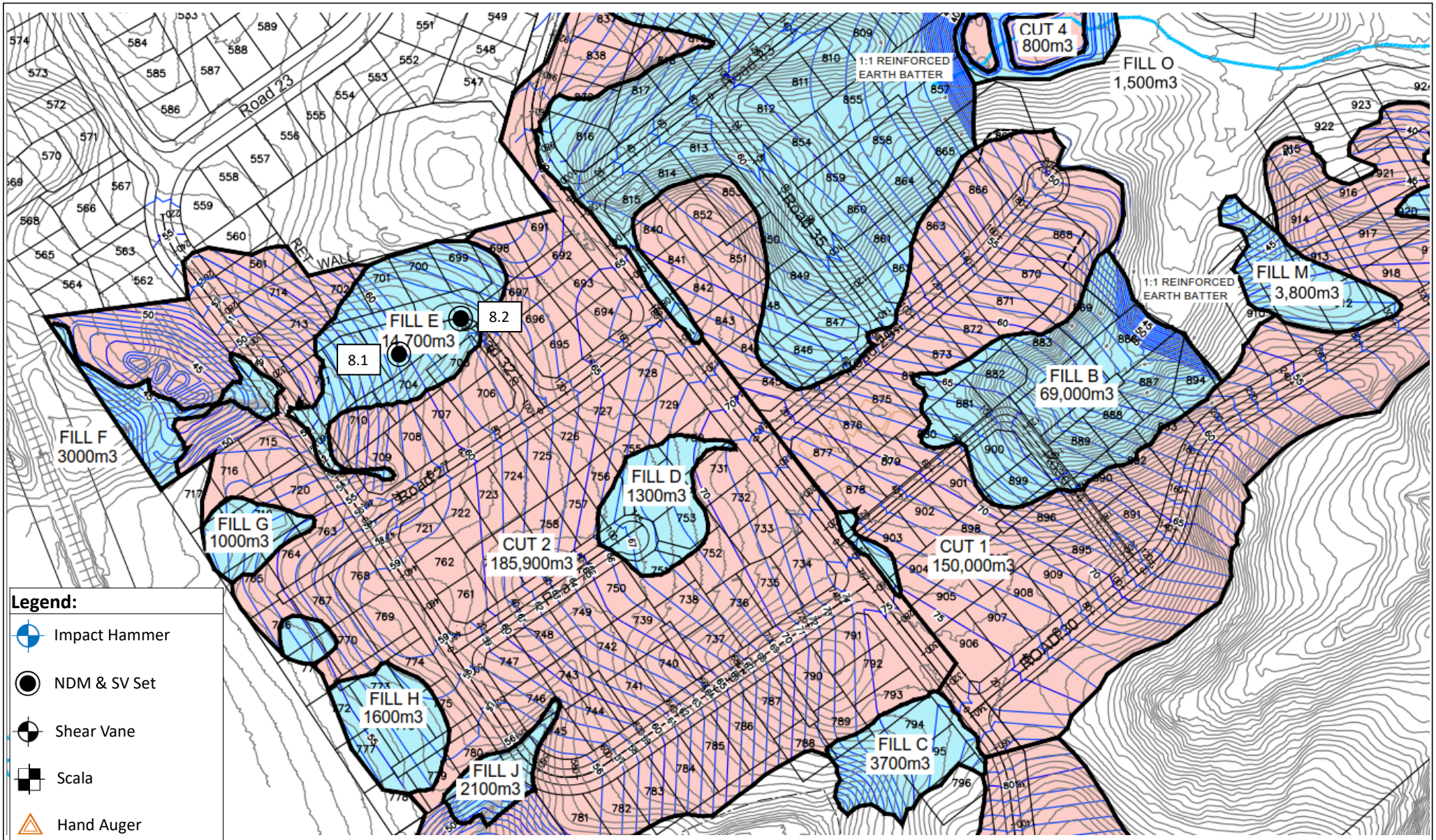

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	7/11/19
Location:	Fill E	Job No.:	1009213.0657.0.0/3	URN:	8	Date:	7/11/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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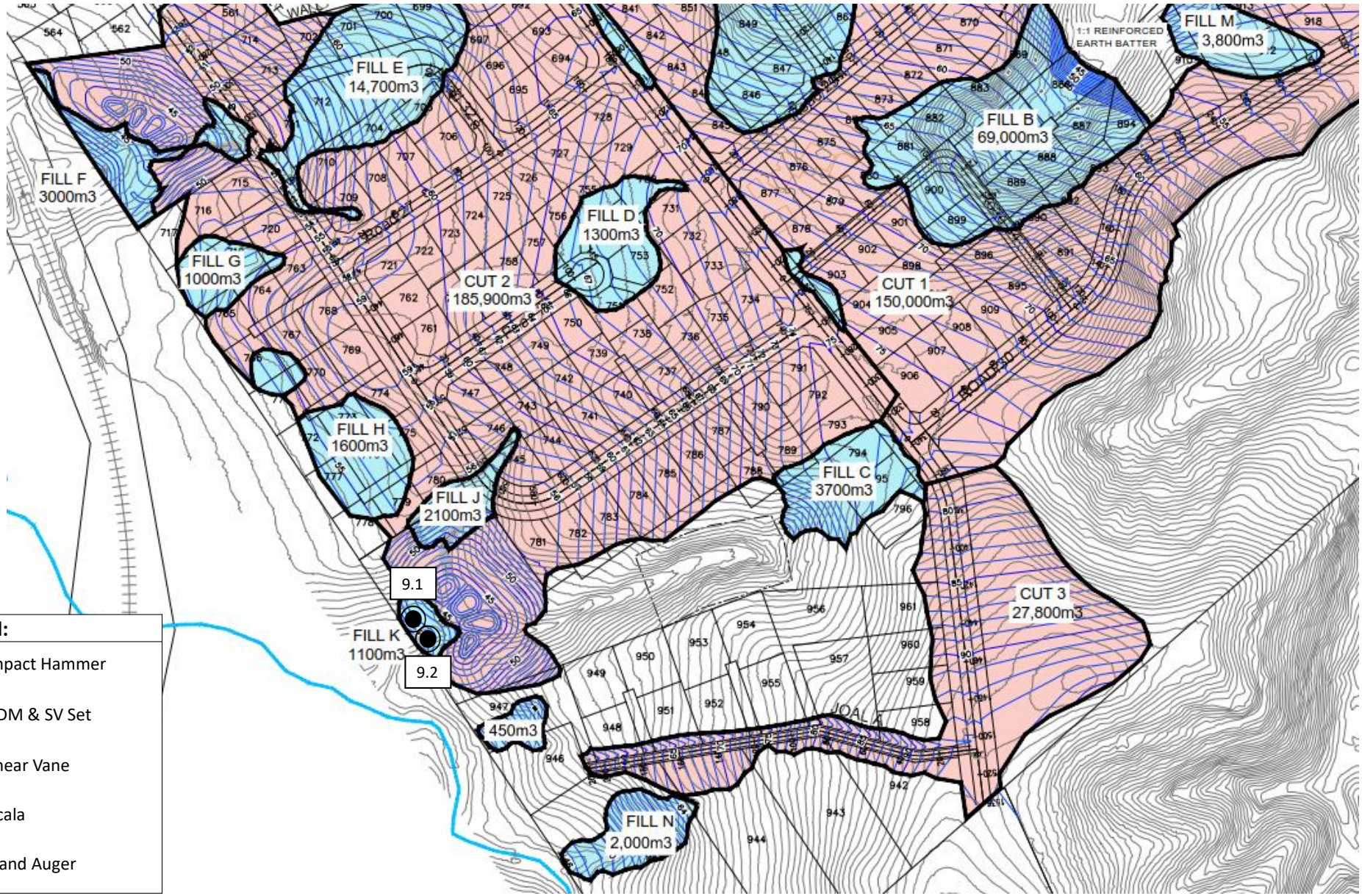

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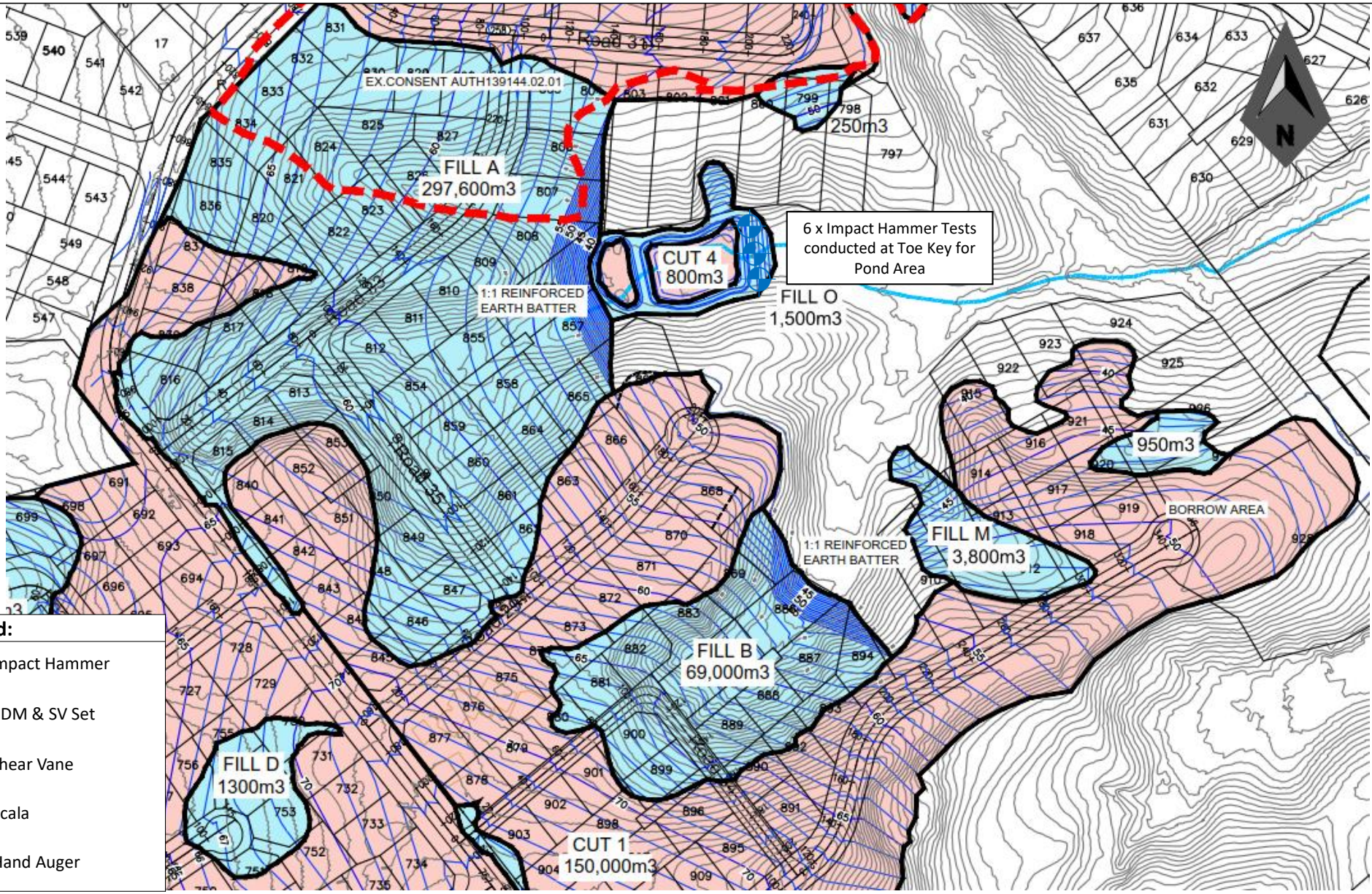
Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	14/11/19
Location:	Fill K – Pond Embankment	Job No.:	1009213.0657.0.0/3	URN:	9	Date:	13/11/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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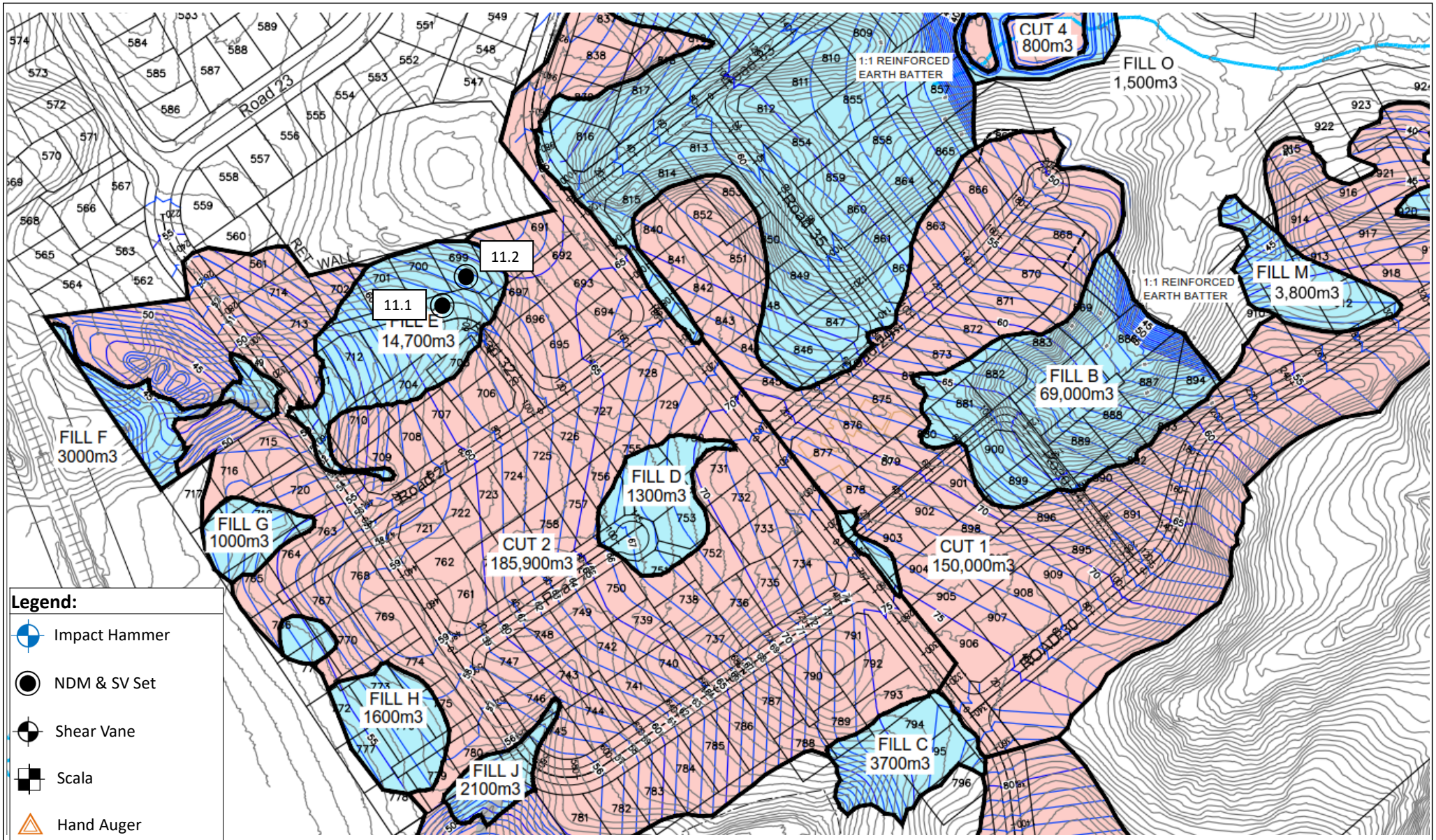
Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	21/11/19
Location:	Fill 0 – Pond Toe Key Area	Job No.:	1009213.0657.0.0/3	URN:	10	Date:	21/11/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	22/11/19
Location:	Fill E	Job No.:	1009213.0657.0.0/3	URN:	11	Date:	22/11/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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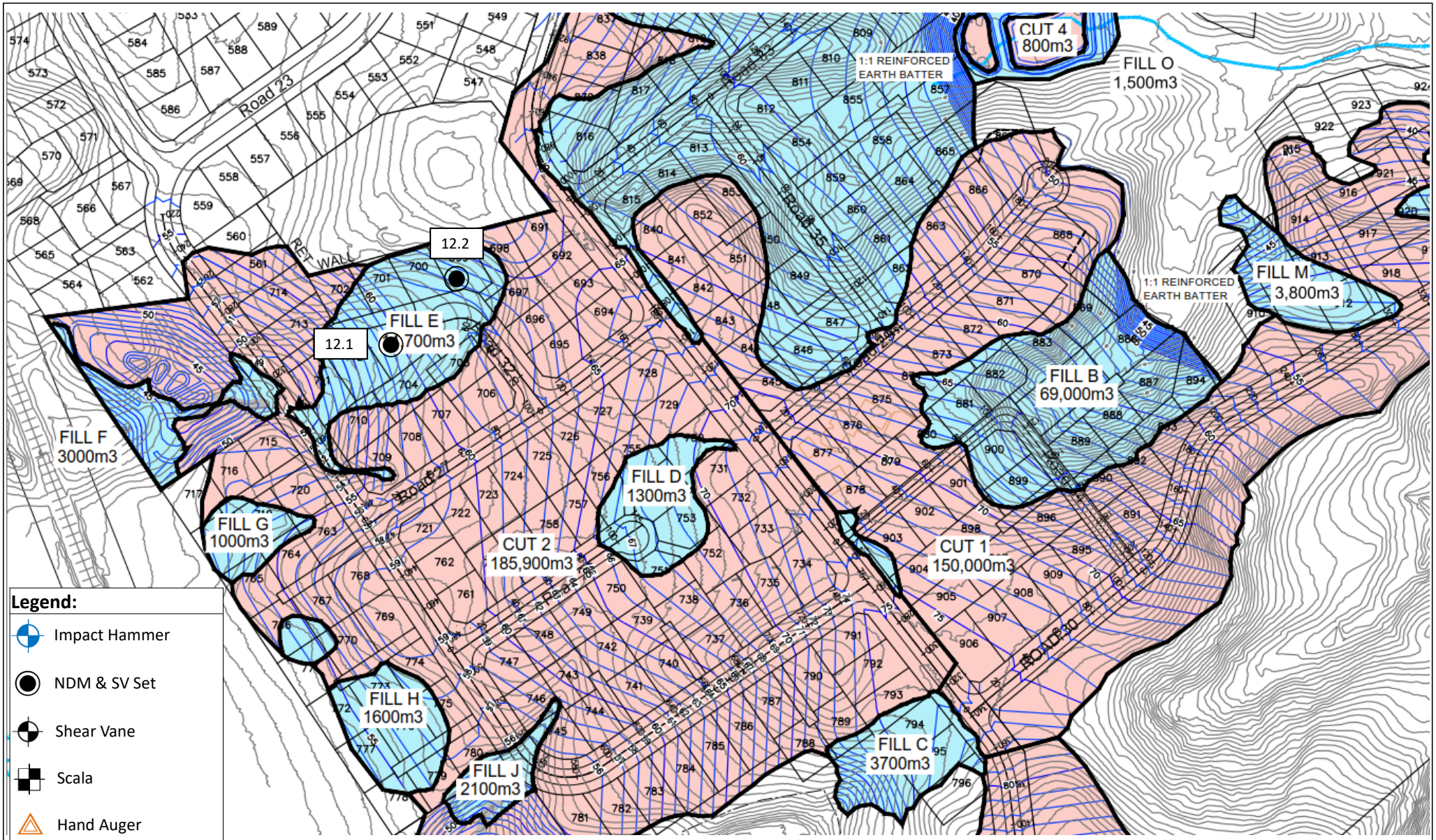

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	25/11/19
Location:	Fill E	Job No.:	1009213.0657.0.0/3	URN:	12	Date:	25/11/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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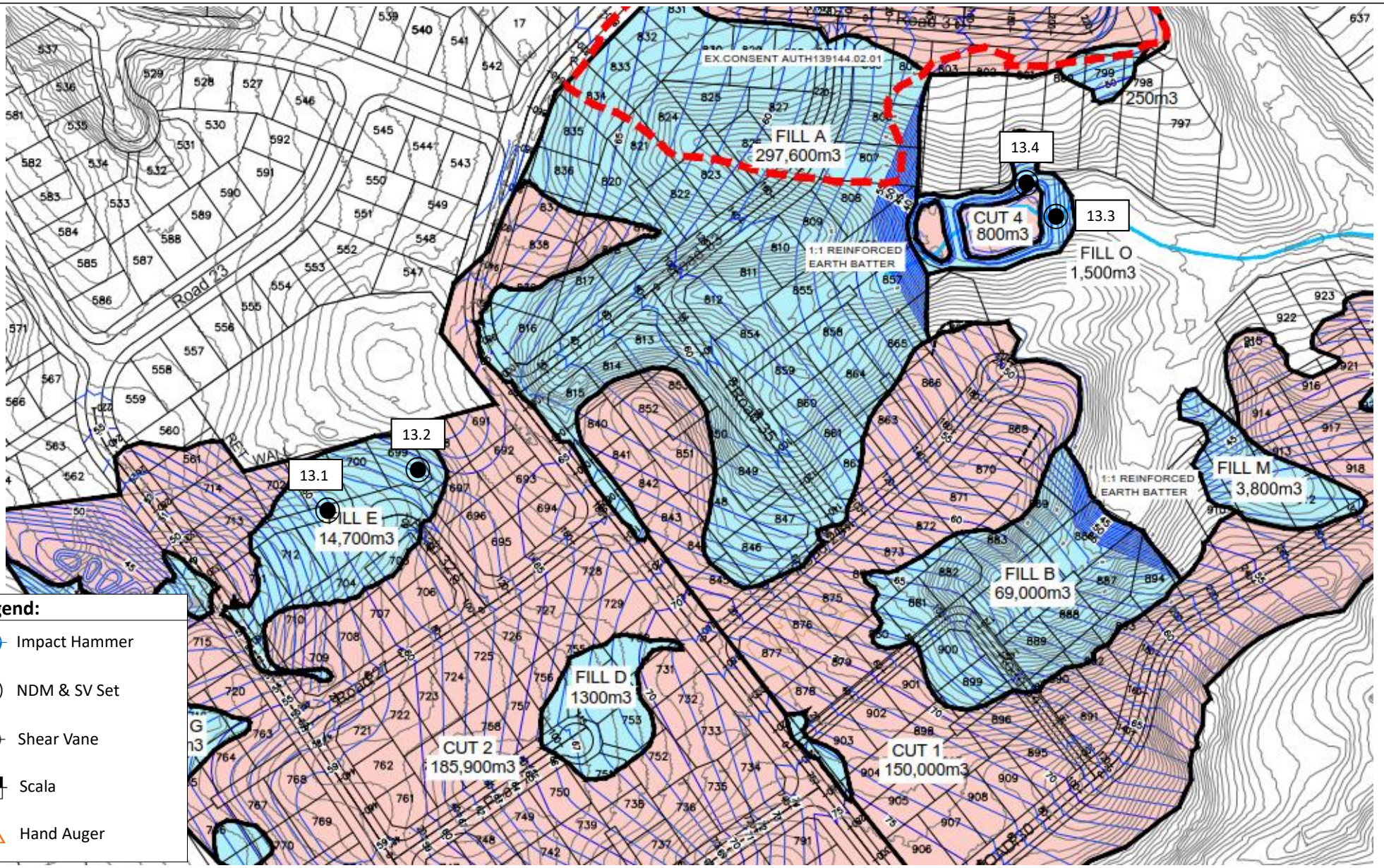

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	27/11/19
Location:	Fill E & Fill O	Job No.:	1009213.0657.0.0/3	URN:	13	Date:	27/11/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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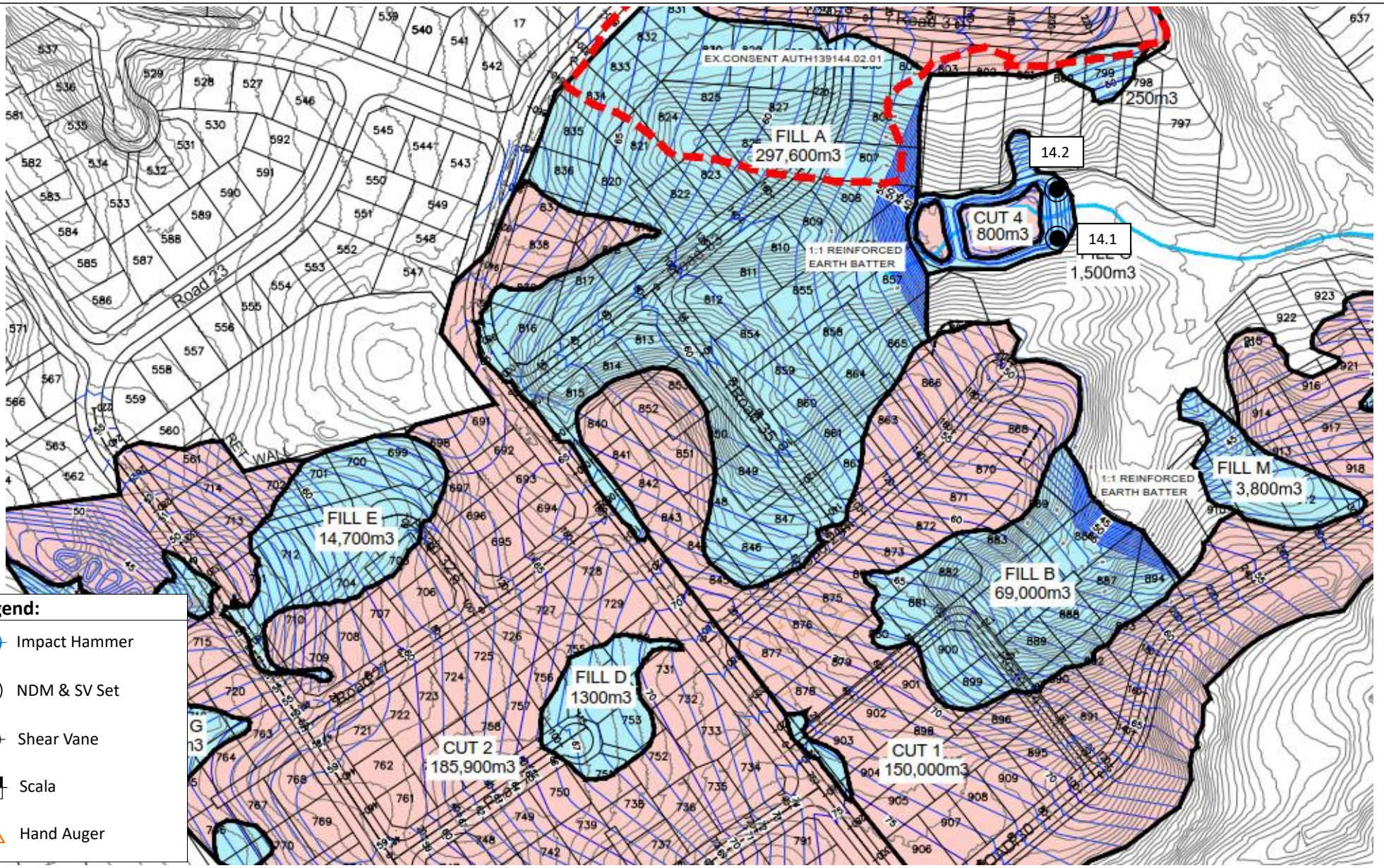

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	29/11/19
Location:	Fill O	Job No.:	1009213.0657.0.0/3	URN:	14	Date:	29/11/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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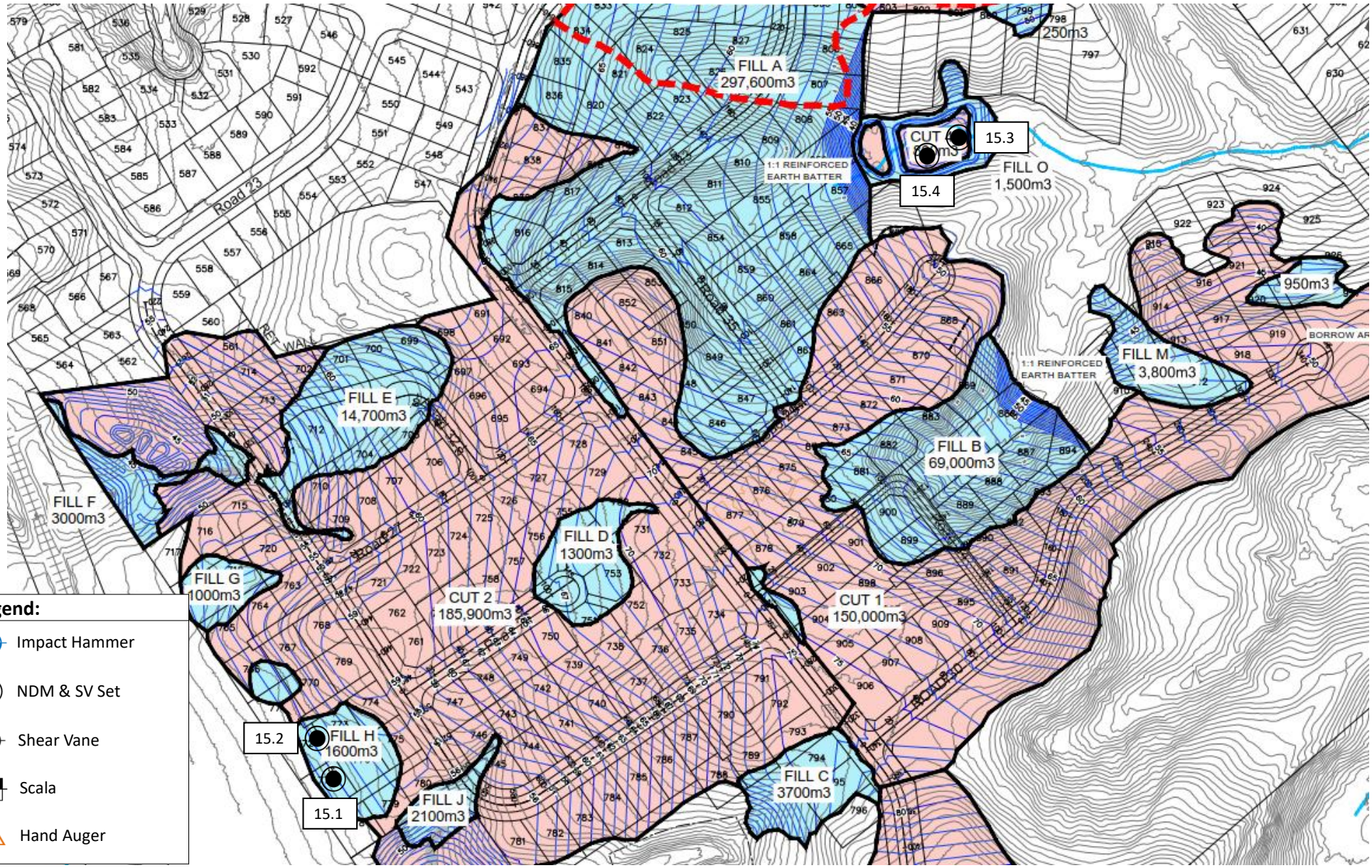

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	2/12/19
Location:	Fill O & Fill H	Job No.:	1009213.0657.0.0/3	URN:	15	Date:	2/12/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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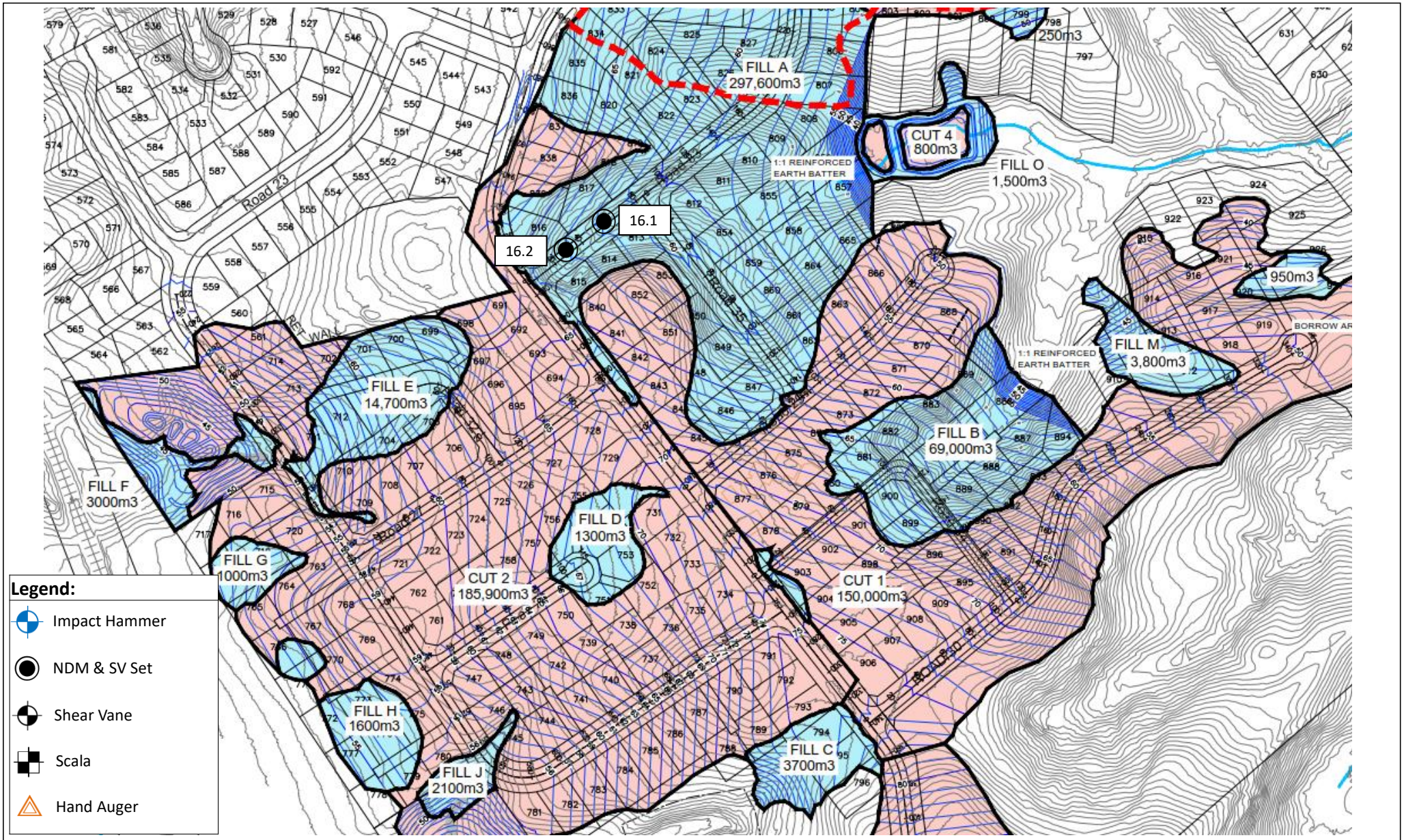

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	13/12/19
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	16	Date:	13/12/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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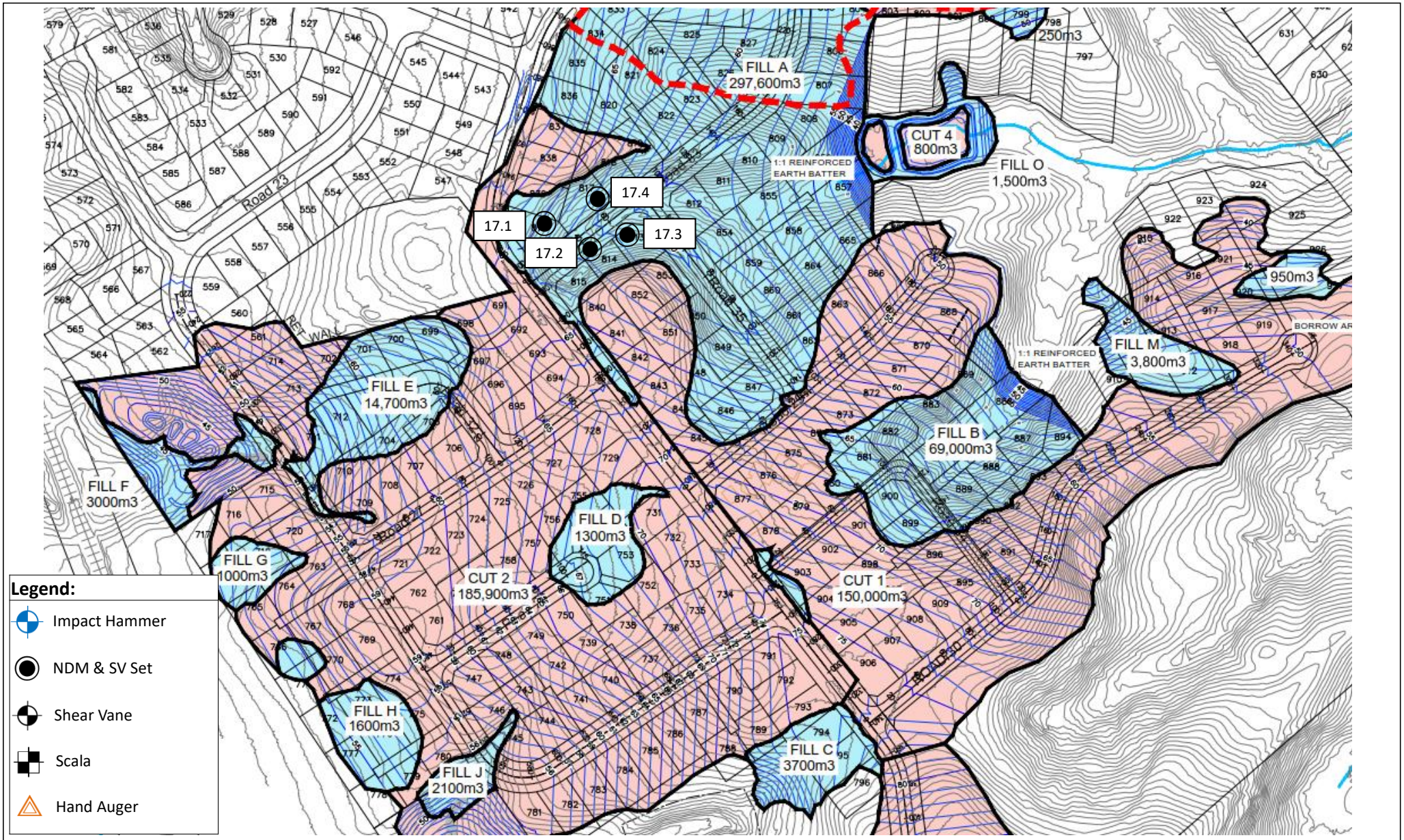

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	06/01/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	17	Date:	06/01/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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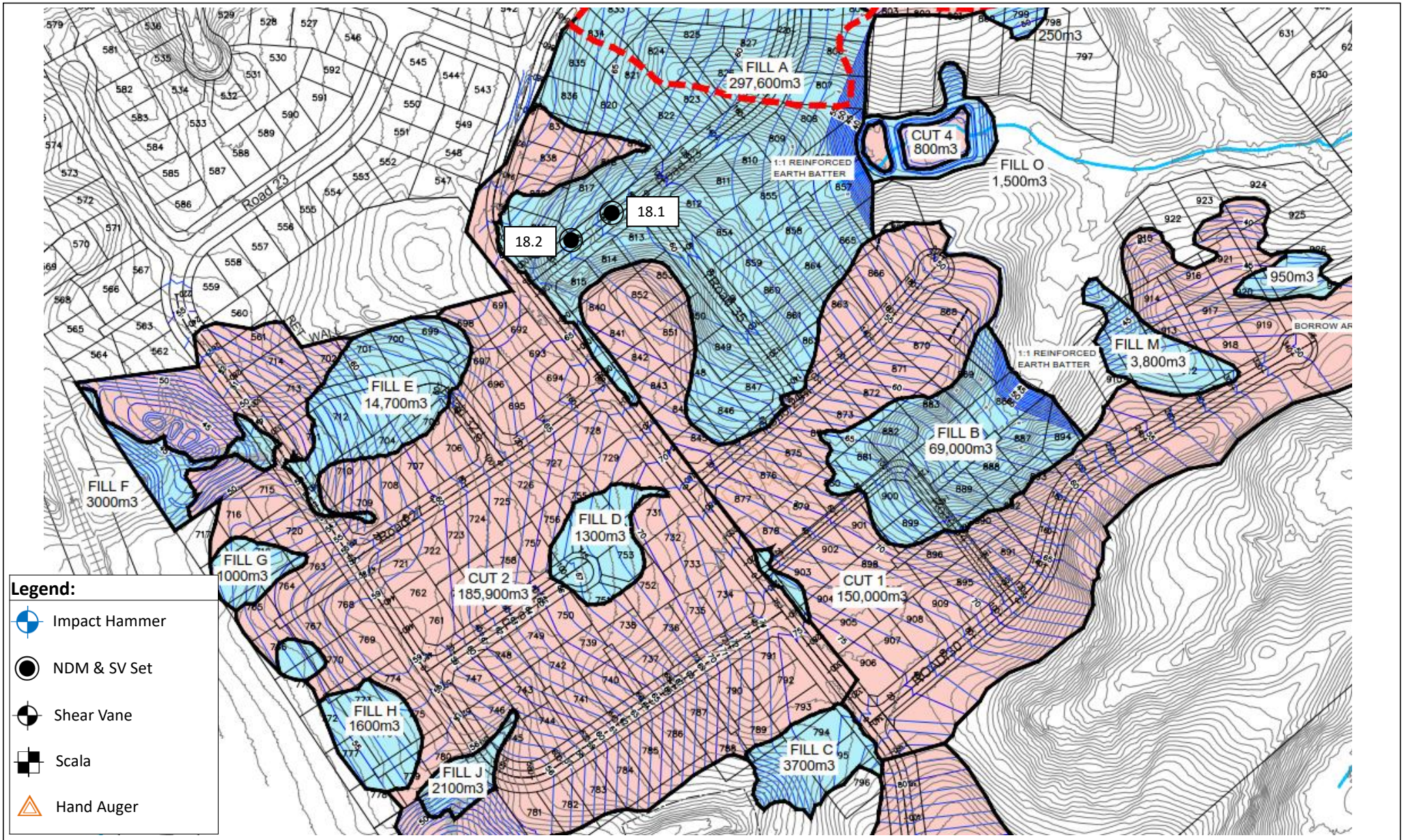

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	08/01/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	18	Date:	08/01/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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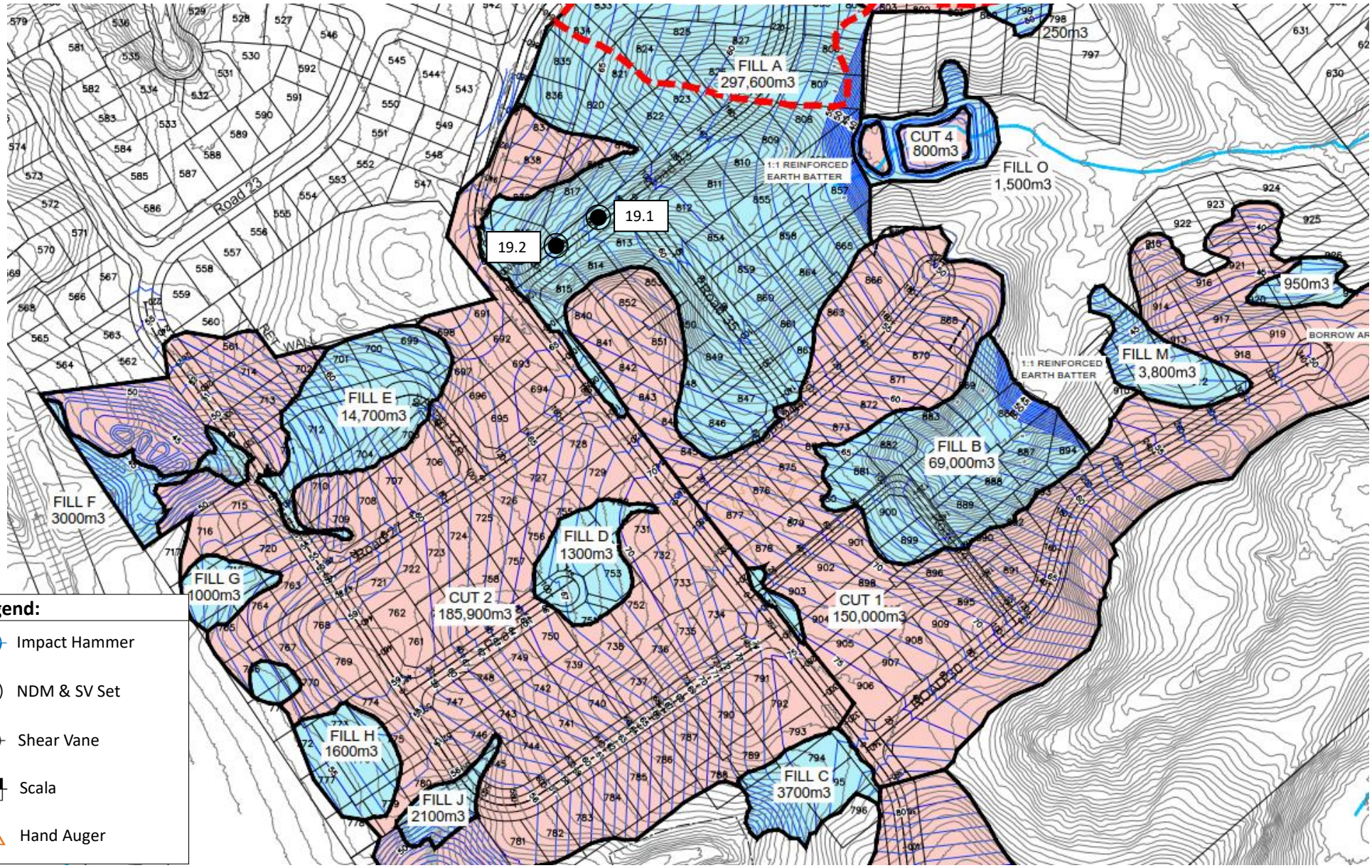

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	10/01/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	19	Date:	10/01/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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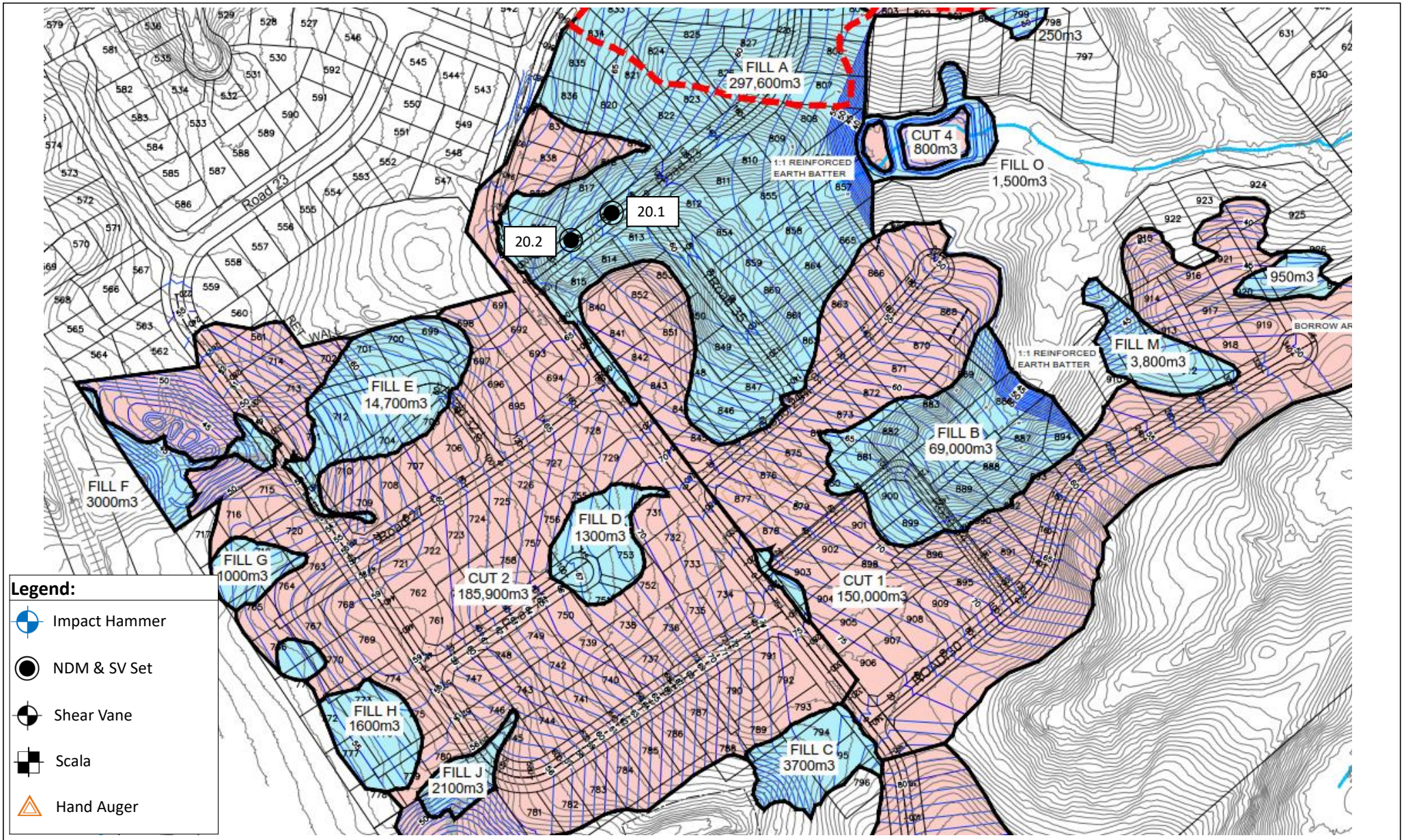

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	13/01/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	20	Date:	13/01/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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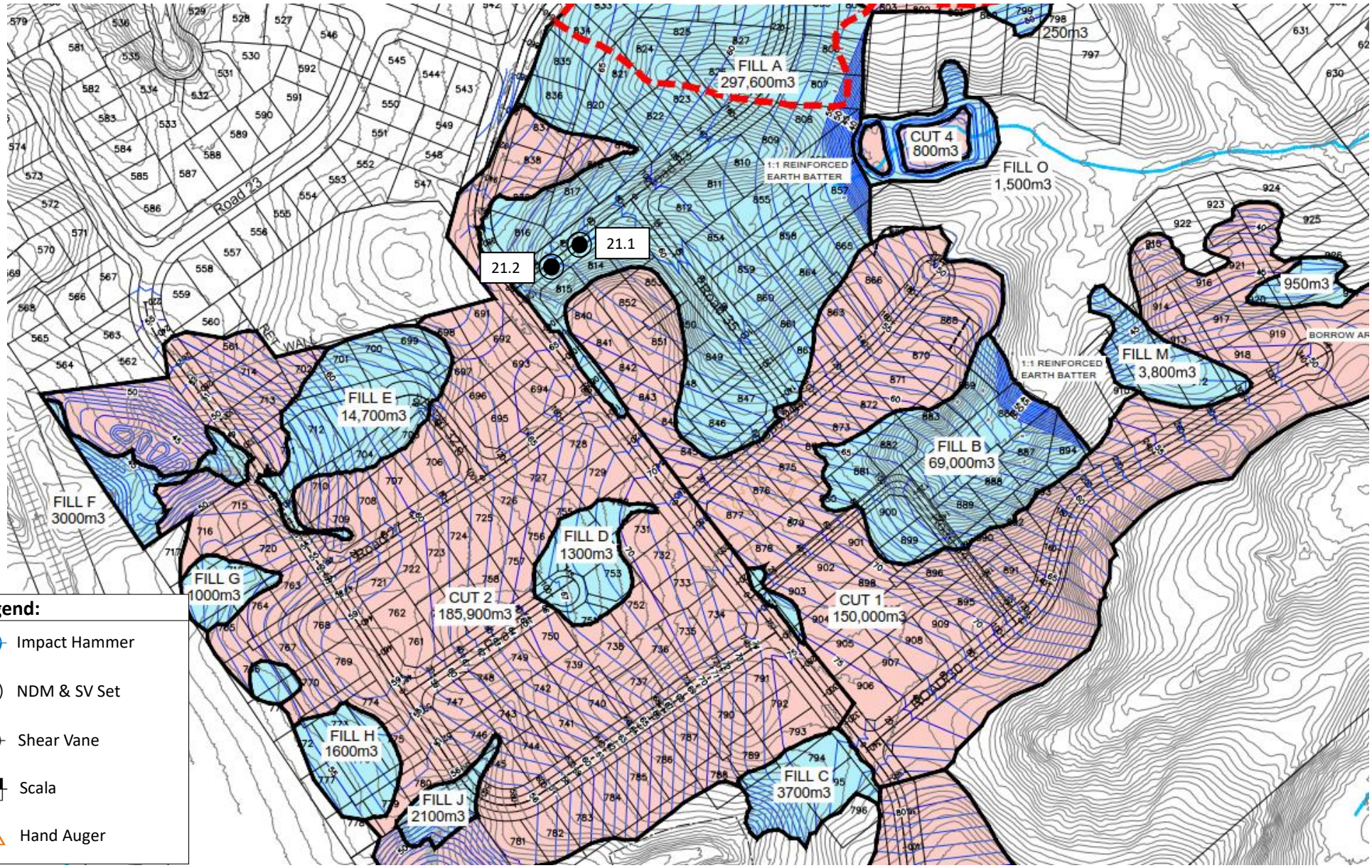

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	14/01/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	21	Date:	14/01/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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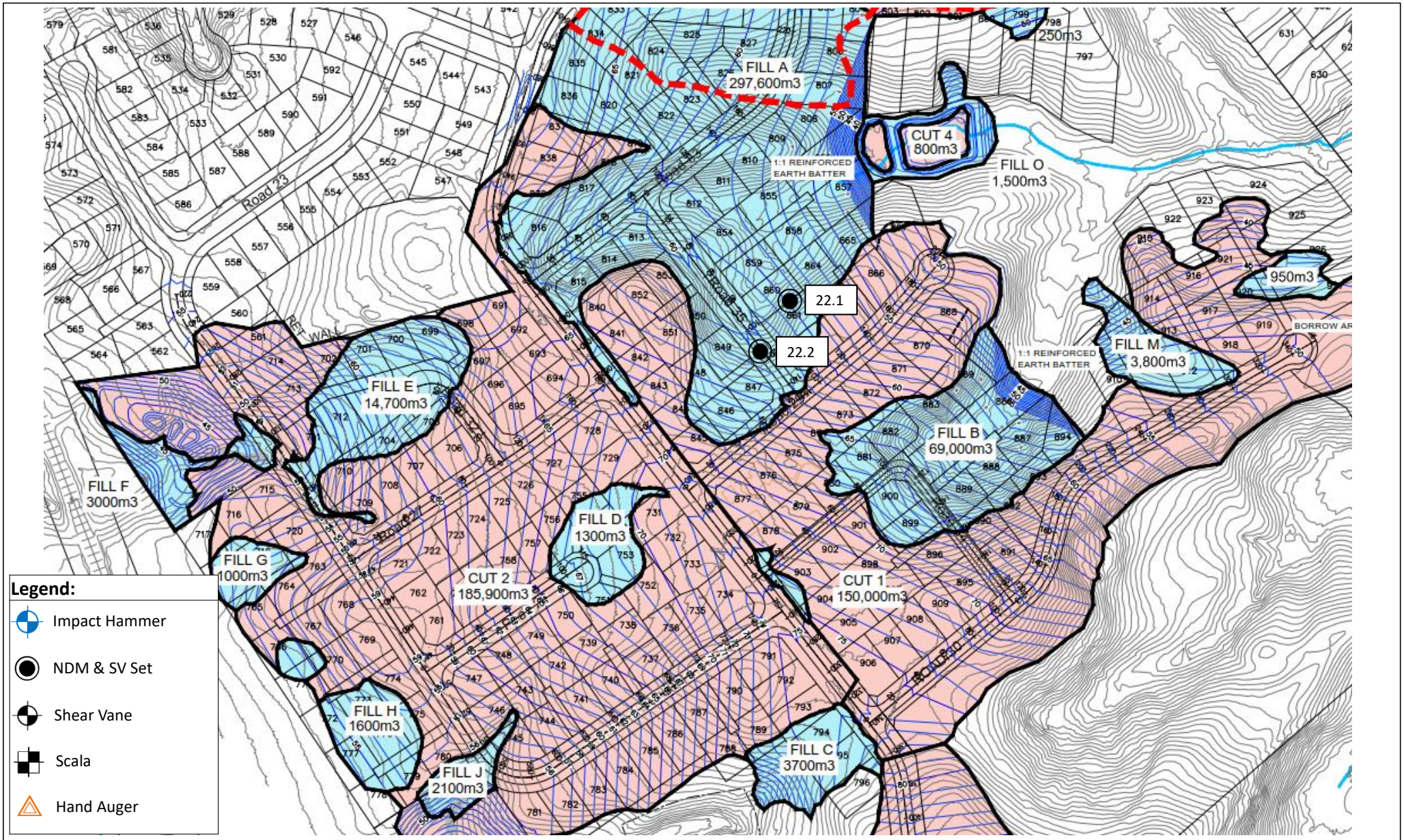

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	20/01/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	22	Date:	20/01/2020
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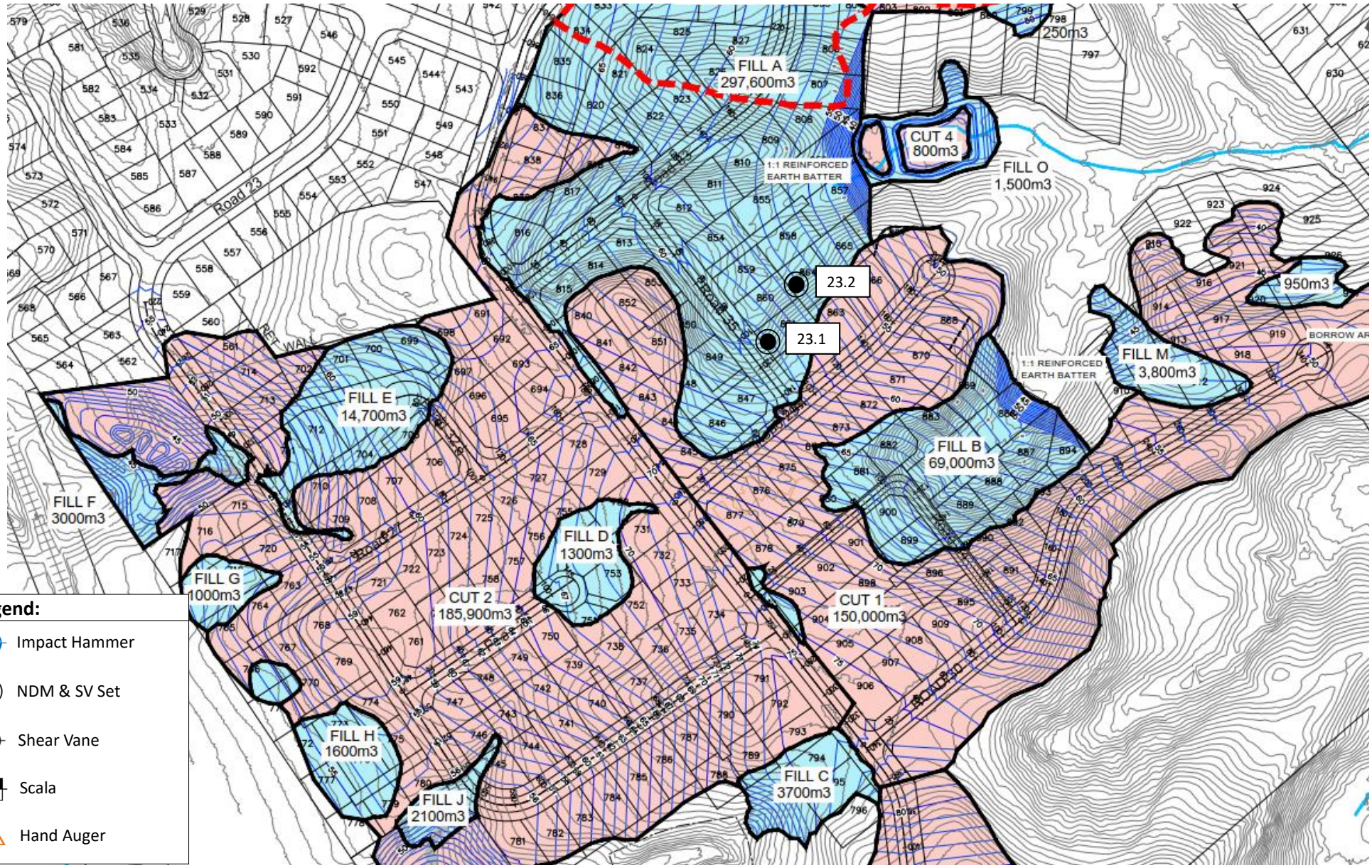

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	22/01/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	23	Date:	22/01/2020
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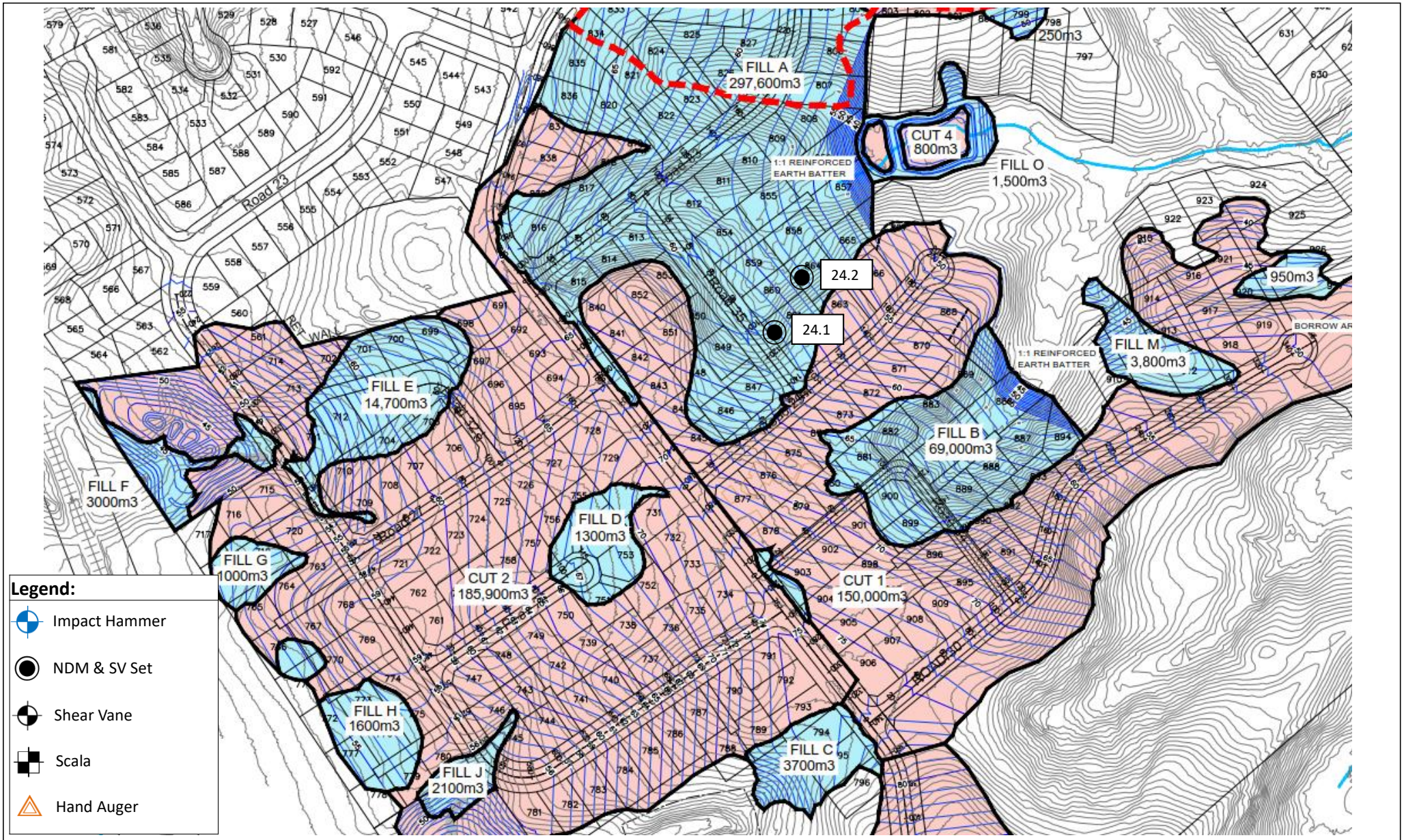

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	24/01/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	24	Date:	24/01/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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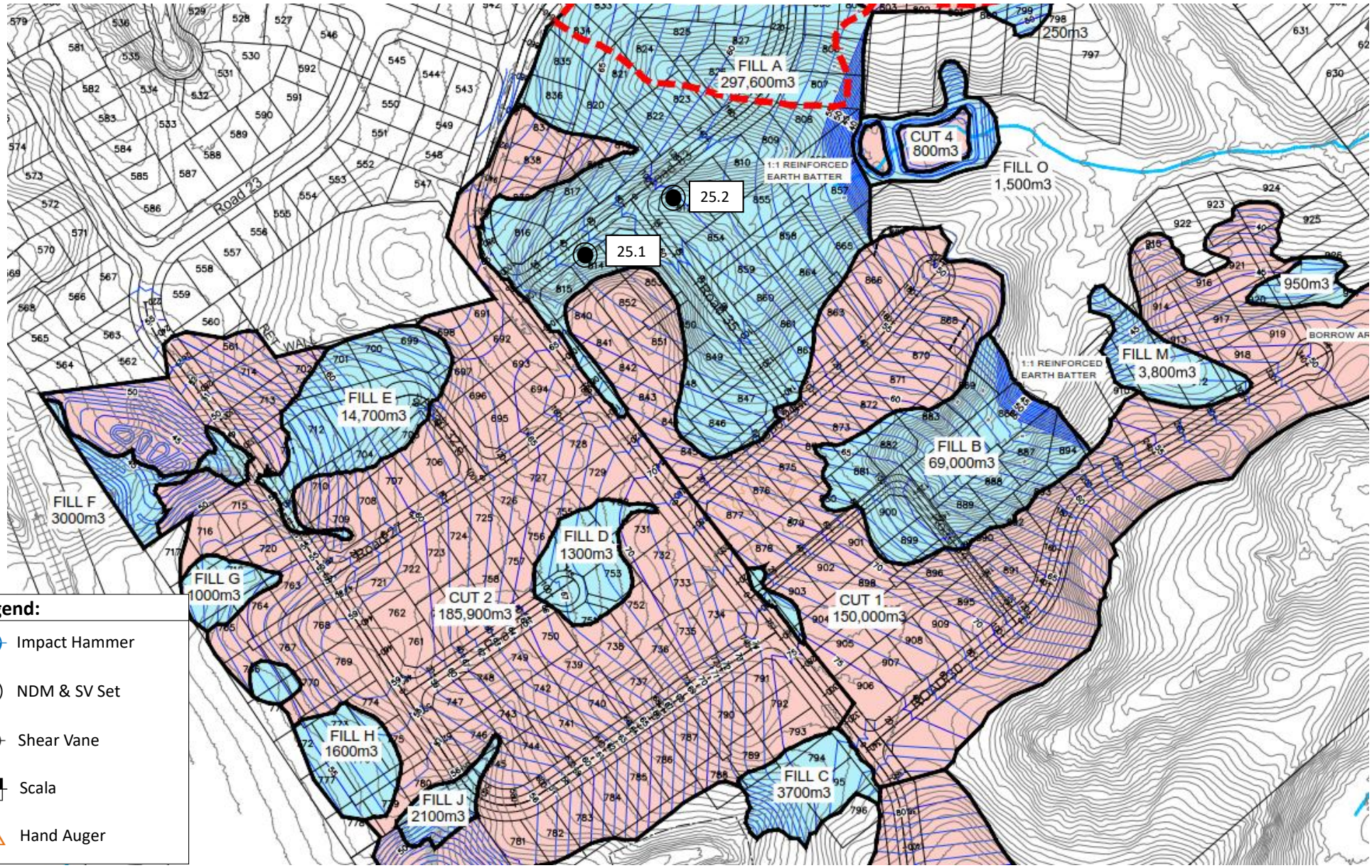

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	29/01/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	25	Date:	29/01/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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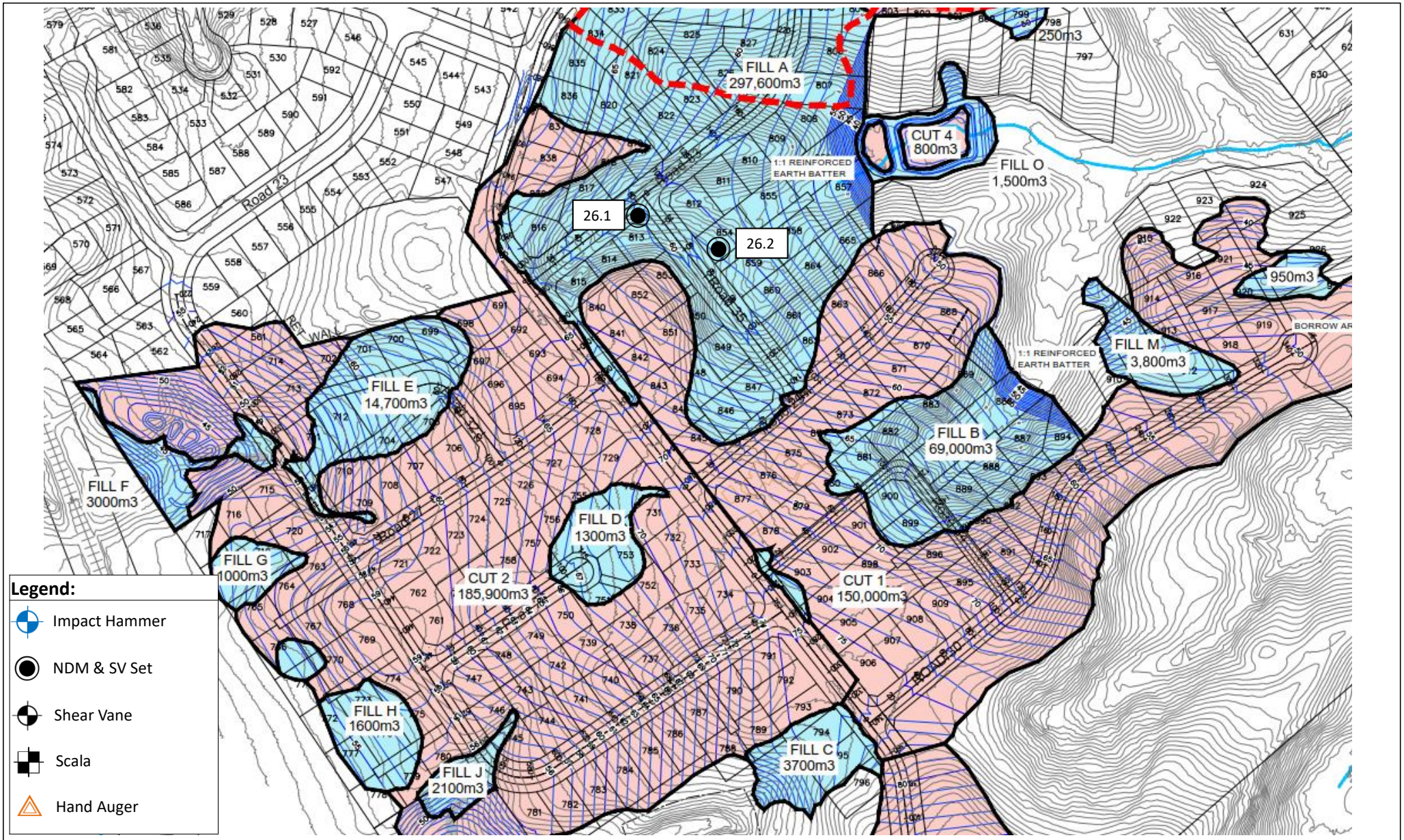

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	31/01/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	26	Date:	31/01/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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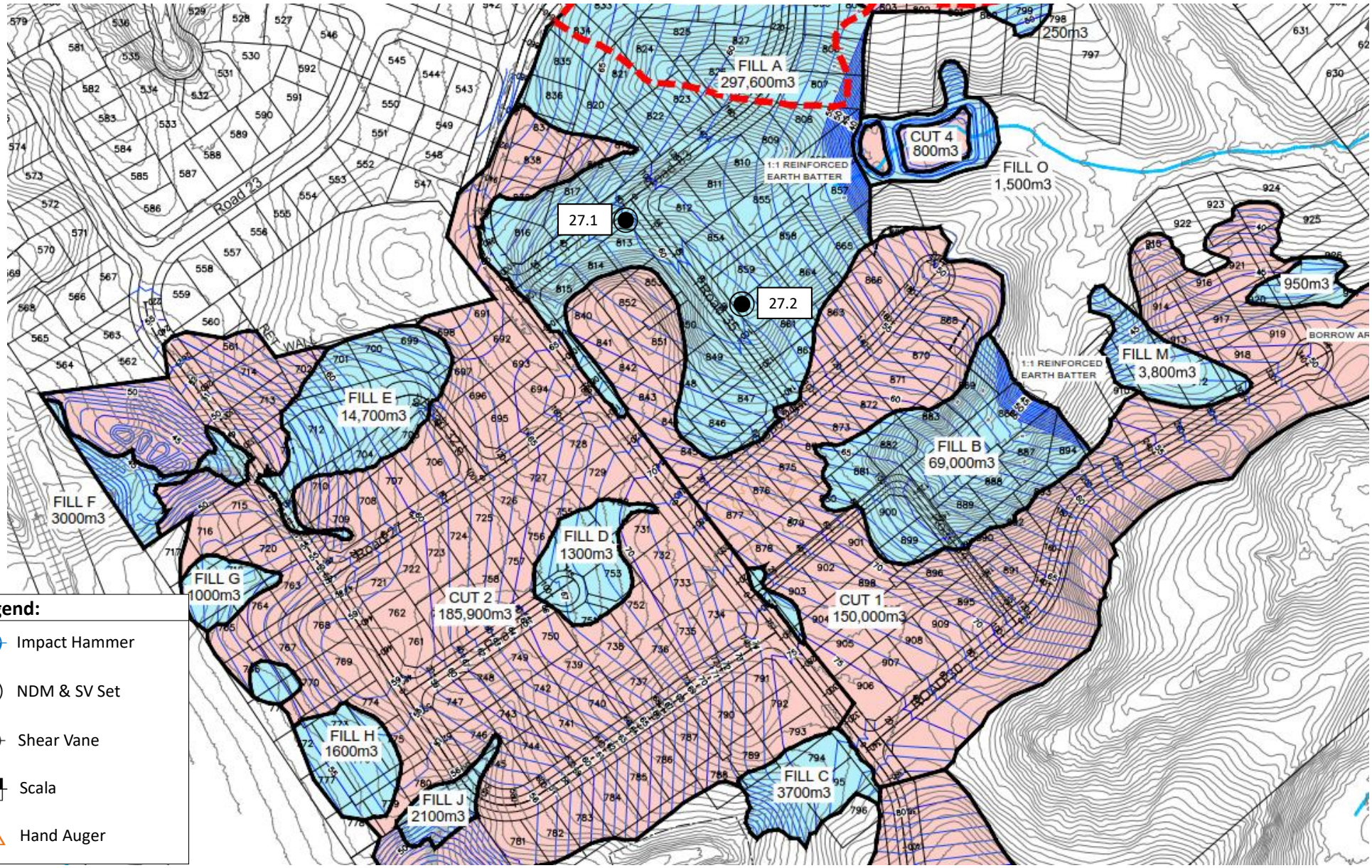

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	03/02/20
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	27	Date:	03/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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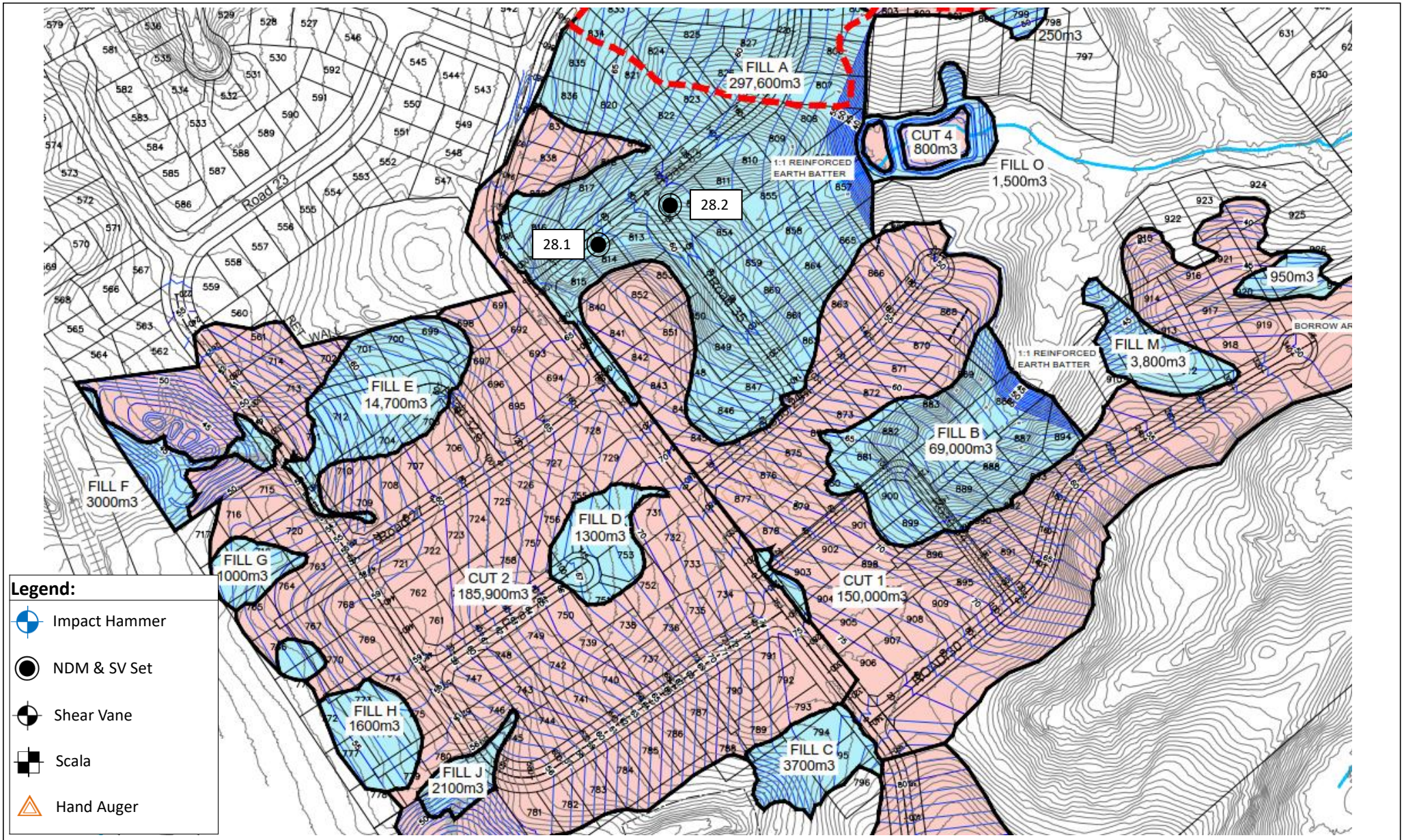

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	05/02/20
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	28	Date:	05/02/20
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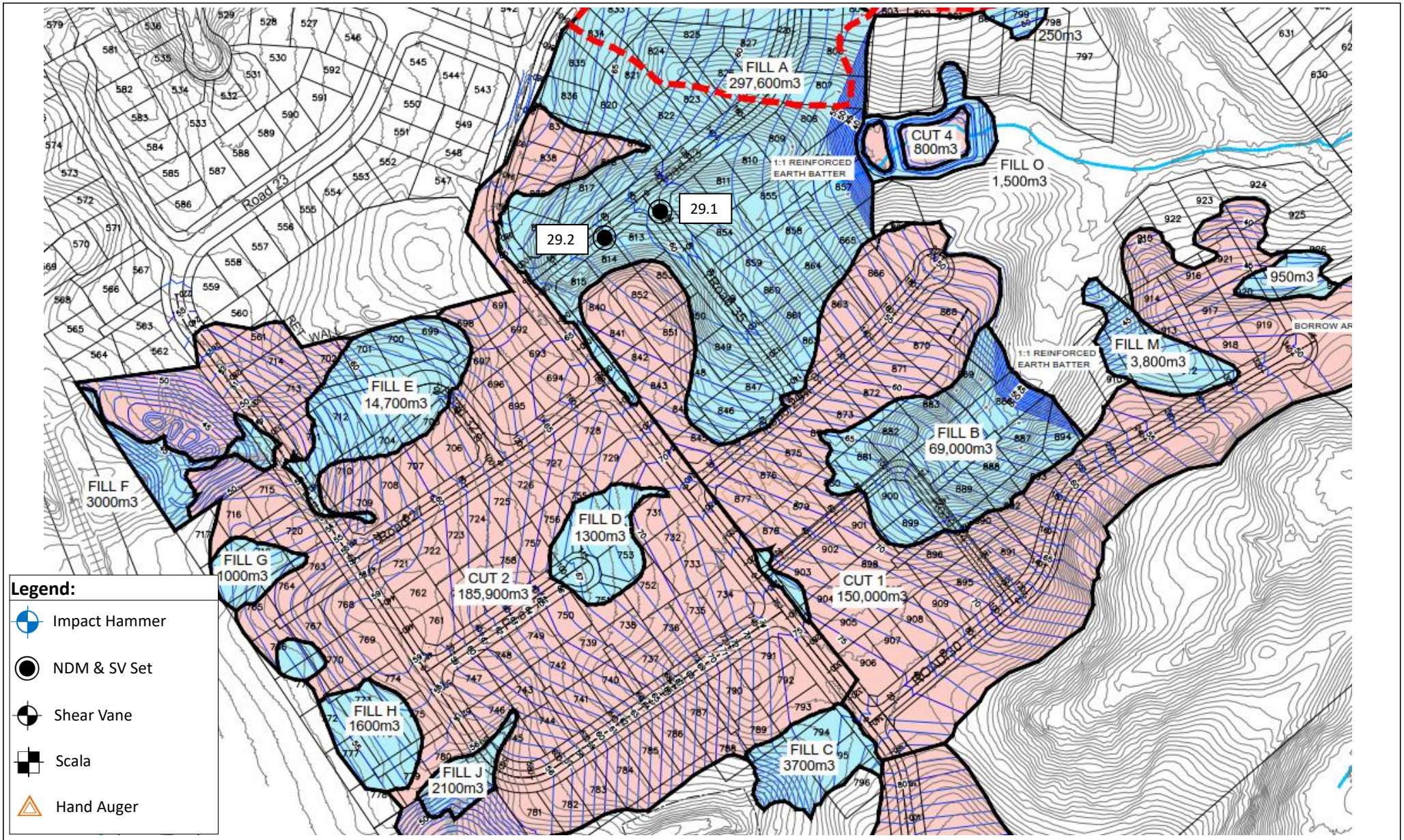

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	10/02/20
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	29	Date:	10/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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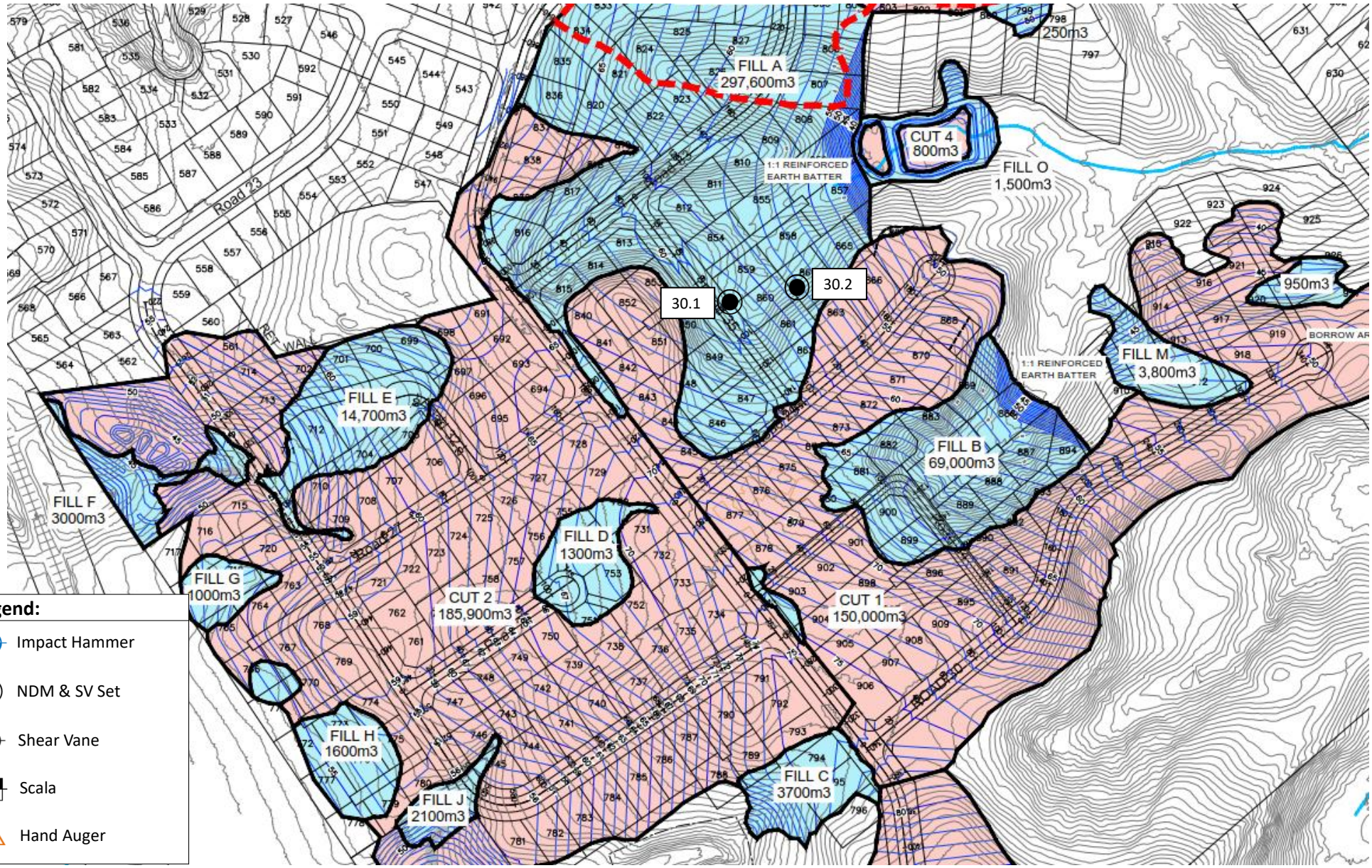

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	12/02/20
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	30	Date:	12/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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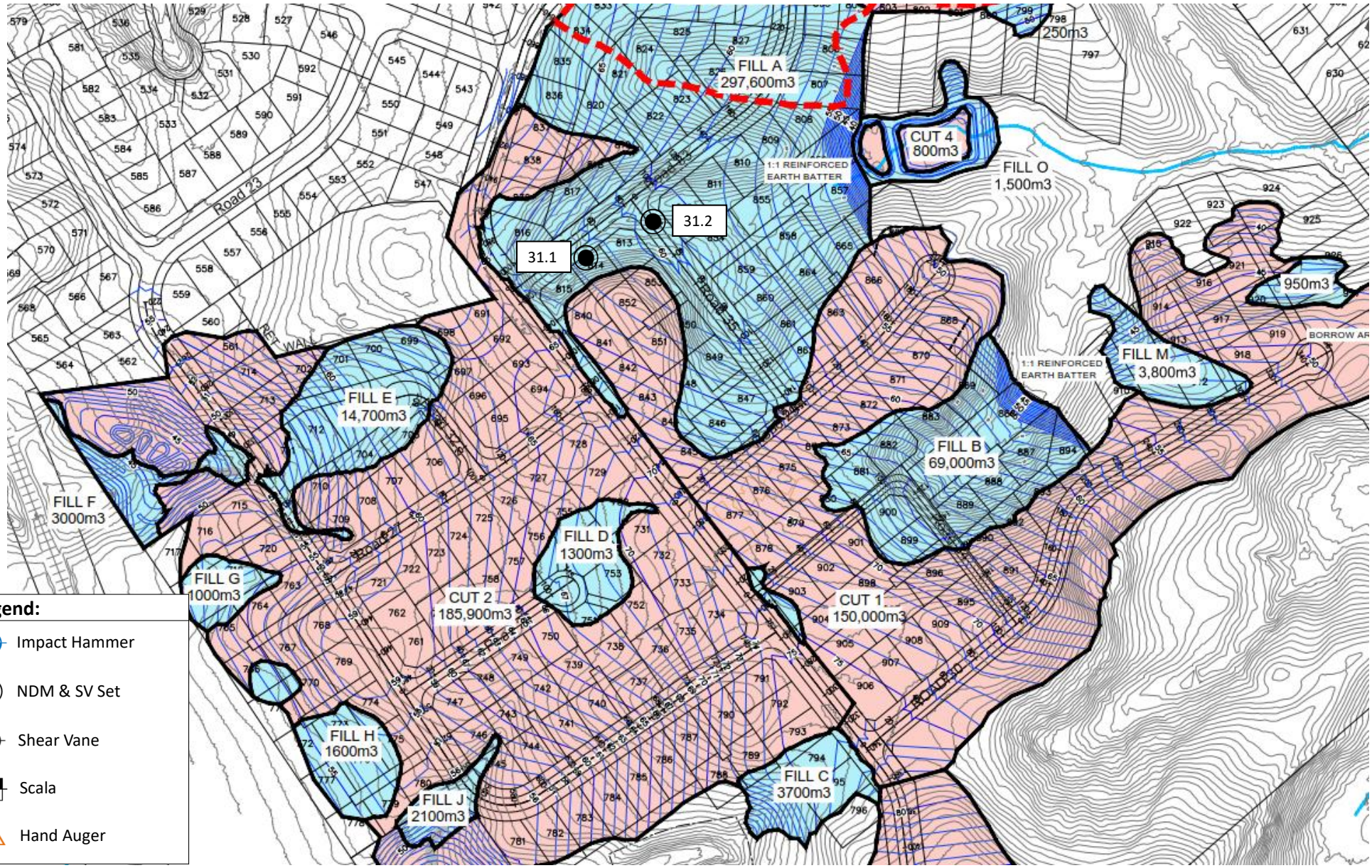

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	14/02/20
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	31	Date:	14/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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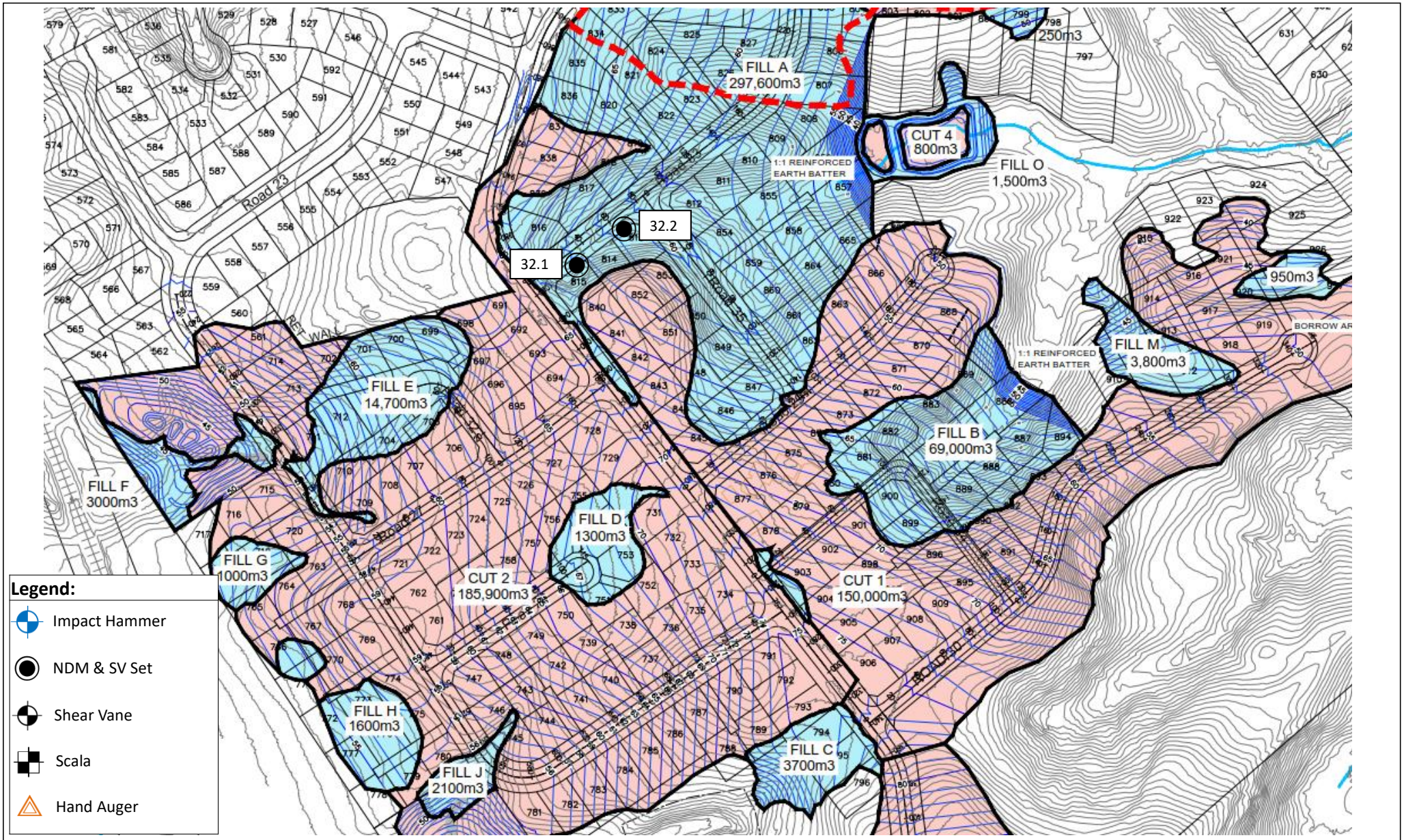

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	17/02/20
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	32	Date:	17/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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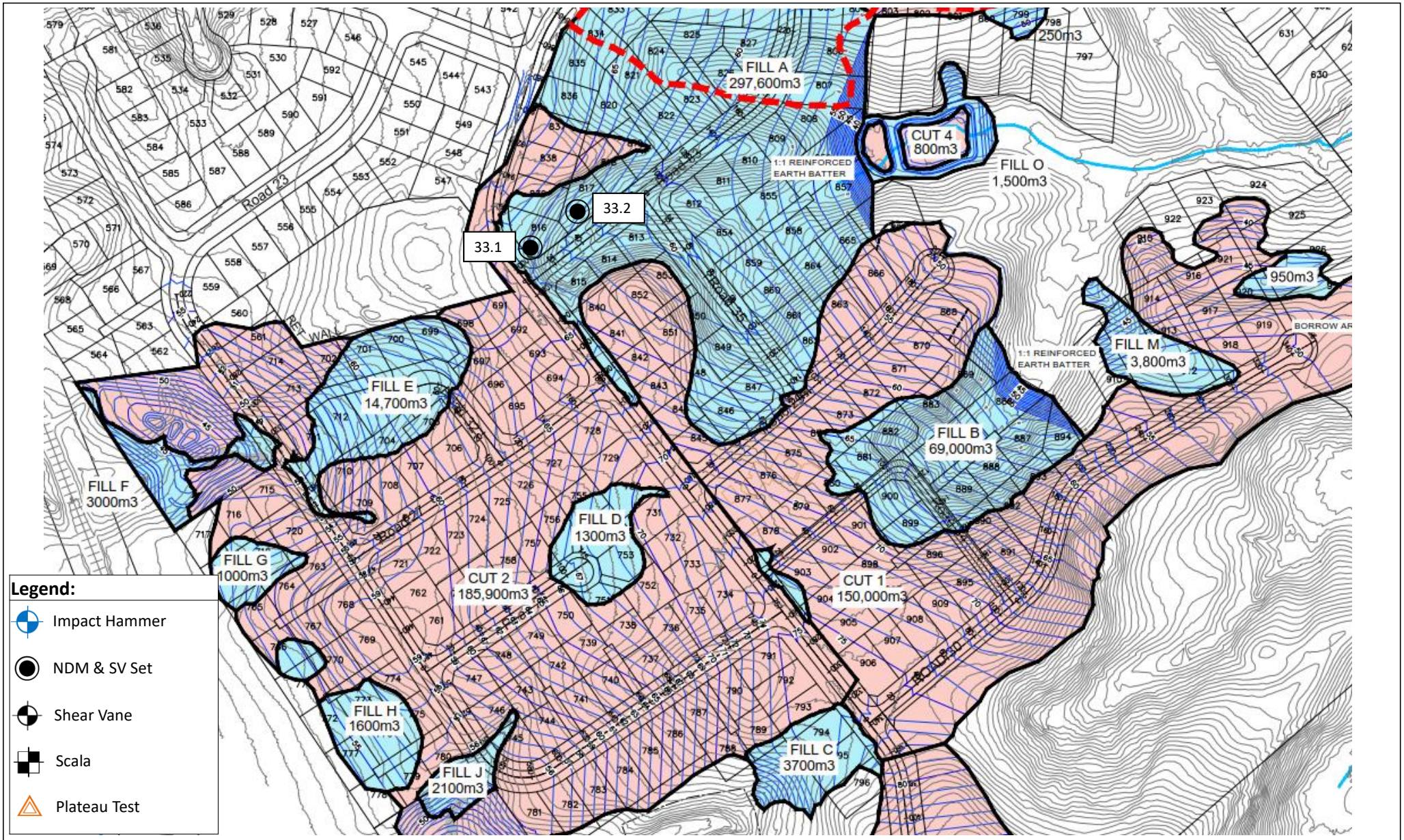

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	19/02/20
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	33 1/2	Date:	19/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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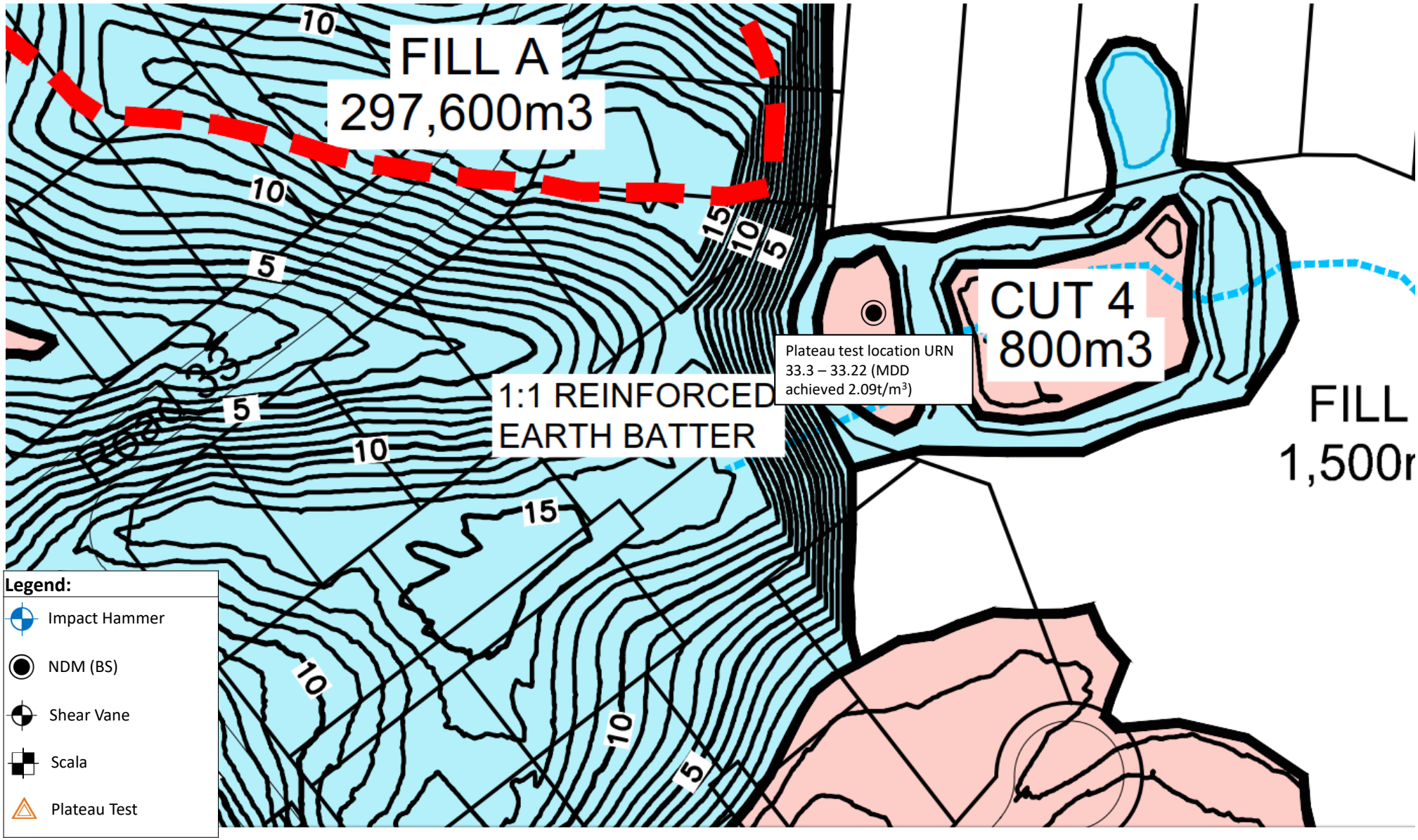

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	19/02/20
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	33 2/2	Date:	19/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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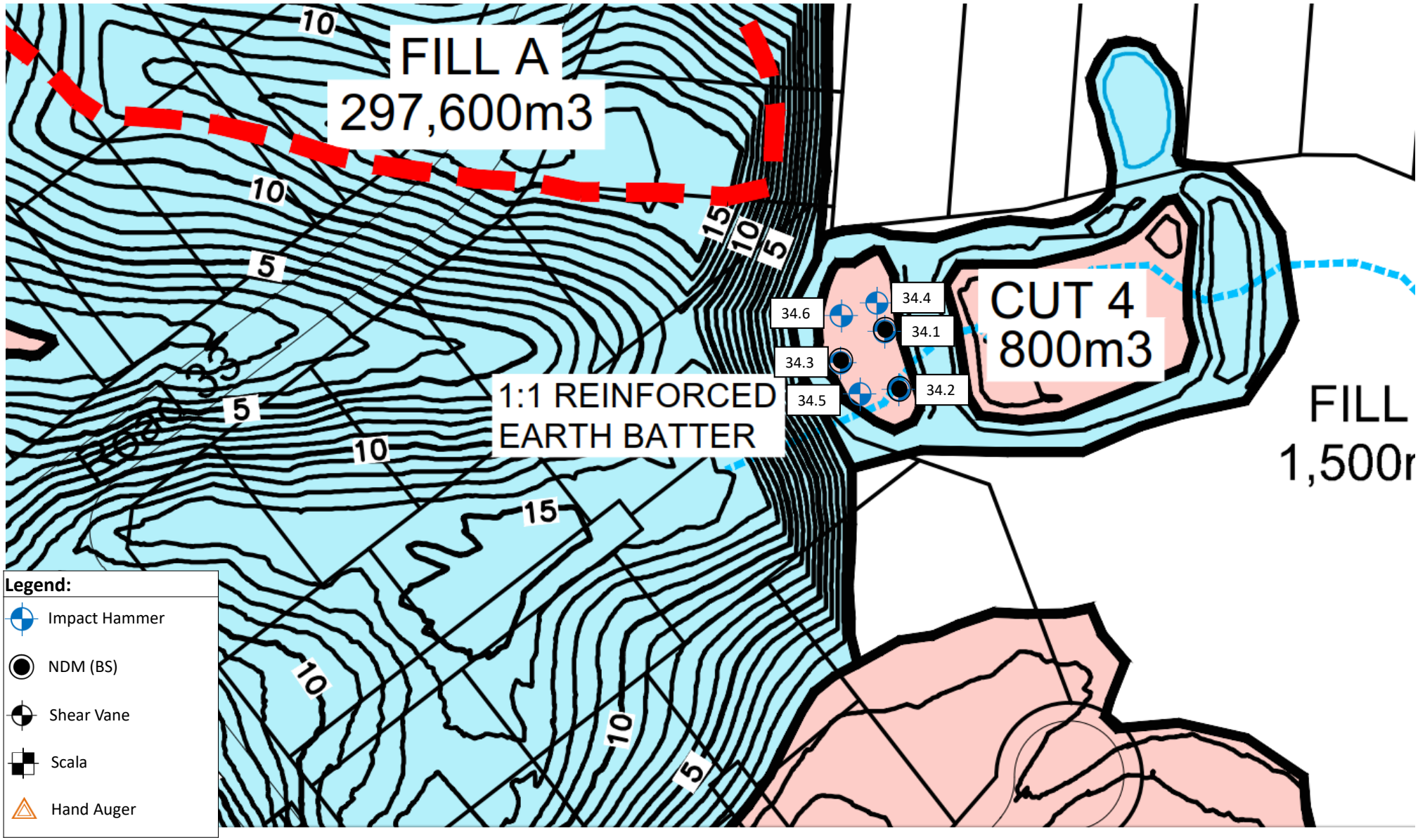

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	20/02/20
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	34	Date:	20/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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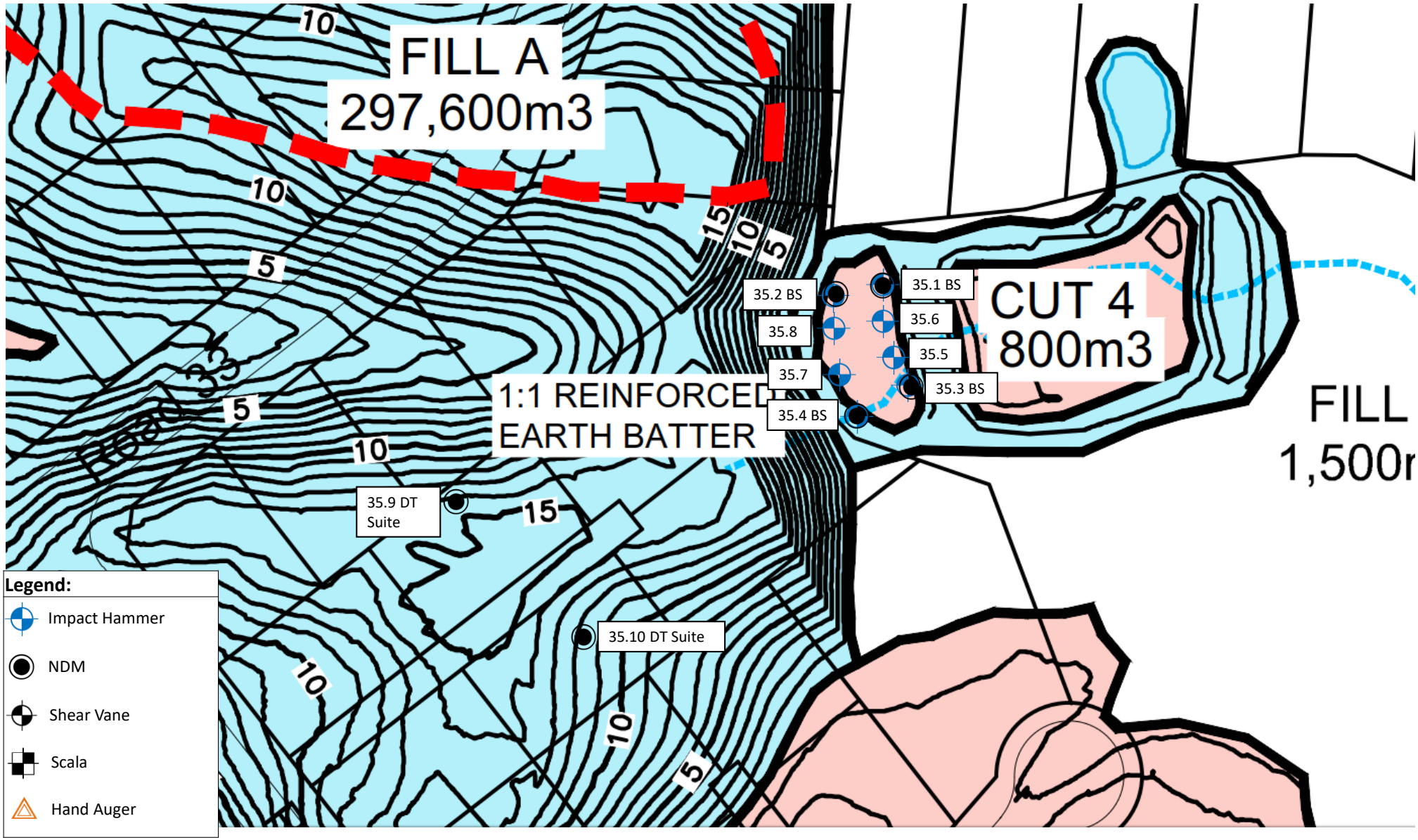

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	21/02/20
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	35	Date:	21/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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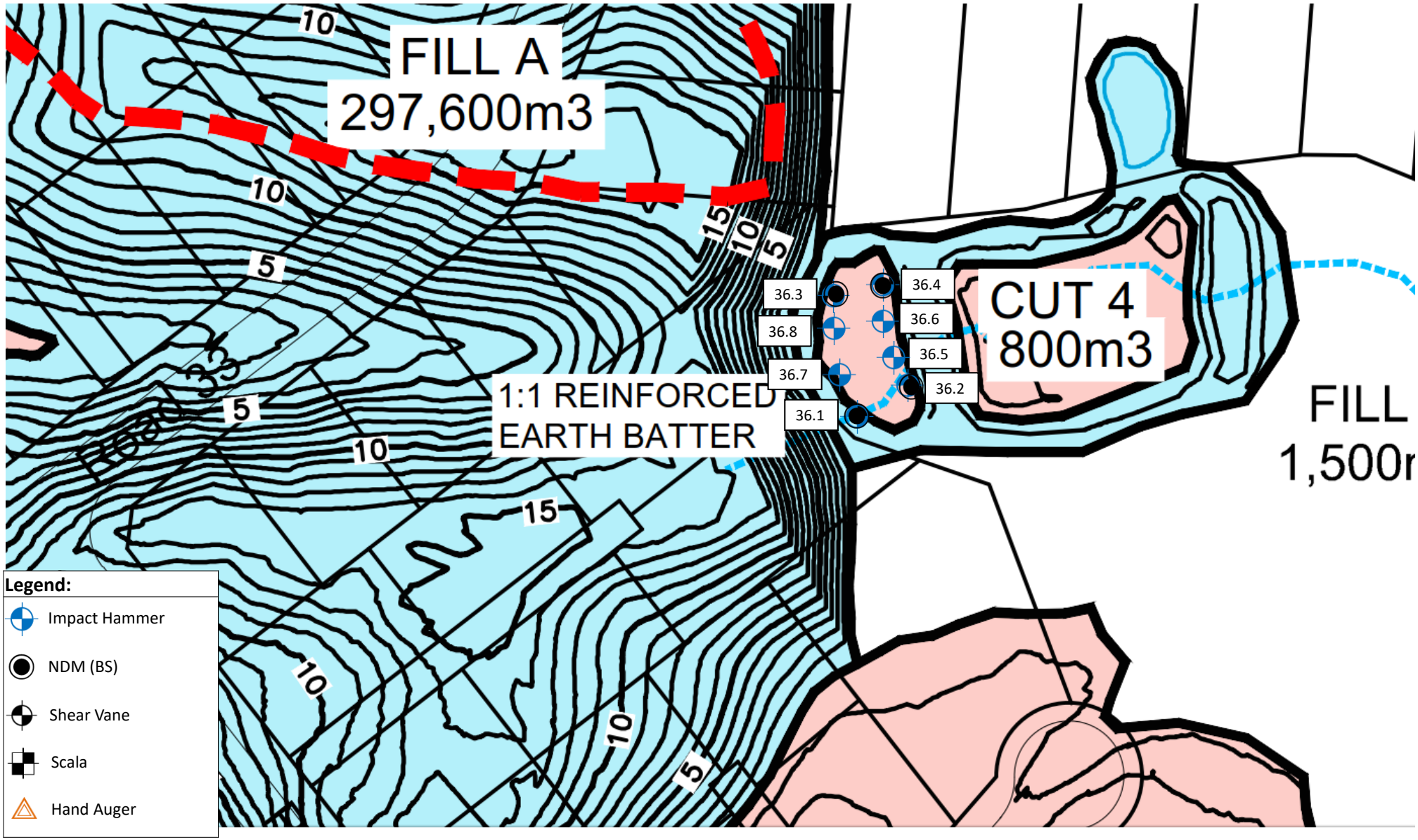

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	24/02/20
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	36	Date:	24/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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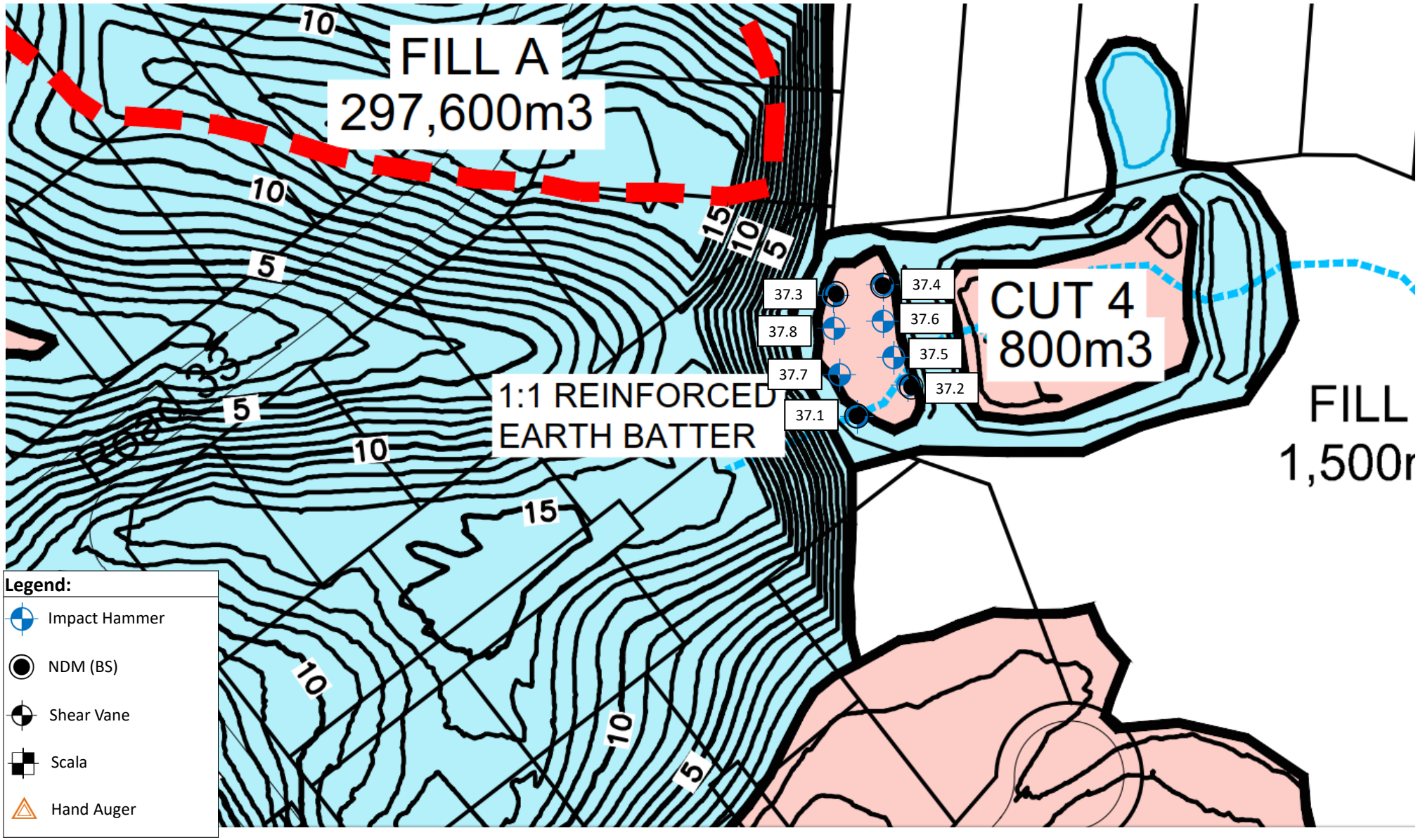

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	25/02/20
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	37	Date:	25/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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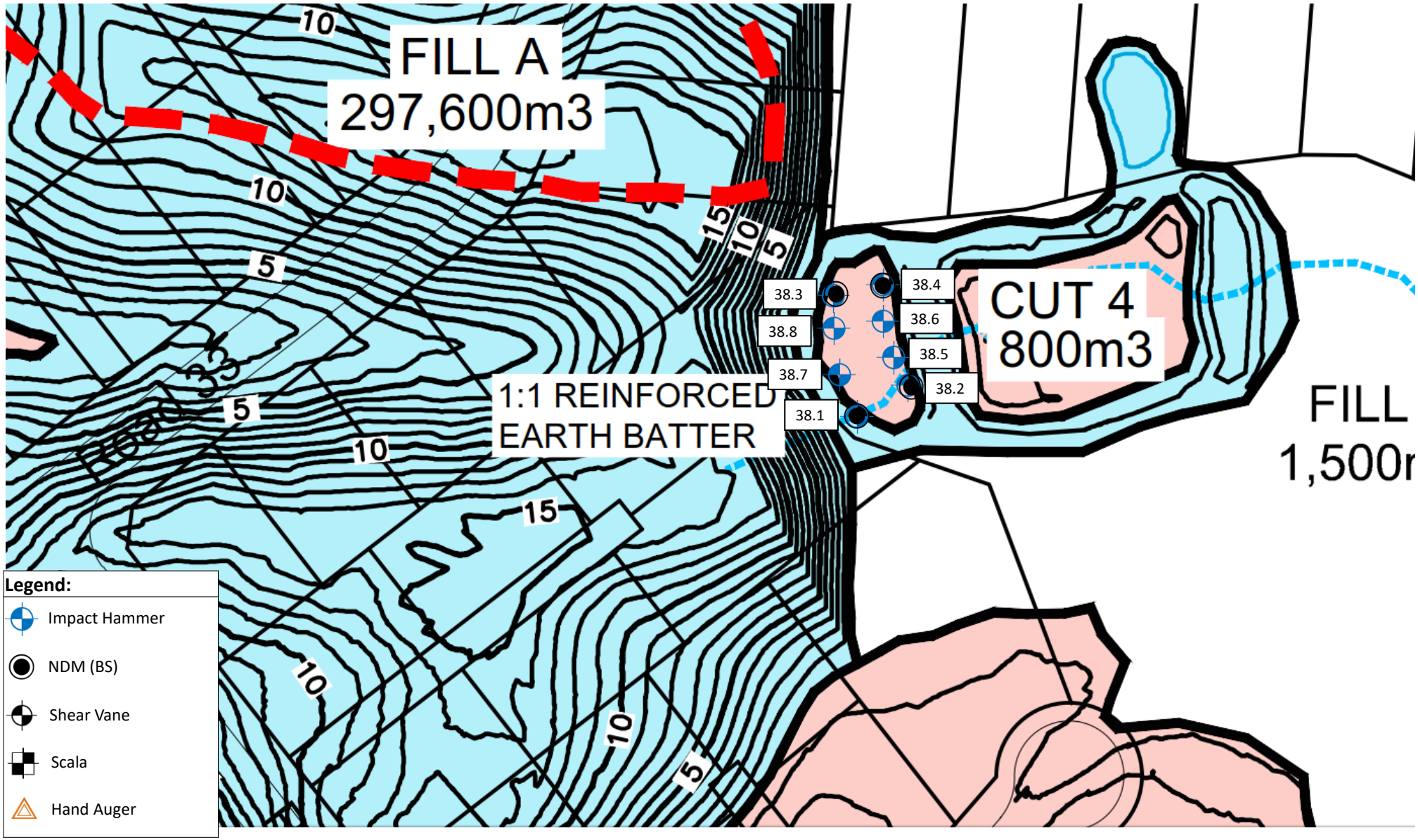

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	25/02/20
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	38	Date:	25/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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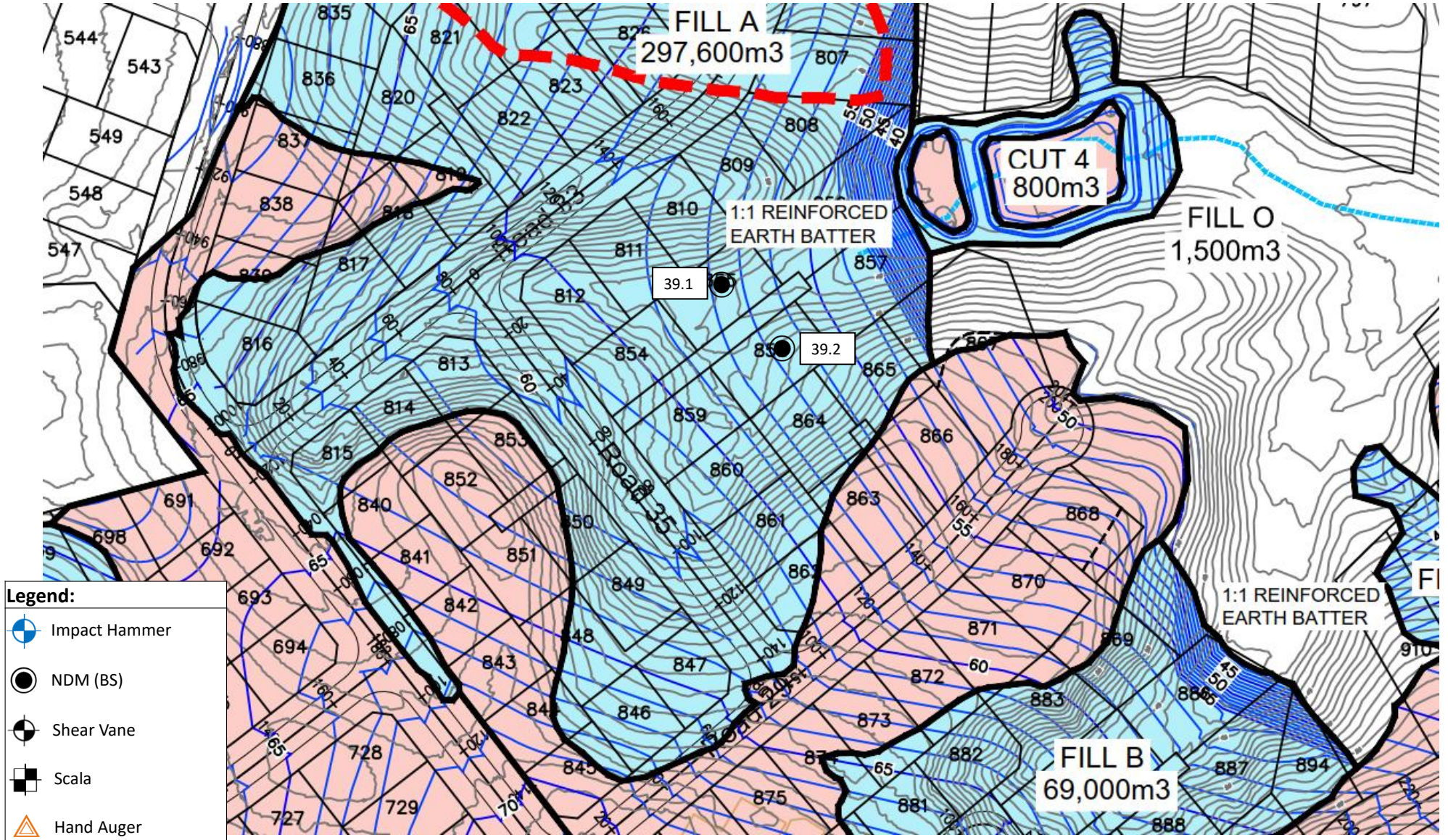

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Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	26/02/20
Location:	Fill A	Job No.:	11009213.0657.0.0/3	URN:	39	Date:	26/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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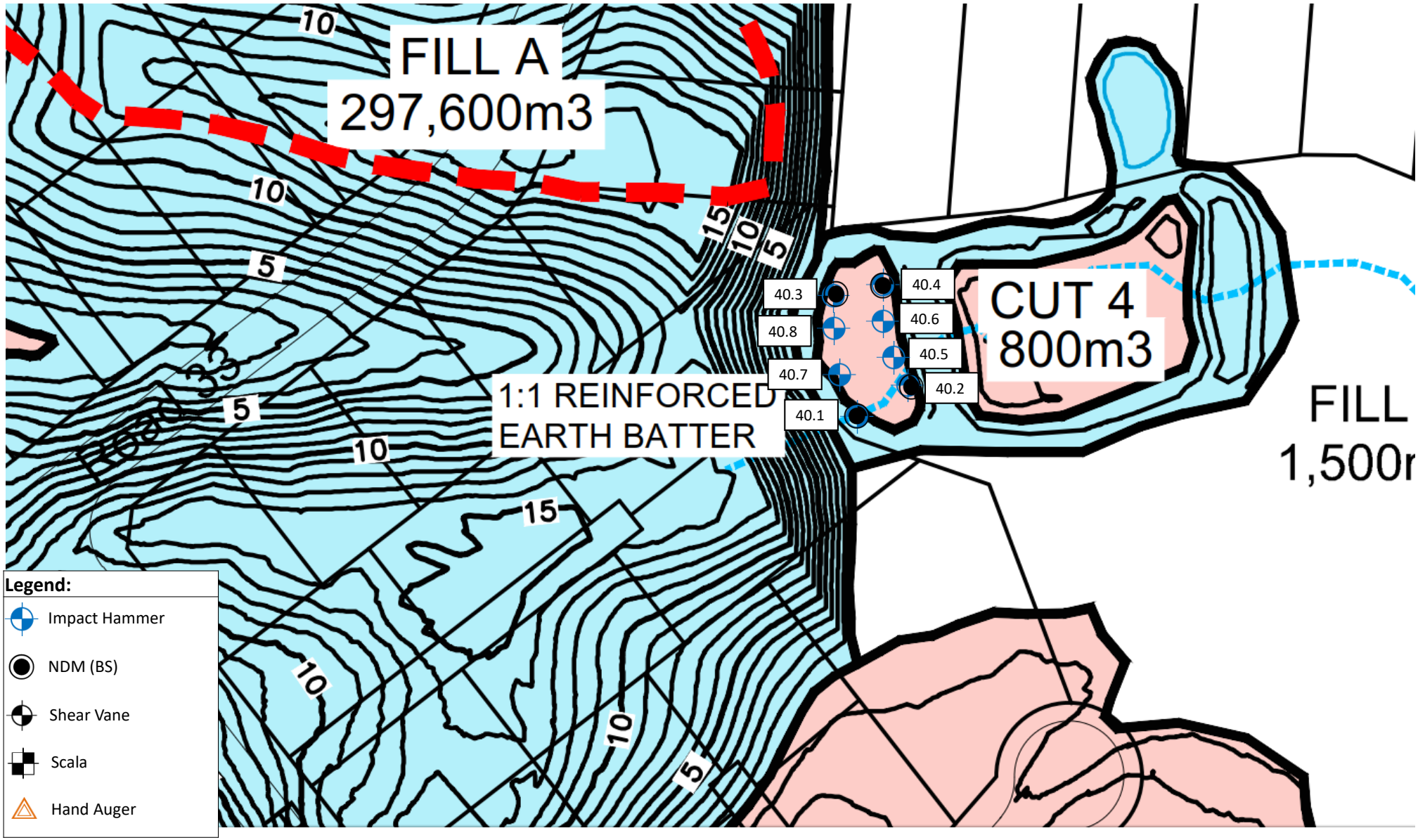

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	27/02/20
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	40	Date:	27/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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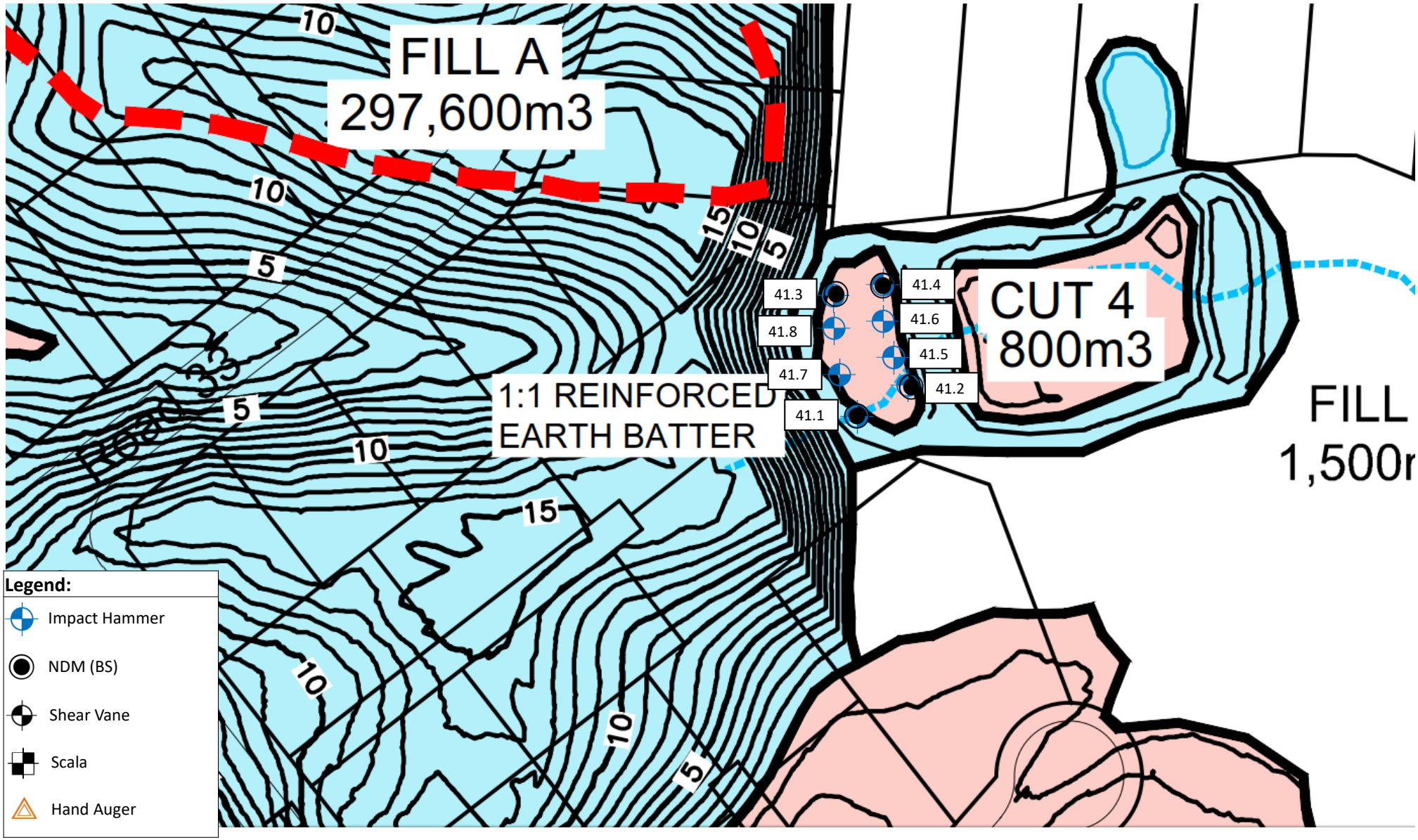

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	28/02/20
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	41	Date:	28/02/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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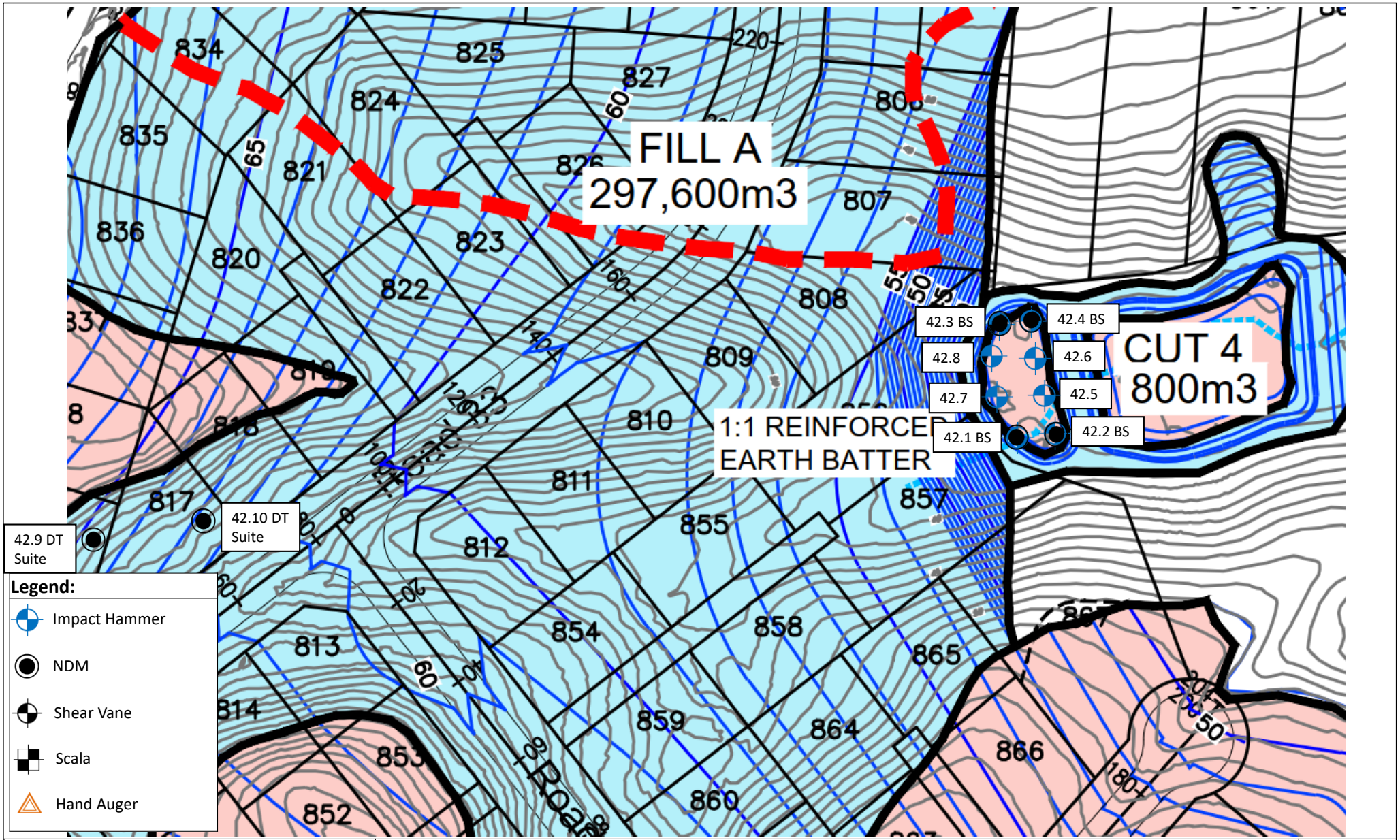

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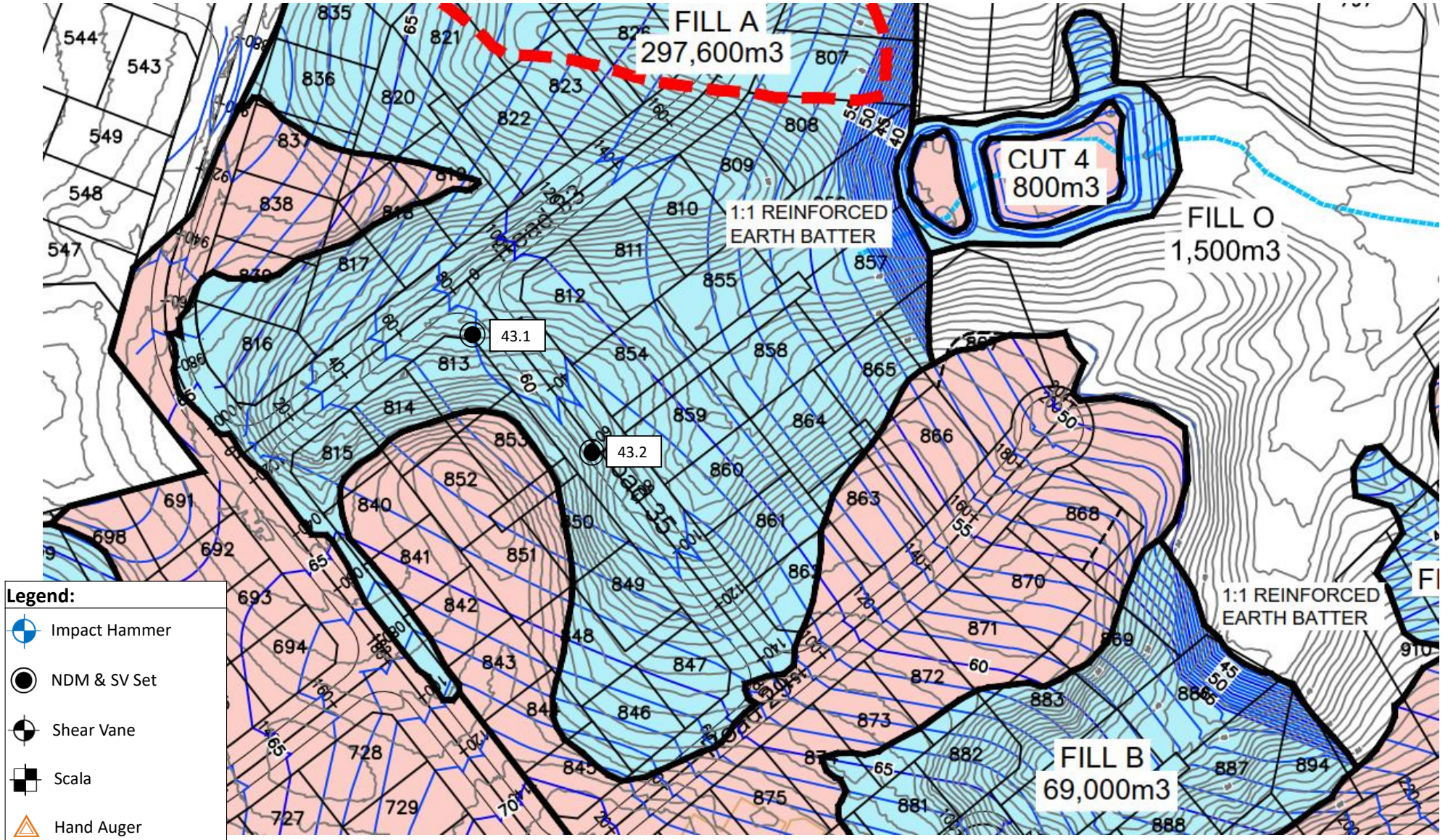
Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	02/03/20
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	42	Date:	02/03/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	9/03/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	43	Date:	9/03/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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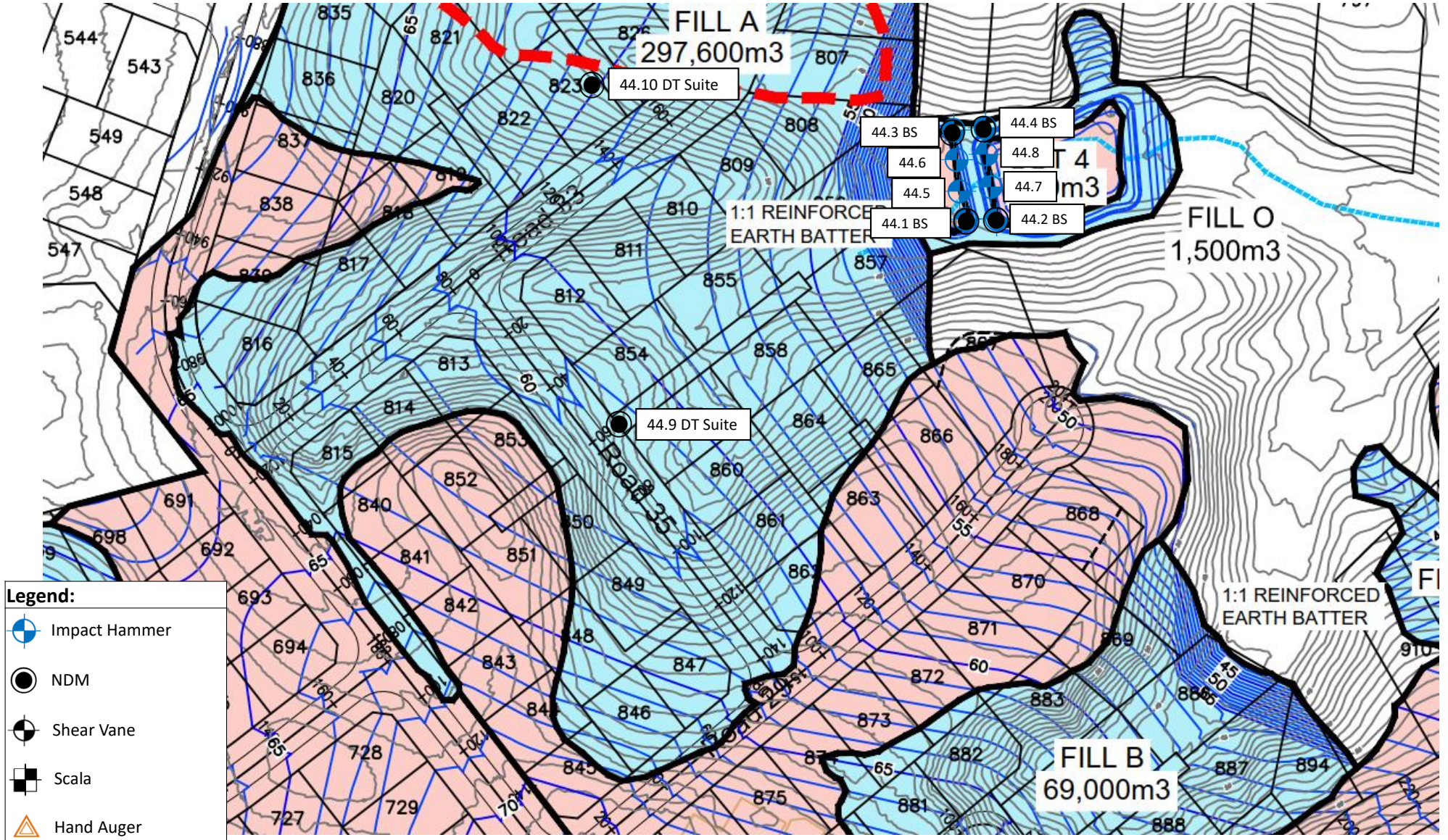

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	13/03/2020
Location:	Fill A / Shear Key	Job No.:	1009213.0657.0.0/3	URN:	44	Date:	13/03/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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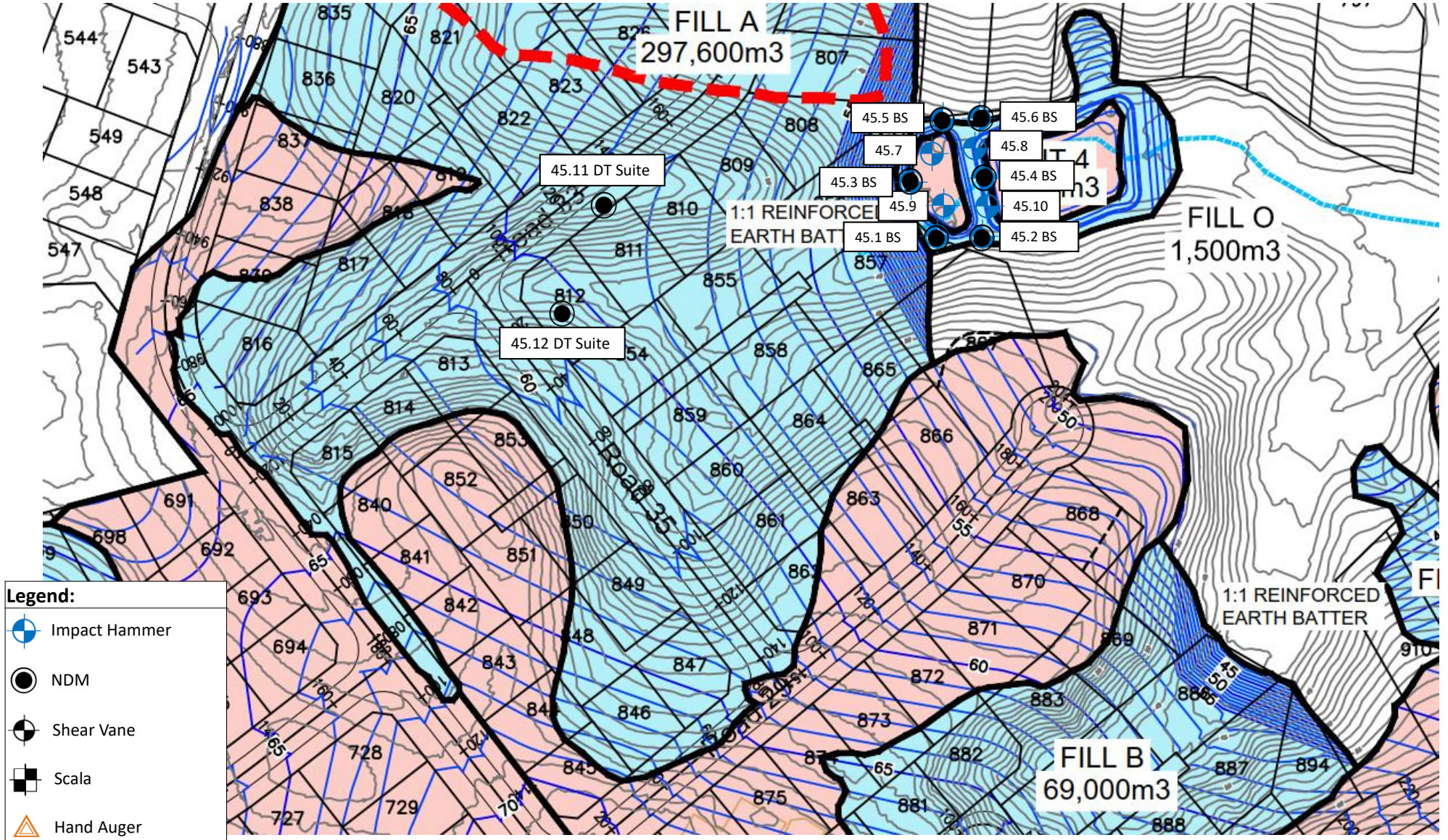

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	16/03/2020
Location:	Fill A / Shear Key	Job No.:	1009213.0657.0.0/3	URN:	45	Date:	16/03/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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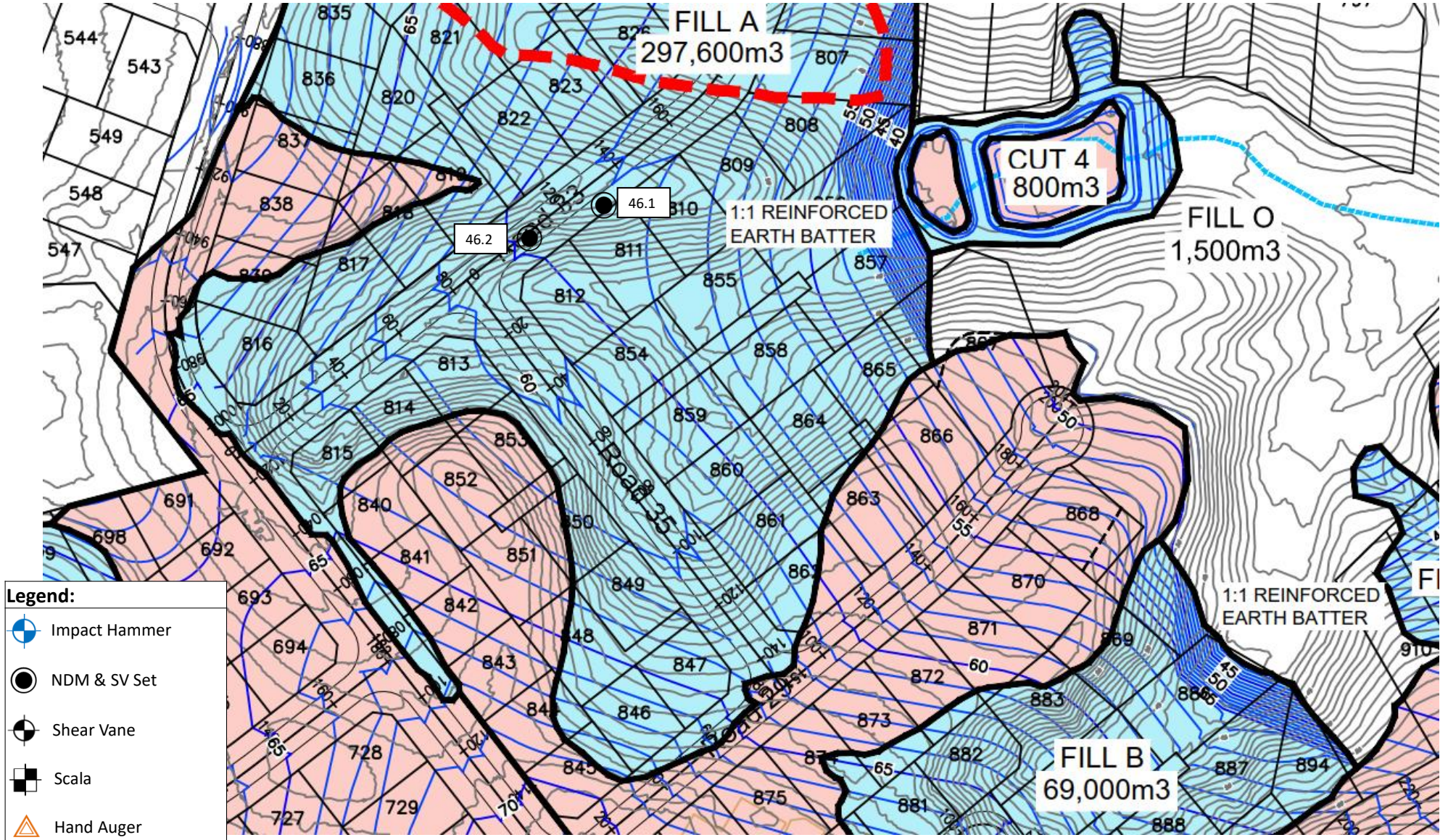

Test Location Plan

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Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	18/03/2020
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	46	Date:	18/03/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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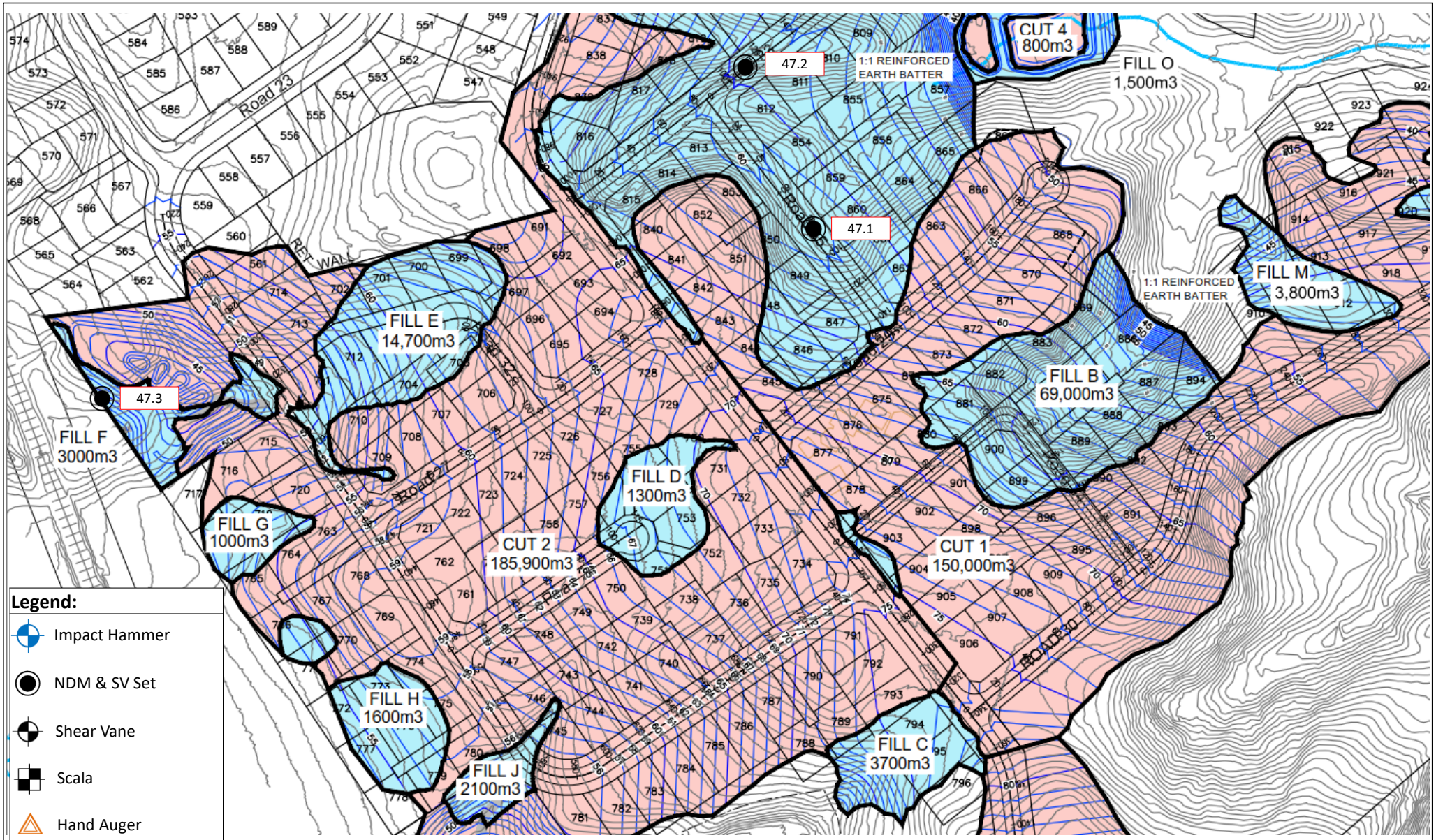

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	1/05/2020
Location:	Fill F, Fill A	Job No.:	1009213.0657.0.0/3	URN:	47	Date:	1/05/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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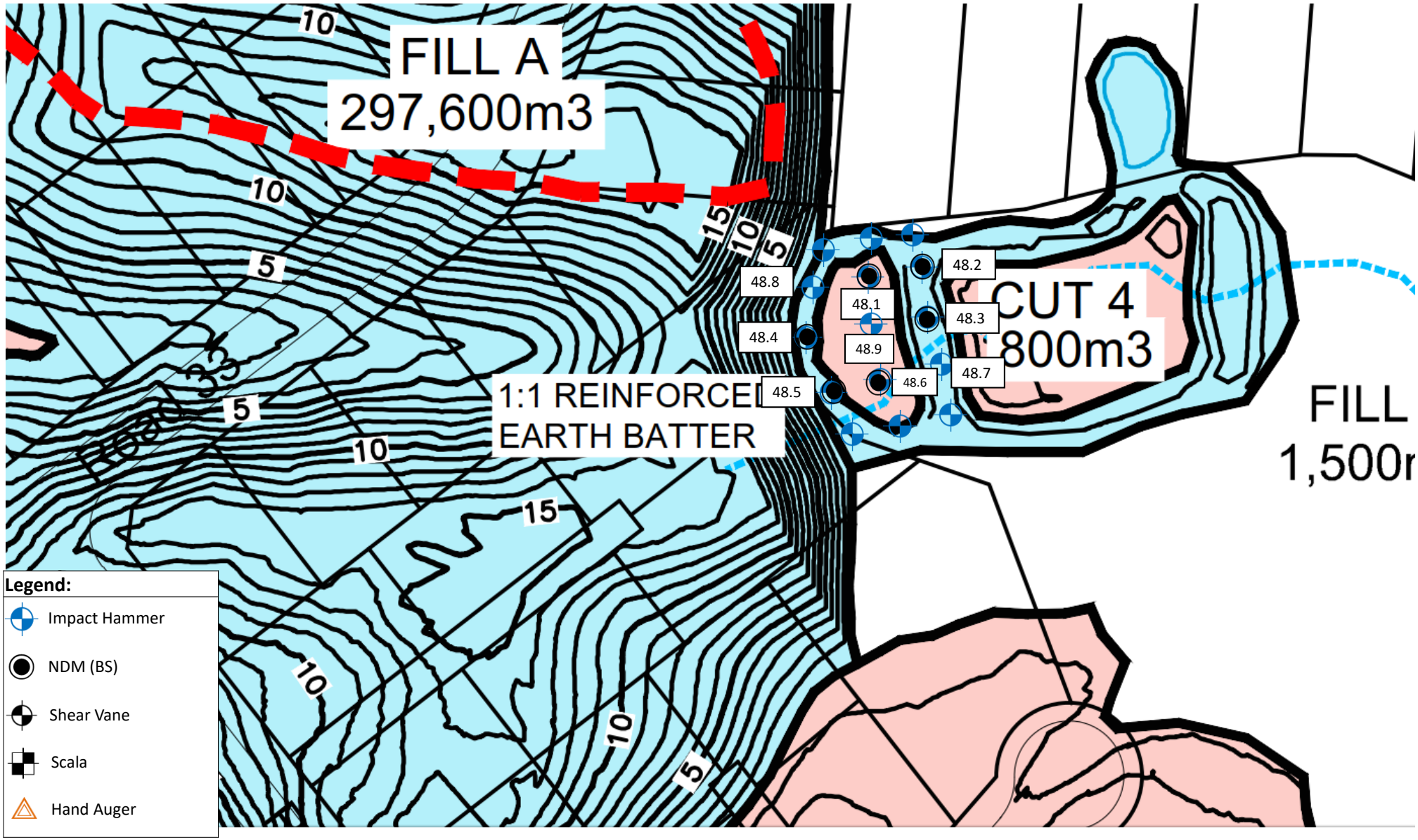

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	13/05/20
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	48	Date:	13/05/20
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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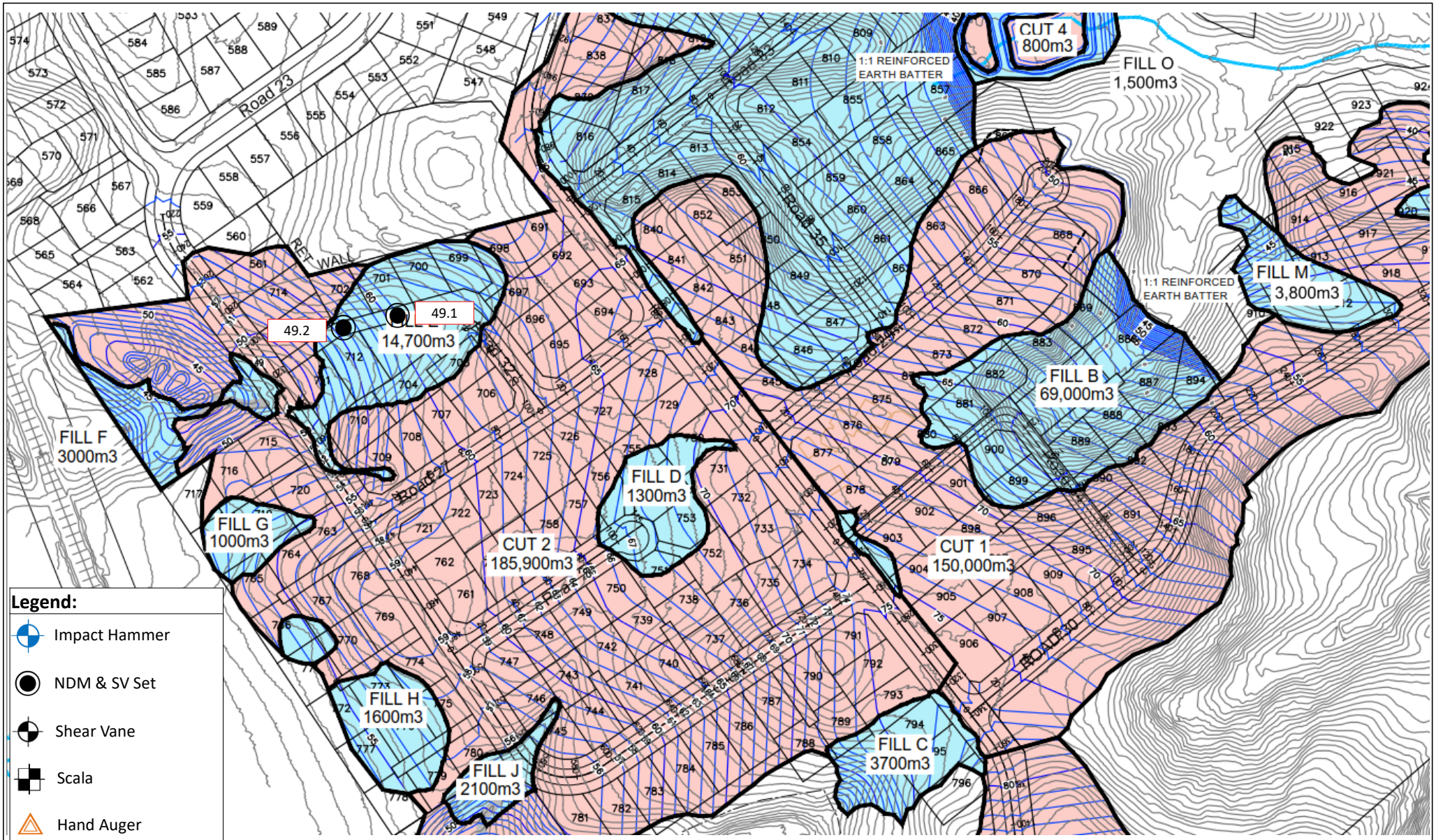

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	15/05/2020
Location:	Fill F, Fill A	Job No.:	1009213.0657.0.0/3	URN:	49	Date:	15/05/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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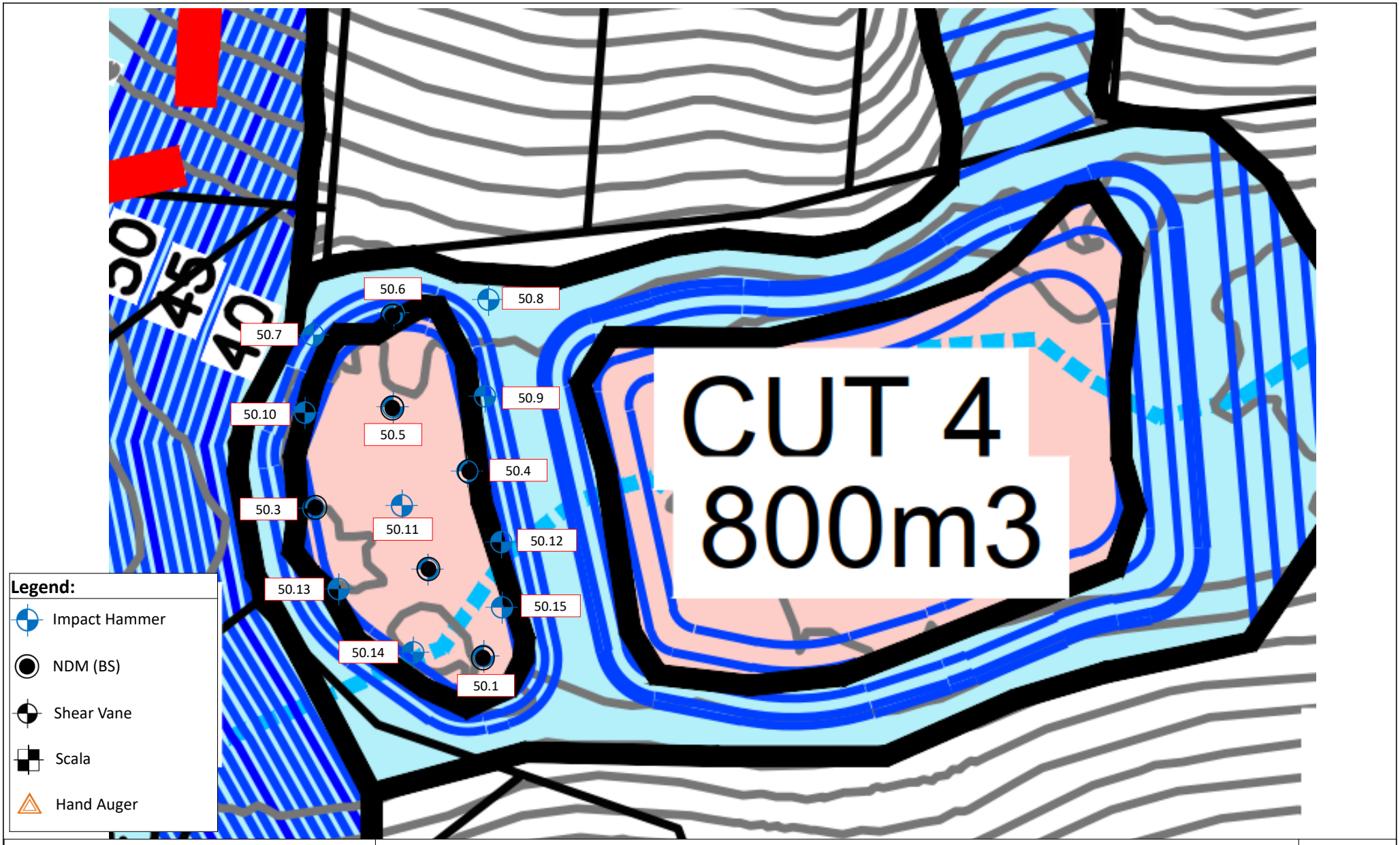

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	18/05/2020
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	50	Date:	18/05/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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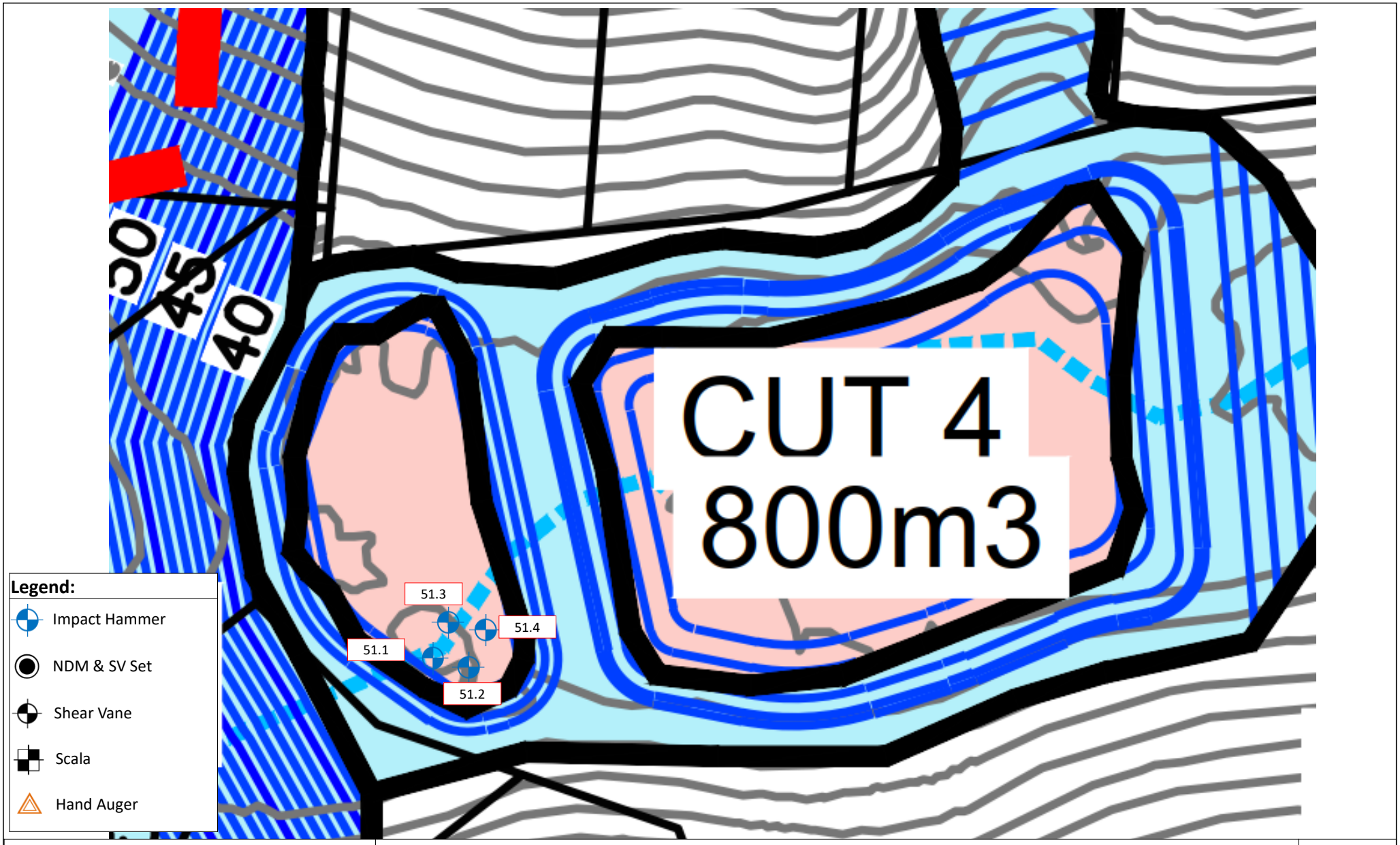

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	FRHA	Date:	17/06/2020
Location:	Fill A – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	51	Date:	17/06/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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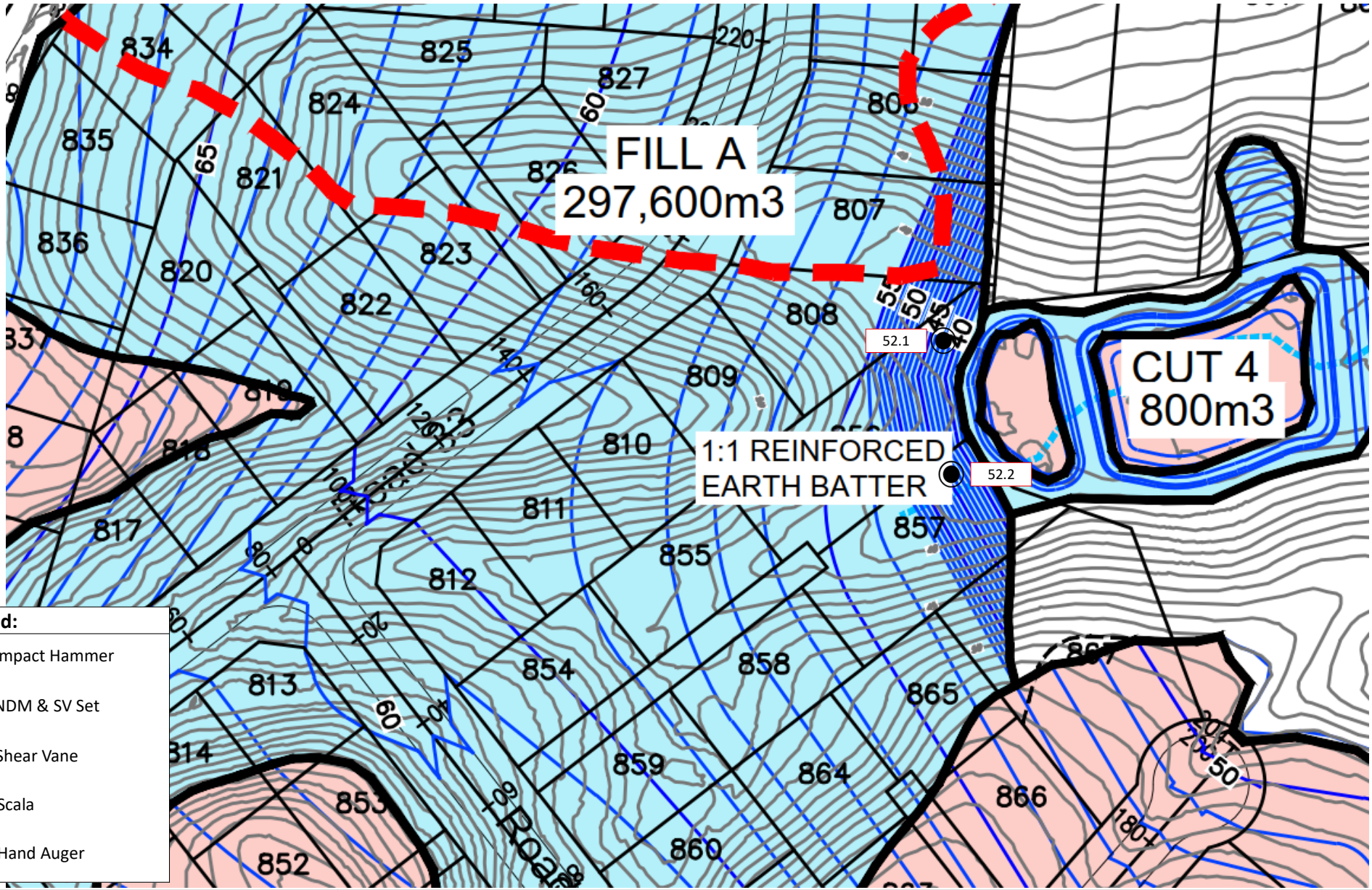

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	7/09/2020
Location:	Fill A – REB	Job No.:	1009213.0657.0.0/3	URN:	52	Date:	4/09/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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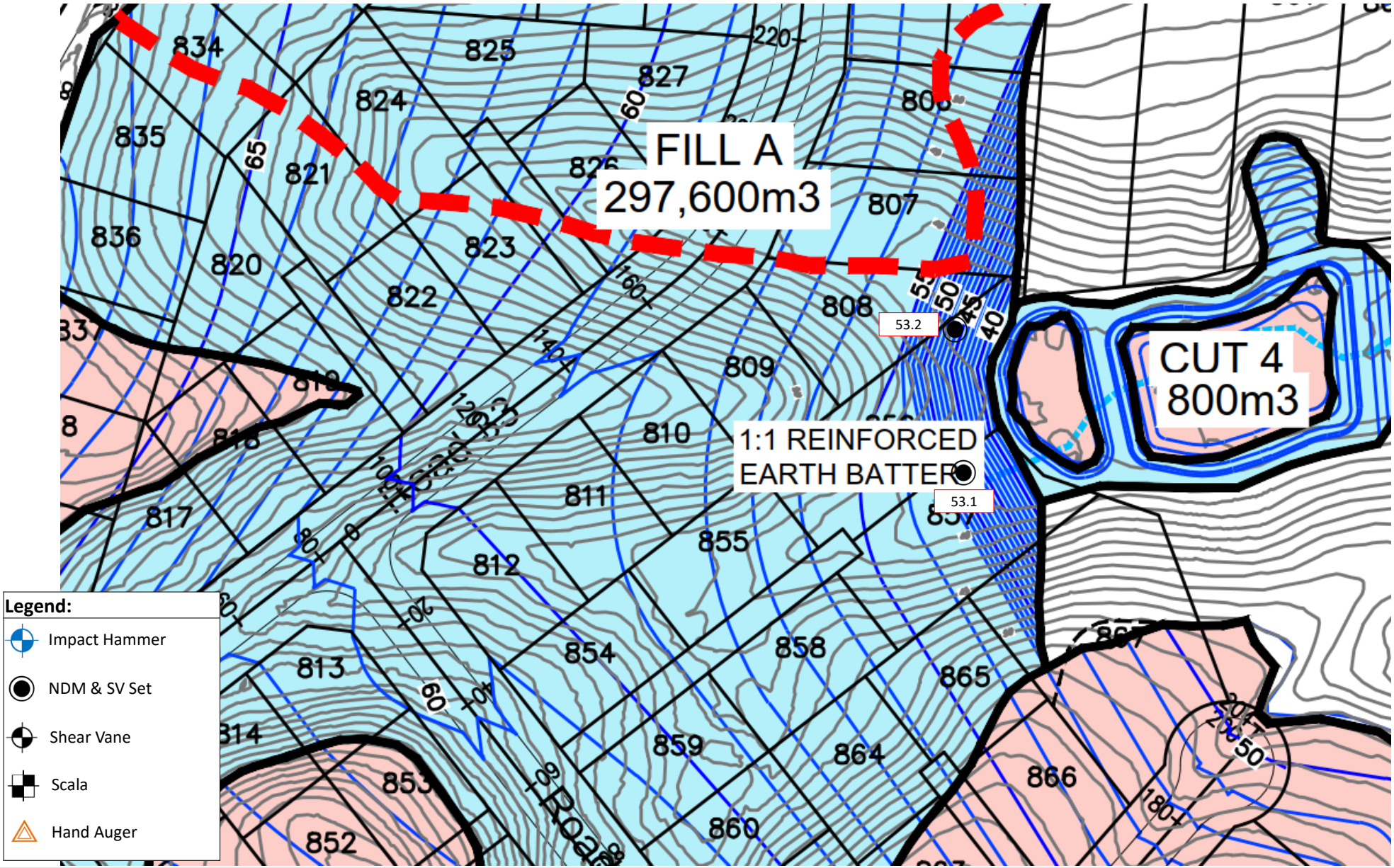

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	22/09/2020
Location:	Fill A – REB	Job No.:	1009213.0657.0.0/3	URN:	53	Date:	22/09/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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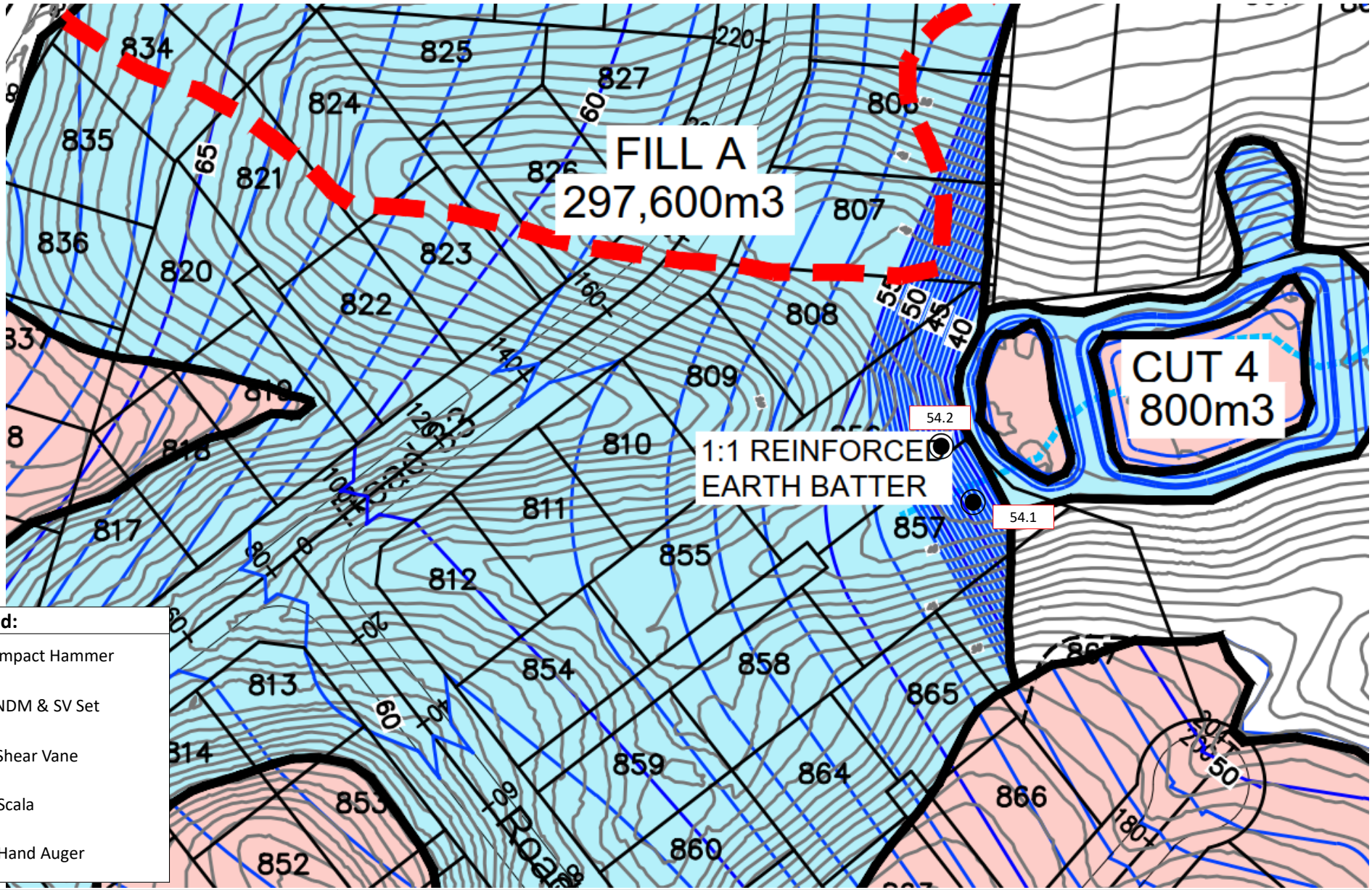

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	SEBA	Date:	05/10/2020
Location:	Fill A – REB	Job No.:	1009213.0657.0.0/3	URN:	54	Date:	05/10/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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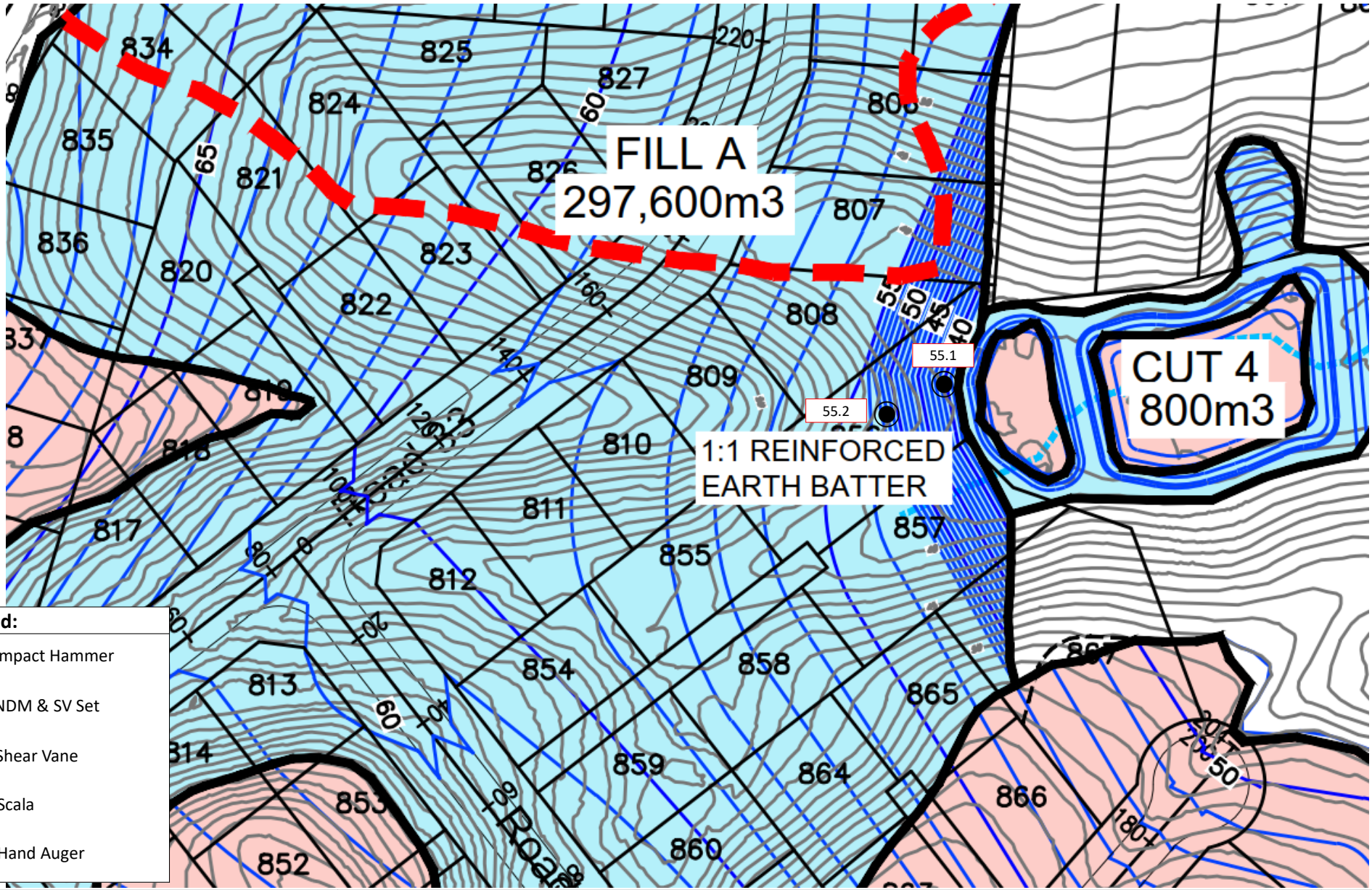

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	STFB	Date:	07/10/2020
Location:	Fill A – REB	Job No.:	1009213.0657.0.0/3	URN:	55	Date:	07/10/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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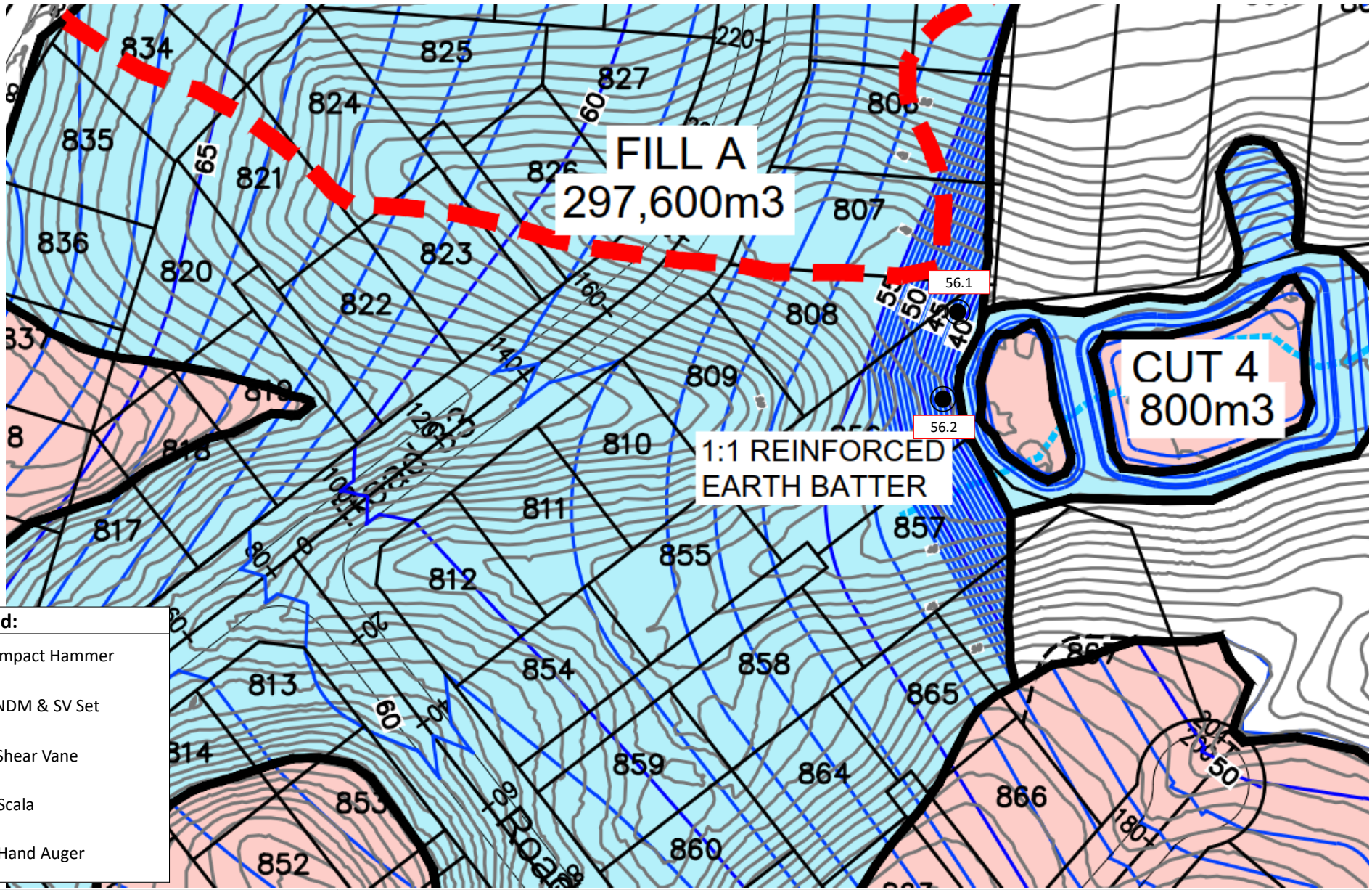

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	PEFE	Date:	9/10/2020
Location:	Fill A, lower shear key	Job No.:	1009213.0657.0.0/3	URN:	56	Date:	9/10/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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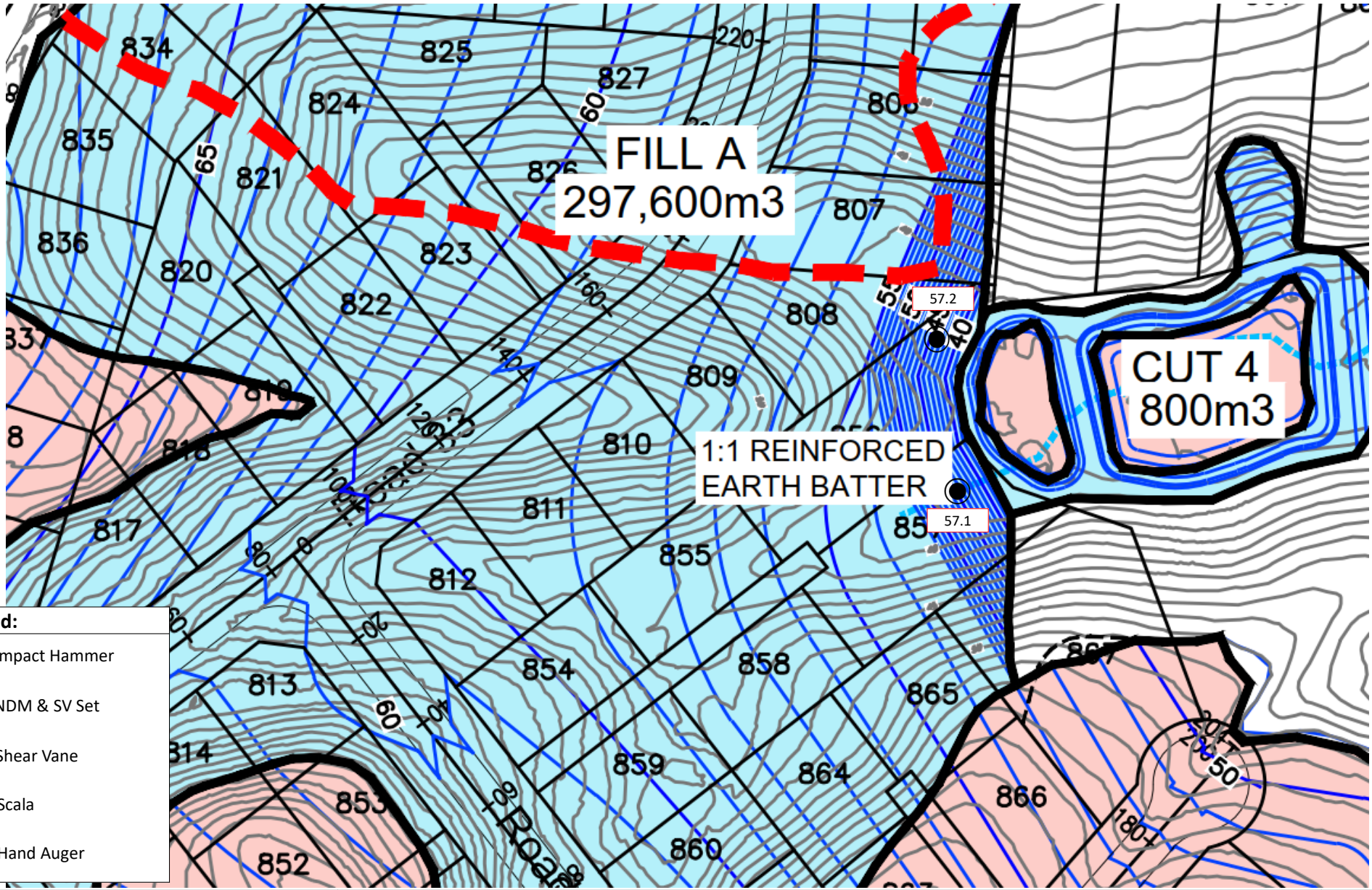

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	23/10/2020
Location:	Fill A, REB	Job No.:	1009213.0657.0.0/3	URN:	57	Date:	23/10/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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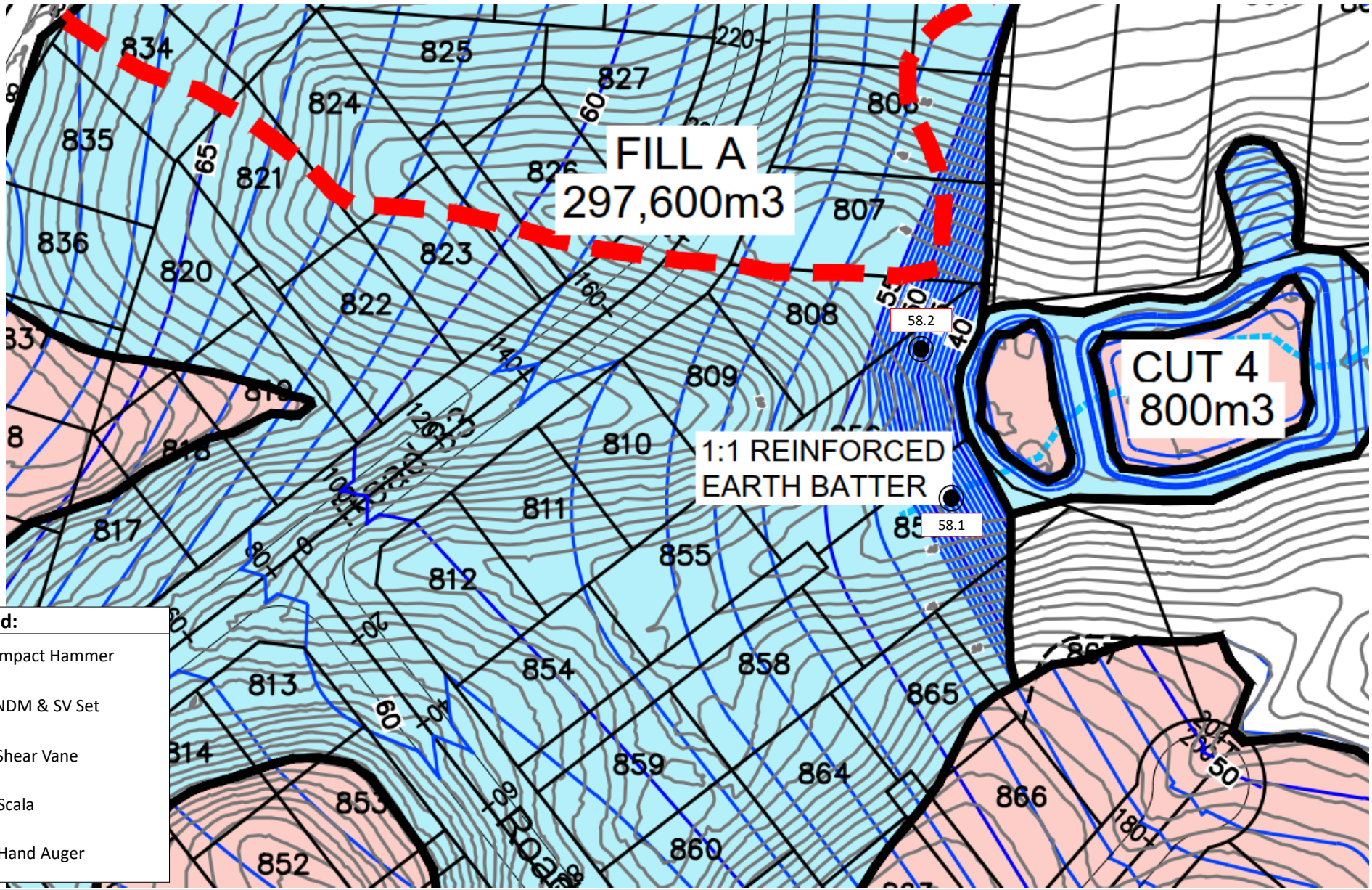

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	28/10/2020
Location:	Fill A, REB	Job No.:	1009213.0657.0.0/3	URN:	58	Date:	28/10/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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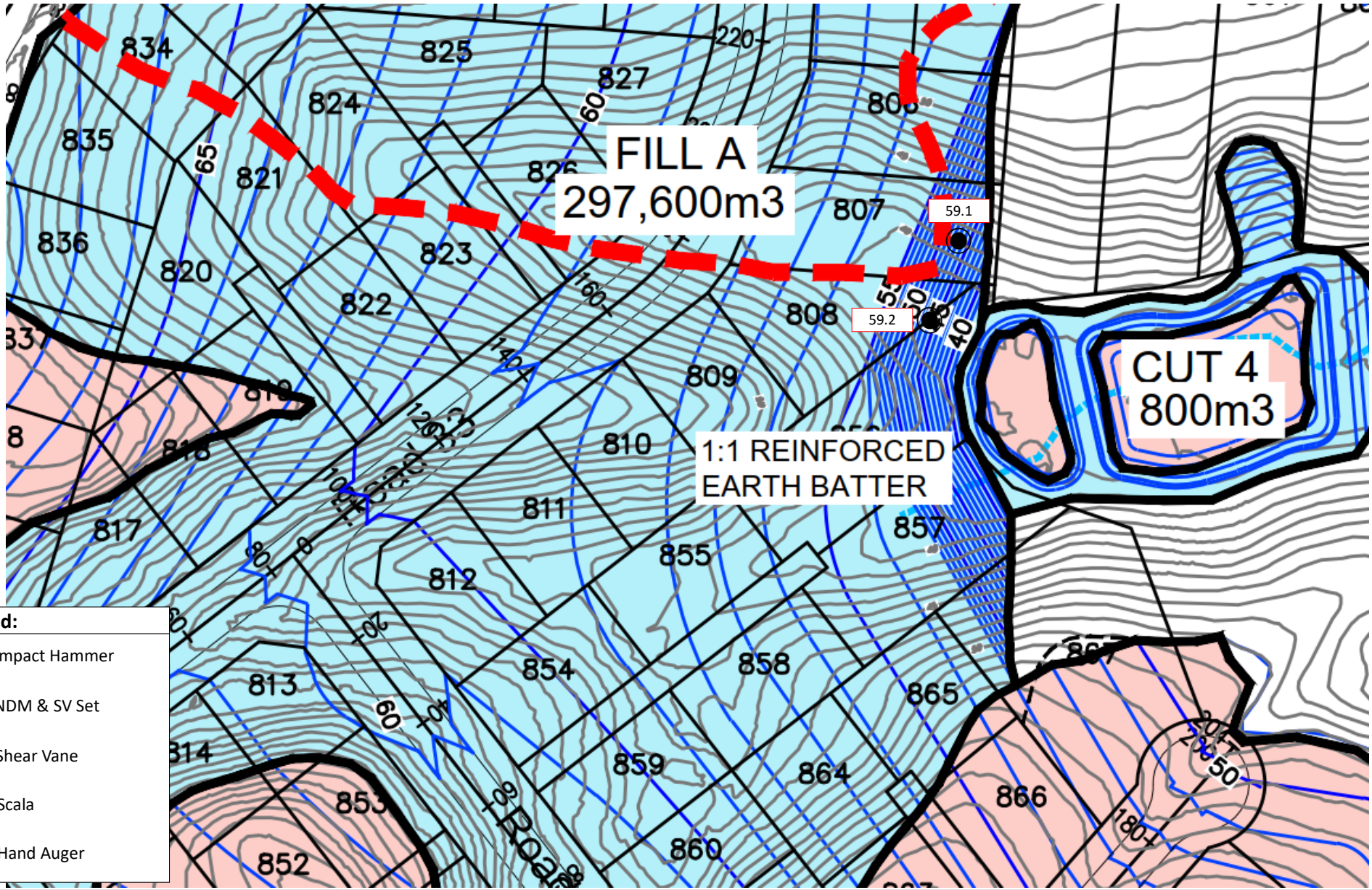

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	30/10/2020
Location:	Fill A, REB	Job No.:	1009213.0657.0.0/3	URN:	59	Date:	30/10/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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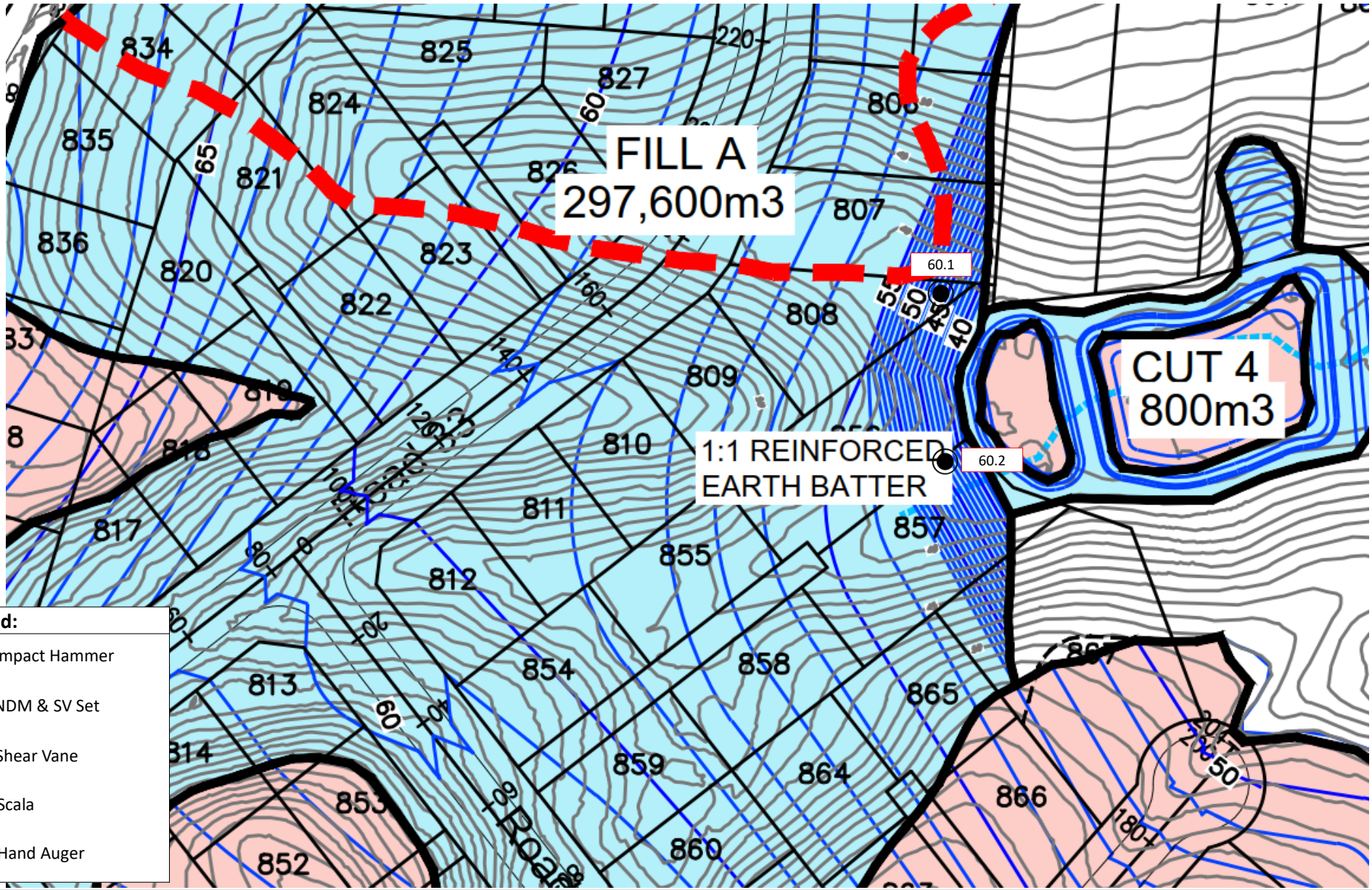

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	4/11/2020
Location:	Fill A, REB	Job No.:	1009213.0657.0.0/3	URN:	60	Date:	4/11/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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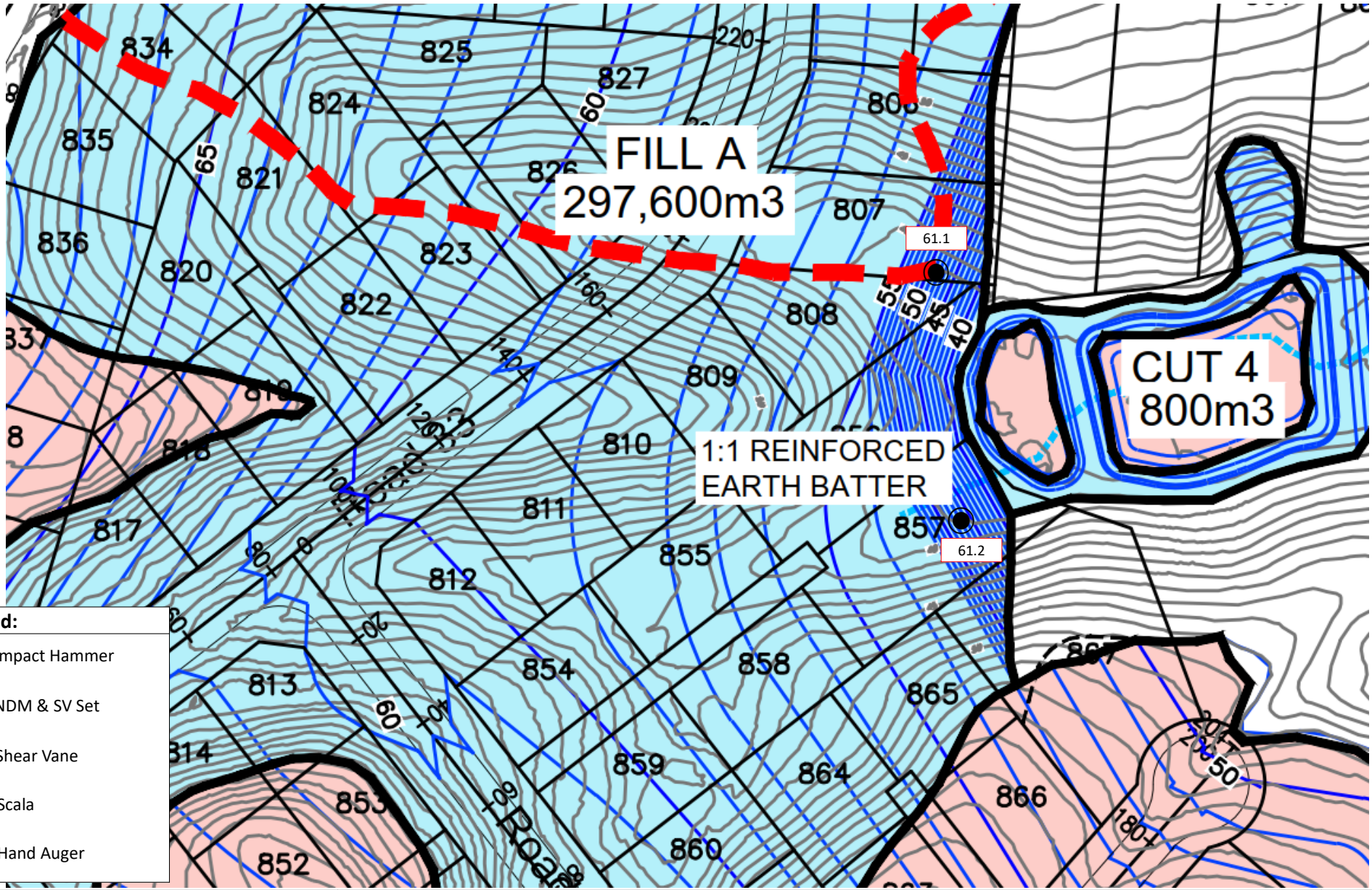

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	16/11/2020
Location:	Fill A, REB	Job No.:	1009213.0657.0.0/3	URN:	61	Date:	16/11/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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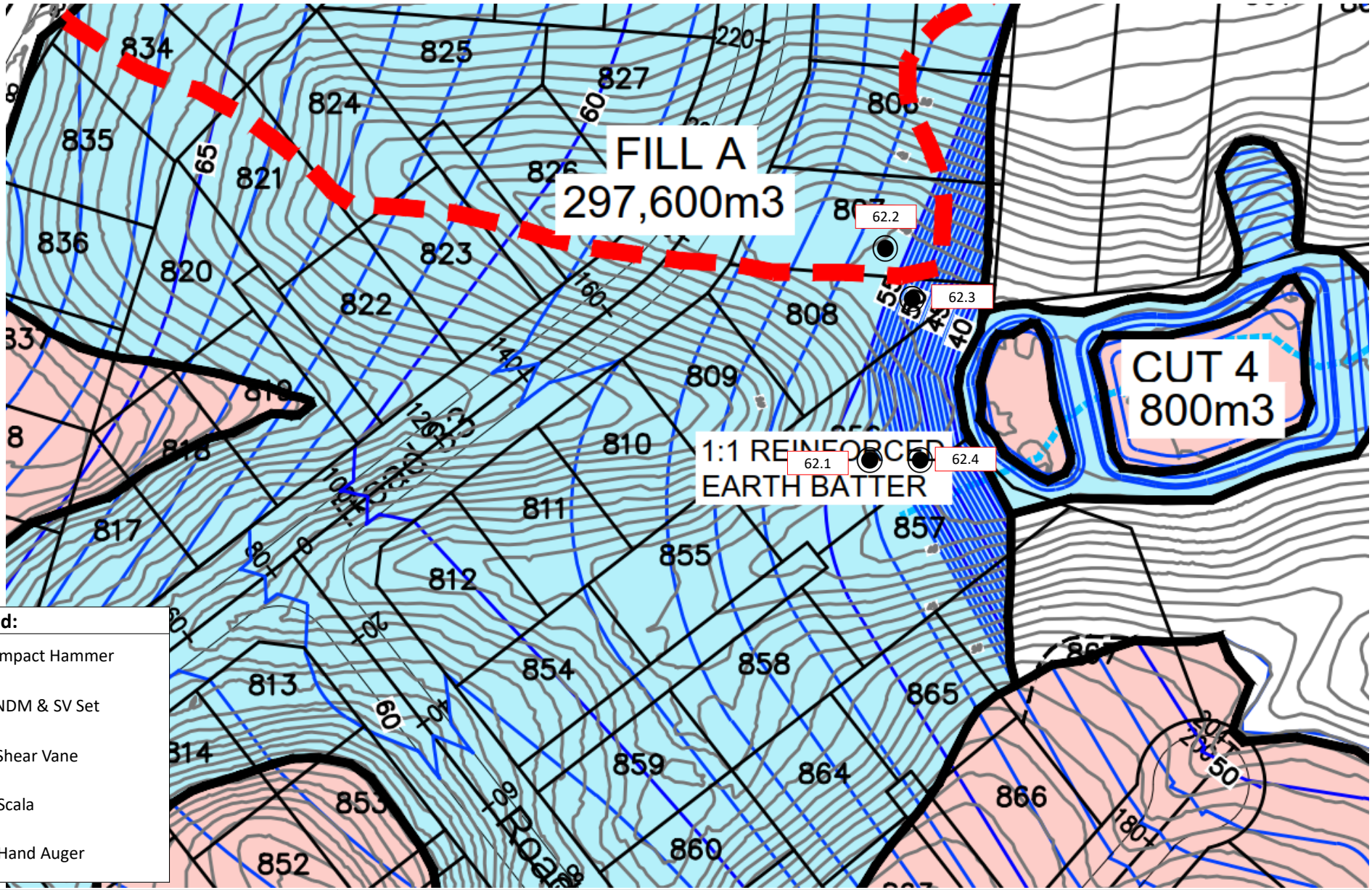

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	5/12/2020
Location:	Fill A, REB	Job No.:	1009213.0657.0.0/3	URN:	62	Date:	4/12/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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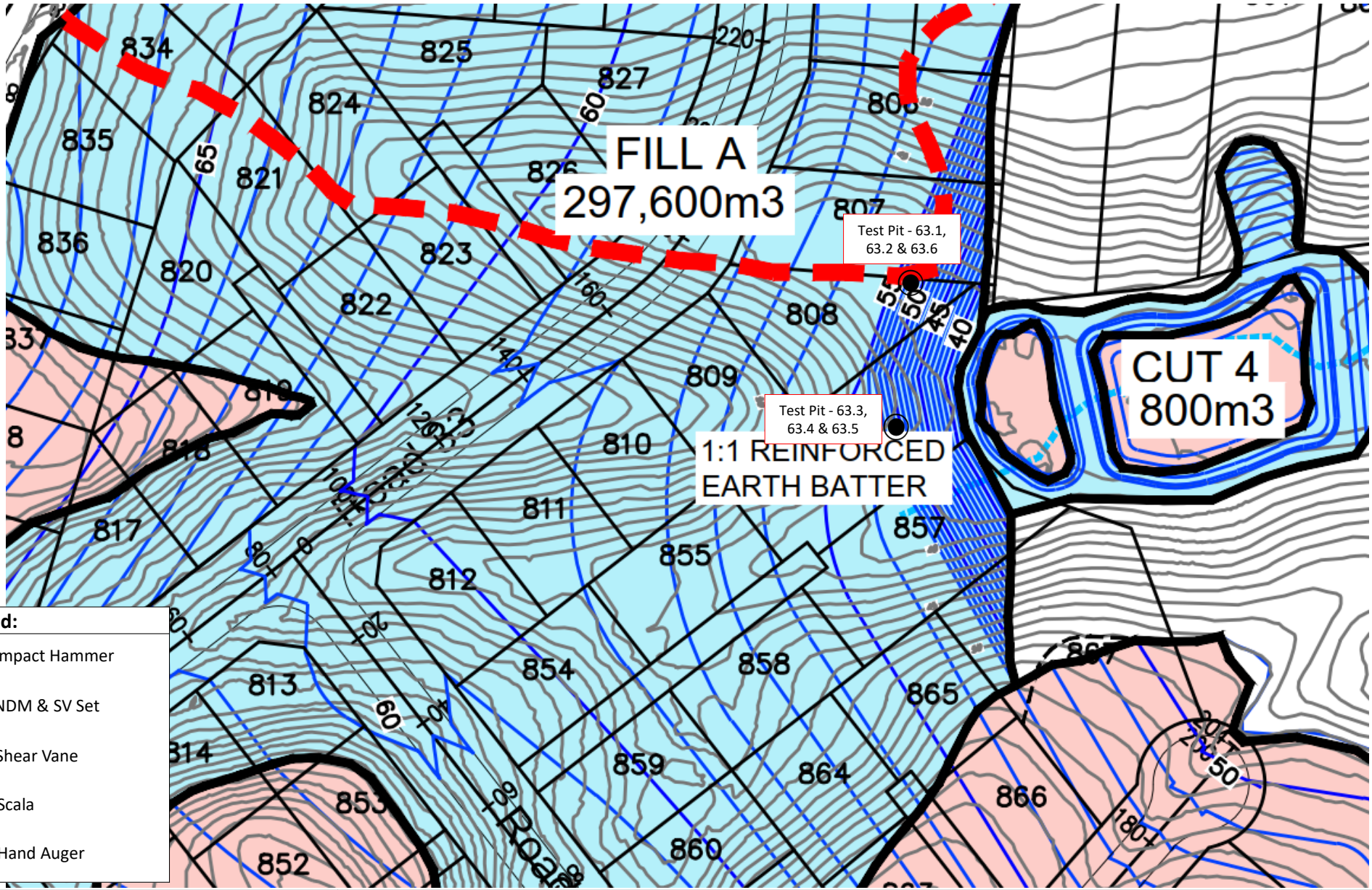

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	7/12/2020
Location:	Fill A, REB	Job No.:	1009213.0657.0.0/3	URN:	63	Date:	7/12/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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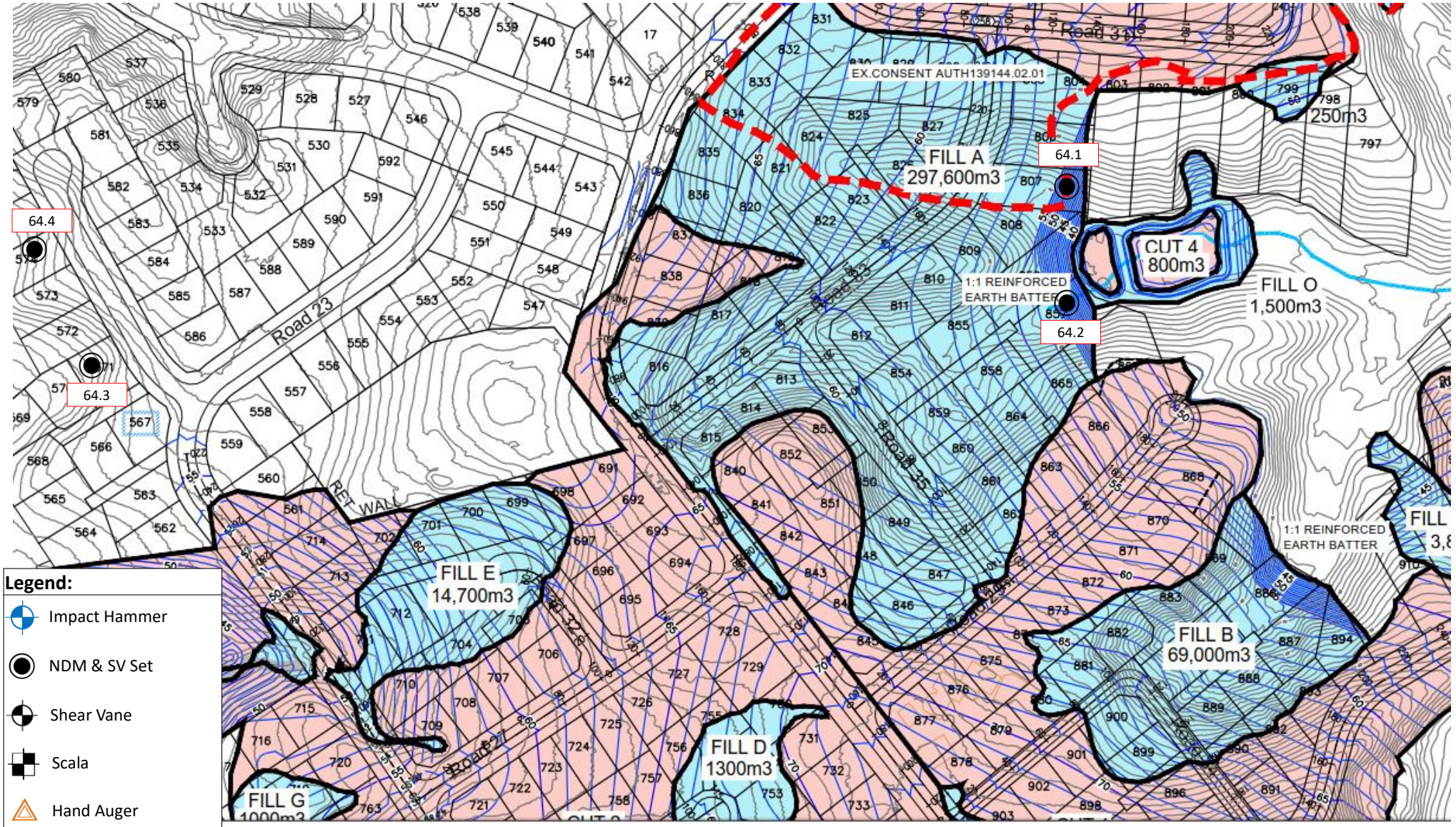

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA / JRA	Date:	9/12/2020
Location:	Fill A-REB & 415/422	Job No.:	1009213.0657.0.0/3	URN:	64	Date:	9/12/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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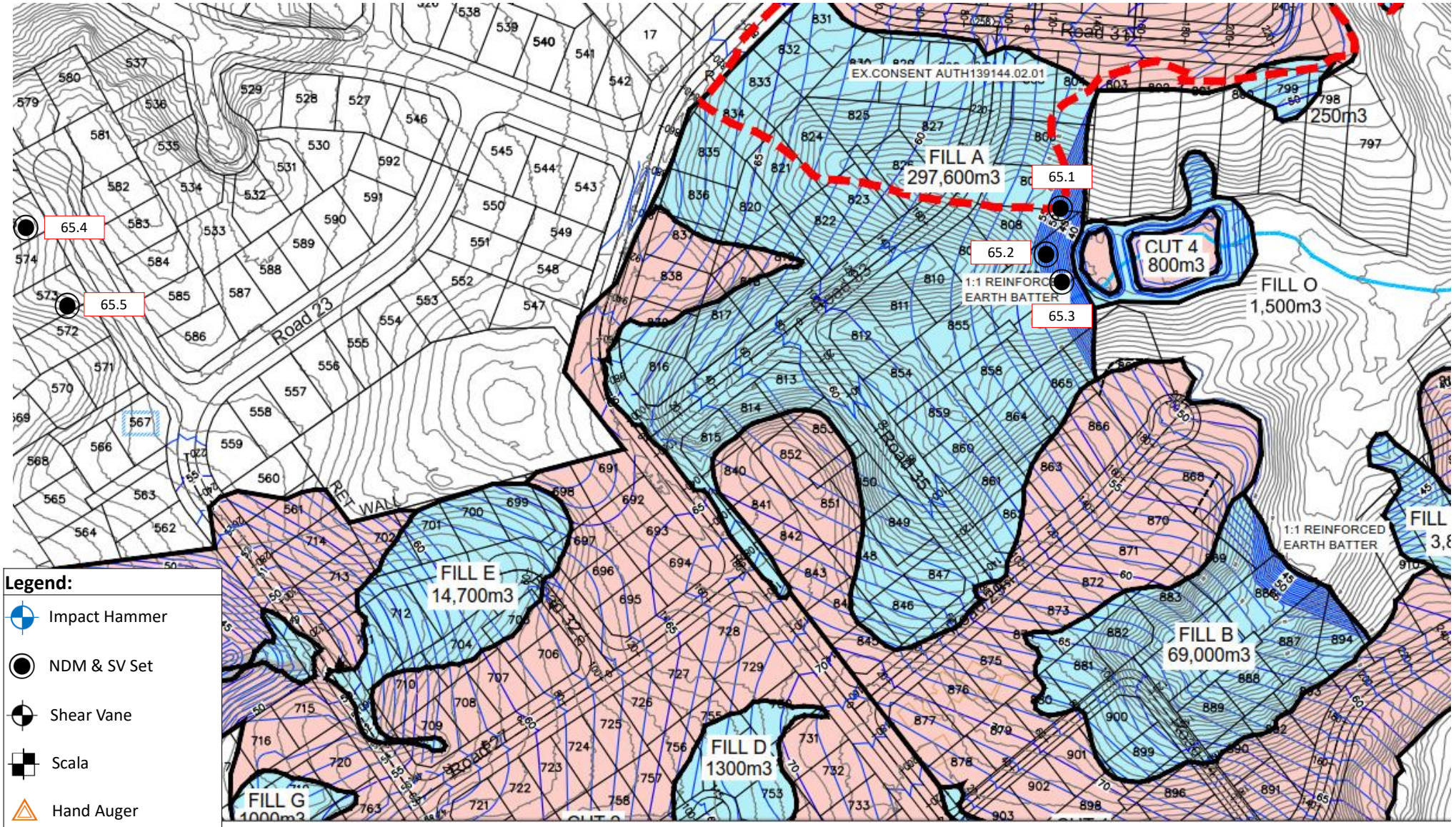

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA / JRA	Date:	14/12/2020
Location:	Fill A-REB & 415/422	Job No.:	1009213.0657.0.0/3	URN:	65	Date:	14/12/2020
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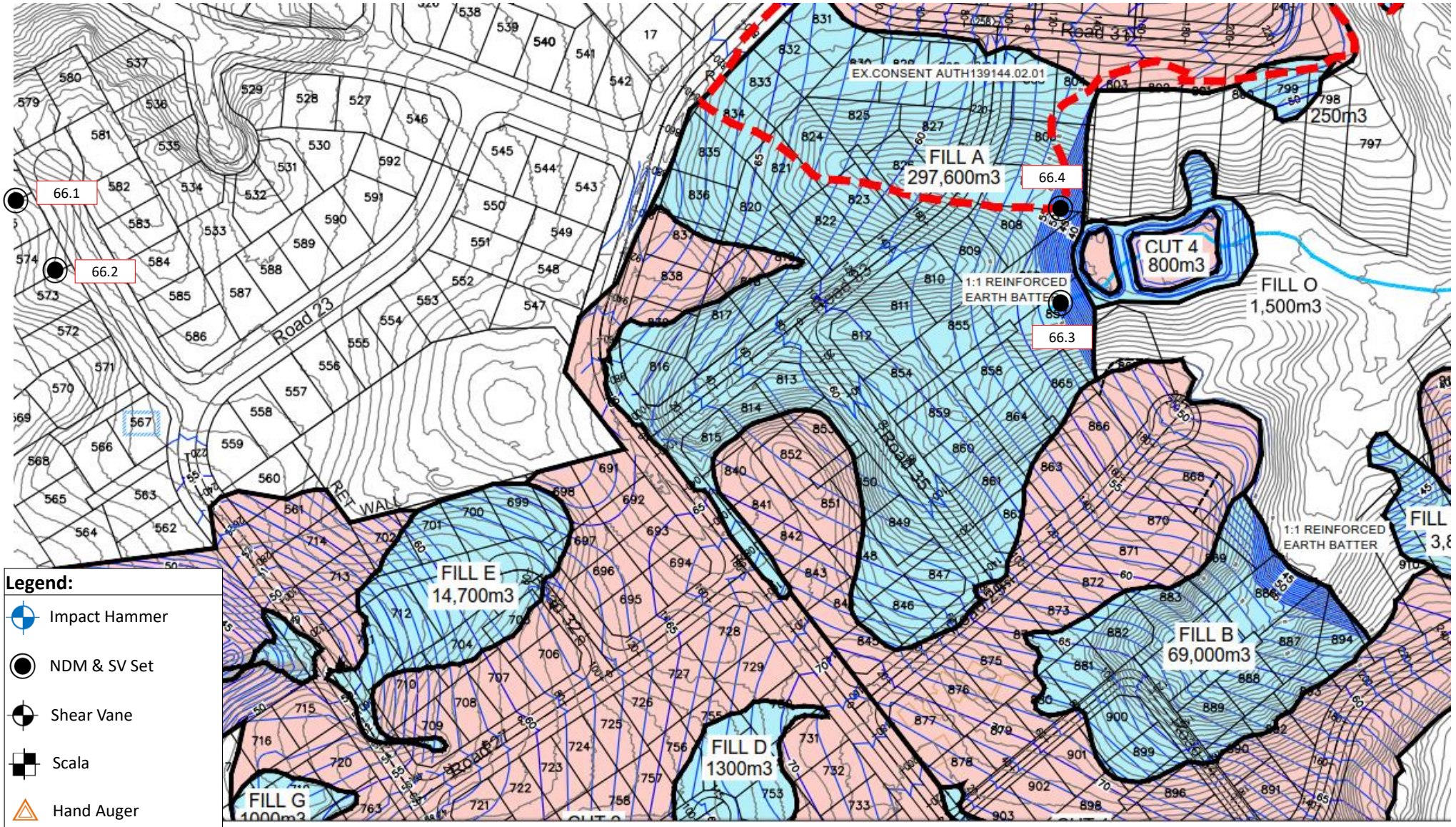

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Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	16/12/2020
Location:	Fill A-REB & 415/422	Job No.:	1009213.0657.0.0/3	URN:	66	Date:	16/12/2020
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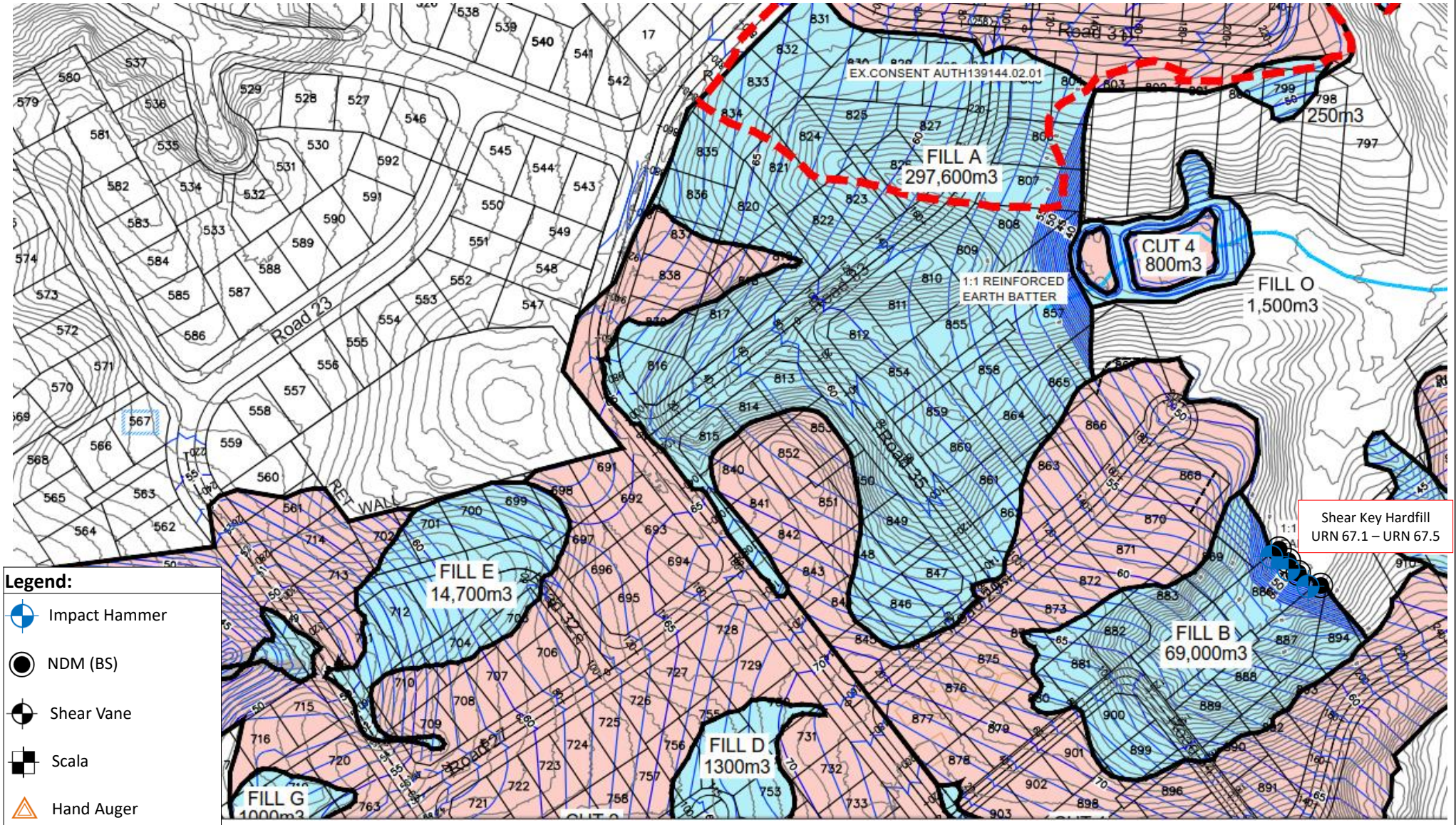

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	17/12/2020
Location:	Fill B – Shear Key	Job No.:	1009213.0657.0.0/3	URN:	67	Date:	17/12/2020
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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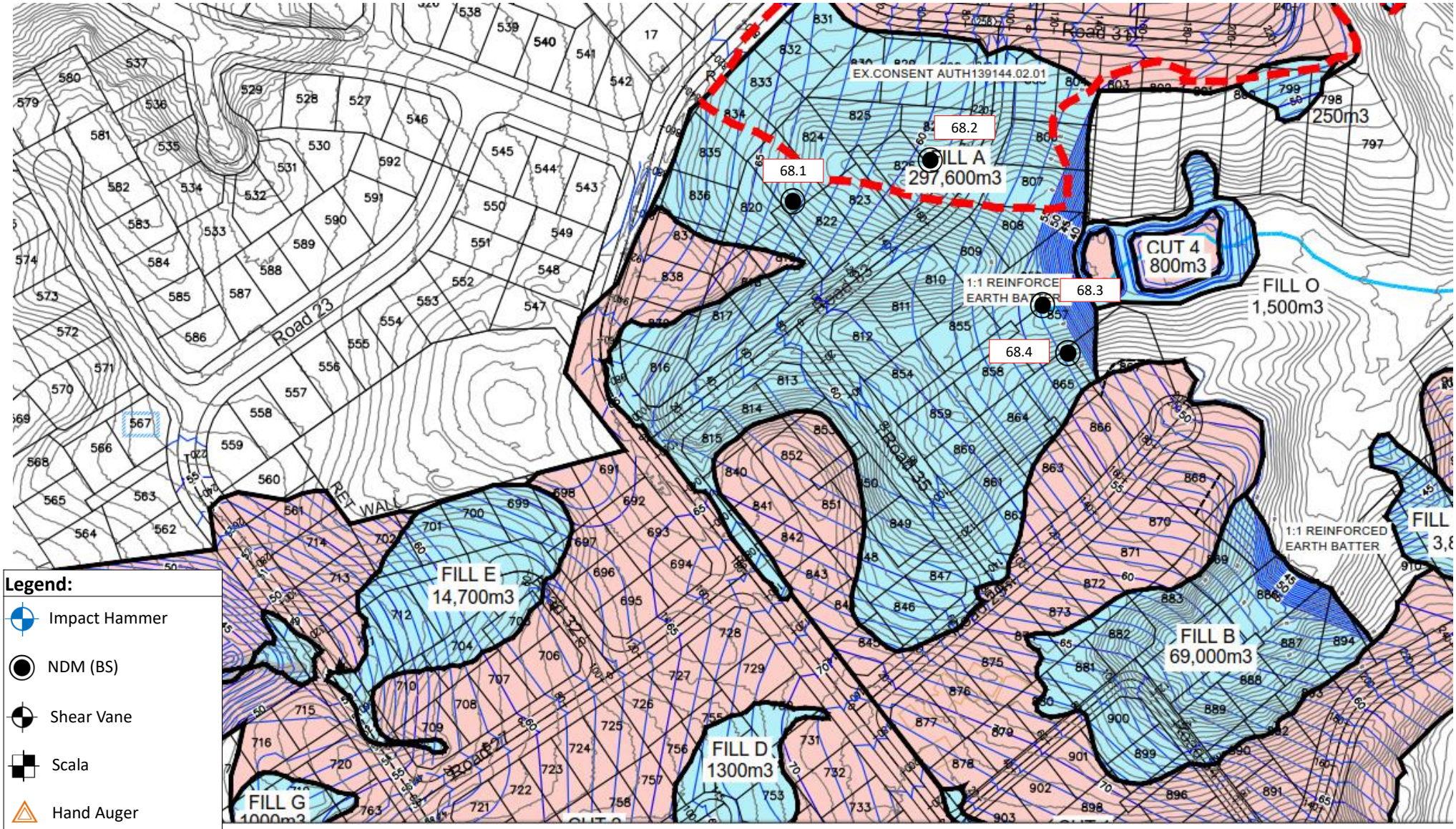

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	6/1/2021
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	68	Date:	6/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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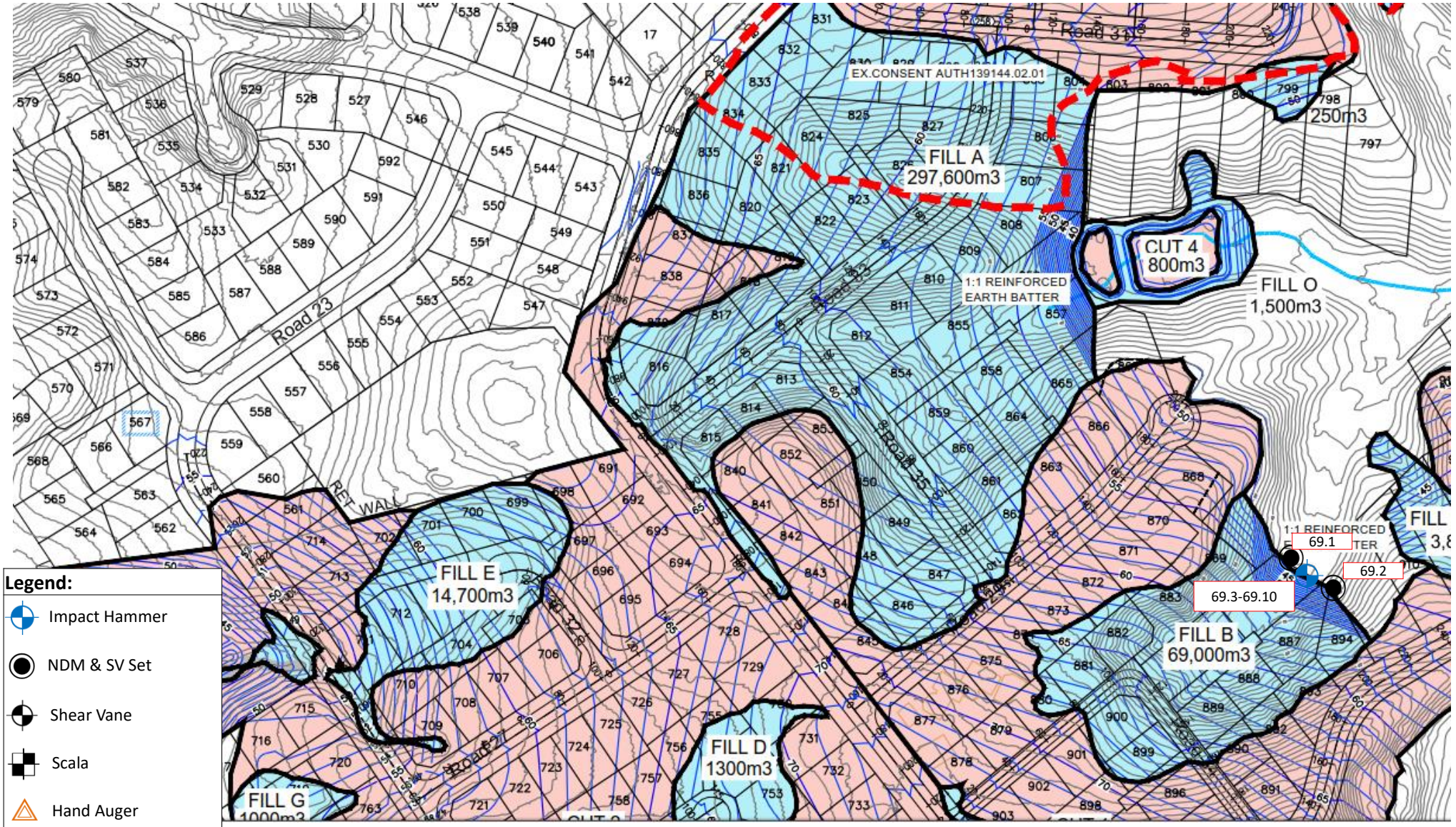

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	11/1/2021
Location:	Fill A	Job No.:	1009213.0657.0.0/3	URN:	69	Date:	11/1/2021
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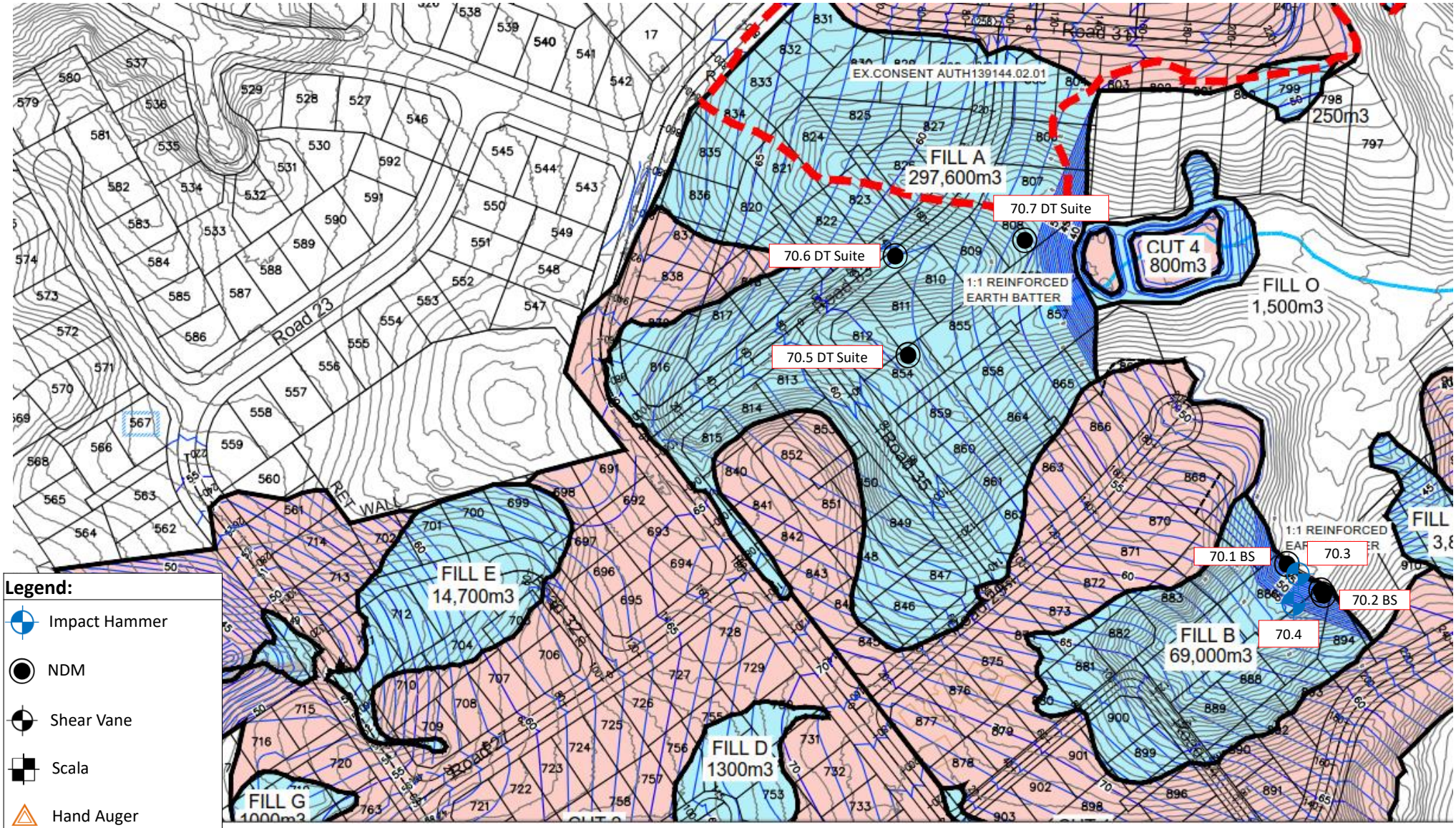

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	11/1/2021
Location:	Fill A and B	Job No.:	1009213.0657.0.0/3	URN:	70	Date:	11/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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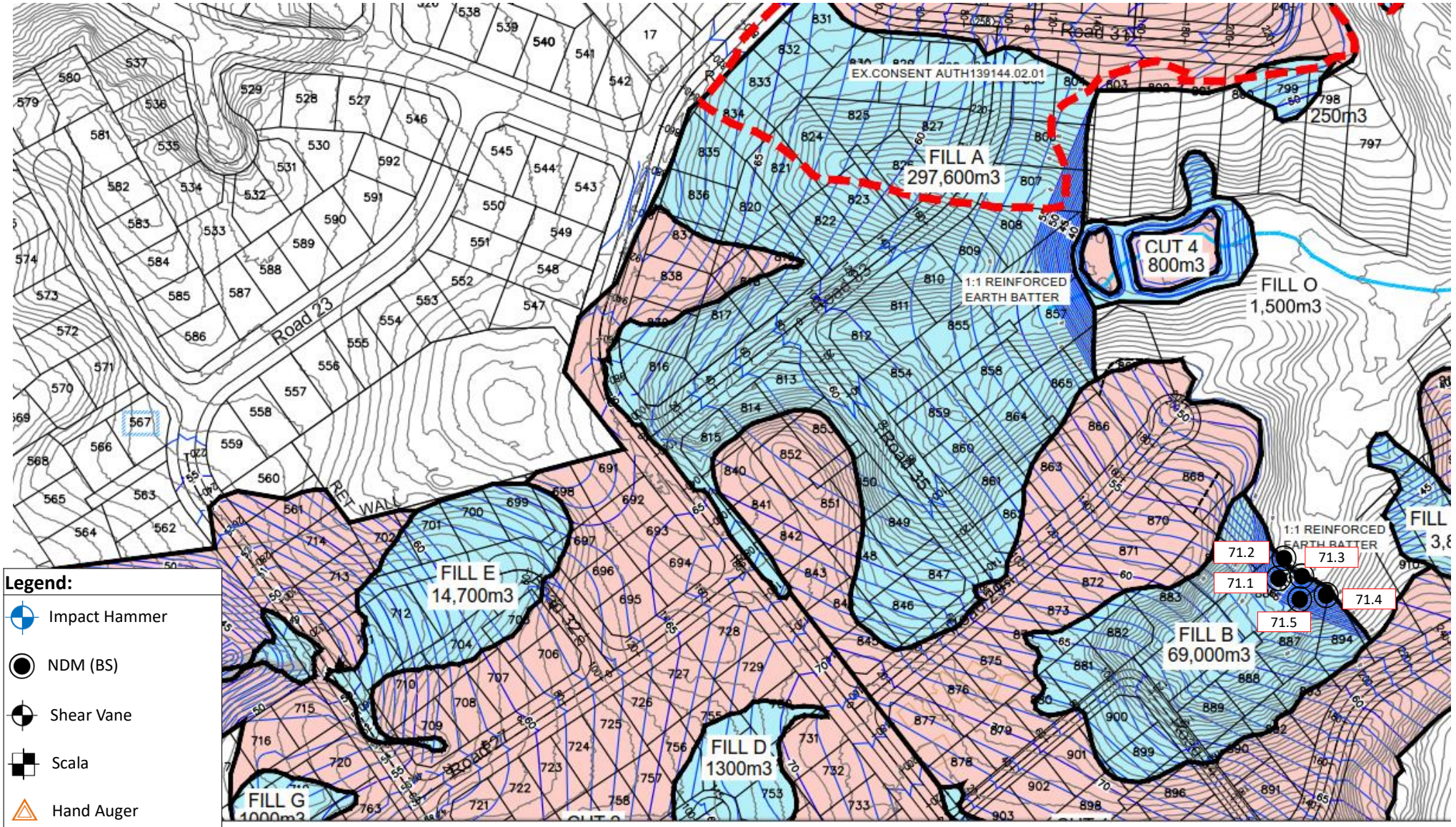

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	12/1/2021
Location:	Fill B	Job No.:	1009213.0657.0.0/3	URN:	71	Date:	12/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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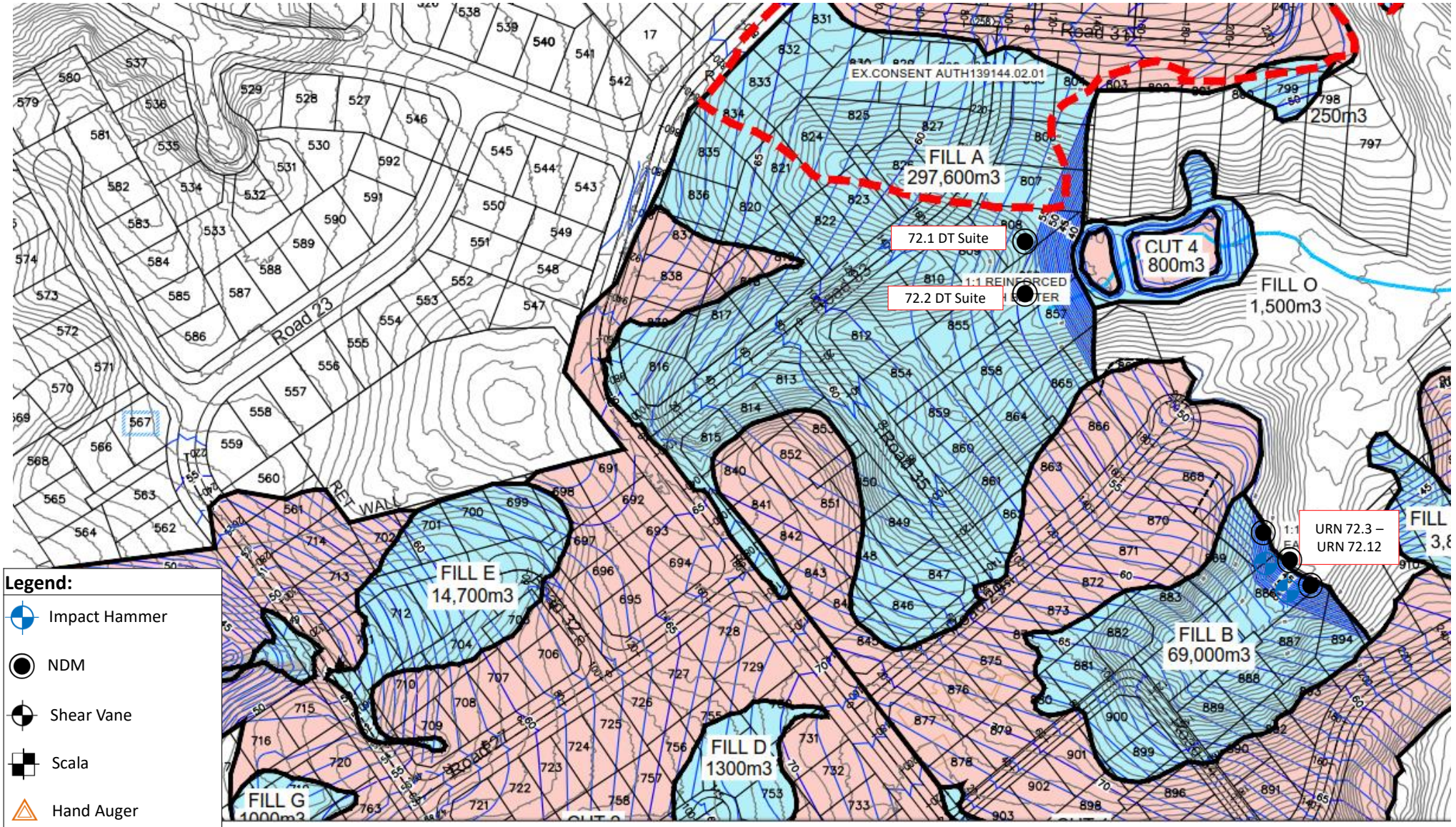

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	12/1/2021
Location:	Fill B	Job No.:	1009213.0657.0.0/3	URN:	72	Date:	12/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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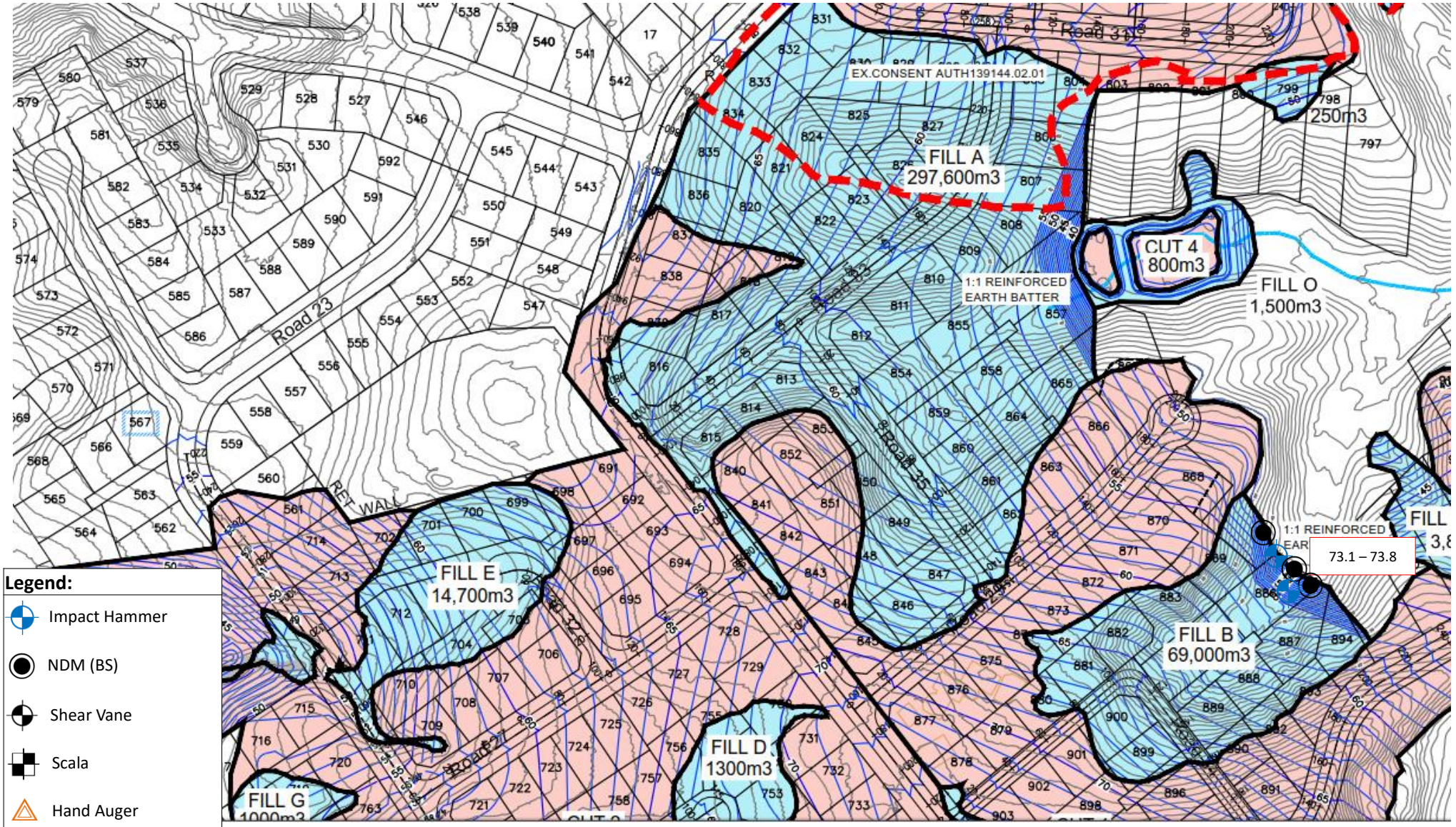

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	13/1/2021
Location:	Fill B – REB	Job No.:	1009213.0657.0.0/3	URN:	73	Date:	13/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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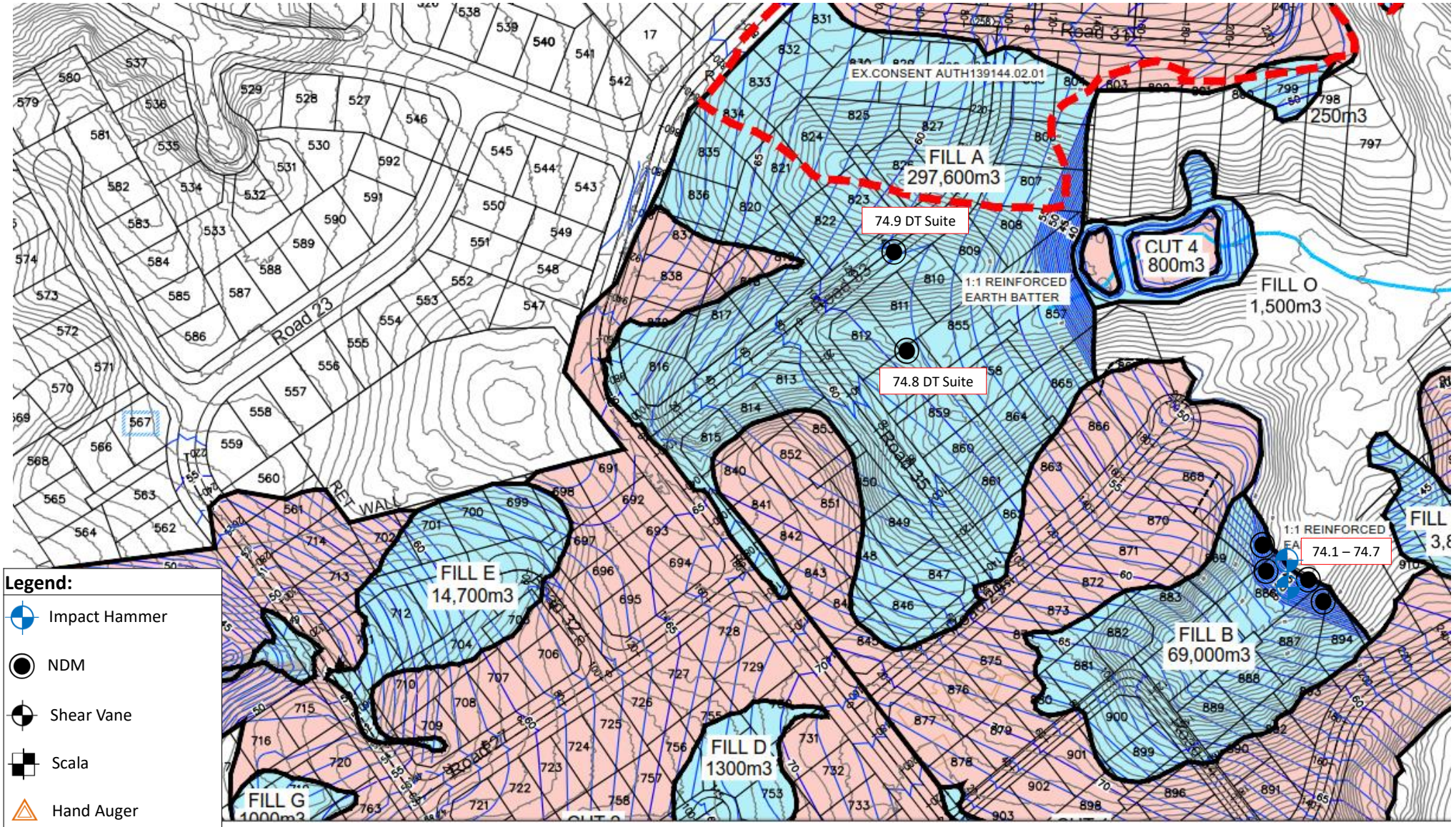

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Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	13/1/2021
Location:	Fill B	Job No.:	1009213.0657.0.0/3	URN:	74	Date:	13/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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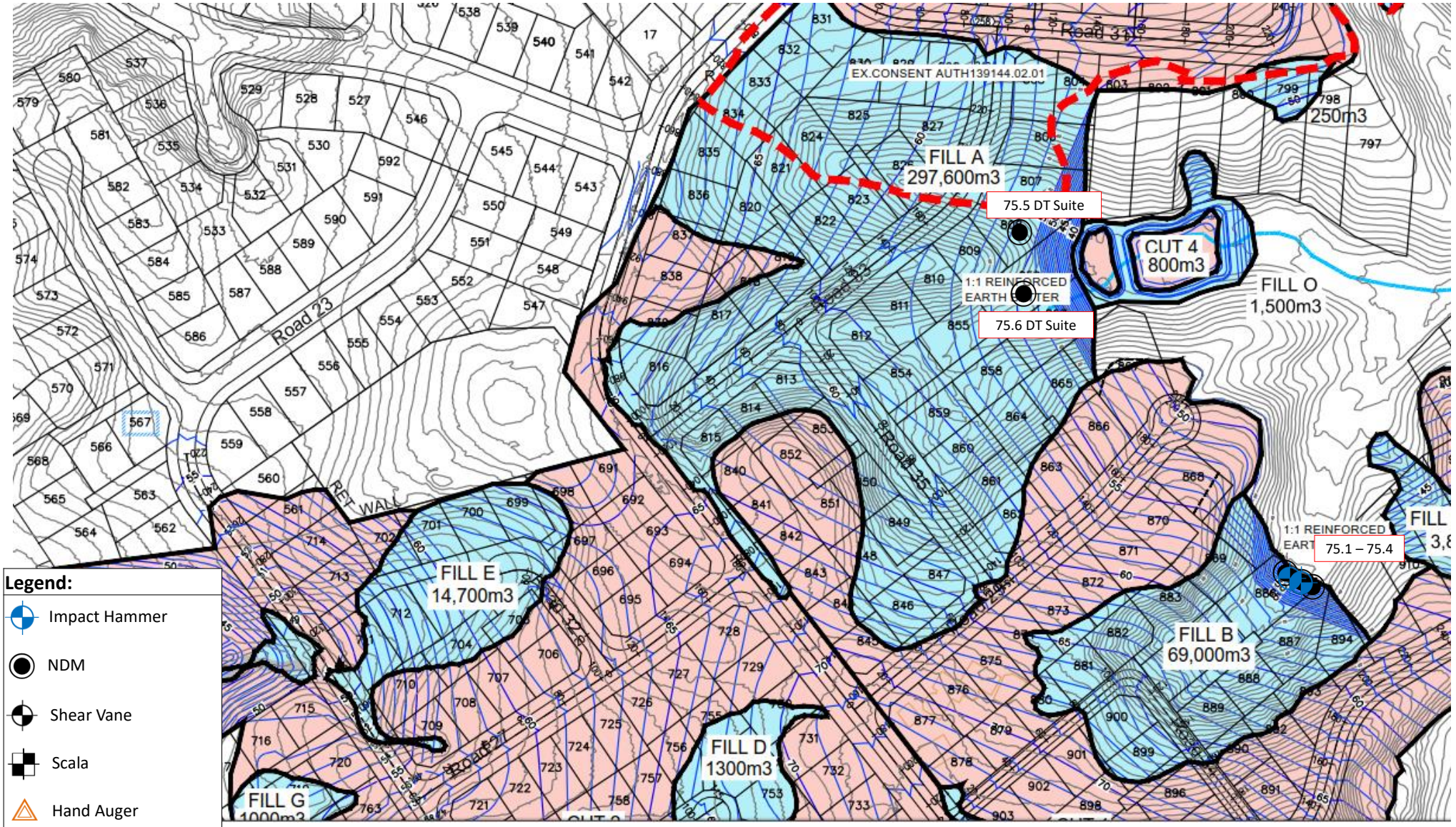

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	14/1/2021
Location:	Fill B Hardfill & REB 1	Job No.:	1009213.0657.0.0/3	URN:	75	Date:	14/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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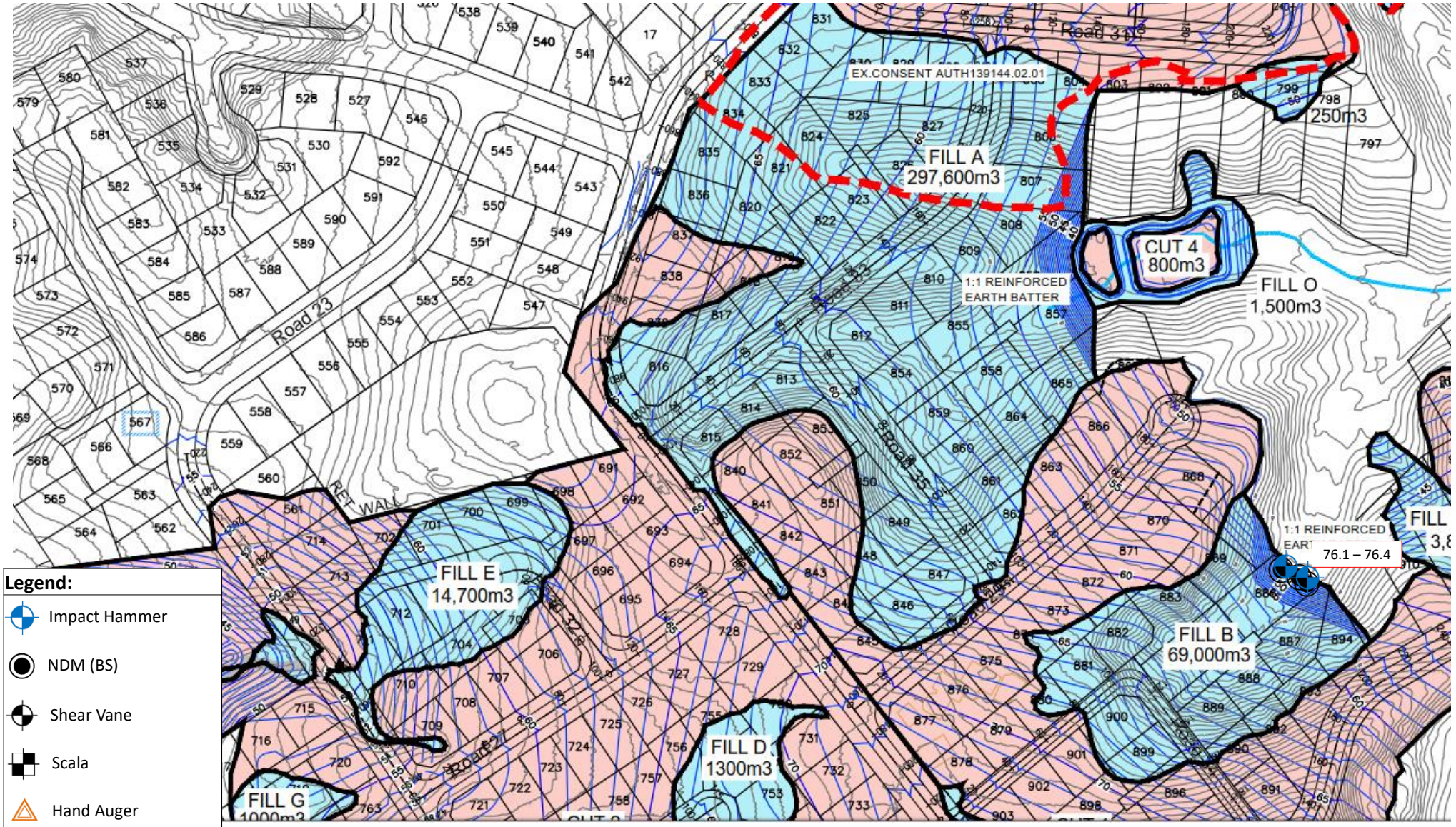

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	14/1/2021
Location:	Fill B Hardfill	Job No.:	1009213.0657.0.0/3	URN:	76	Date:	14/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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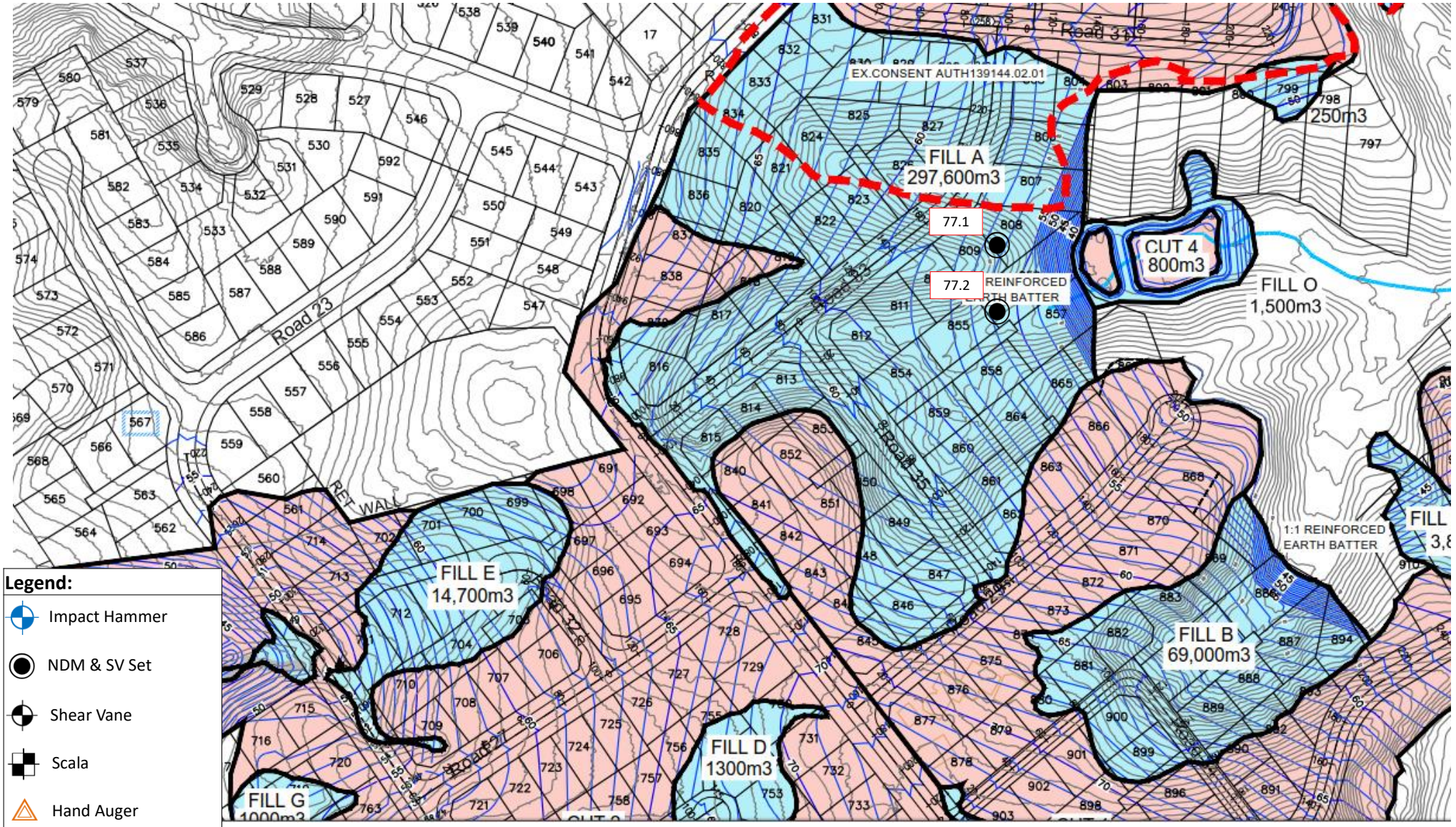

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	15/1/2021
Location:	Fill B Hardfill	Job No.:	1009213.0657.0.0/3	URN:	77	Date:	15/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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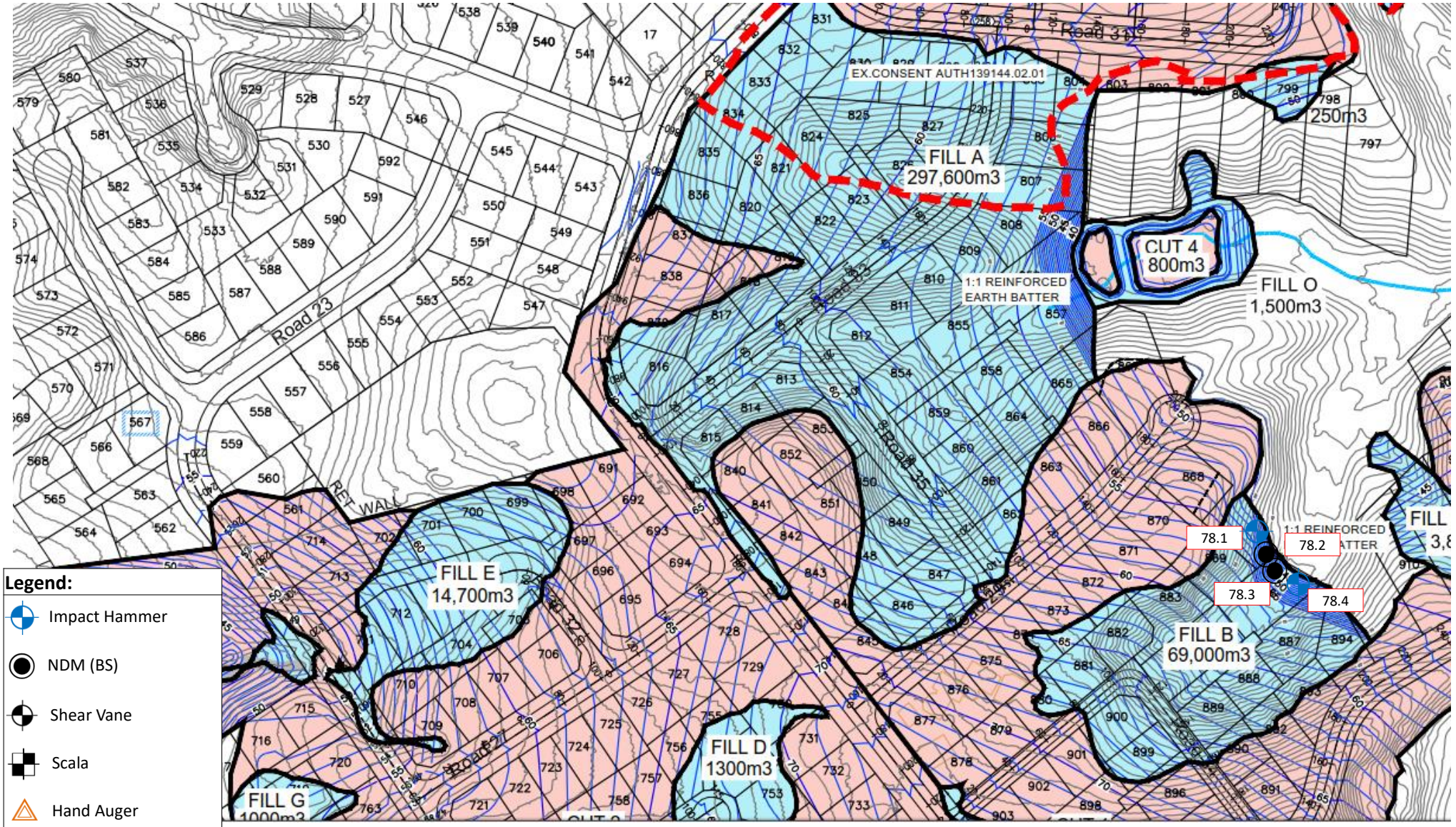

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	18/1/2021
Location:	Fill B Hardfill	Job No.:	1009213.0657.0.0/3	URN:	78	Date:	18/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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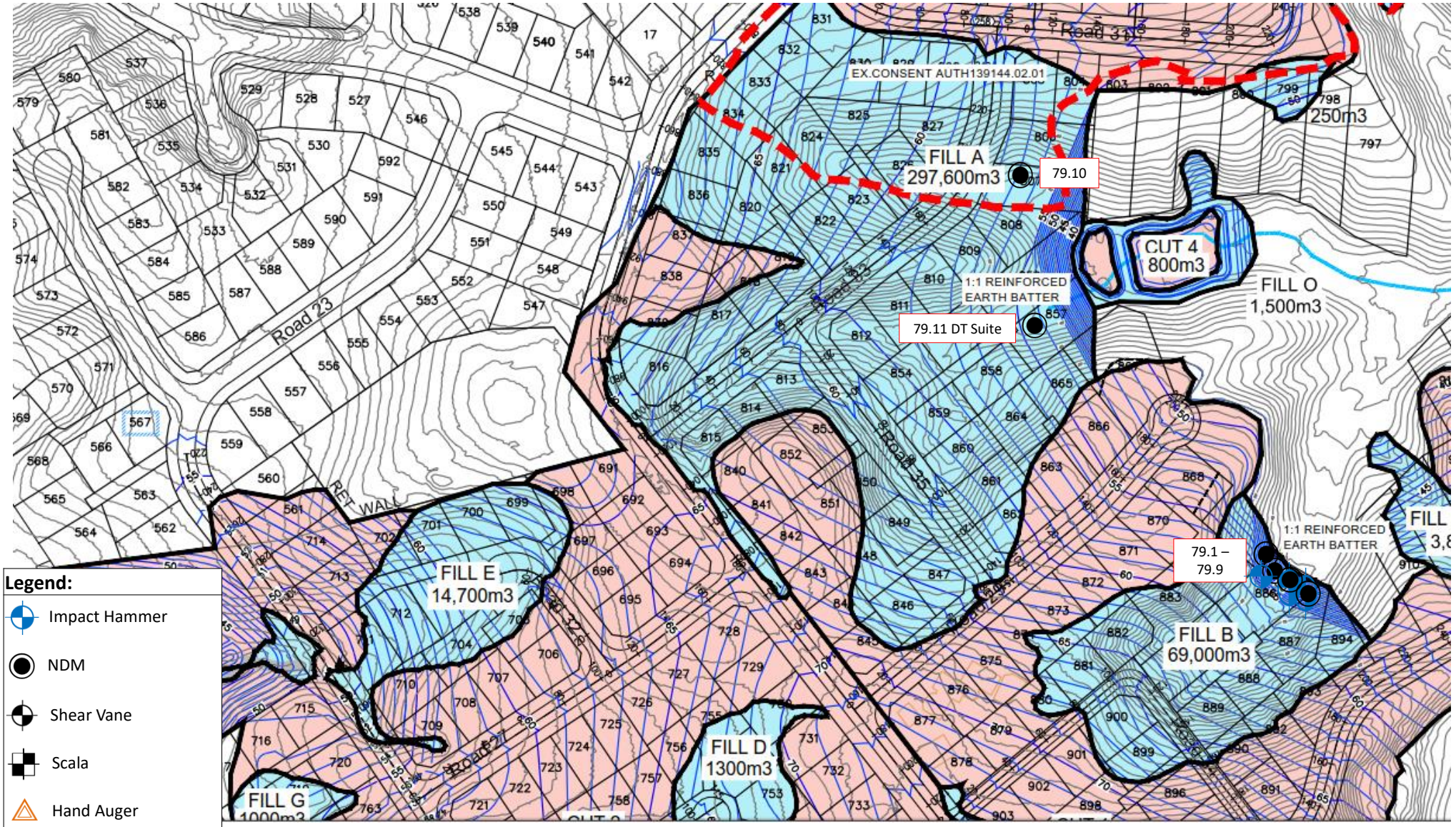

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	18/1/2021
Location:	REB & Fill B Hardfill	Job No.:	1009213.0657.0.0/3	URN:	79	Date:	18/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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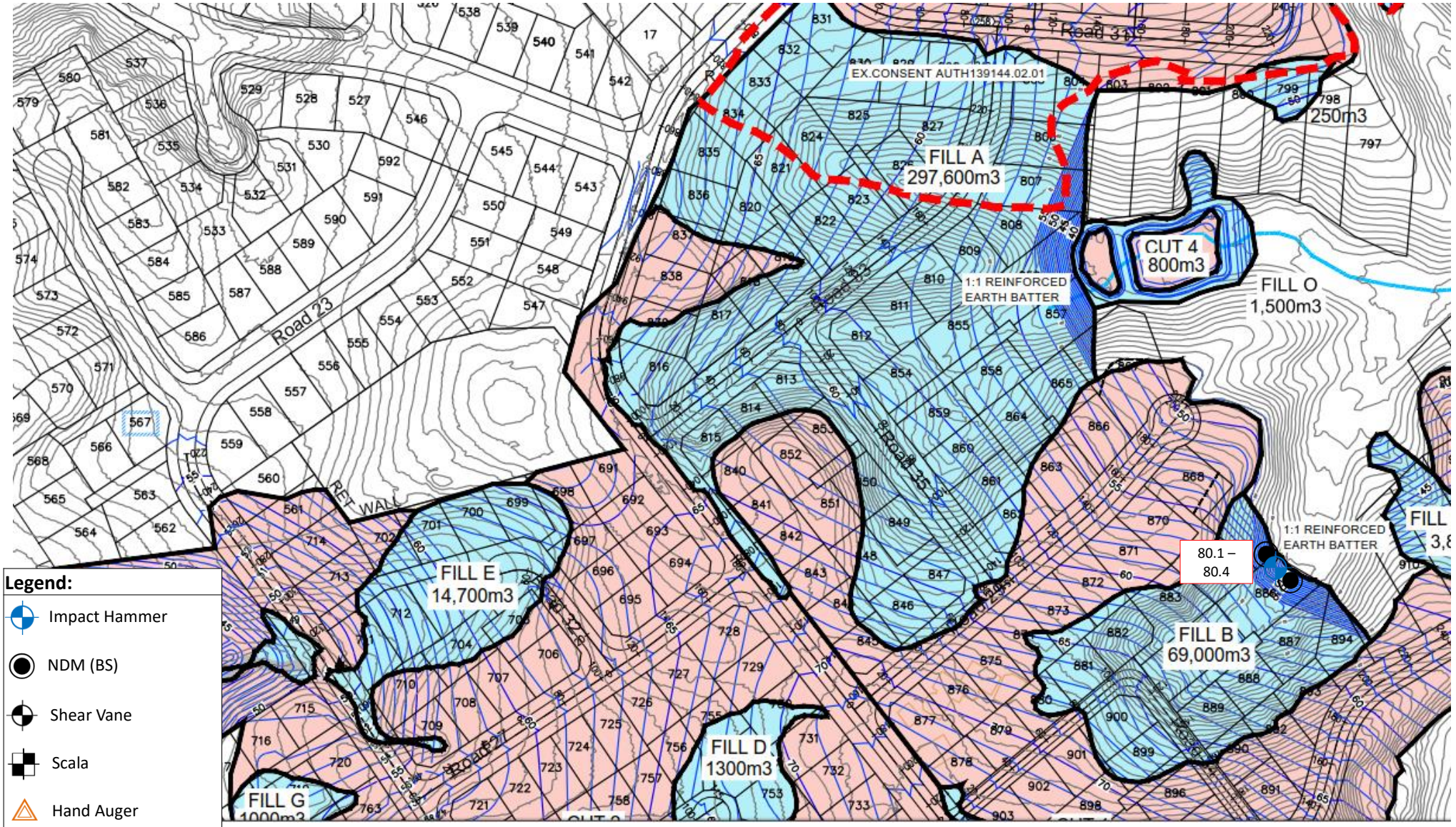

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	19/1/2021
Location:	Fill B Hardfill	Job No.:	1009213.0657.0.0/3	URN:	80	Date:	19/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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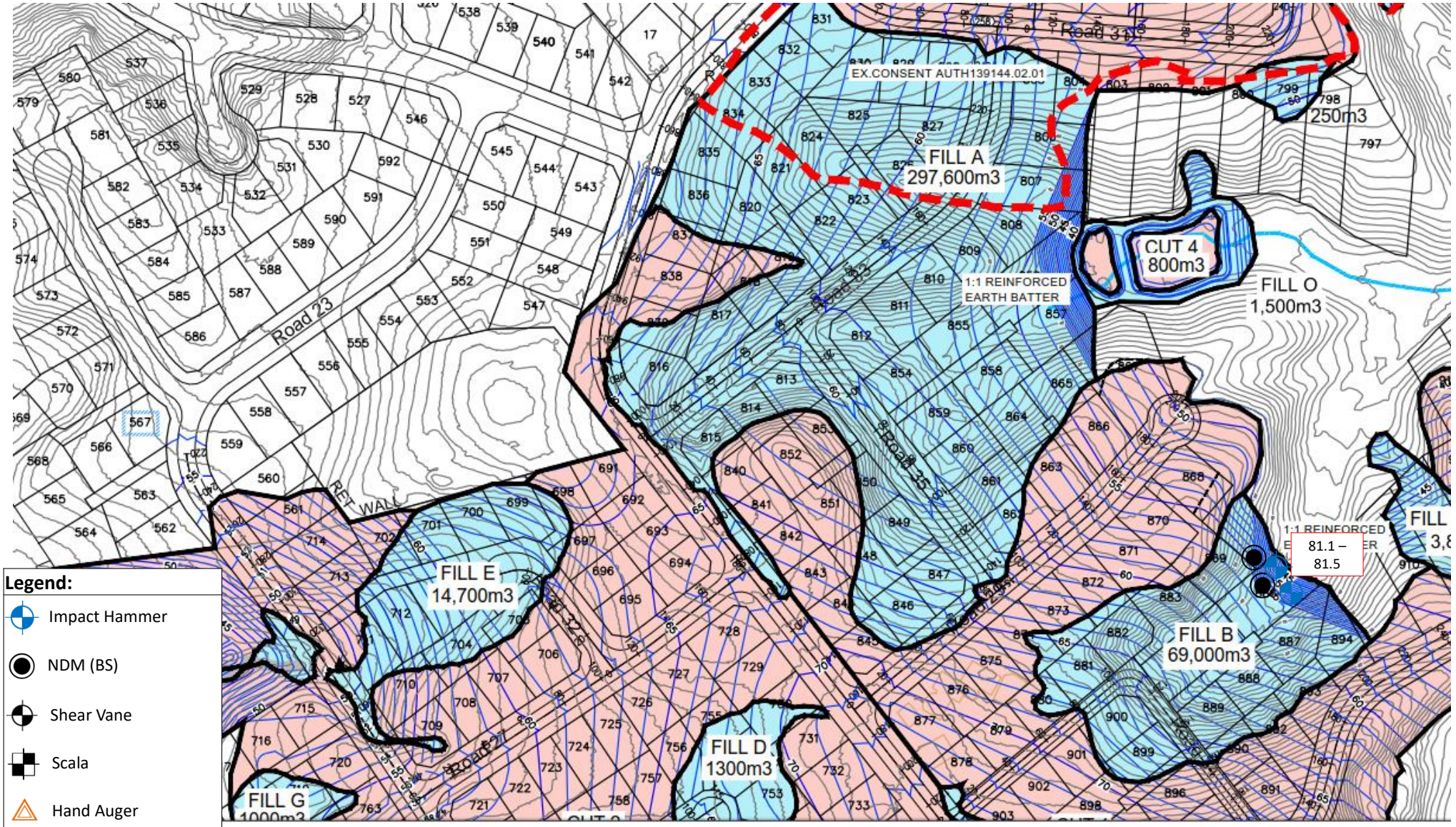

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	21/1/2021
Location:	Fill B Hardfill	Job No.:	1009213.0657.0.0/3	URN:	81	Date:	21/1/2021
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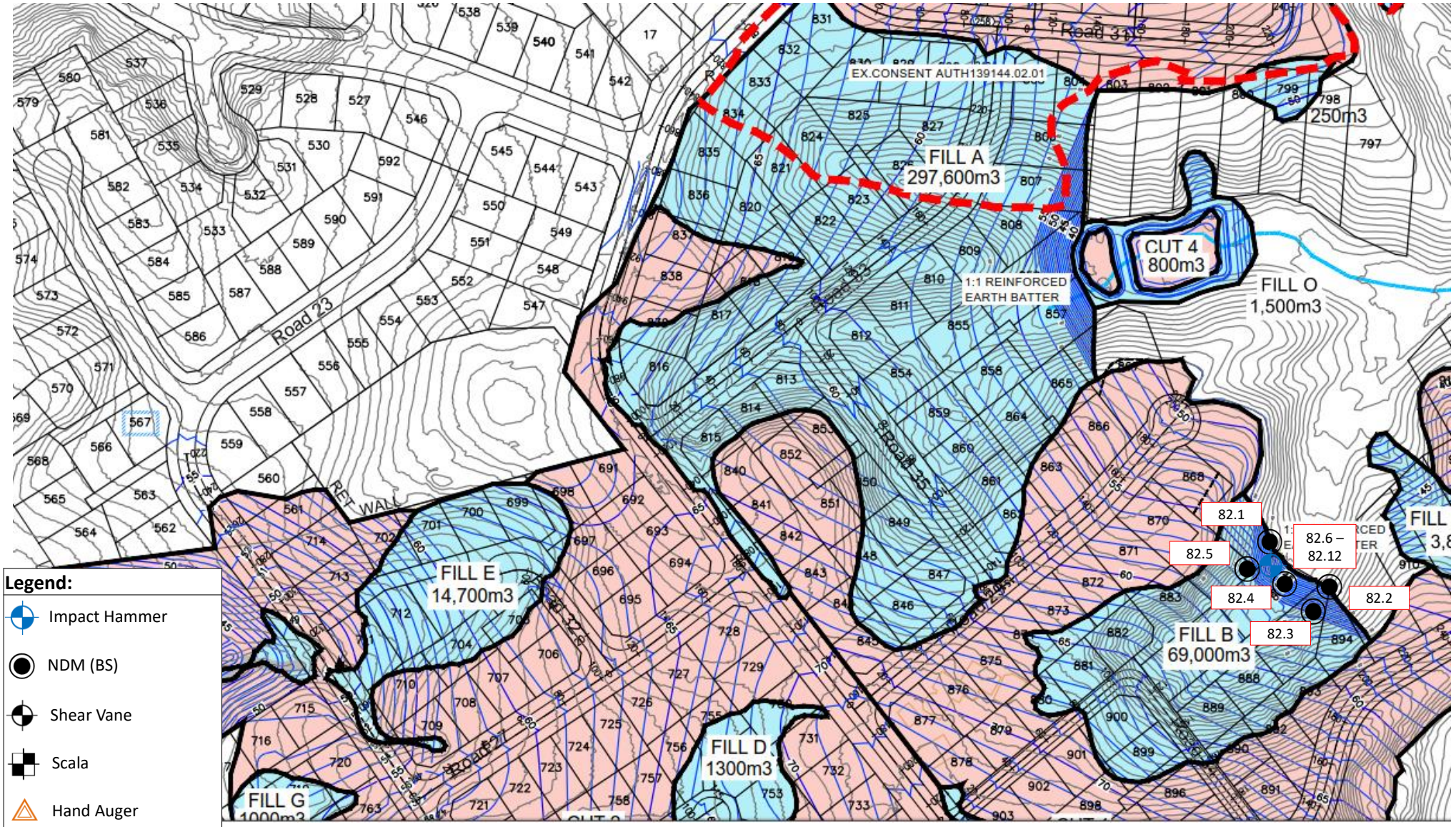

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	22/1/2021
Location:	Fill B Hardfill	Job No.:	1009213.0657.0.0/3	URN:	82	Date:	22/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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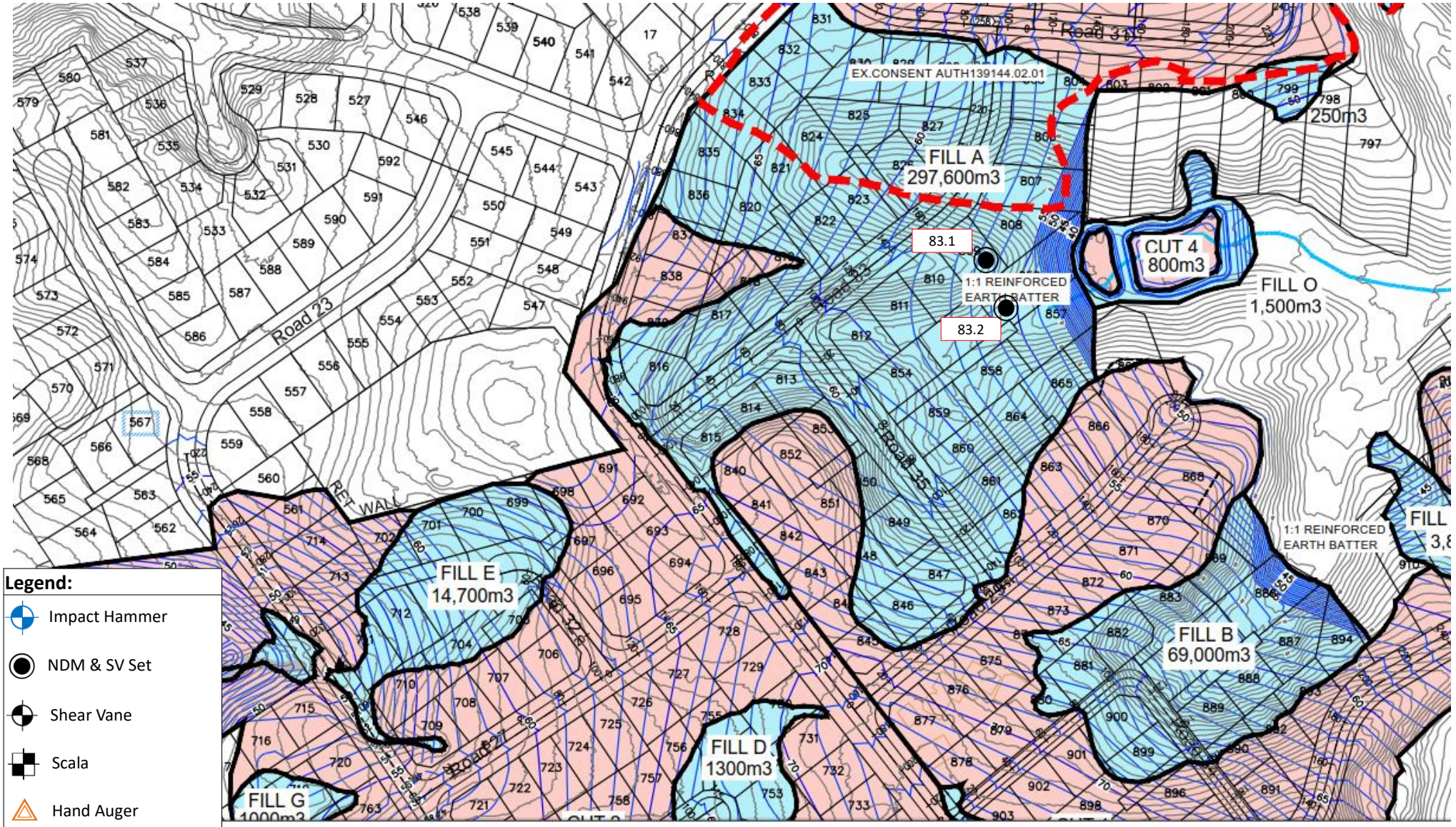

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	27/1/2021
Location:	Fill A REB	Job No.:	1009213.0657.0.0/3	URN:	83	Date:	27/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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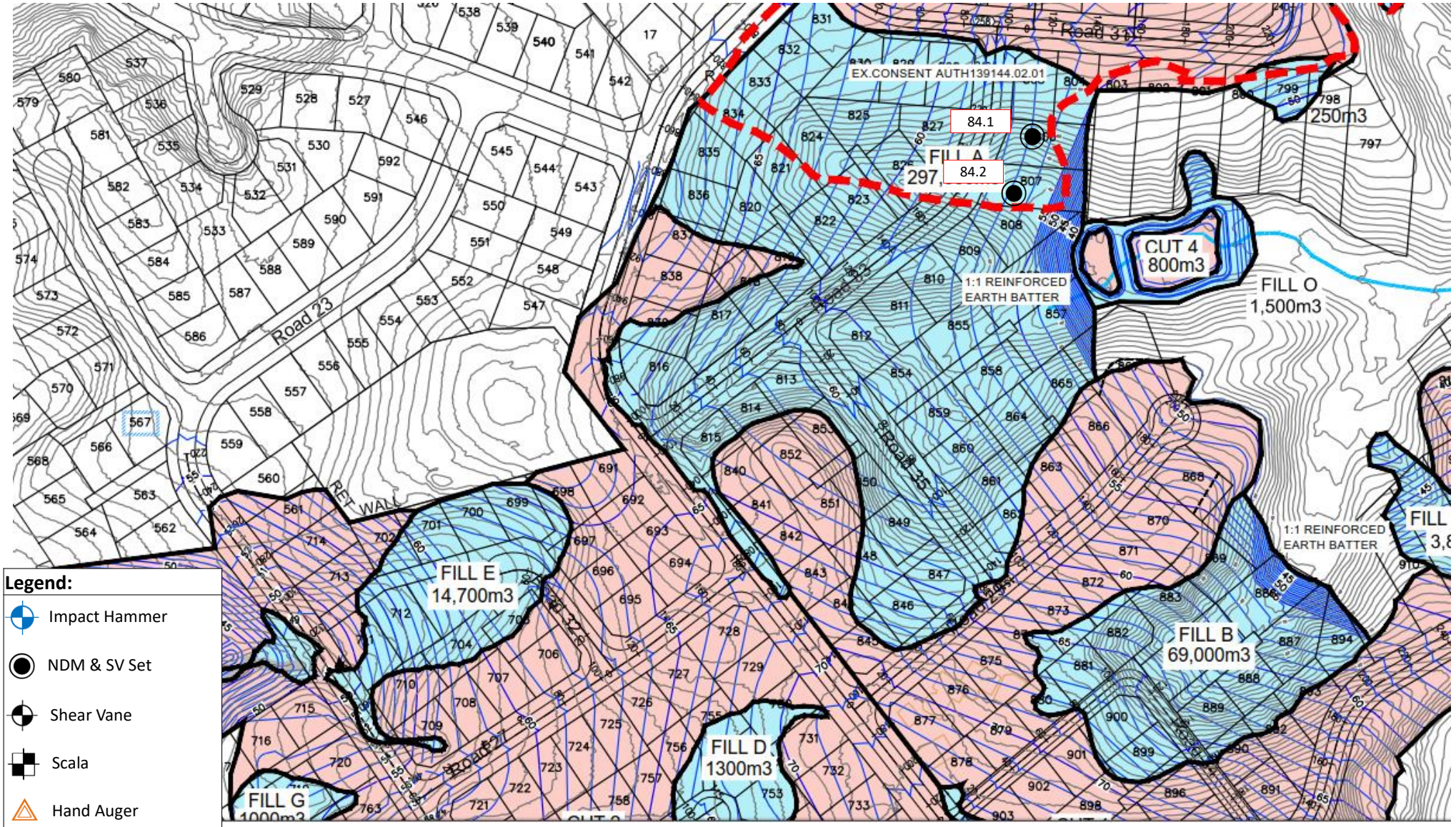

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	29/1/2021
Location:	Fill A REB	Job No.:	1009213.0657.0.0/3	URN:	84	Date:	29/1/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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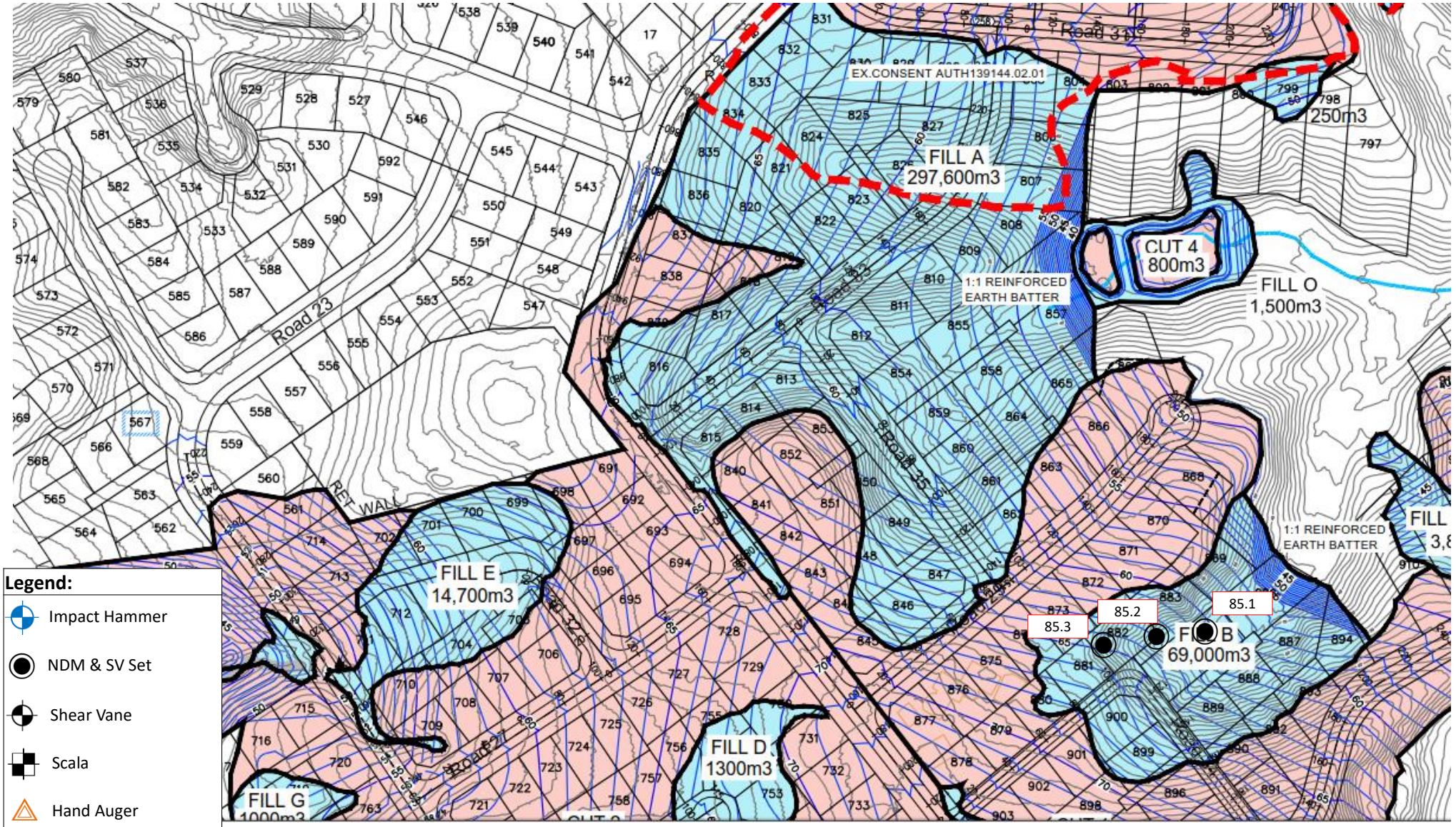

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	2/02/2021
Location:	Fill A REB	Job No.:	1009213.0657.0.0/3	URN:	85	Date:	2/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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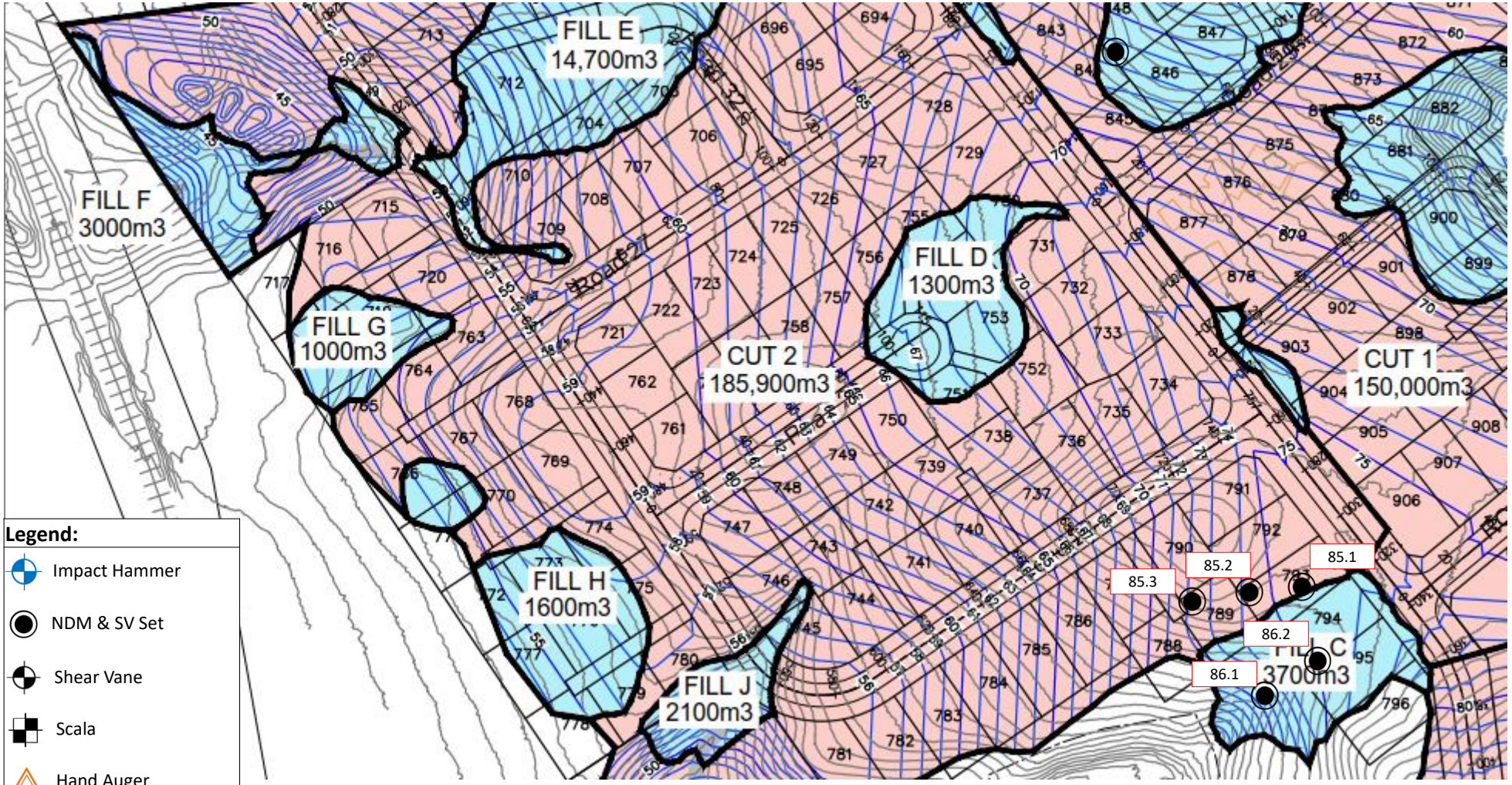

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	2/02/2021
Location:	Fill C	Job No.:	1009213.0657.0.0/3	URN:	86	Date:	2/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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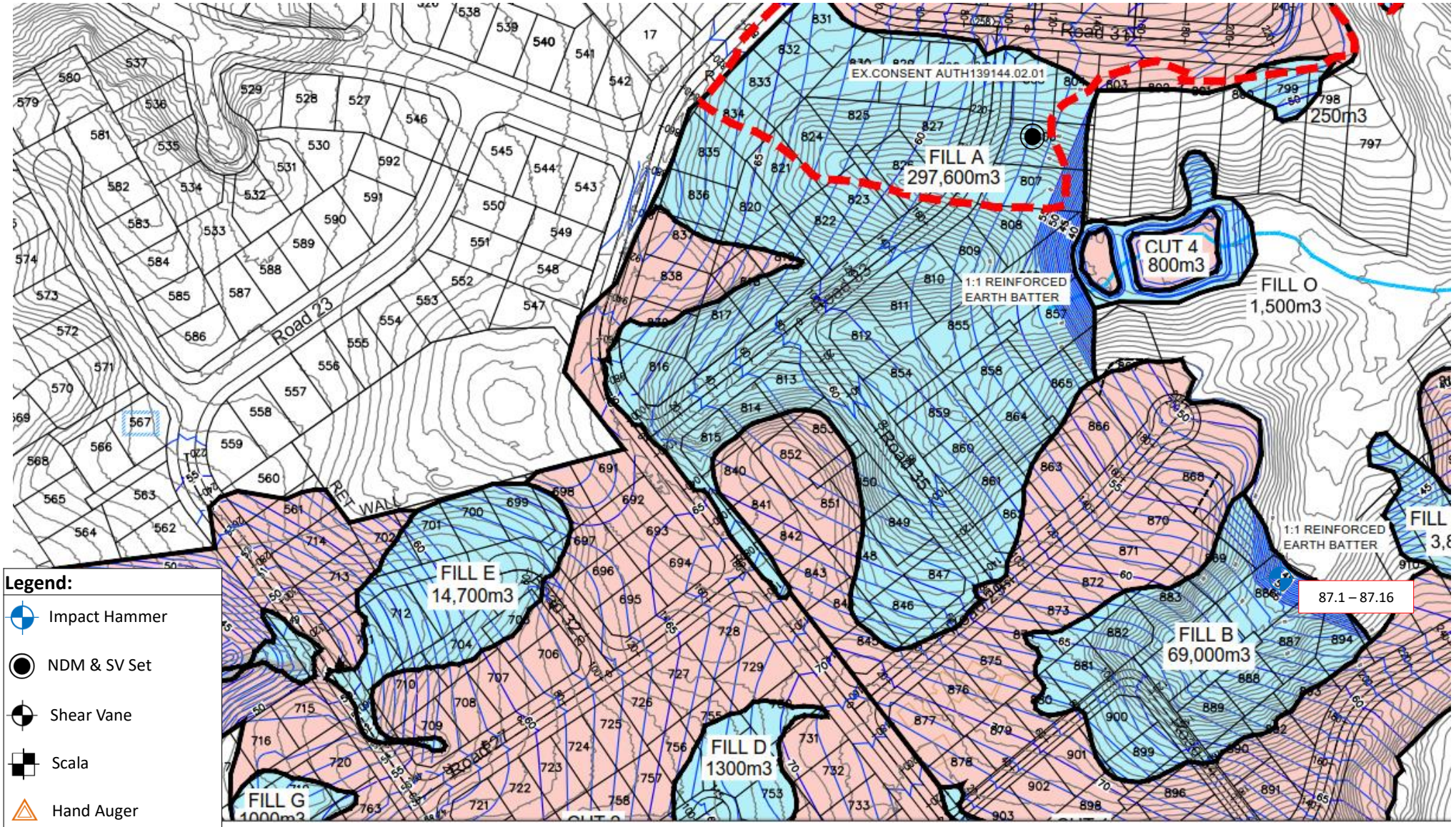

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	4/02/2021
Location:	Fill C	Job No.:	1009213.0657.0.0/3	URN:	87	Date:	4/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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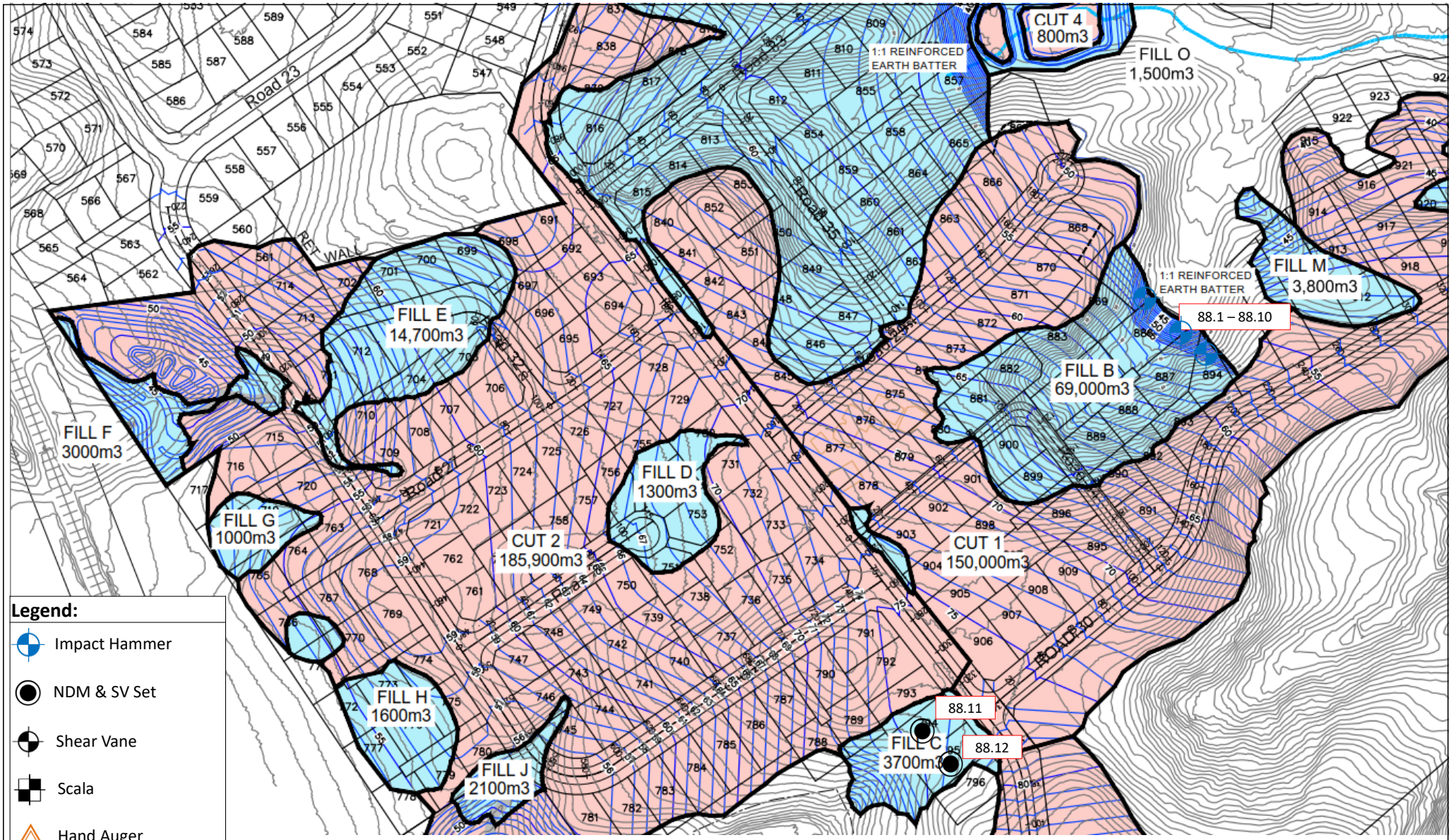

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	5/02/2021
Location:	Fill C	Job No.:	1009213.0657.0.0/3	URN:	88	Date:	5/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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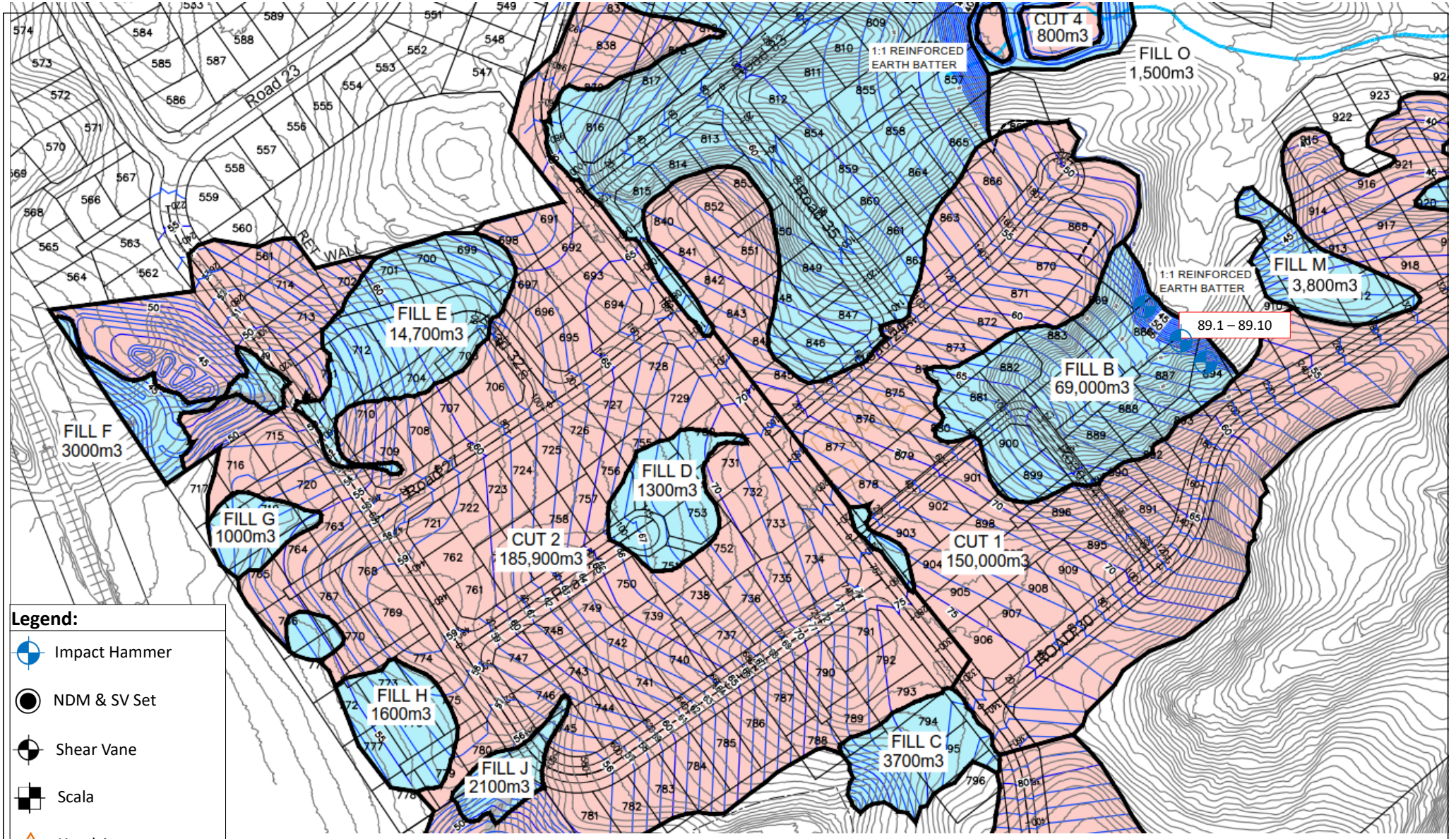

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	9/02/2021
Location:	Fill C	Job No.:	1009213.0657.0.0/3	URN:	89	Date:	9/02/2021
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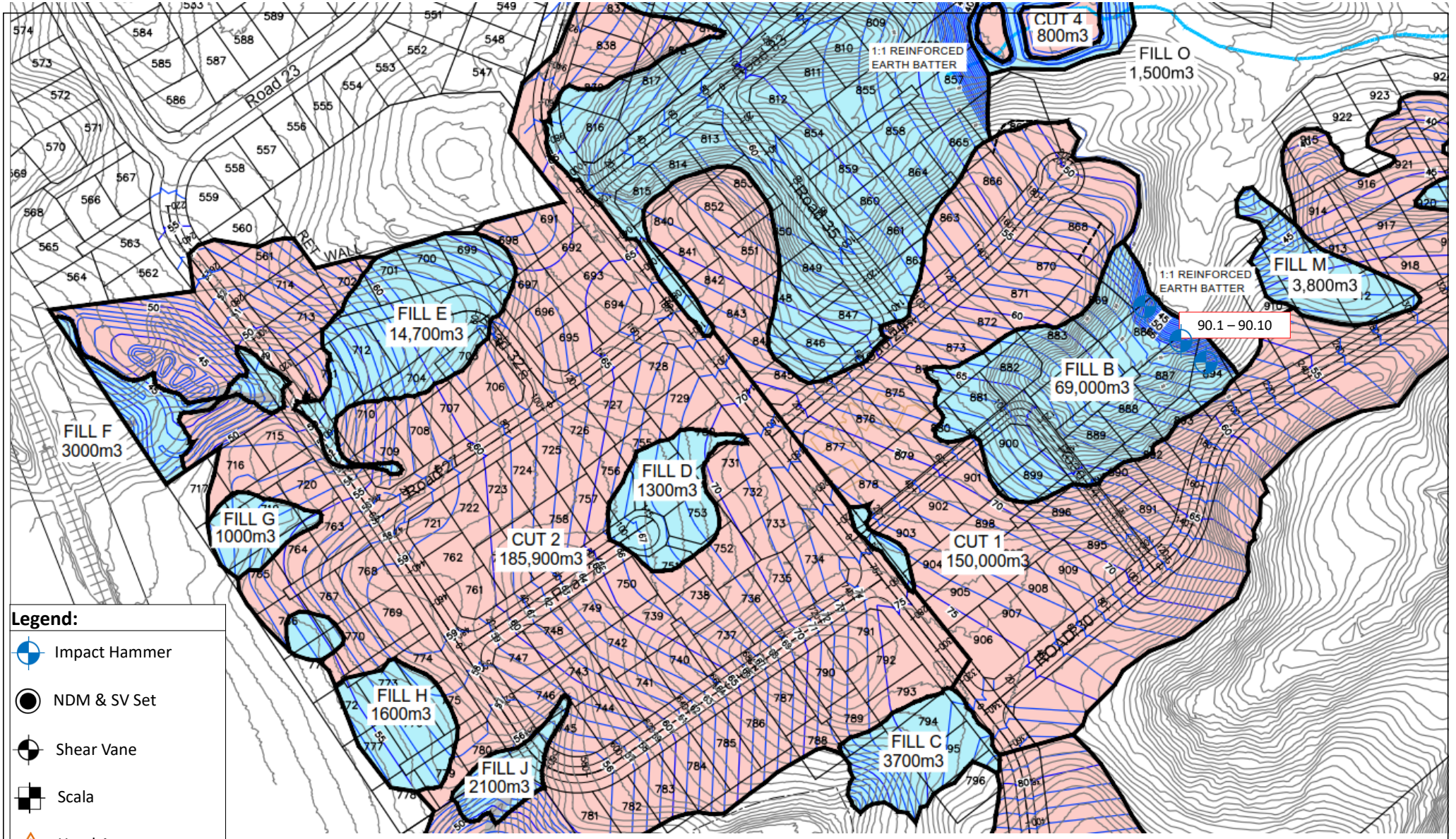

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	10/02/2021
Location:	Fill C	Job No.:	1009213.0657.0.0/3	URN:	90	Date:	10/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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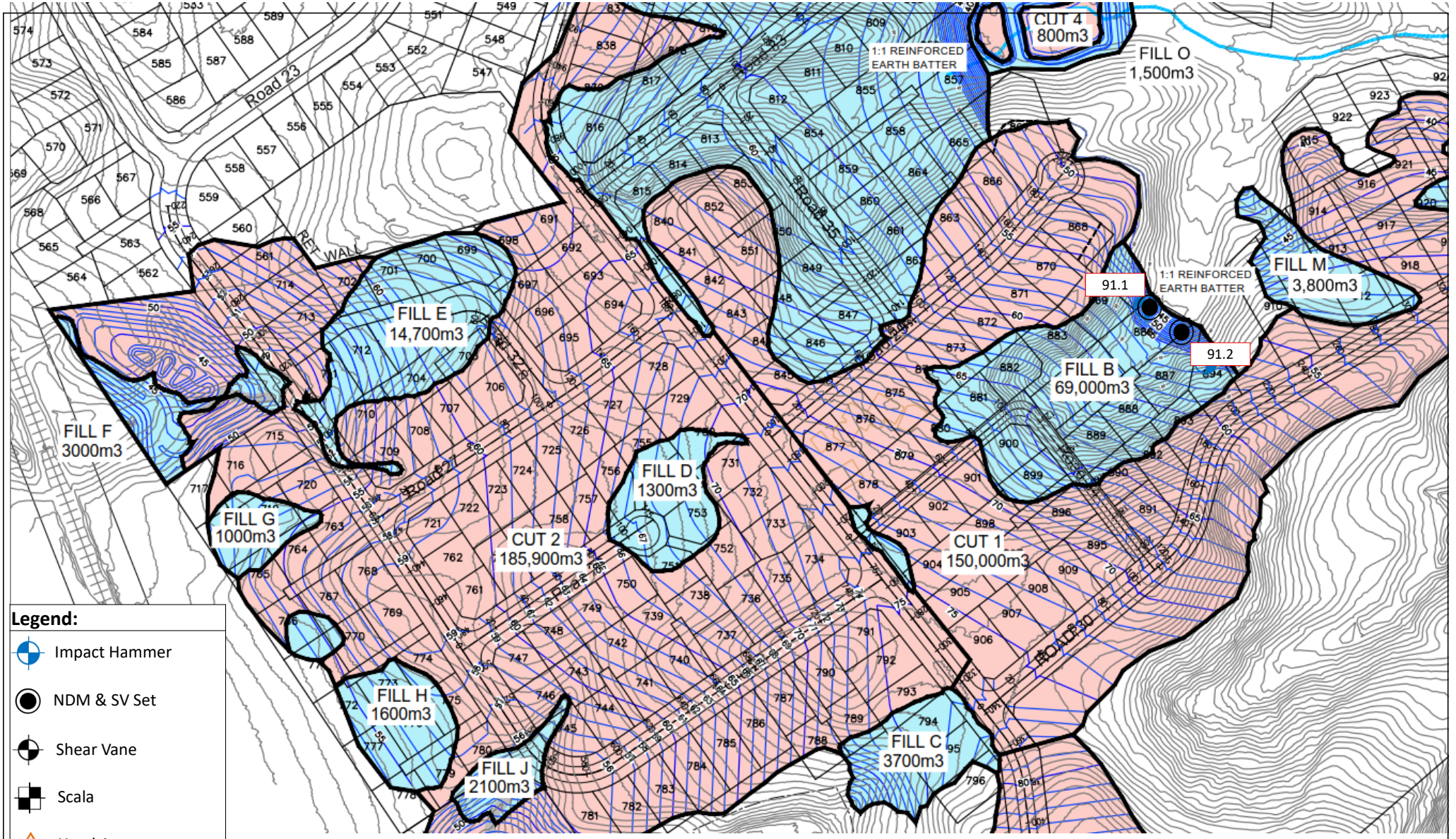

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	12/02/2021
Location:	Fill C	Job No.:	1009213.0657.0.0/3	URN:	91	Date:	12/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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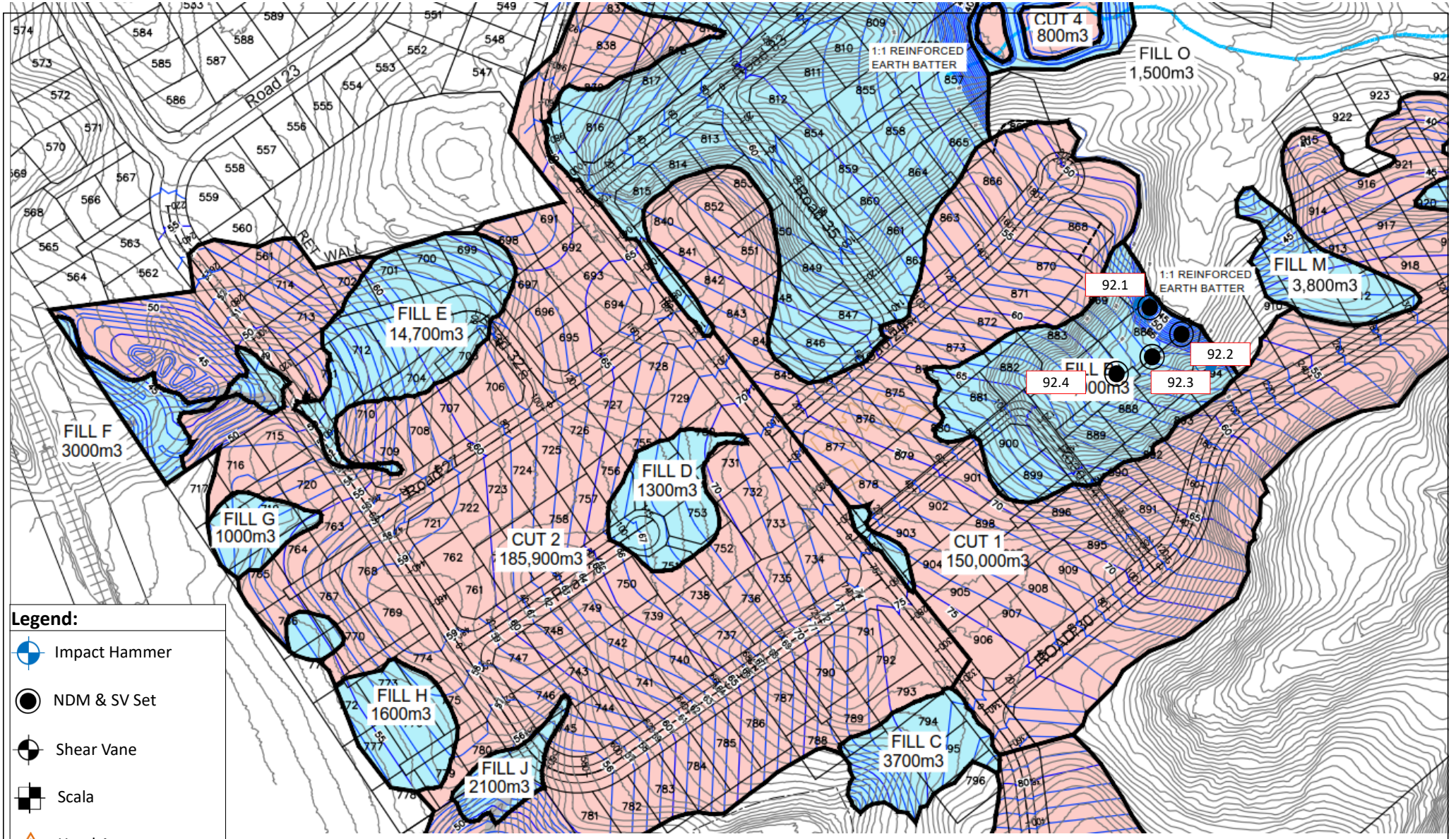

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	17/02/2021
Location:	Fill B	Job No.:	1009213.0657.0.0/3	URN:	92	Date:	17/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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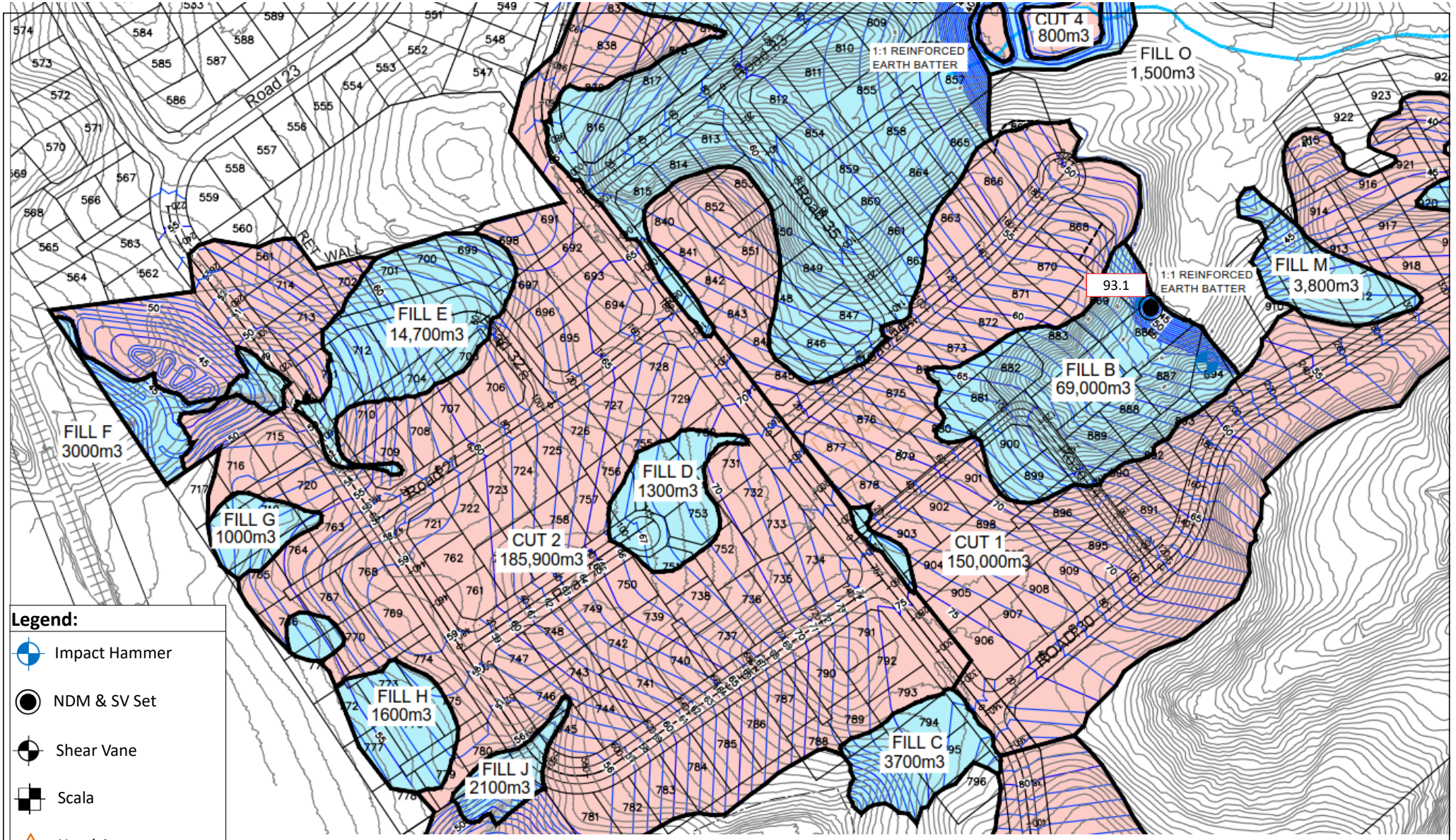

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	18/02/2021
Location:	Fill B	Job No.:	1009213.0657.0.0/3	URN:	93	Date:	18/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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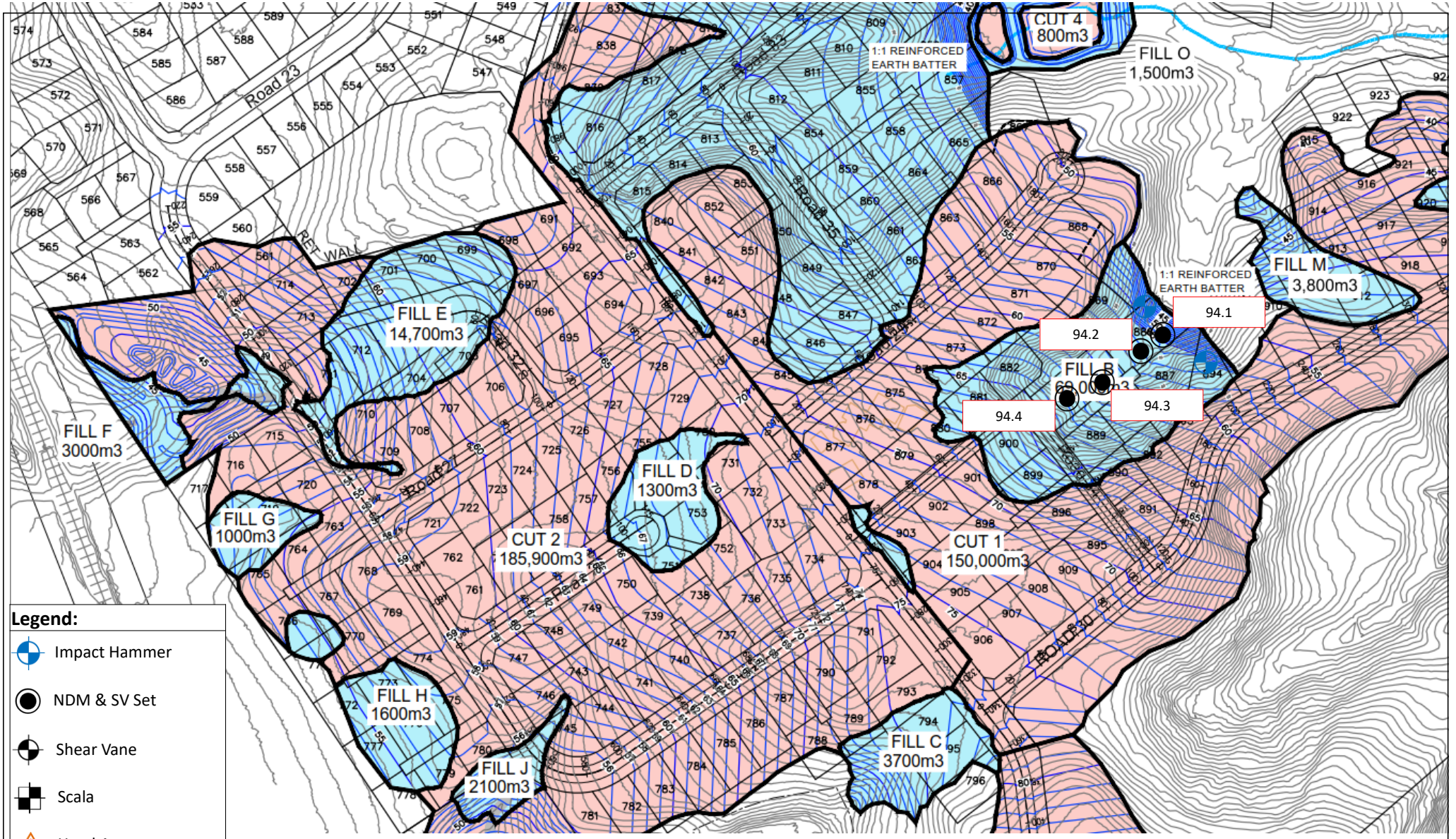

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	19/02/2021
Location:	Fill B	Job No.:	1009213.0657.0.0/3	URN:	94	Date:	19/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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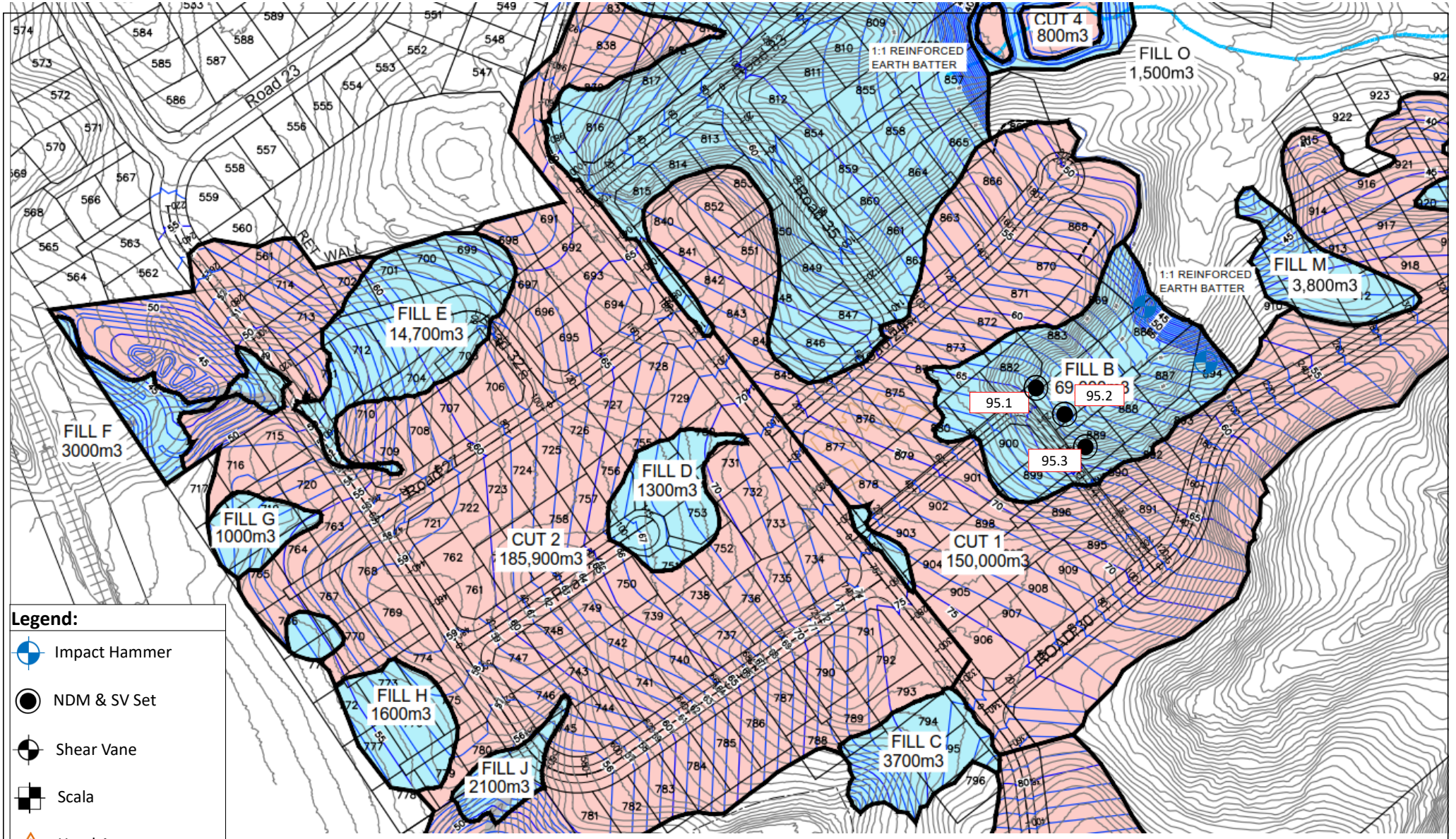

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	22/02/2021
Location:	Fill B	Job No.:	1009213.0657.0.0/3	URN:	95	Date:	22/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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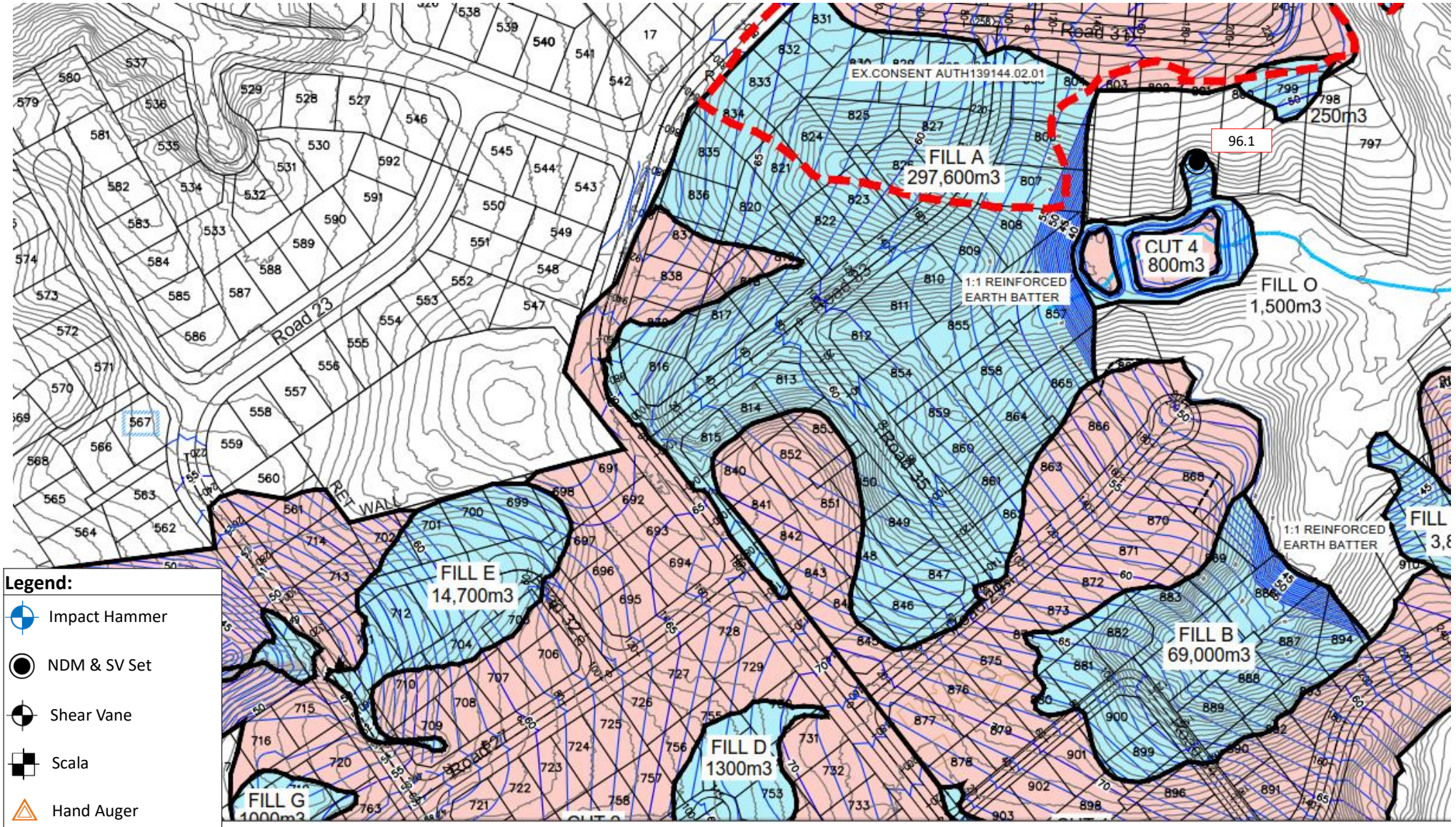

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	23/02/2021
Location:	REB 1	Job No.:	1009213.0657.0.0/3	URN:	96	Date:	23/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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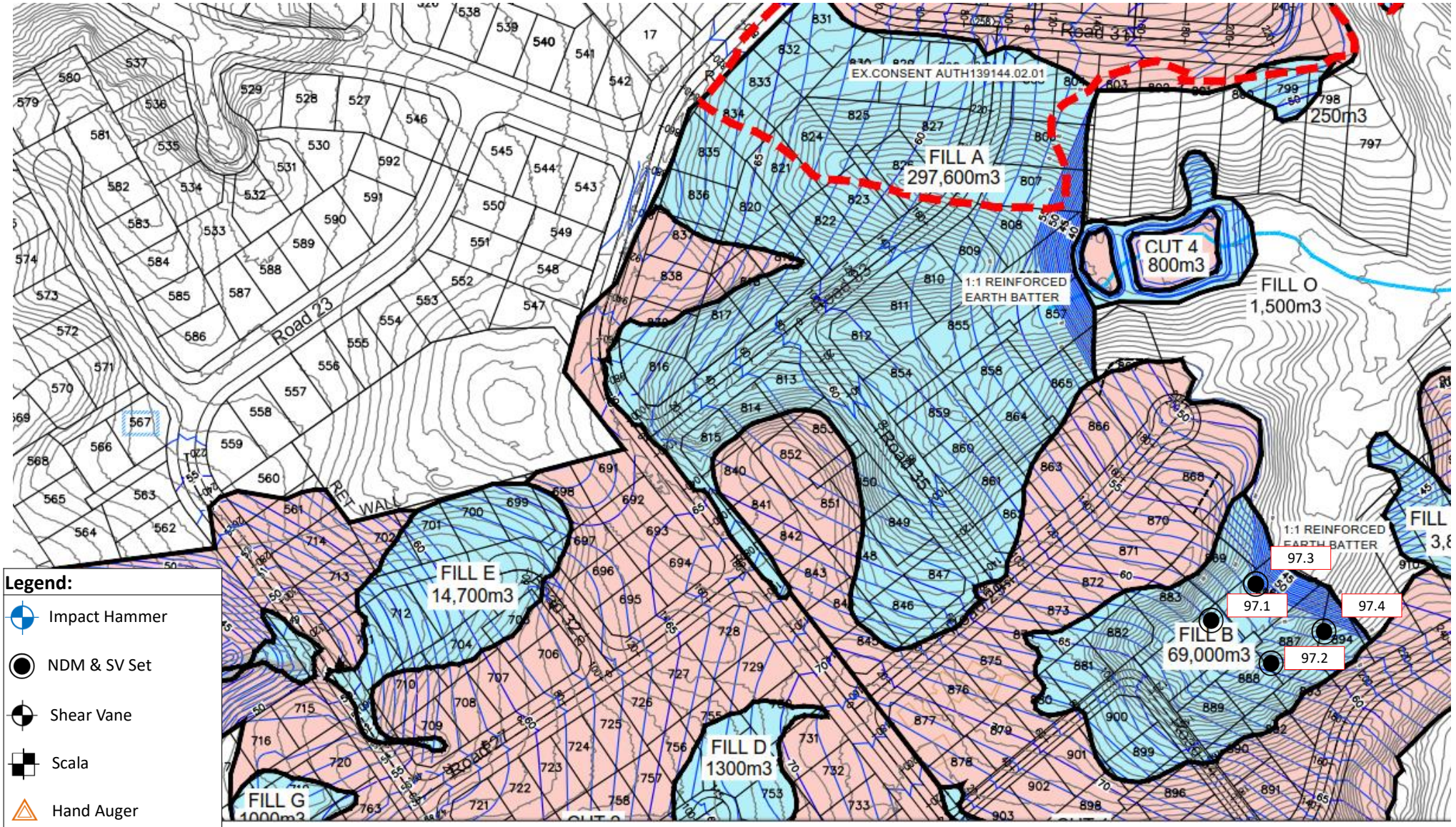

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	24/02/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	97	Date:	24/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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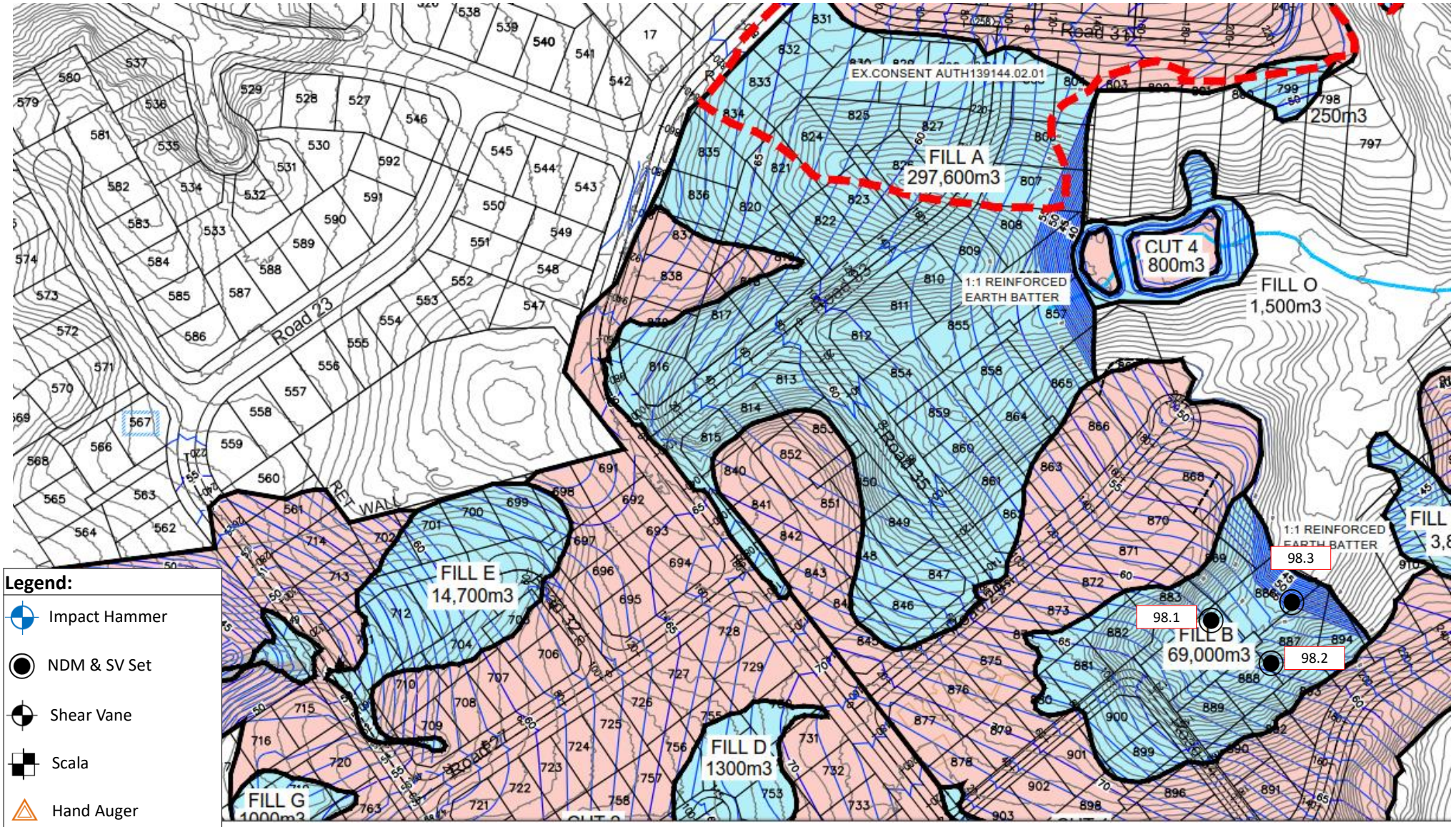

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	26/02/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	98	Date:	26/02/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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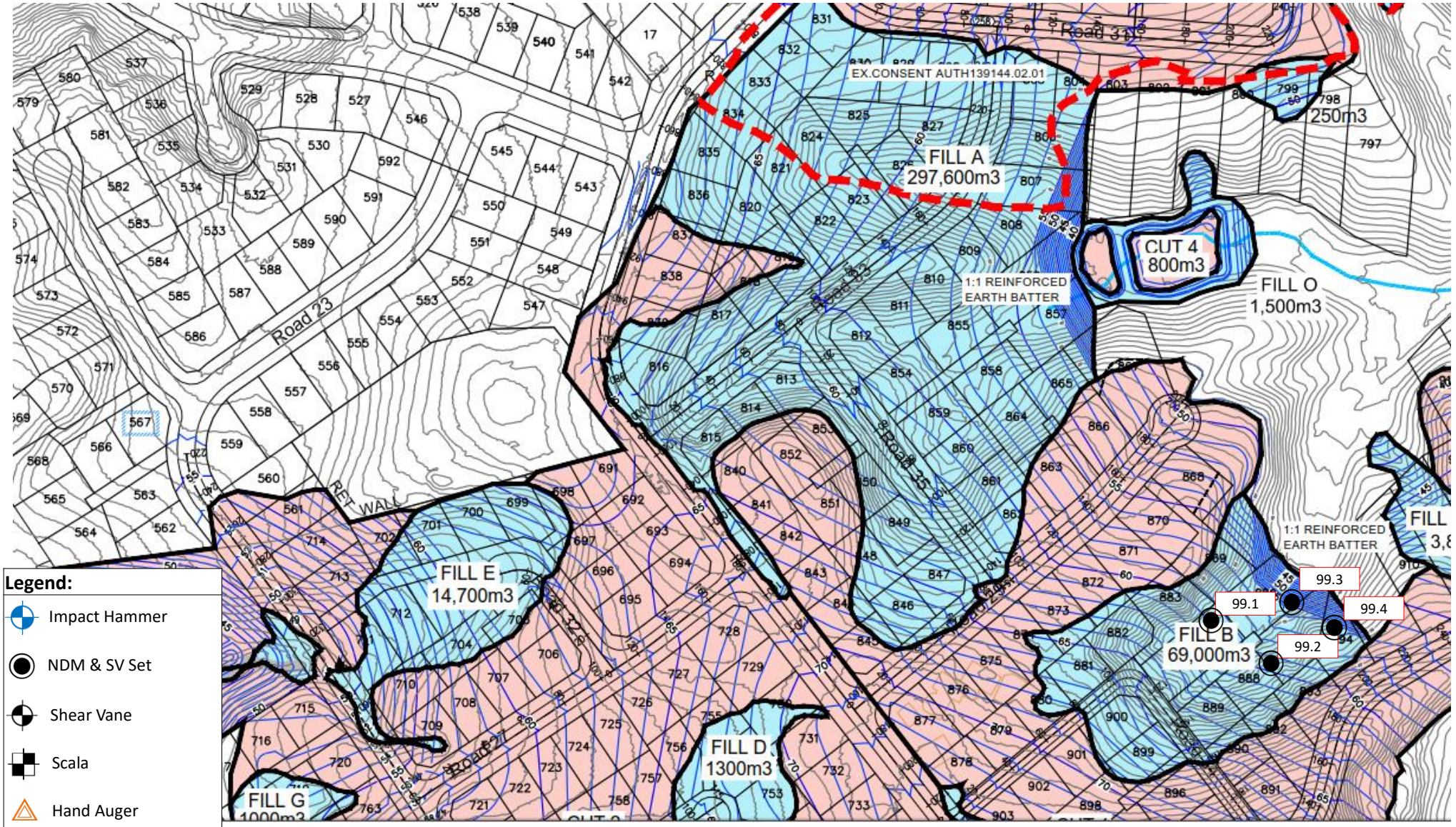

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	1/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	99	Date:	1/3/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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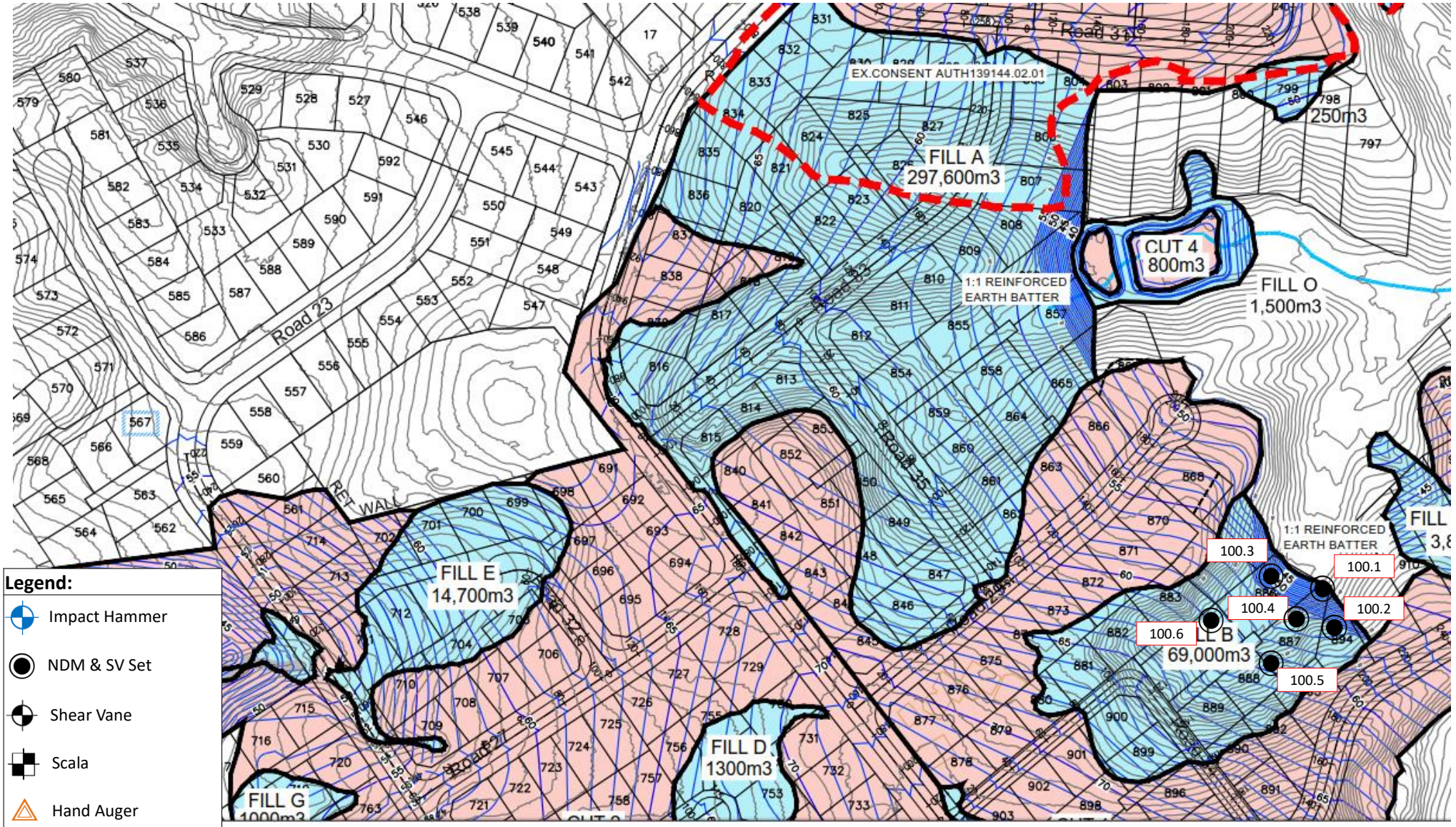

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	8/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	100	Date:	8/3/2021
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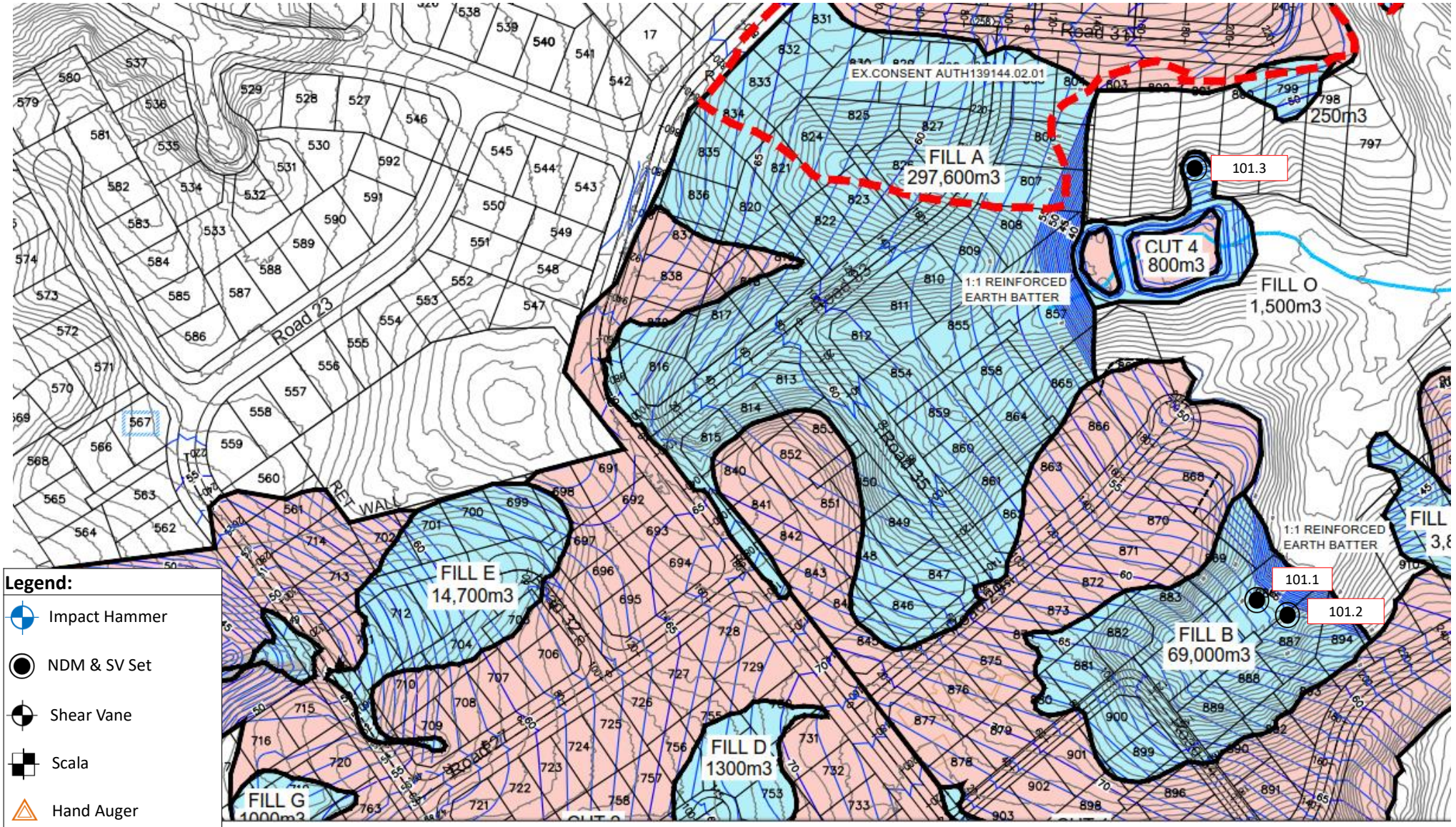

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	10/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	101	Date:	10/3/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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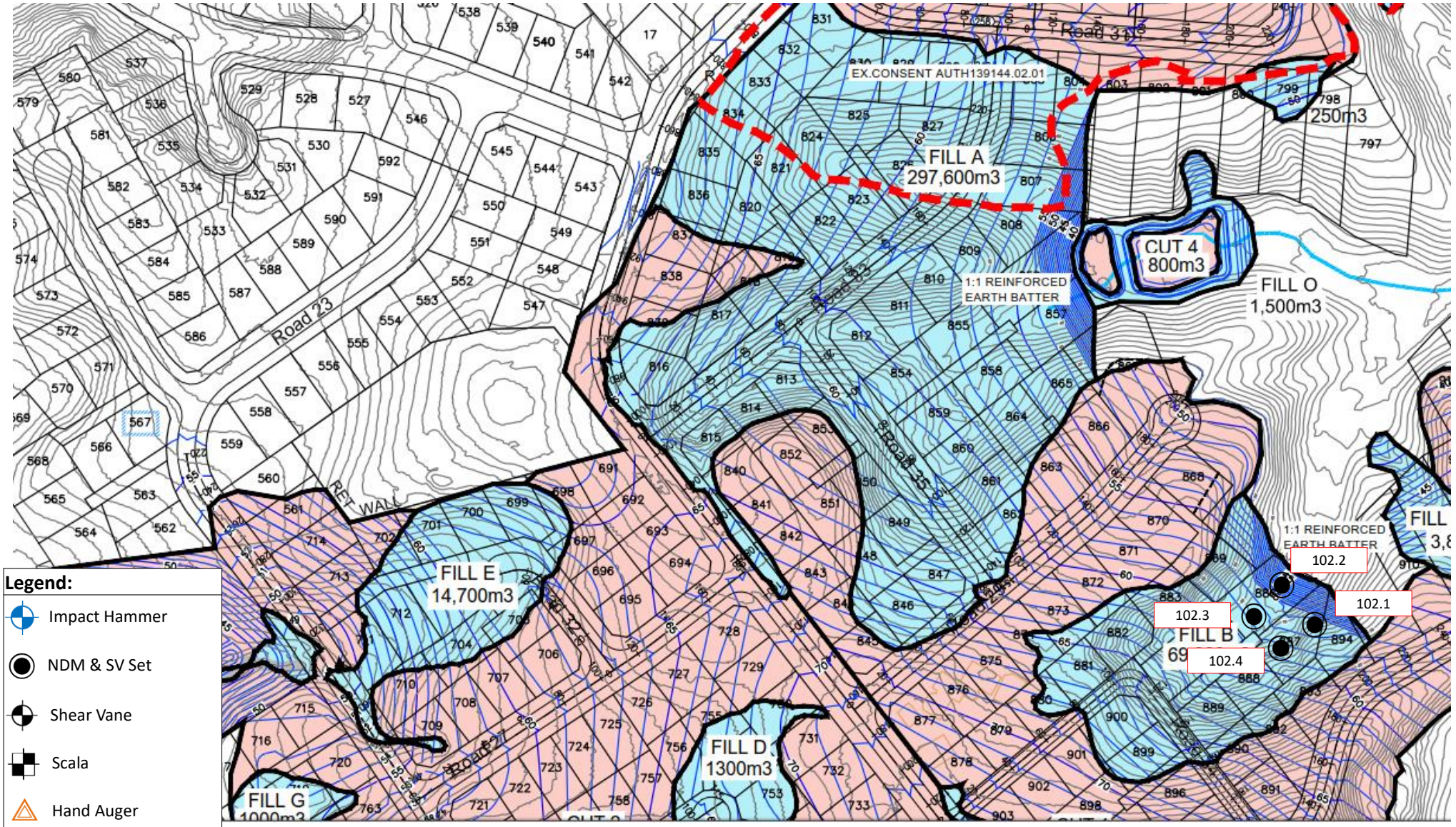

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	12/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	102	Date:	12/3/2021
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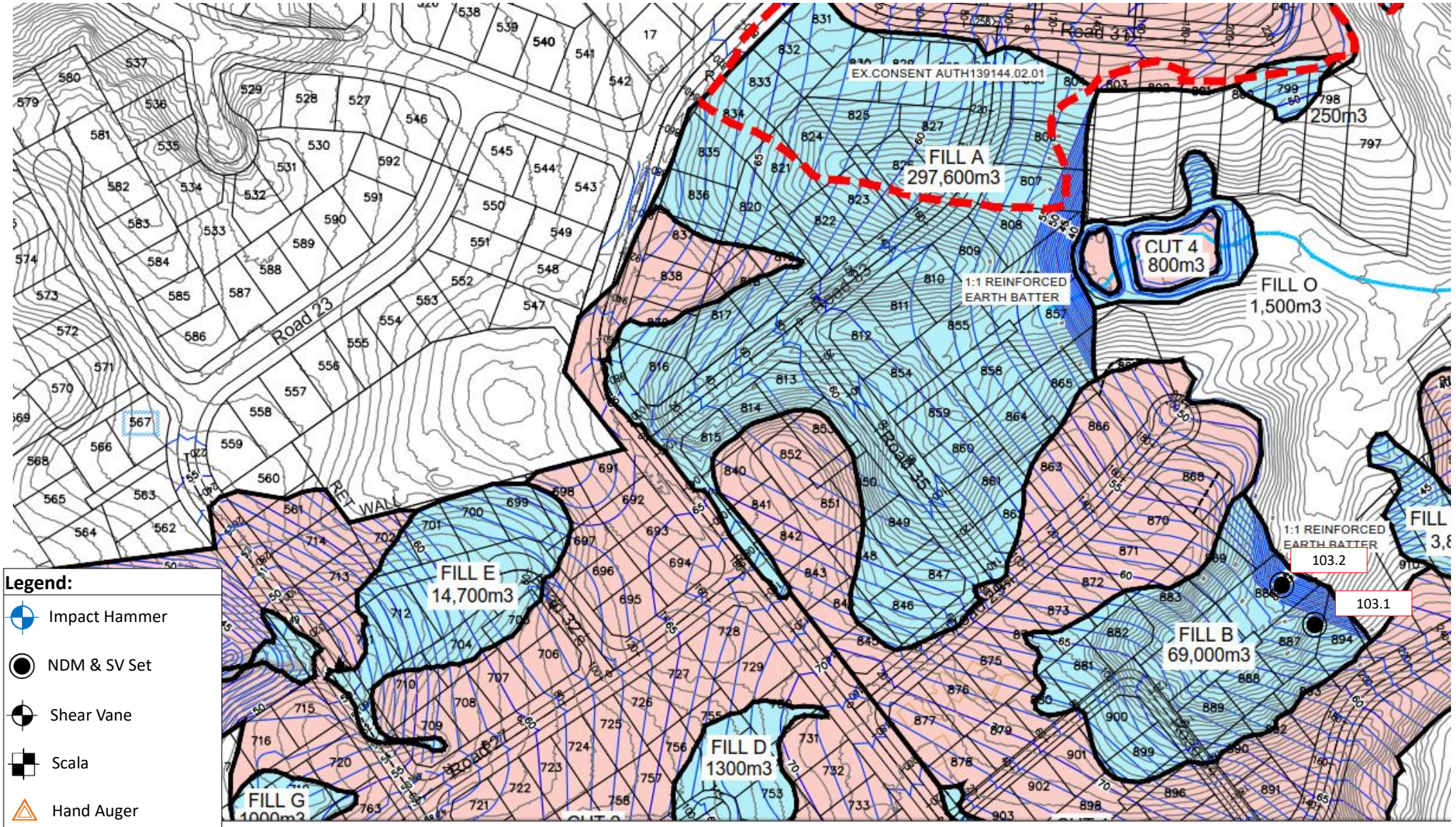

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Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	16/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	103	Date:	16/3/2021
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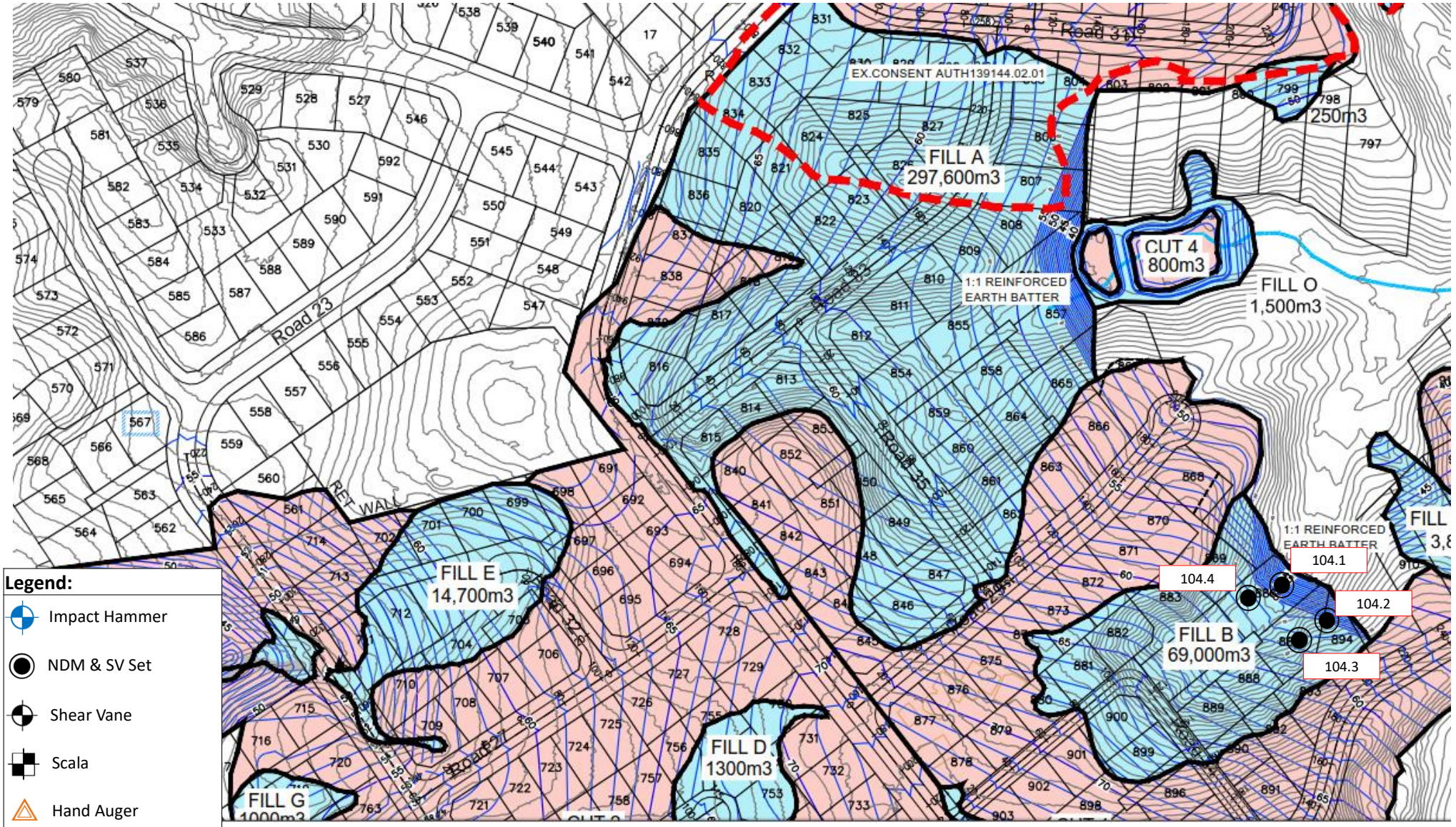

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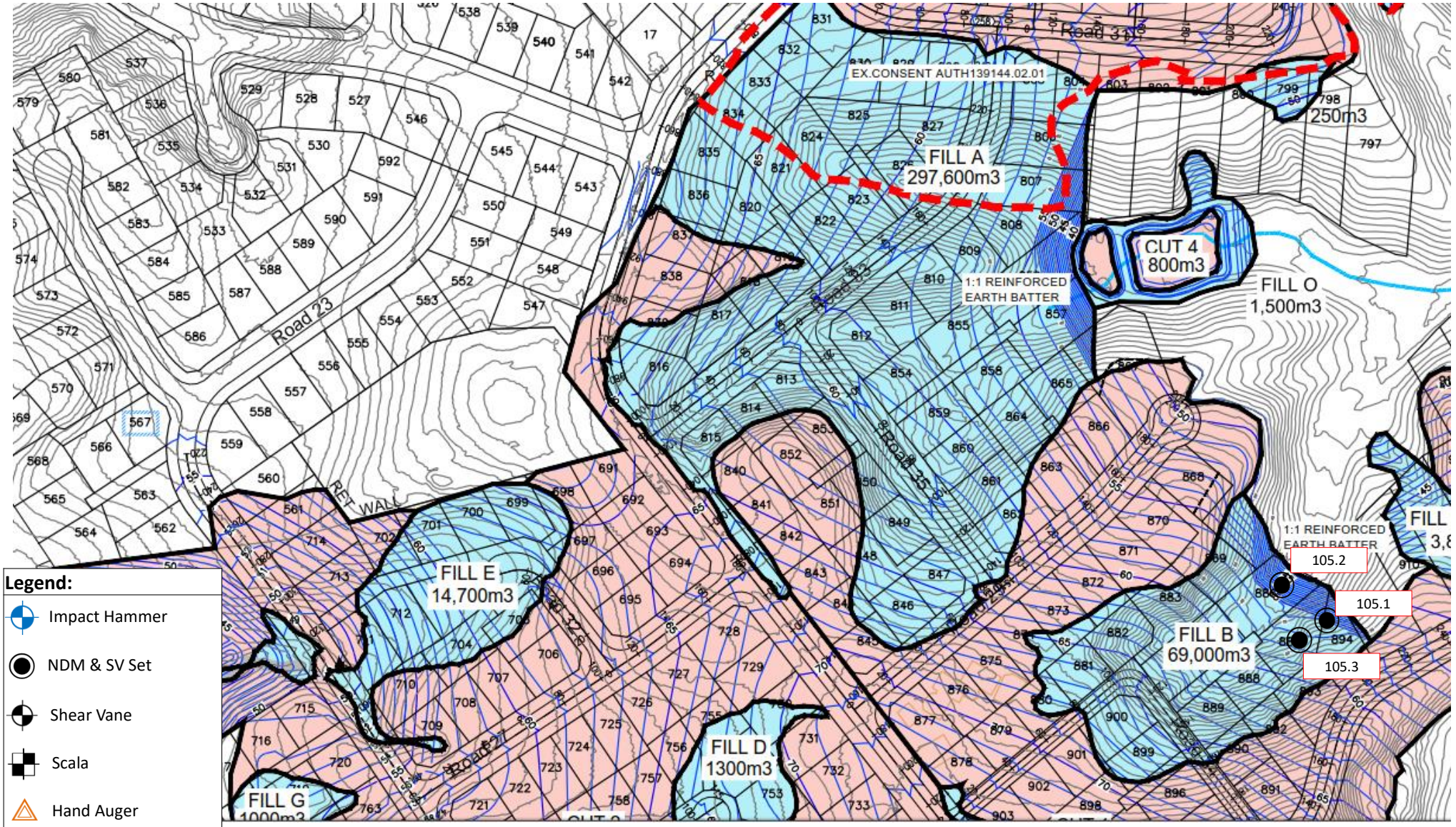
Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	18/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	104	Date:	18/3/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	19/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	105	Date:	19/3/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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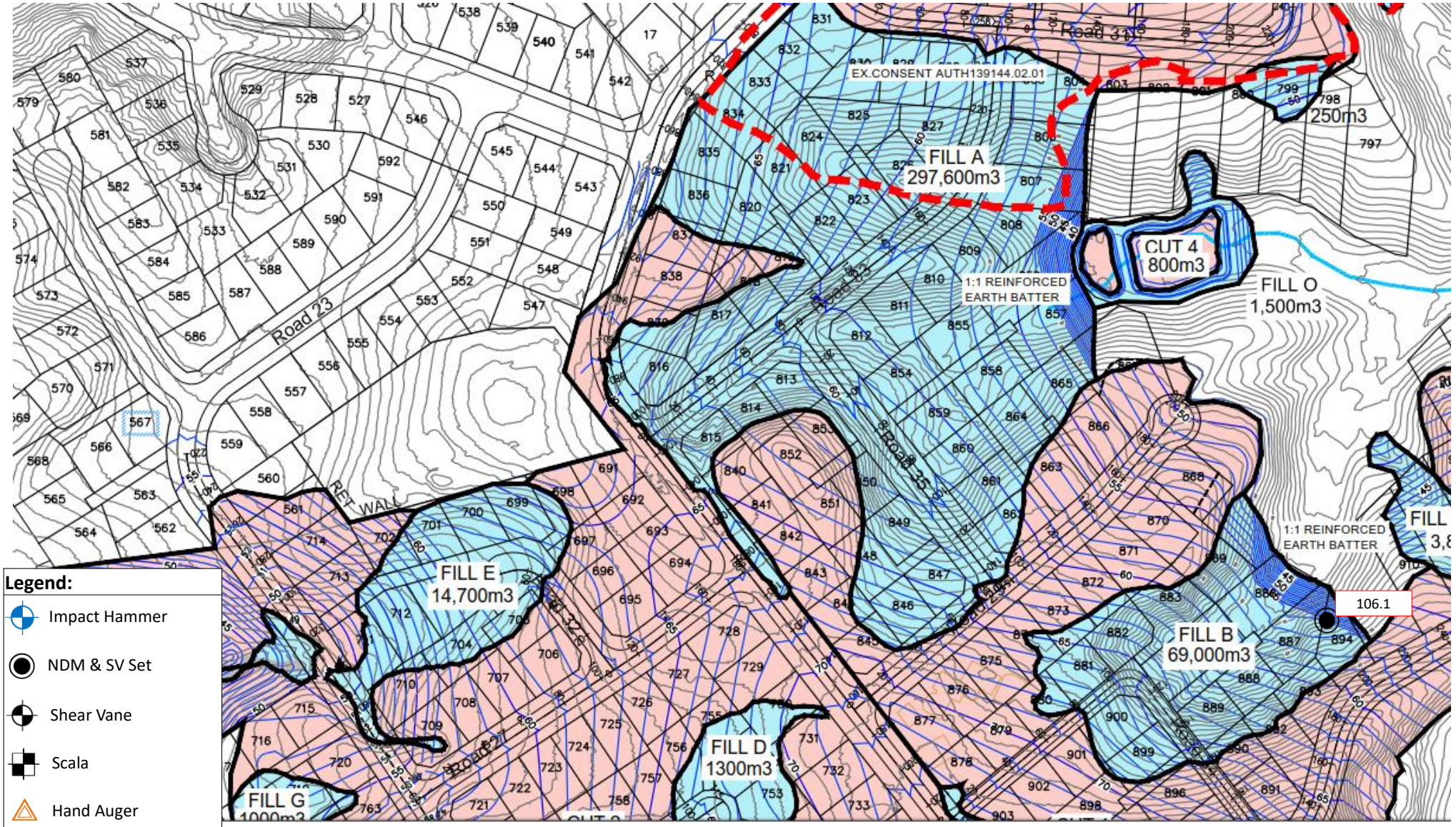

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	JRA	Date:	22/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	106	Date:	22/3/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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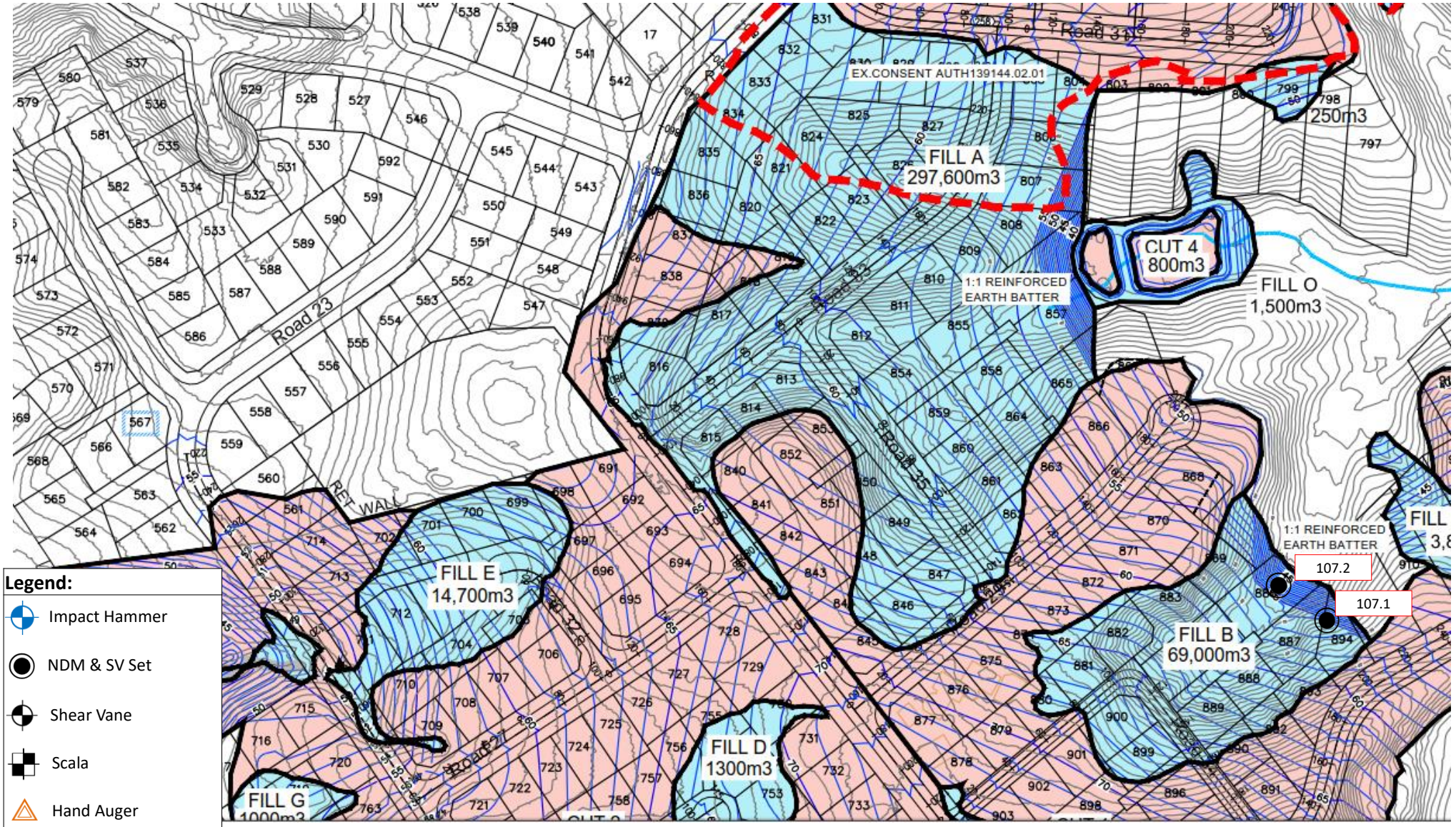

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	24/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	107	Date:	24/3/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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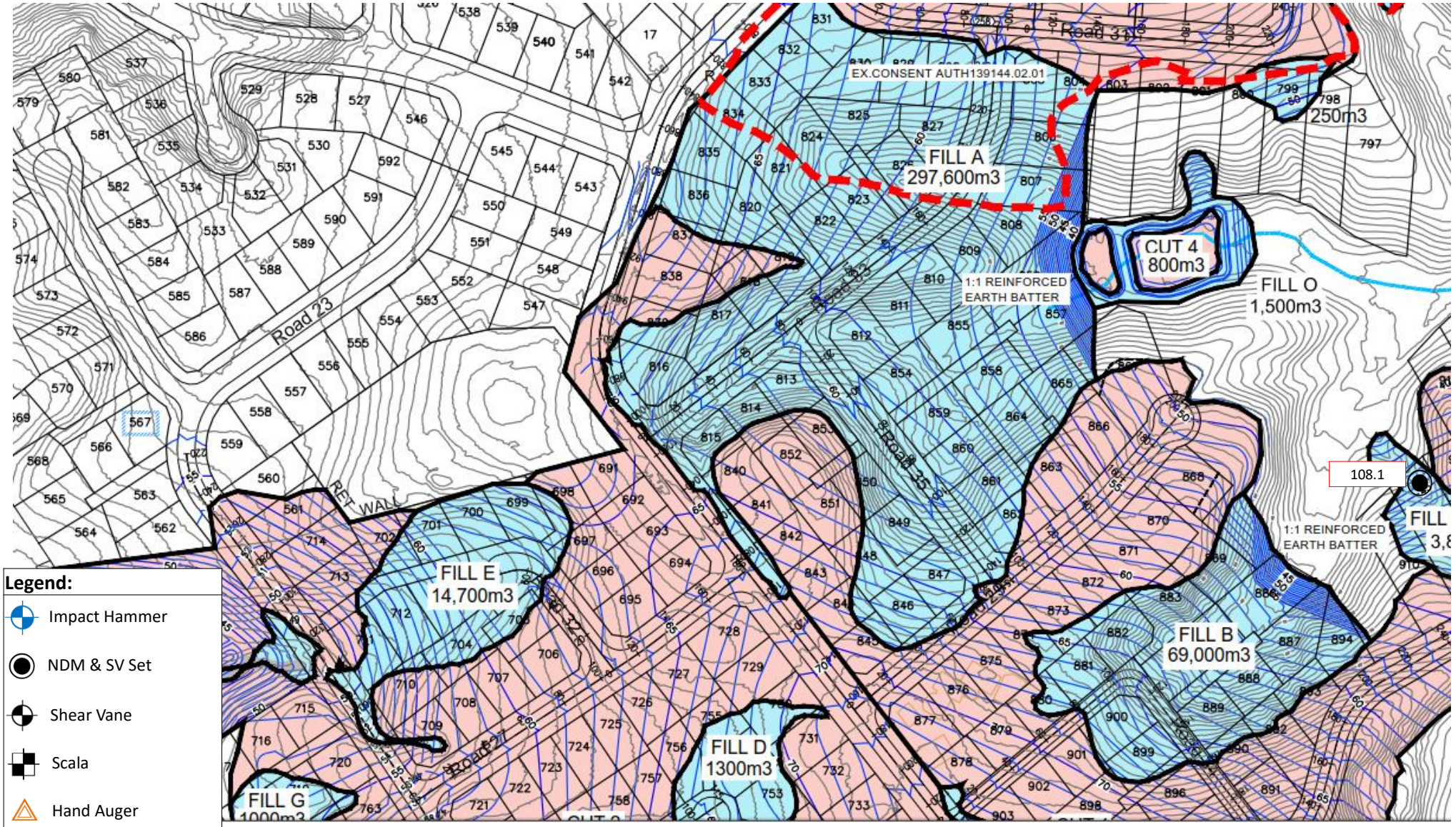

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	25/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	108	Date:	25/3/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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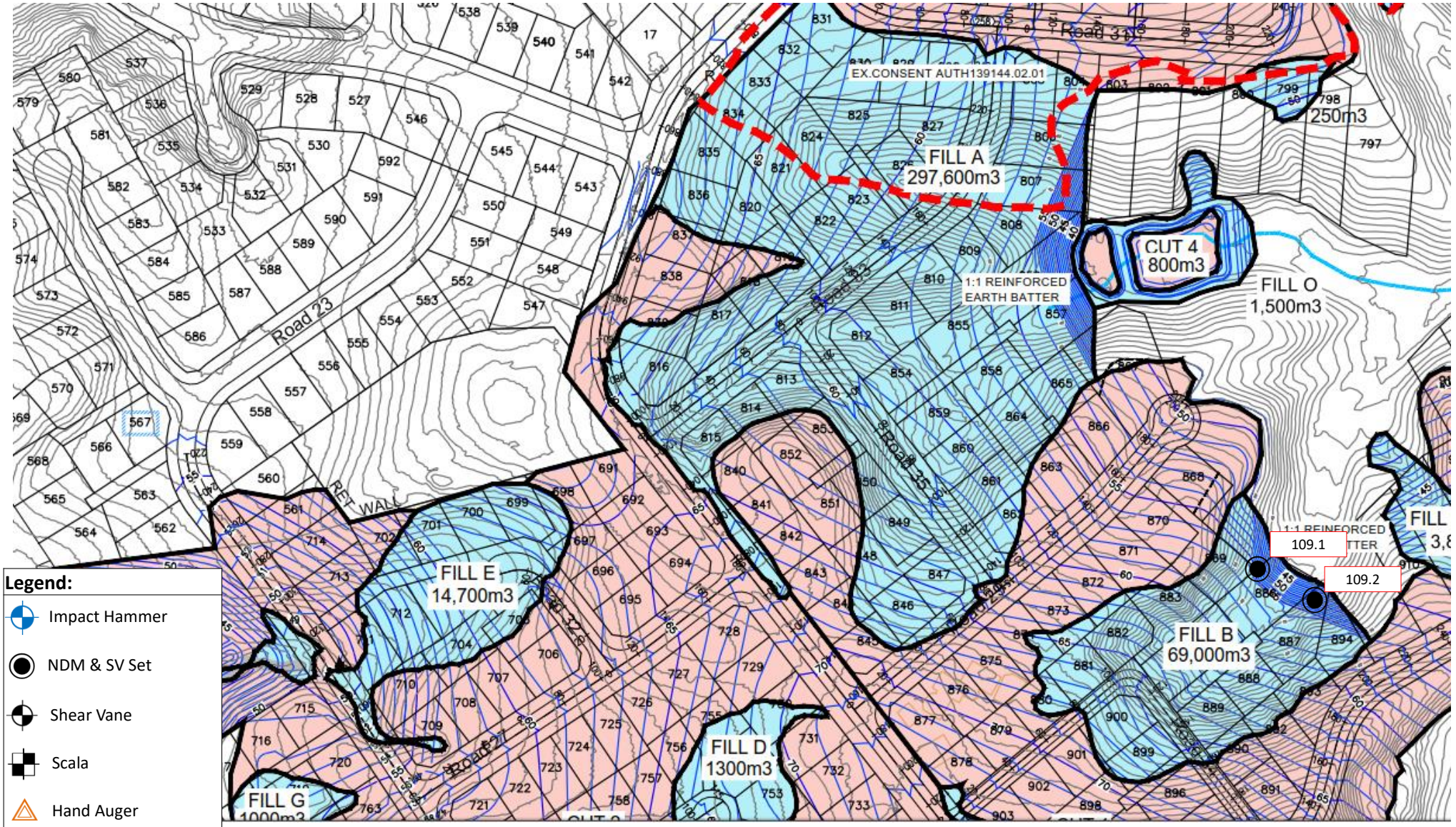

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	26/3/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	109	Date:	26/3/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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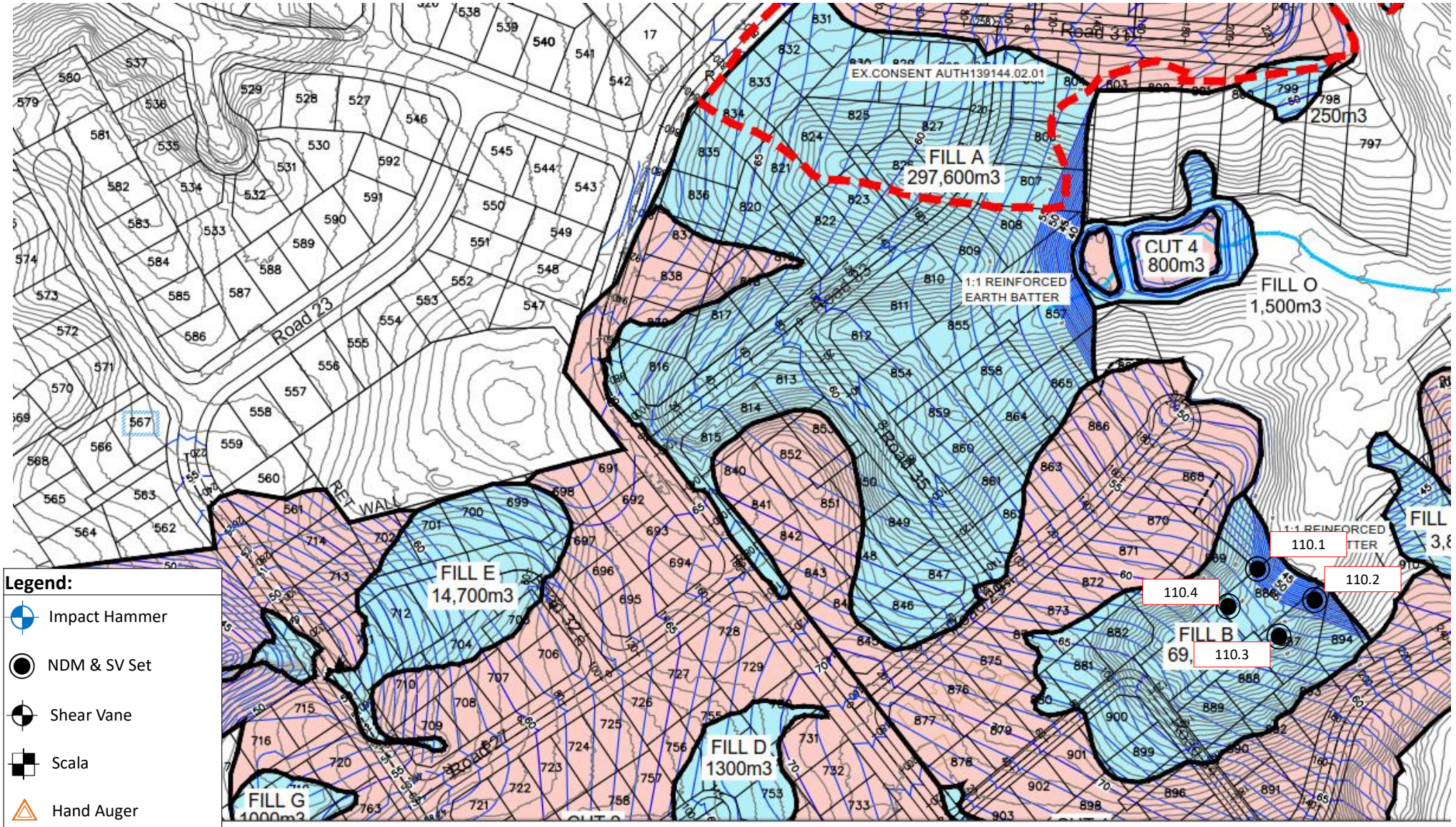

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	7/4/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	110	Date:	7/4/2021
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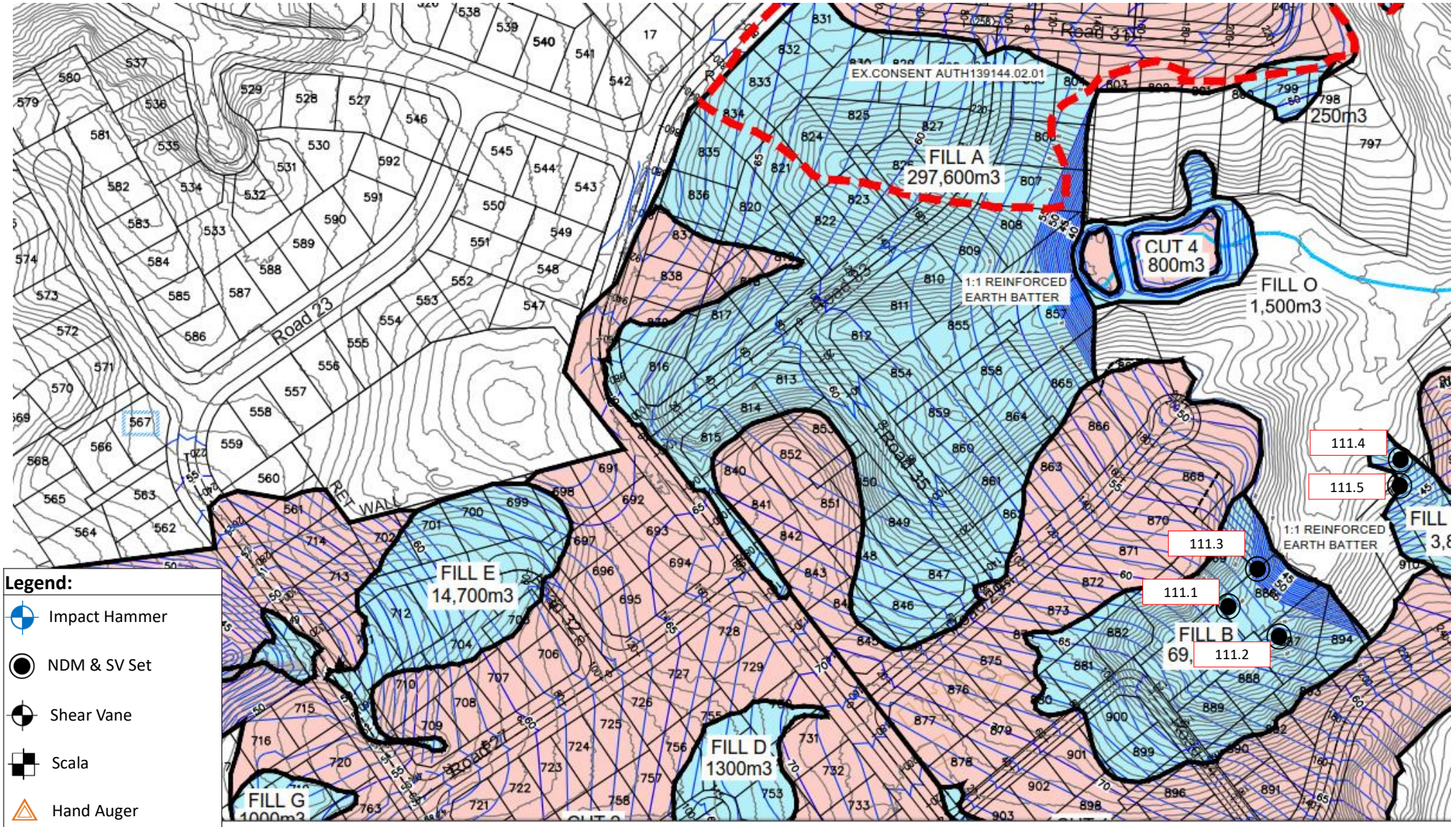

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	7/4/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	111	Date:	7/4/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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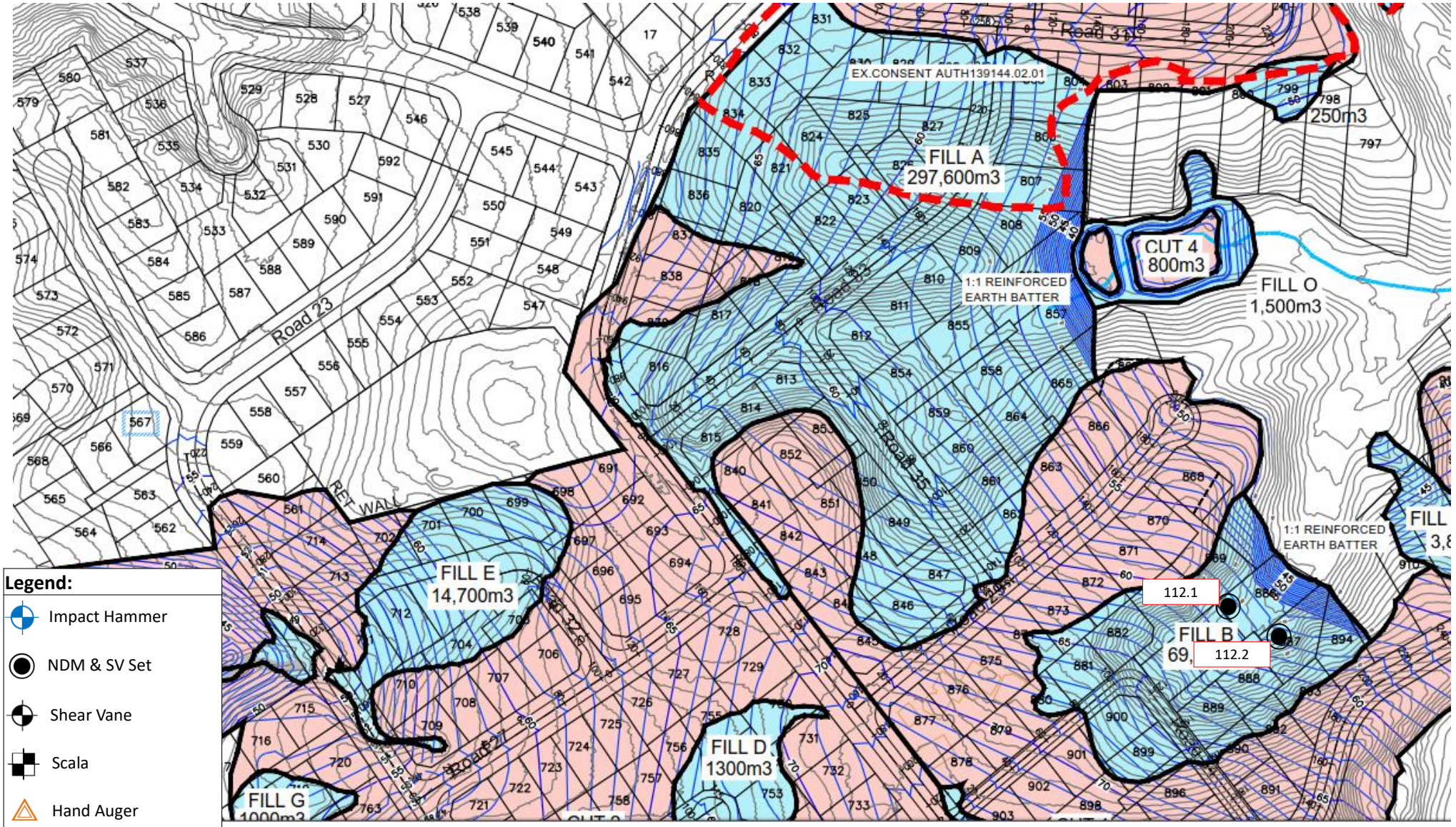

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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	19/4/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	112	Date:	19/4/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

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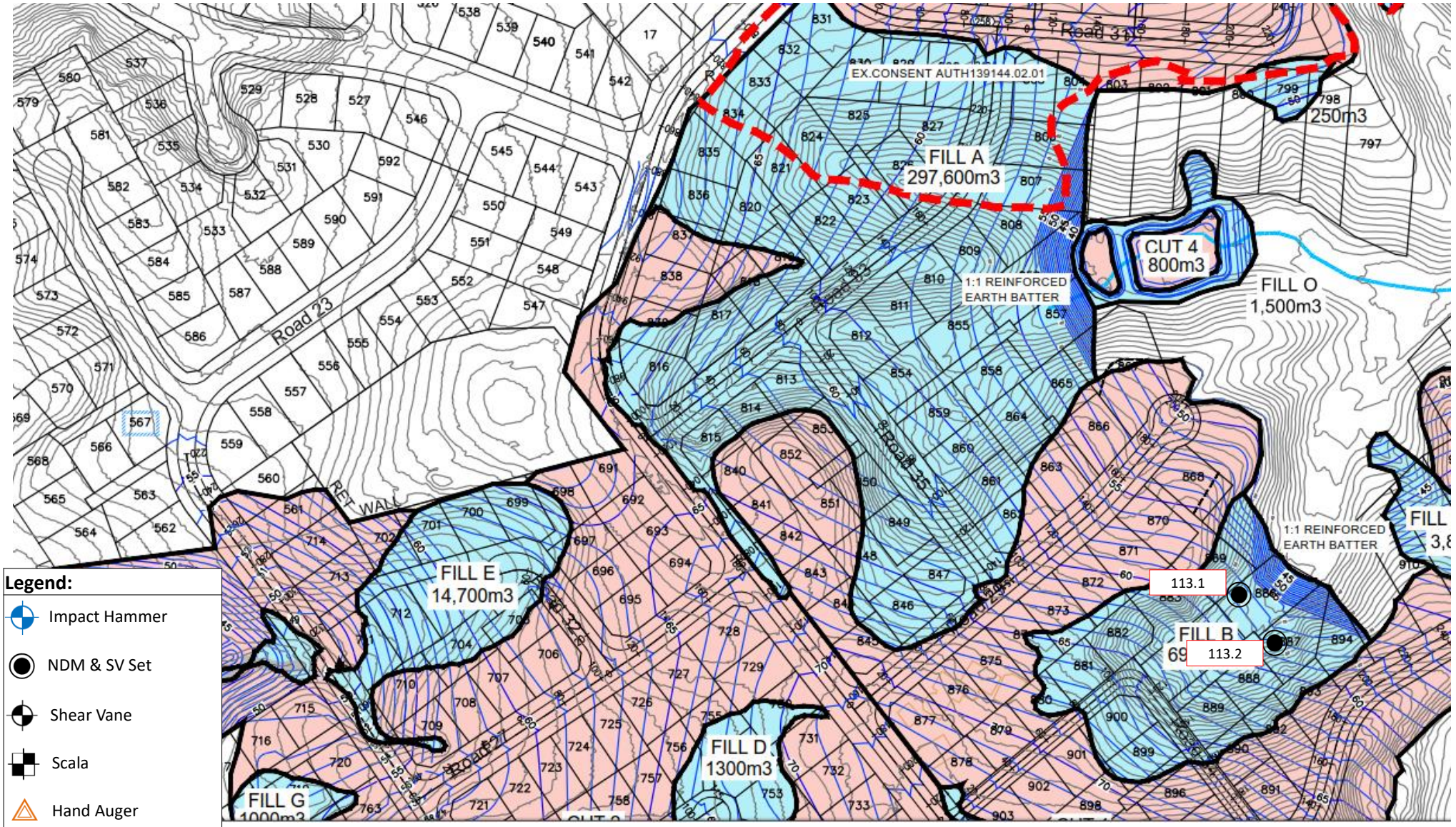

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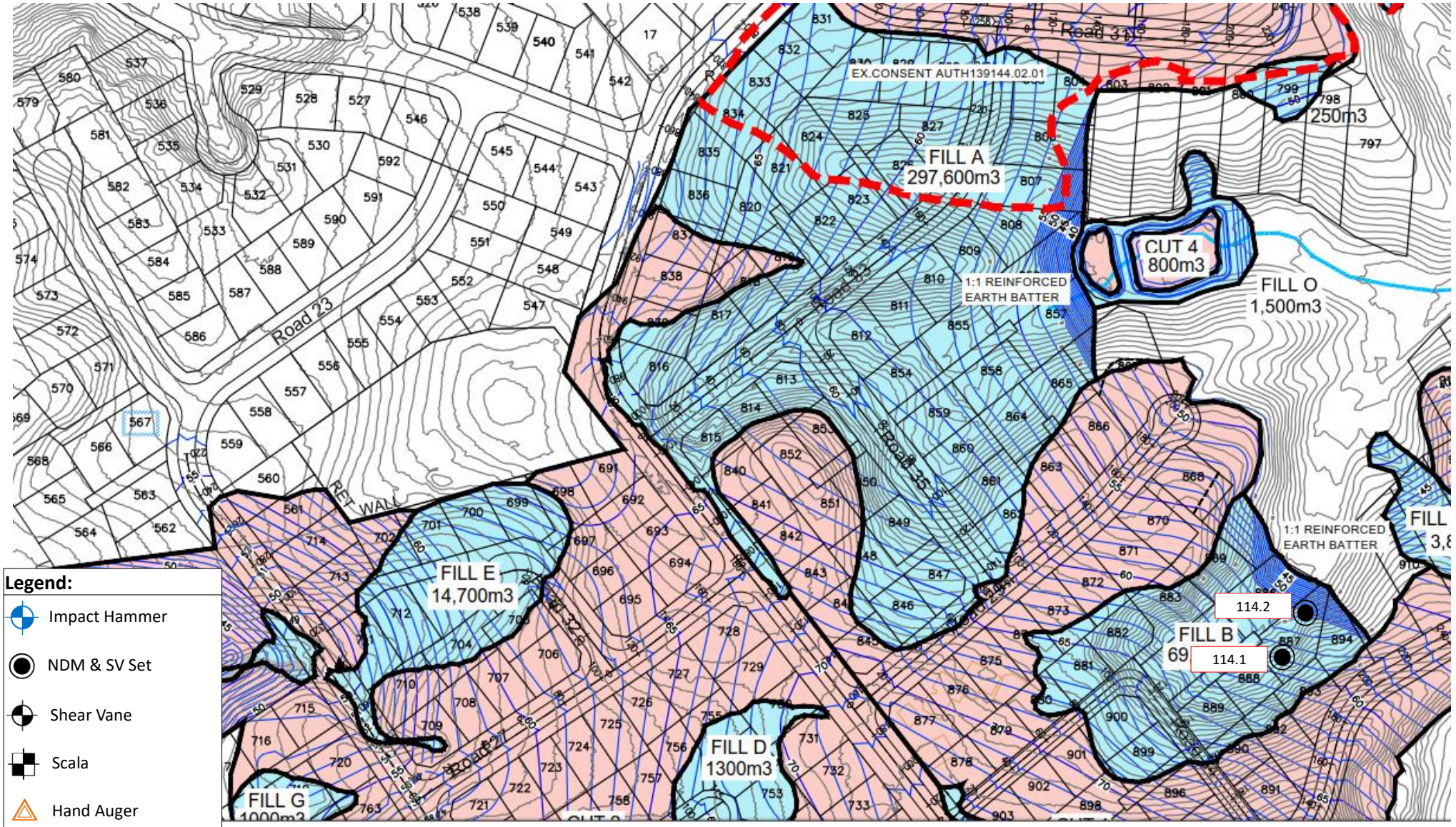
Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	23/4/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	113	Date:	23/4/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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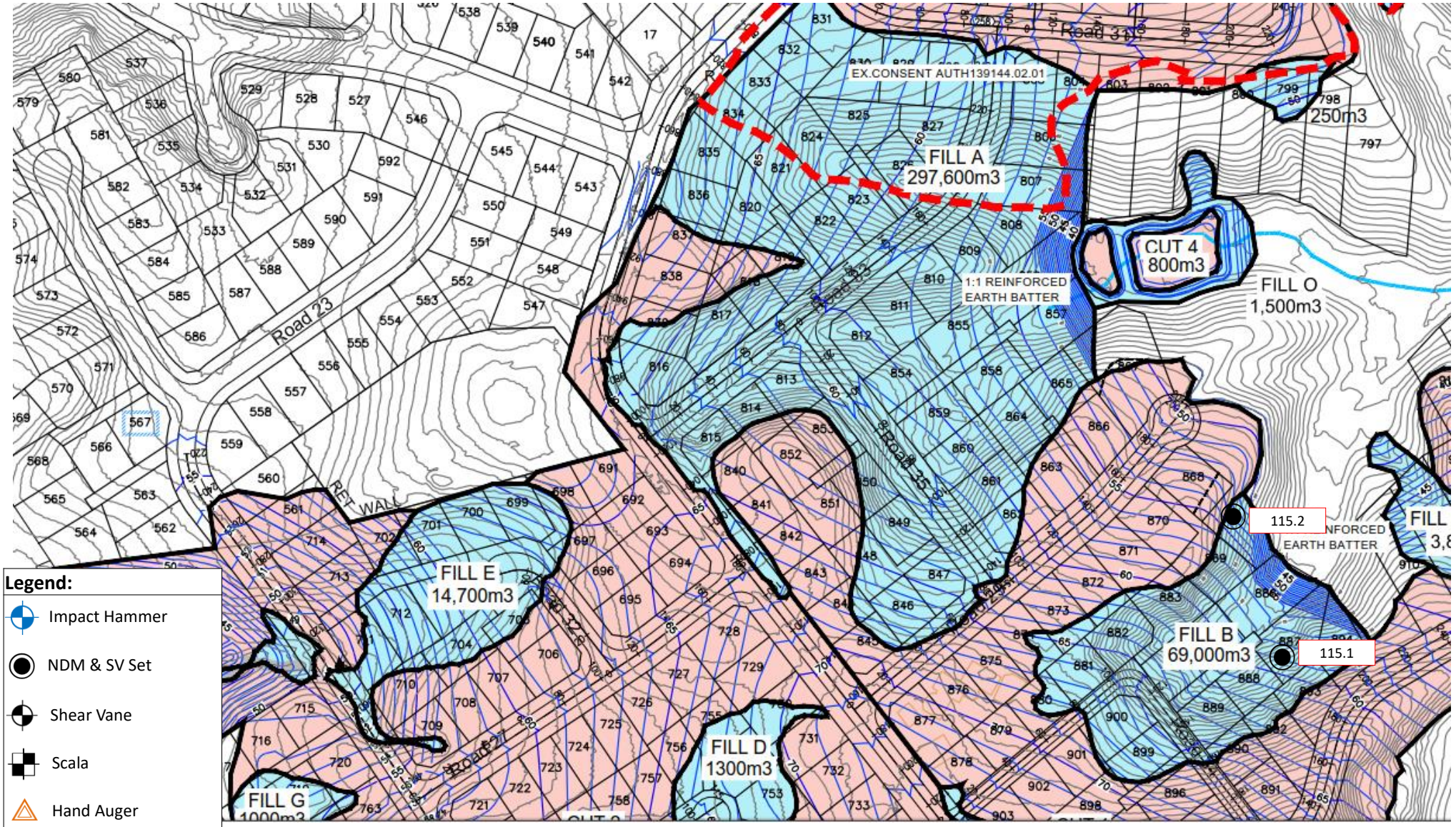
w. www.geotechnics.co.nz

Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	30/4/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	114	Date:	30/4/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N



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Test Location Plan

Site:	Hitchen Block Stage 5	Job Name:	Hitchen Block Stage 5	Drawn:	DASA	Date:	10/5/2021
Location:	REB 2	Job No.:	1009213.0657.0.0/3	URN:	115	Date:	10/5/2021
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1

N

Appendix 3

Soil Classification Test Results

GEOTECHNICS

Our Ref: 1009479.1017.0.0/Rep1
Customer Ref: J00113
30 June 2021

Lander Geotechnical Ltd.
PO Box 97385, Manukau 2241

Attention: Kyle Meffan

Dear Kyle

Hitchen Block, Pokeno - Stage 13A

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.

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 Lander Geotechnical 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 prepared by:

.....
Jack Singh
Laboratory Technician
Approved Signatory

Authorised for Geotechnics by:

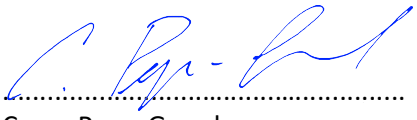
Digitally signed by Paul Burton
DN: cn=Paul Burton, c=NZ, o=Geotechnics, email=pburton@geotechnics.co.nz
Reason: I agree to the terms defined by the placement of my signature on this document
Date: 2021.07.01 09:44:45 +12'00'

.....
Paul Burton
Project Director

ACCREDITED IANZ TESTING LABORATORY

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

Report checked by:



.....

Corey Papu-Gread
Christchurch Manager

30-Jun-21
\\ttgroup.local\corporate\geotechnicsgroup\projects\1009479\1009479.1017\workingmaterial\20210630.jasi.1009479.1017.0.0.rep1.docx

GEOTECHNICS

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

Geotechnics Project Number	**1009479.1017.0.0**
QESTLab Work Order ID	**W21CH-0121**
Customer Project ID	**J00113**

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

TEST DETAILS

LOCATION	**Description**	Hitchen Block, Pokeno - Stage 13A		
	Data	N/A		
SAMPLE	**Geotechnics ID**	S21CH000417	**BH No**	Lot 695
	Reference	Lot 695	**Top Depth**	0.5m
	Sampled By	Geotechnics	**Bottom Depth**	0.8m
	Description	SILT with minor clay and trace sand, light brownish grey. Moist.		
SPECIMEN	**Reference**		**Depth**	
	Description			

TEST RESULTS

Applied Pressure		(kPa)	25
SWELL TEST	Initial Water Content	(%)	41.5
	Bulk Density	(t/m³)	1.70
	Dry Density	(t/m³)	1.20
	Final Water Content	(%)	41.9
	Swelling Strain	(%)	-0.16
SHRINKAGE TEST	Initial Water Content	(%)	41.6
	Shrinkage Strain	(%)	1.7
	Inert Material Estimate in the Soil Specimen	(%)	None
	Soil Crumbling During Shrinkage		Moderate
	Cracking of the Shrinkage Specimen		Major
SHRINK - SWELL INDEX		(%)	0.9

TEST REMARKS

• Estimates of inert material, soil cracking and soil crumbling are enclosed for your information, but are not covered under the IANZ endorsement of this report. • This test result is IANZ accredited.•Date tested 25/06/2021

Approved Signatory Jack Singh
Date 30/06/2021

GEOTECHNICS

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

Geotechnics Project Number	**1009479.1017.0.0**
QESTLab Work Order ID	**W21CH-0121**
Customer Project ID	**J00113**

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

TEST DETAILS

LOCATION	**Description**	Hitchen Block, Pokeno - Stage 13A		
	Data	N/A		
SAMPLE	**Geotechnics ID**	S21CH000418	**BH No**	Lot 727
	Reference	Lot 727	**Top Depth**	0.5m
	Sampled By	Geotechnics	**Bottom Depth**	0.8m
	Description	SILT with minor clay and trace sand, brown. Moist.		
SPECIMEN	**Reference**		**Depth**	
	Description			

TEST RESULTS

Applied Pressure		(kPa)	25
SWELL TEST	Initial Water Content	(%)	32.1
	Bulk Density	(t/m³)	1.85
	Dry Density	(t/m³)	1.40
	Final Water Content	(%)	32.7
	Swelling Strain	(%)	-0.24
SHRINKAGE TEST	Initial Water Content	(%)	31.7
	Shrinkage Strain	(%)	5.1
	Inert Material Estimate in the Soil Specimen	(%)	None
	Soil Crumbling During Shrinkage		Minor
	Cracking of the Shrinkage Specimen		Moderate
SHRINK - SWELL INDEX		(%)	2.8

TEST REMARKS

• Estimates of inert material, soil cracking and soil crumbling are enclosed for your information, but are not covered under the IANZ endorsement of this report. • This test result is IANZ accredited.•Date tested 25/06/2021

Approved Signatory Jack Singh
Date 30/06/2021

GEOTECHNICS

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Wigram
Christchurch 8042
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Geotechnics Project Number	**1009479.1017.0.0**
QESTLab Work Order ID	**W21CH-0121**
Customer Project ID	**J00113**

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

TEST DETAILS

LOCATION	**Description**	Hitchen Block, Pokeno - Stage 13A		
	Data	N/A		
SAMPLE	**Geotechnics ID**	S21CH000419	**BH No**	Lot 737
	Reference	Lot 737	**Top Depth**	0.5m
	Sampled By	Geotechnics	**Bottom Depth**	0.8m
	Description	SILT with trace sand and trace clay, brown. Moist.		
SPECIMEN	**Reference**		**Depth**	
	Description			

TEST RESULTS

Applied Pressure		(kPa)	25
SWELL TEST	Initial Water Content	(%)	27.4
	Bulk Density	(t/m³)	1.92
	Dry Density	(t/m³)	1.51
	Final Water Content	(%)	28.9
	Swelling Strain	(%)	-0.08
SHRINKAGE TEST	Initial Water Content	(%)	28.4
	Shrinkage Strain	(%)	2.0
	Inert Material Estimate in the Soil Specimen	(%)	None
	Soil Crumbling During Shrinkage		Minor
	Cracking of the Shrinkage Specimen		Moderate
SHRINK - SWELL INDEX		(%)	1.1

TEST REMARKS

• Estimates of inert material, soil cracking and soil crumbling are enclosed for your information, but are not covered under the IANZ endorsement of this report. • This test result is IANZ accredited.•Date tested 25/06/2021

Approved Signatory Jack Singh
Date 30/06/2021

GEOTECHNICS

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

Geotechnics Project Number	**1009479.1017.0.0**
QESTLab Work Order ID	**W21CH-0121**
Customer Project ID	**J00113**

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

TEST DETAILS

LOCATION	**Description**	Hitchen Block, Pokeno - Stage 13A		
	Data	N/A		
SAMPLE	**Geotechnics ID**	S21CH000420	**BH No**	Lot 748
	Reference	Lot 748	**Top Depth**	0.5m
	Sampled By	Geotechnics	**Bottom Depth**	0.8m
	Description	SILT with minor clay and trace sand, dark brown. Moist.		
SPECIMEN	**Reference**		**Depth**	
	Description			

TEST RESULTS

Applied Pressure		(kPa)	25
SWELL TEST	Initial Water Content	(%)	39.1
	Bulk Density	(t/m³)	1.83
	Dry Density	(t/m³)	1.32
	Final Water Content	(%)	39.9
	Swelling Strain	(%)	-0.16
SHRINKAGE TEST	Initial Water Content	(%)	39.6
	Shrinkage Strain	(%)	2.9
	Inert Material Estimate in the Soil Specimen	(%)	None
	Soil Crumbling During Shrinkage		Moderate
	Cracking of the Shrinkage Specimen		Major
SHRINK - SWELL INDEX		(%)	1.6

TEST REMARKS

• Estimates of inert material, soil cracking and soil crumbling are enclosed for your information, but are not covered under the IANZ endorsement of this report. • This test result is IANZ accredited.•Date tested 25/06/2021

Approved Signatory Jack Singh
Date 30/06/2021

3.2 Slab-on-ground in expansive soils

3.2.1 NZS 3604 Clause 1.1.2 Buildings covered by this Standard

Amend 1.1.2(a) to read:

"Buildings founded on good ground or on expansive soils where the requirements of 1.1.5 are met"

3.2.2 NZS 3604 New Clause

Add new: "**Clause 1.1.5 Buildings on expansive soils**

Buildings on expansive soils shall be supported on slab-on-ground foundations complying with 7.5.13 and in addition to 1.1.2 shall be limited as follows:

(a) single storey, stand-alone household unit, and

(b) maximum length or width of floor of 24.0 m including any attached garage, and

(c) simple plan shapes such as rectangular, L, T or boomerang, and

(d) concrete slab-on-ground with a minimum thickness of 100 mm and a minimum concrete compressive strength of 20 MPa, and

(e) simple roof forms, incorporating hips, valleys, gables or mono pitches, and

(f) maximum overall height of 7.0 m to roof apex from lowest cleared ground level, and

(g) maximum roof height of 3.0 m, and

(h) roof slope between 10° and 35° from the horizontal, and

(i) maximum span of roof truss 12.0 m, and

(j) external walls maximum of 2.4 m height studs, other than gable end walls and walls to mono-pitched roofs, which shall not exceed 4.0 m.

COMMENT:

Floor plans

Where floor plans incorporate re-entrant corners then continuity of the exterior ground beam shall be maintained by continuing it as an internal beam, with the exterior beam details continued for a length of at least 1.0 m into the internal beam. This is only applicable where internal beams are specified in Tables 7.4A and 7.4B. This is aimed to bring the solution in NZS 3604 in line with Clause 5.3.8 of AS 2870:2011.

Amend 19
Nov 2019

Ground movement

Provision for the additional ground movement effects from trees near to foundations in expansive soils should be considered. Trees remove moisture from the soil for a radius equal to the height of the tree. This causes expansive soils to shrink to varying degrees, and when near houses leads to differential settlement occurring under foundations. Movement of the foundations may lead to cracks in the building and door jamming.

Where existing trees (including trees that have been recently removed) are located closer to the foundations than 1.5 times the mature height of a tree, then additional geotechnical advice should be obtained. Planting of new trees should be avoided near foundations of new buildings or neighbouring buildings on sites with expansive soils.

3.2.3 NZS 3604 Clause 7.5.1

Add the following paragraph at the end of Clause 7.5.1:

"Slabs on expansive soils for buildings meeting the requirements of 1.1.5 shall, in addition to meeting the requirements of 7.5.1 to 7.5.12, meet the requirements of 7.5.13. Where there is conflict the requirements of 7.5.13 shall apply."

3.2.4 NZS 3604 New clause, tables and figures

Add new: **Clause 7.5.13 Slab-on-ground in expansive soils**

7.5.13.1 Identification of expansive soils

7.5.13.1.1 Should reasonable enquiry as outlined in 3.1.3 show any signs of expansive soils, the expansive soil class, as defined in AS 2870, shall be established by one or all of:

(a) enquiry to the local territorial authority, and/or

(b) reference to the certificate of suitability issued in terms of NZS 4431, and/or

(c) a soil test undertaken by a suitably qualified soils engineer.

7.5.13.1.2 Expansive soil class shall be defined as:

(a) Slightly 'S', having an I_{SS} range of 0–1.9%, and a 500 year design characteristic surface movement return (y_S) of 22 mm, or

(b) Moderately 'M', having an I_{SS} range of 2.0–3.7% and a 500 year design characteristic surface movement return (y_S) of 44 mm, or

Amend 19
Nov 2019

(c) Highly 'H', having an I_{SS} range of 3.8–6.5%and a 500 year design characteristic surface movement return (y_S) of 78 mm, or

(d) Extremely 'E', having an I_{SS} range of 6.6–7.5% and a 500 year design characteristic surface movement return (y_S) of 90 mm.

7.5.13.2 Maximum aspect ratio of concrete slabs

The aspect ratio of the concrete slabs or bays of concrete slabs, such as in the case of L, T or boomerang concrete slab shapes, shall not exceed 5 to 1 (length to width).

7.5.13.3 Foundation details

7.5.13.3.1 For the identified expansive soil class the foundation details, external and internal thickenings shall be as follows.

(a) For light wall claddings refer to Table 7.4A and Figure 7.22.

(b) For medium wall or heavy wall claddings refer to Table 7.4B and Figure 7.23.

7.5.13.3.2 Situations where no internal thickenings shall be required are limited to a rectangular slab with long side not exceeding 17.0 m. Where this limit is exceeded, add additional internal thickenings across the slab with the same cross section dimensions and reinforcing as the external footing, so that the centre to centre spacing of thickenings is always less than 17.0 m.

COMMENT:

Design constraints:

a) The characteristic surface movements and the corresponding expansivity classifications have been calculated based on design for ultimate limit state (ULS) conditions for a 1 in 1000 year "extreme" drought event, and the serviceability limit state (SLS) conditions for a 1 in 500 year drought event.

b) Maximum soil movements are calculated to be based on a 500 year return period for SLS, and a 1000 year return period for ULS*;

(*NB: *This differed from the recommendations contained within BRANZ Study Report 120A (BSR120A) which used a 300 year return period for the design level drought conditions)*

Amend 19
Nov 2019

c) Climate parameters adopted from BSR120A of Δu = 1.2 pF, Hs = 1.5 m, and a crack depth of 0.5 Hs

d) The I_{SS} (soil stability index) ranges attributed to the expansivity classifications as defined in 3.2.4 above have been calculated using the parameters presented in BSR120A and Equation 2.3.1 of AS 2870:2011.

e) Sites subject to parameters that differ from those mentioned above, in particular sites where the crack depth is less than 0.75 m, such as cut natural ground or clay backfill, require specific engineering assessment to confirm their appropriate site classification.

f) The effects of nearby trees (whether existing, recently removed, or future planting) are not considered in these solutions. It is recommended that specific geotechnical engineering advice is obtained where a tree is within a lateral distance of 1.5 times its mature height of the foundations.

Maintenance of foundations in expansive soils

Normal maintenance is that work generally recognised as necessary to achieve the expected performance over time of the foundation located on expansive soils. Unless otherwise specified by the designer and noted on the drawings, basic normal maintenance tasks should ensure that:

a) the drainage and wetting of the site is controlled so that extremes of wetting and drying of the soils are prevented, and

b) the position and operation of gardens adjacent to the dwelling are controlled, and the planting of trees near to foundations is suitably restricted, and

c) any leaks which develop in plumbing, storm water or sanitary sewage systems are repaired promptly.

Amend 19
Nov 2019

Table 7.4A **Reinforced concrete foundations in expansive soils for light wall claddings**
Clause 7.5.13 and Figure 7.22

Expansive soil class	Slightly 'S'	Moderately 'M'	Highly 'H'	Extremely 'E'
Soil embedment (De)	375 mm	525 mm	575 mm	625 mm
Top steel (A_S top)	2/D 16	2/ D16	2/ D16	2/ D16
Bottom steel (A_S bottom)	1/ D16	1/ D25	1/ D20	1/ D25
Stirrups	R6/ 125 crs.	R6/ 125 crs.	R6/ 300 crs.	R6/ 300 crs.
Maximum spacing of internal thickenings	no internal thickening	no internal thickening	2.5 m crs.	2.5 m crs.
Depth of thickening (D1)	–	–	400 mm	450 mm
Base width (B1)	–	–	300 mm	350 mm
Top steel (A_S top)	–	–	2/ D20	2/ D20
Bottom steel (A_S bottom)	–	–	2/ D16	2/ D20
Stirrups	–	–	R6/ 150 crs.	R6/ 150 crs.

Table 7.4B **Reinforced concrete foundations in expansive soils for medium wall and heavy wall claddings**
Clause 7.5.13 and Figure 7.23

Expansive soil class	Slightly 'S'	Moderately 'M'	Highly 'H'	Extremely 'E'
Soil embedment (De)	500 mm	550 mm	775 mm	800 mm
Top steel (A_S top)	2/ D16	2/ D20	2/ D20	3/ D20
Bottom steel (A_S bottom)	2/ D16	2/ D16	2/ D20	2/ D20
Stirrups	R6/ 125 crs.	R6/ 250 crs.	R6/ 300 crs.	R6/ 300 crs.
Maximum spacing of internal thickenings	–	2.5 m crs.	2.5 m crs.	2.5 m crs.
Depth of thickening (D1)	–	350 mm	450 mm	500 mm
Base width (B1)	–	300 mm	300 mm	350 mm
Top steel (A_S top)	–	2/ D16	3/ D20	3/ D20
Bottom steel (A_S bottom)	–	2/ D16	2/ D16	2/ D20
Stirrups	–	R6/ 125 crs.	R6/ 150 crs.	R6/ 150 crs.

Amend 19
Nov 2019

Appendix 4

Post-Construction Borehole Records

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 547 & 561

Vane Head:	Logged By:	Processor :	Date:
2153	NM	AT	08.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak/ residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
LOT 547						
TOPSOIL		0.0				
clayey SILT, black streaked orange. Very stiff, moist, low plasticity, moderately sensitive, with topsoil leaching to 0.7m [NATURAL]						
		0.5		185/77	2.4	
becoming insensitive		1.0		170/93	1.8	
becoming moderately sensitive		1.5		188/83	2.3	
		2.0		145/49	2.9	
EOB at 2.0m. Target Depth.						
LOT 561						
TOPSOIL		0.0				
silty CLAY, grey streaked orange. Very stiff, wet, medium plasticity, moderately sensitive, with trace rootlets to 0.5m [NATURAL]						
		0.5		170/65	2.6	
becoming red and grey streaked orange, saturated						
becoming hard		1.0		216+		
clayey SILT, trace of fine sand, grey and red streaked orange. Very stiff, saturated, low plasticity						
		1.5		142/102	1.4	
			▽			
EOB at 2.0m. Target Depth.		2.0		123/96	1.3	

LANDER geotechnical

Comments:
LOT 561 Groundwater encountered at 0.8m
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: RZ

Topsoil	Sand	Sandstone	Plutonic		
Fill	Gravel	Siltstone	No Core		
Clay	Organic	Limestone			
Silt	Pumice	Volcanic			

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 563 & 692

Vane Head:	Logged By:	Processor :	Date:
3195/2153	AT/NM	NM	07.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak/ residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
LOT 563						
TOPSOIL		0.0				
clayey SILT, orange/brown. Very stiff, moist, low to medium plasticity [FILL]						
clayey SILT, brown. Very stiff, moist, medium plasticity, insensitive [NATURAL]		0.5		177/116	1.5	
becoming light grey streaked orange/brown, low plasticity		1.0		156/98	1.6	
becoming orange/red		1.5		117/138	1.3	
EOB at 2.0m Target depth		2.0		164/127	1.3	
LOT 692						
TOPSOIL		0.0				
clayey silt with trace organic inclusions, red mottled orange. Very stiff, moist, low plasticity, insensitive, with some topsoil leaching to 0.4m [NATURAL]		0.5		130/83	1.6	
becoming grey and orange streaked red		1.0		145/99	1.5	
		1.5		154/139	1.1	
EOB at 2.0m target depth		2.0		123/93	1.3	

LANDER geotechnical

Comments:
Groundwater not encountered. (unless noted)
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: RZ

Topsoil	Sand	Sandstone	Plutonic
Fill	Gravel	Siltstone	No Core
Clay	Organic	Limestone	
Silt	Pumice	Volcanic	

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 694 & 695

Vane Head:	Logged By:	Processor :	Date:
2153	NM	NM	07.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION	Depth (m)	Standing Water Level	Vane Shear(kPa) peak/ residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
LOT 694					
TOPSOIL	0.0				
clayey SILT, orange/grey. Stiff, moist, low plasticity, insensitive [NATURAL]					
	0.5		145/80	1.8	
becoming moderately sensitive becoming black streaked grey	1.0		151/177	2.0	
becoming hard	1.5		216+		
at 2.0m, becoming very stiff, insensitive					
EOB at 2.0m target depth	2.0		170/108	1.6	
LOT 695					
TOPSOIL	0.0				
clayey SILT, black speckled grey/orange. Hard, moist, low plasticity, moderately sensitive [NATURAL]					
	0.5	▽	204/77	2.6	
becoming wet becoming saturated					
becoming very stiff	1.0		194/80	2.4	
becoming hard	1.5		201/77	2.6	
EOB at 2.0m. Target depth	2.0		204/83	2.4	

LANDER geotechnical

Comments:
Groundwater encountered in LOT 695 at 0.8m
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: RZ

Topsoil	Sand	Sandstone	Plutonic		
Fill	Gravel	Siltstone	No Core		
Clay	Organic	Limestone			
Silt	Pumice	Volcanic			

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 698 & 702

Vane Head:	Logged By:	Processor :	Date:
2153	NM	AT	07.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION

Soil Description	Depth (m)	Vane Shear(kPa) peak/ residual	Soil Sensitivity
LOT 698			
TOPSOIL	0.0		
clayey SILT, black streaked brown/orange. Very stiff, moist, low plasticity, moderately sensitive [NATURAL]			
at 0.4m becoming wet	0.5	170/80	2.1
with trace fine sand			
becoming insensitive	1.0	151/74	2.0
	1.5	123/93	1.3
EOB at 2.0m. Target Depth.	2.0	133/83	1.6
LOT 702			
TOPSOIL	0.0		
clayey SILT, grey streaked blue mottled orange. Very stiff, moist, low plasticity, moderately sensitive, with trace rootlets [NATURAL]			
	0.5	186/65	2.8
becoming hard	1.0	204/52	3.9
	1.5	216+	
EOB at 2.0m. Target Depth.	2.0	216+	

LANDER geotechnical

Comments:
Groundwater not encountered. (unless noted)
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: RZ

Topsoil	Sand	Sandstone	Plutonic		
Fill	Gravel	Siltstone	No Core		
Clay	Organic	Limestone			
Silt	Pumice	Volcanic			

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 705 & 714

Sheet 5 of 11

Vane Head:	Logged By:	Processor :	Date:
2153/3195	NM/AT	AT	08.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak/ residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
LOT 705						
TOPSOIL		0.0				
clayey SILT, red/orange. Very stiff, moist, low plasticity, moderately sensitive [NATURAL]						
		0.5		117/46	2.5	
becoming hard, wet, sensitive		1.0		201/46	4.3	
becoming very stiff, insensitive		1.5		111/89	1.2	
at 2.0m becoming moderately sensitive						
EOB at 2.0m. Target Depth.		2.0		185/49	3.8	
LOT 714						
TOPSOIL		0.0				
clayey SILT, light grey mottled light brown. Very stiff, moist, medium plasticity, insensitive [NATURAL]						
		0.5		175/90	1.9	
becoming red streaked light grey						
		1.0		157/88	1.8	
becoming orange/brown, low plasticity						
		1.5		175/103	1.7	
silty CLAY, light grey/white. Very stiff, moist, medium to high plasticity, insensitive, with trace rootlets						
EOB at 2.0m. Target Depth.		2.0		177/101	1.8	

LANDER geotechnical

Comments:
Groundwater not encountered. (unless noted)
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: RZ

Topsoil	Sand	Sandstone	Plutonic
Fill	Gravel	Siltstone	No Core
Clay	Organic	Limestone	
Silt	Pumice	Volcanic	

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 719 & 723

Vane Head:	Logged By:	Processor :	Date:
3195	AT	AT	07.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak/ residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
LOT 719						
TOPSOIL		0.0				
clayey SILT, light grey mottled orange/red streaked light brown. Very stiff, moist, medium plasticity [FILL]		0.5		191+		
		1.0		191+		
clayey SILT, light grey mottled light brown. Very stiff, moist, medium plasticity [NATURAL]		1.5		191+		
becoming wet						
at 2.0m, becoming insensitive		2.0		175/95	1.8	
EOB at 2.0m. Target Depth.						
LOT 723						
TOPSOIL		0.0				
clayey SILT, orange/brown. Very stiff, wet, medium plasticity, insensitive [NATURAL]		0.5		177/143	1.2	
		1.0		138/98	1.4	
		1.5		127/71	1.8	
at 2.0m becoming stiff		2.0		85/58	1.5	
EOB at 2.0m. Target Depth.						

LANDER geotechnical

Comments:
Groundwater not encountered. (unless noted)
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: RZ

Topsoil	Sand	Sandstone	Plutonic		
Fill	Gravel	Siltstone	No Core		
Clay	Organic	Limestone			
Silt	Pumice	Volcanic			

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 727 & 729

Sheet 7 of 11

Vane Head:	Logged By:	Processor :	Date:
3195	AT	AT	07.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak/ residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
LOT 727						
TOPSOIL		0.0				
clayey SILT with trace of gravel, orange streaked grey/brown. Very stiff, moist, low to medium plasticity [FILL]		0.5		191+		
		1.0		UTP		
		1.5		191+		
EOB at 2.0m. Target Depth.		2.0		191+		
LOT 729						
TOPSOIL		0.0				
clayey SILT, light grey mottled orange/brown. Very Stiff, wet, low to medium plasticity, insensitive [NATURAL]		0.5		101/58	1.7	
becoming stiff, moderately sensitive		1.0		98/45	2.2	
becoming saturated becoming very stiff becoming light yellow/brown, with trace fine sand		1.5	▽	151/69	2.2	
EOB at 2.0m. Target Depth.		2.0		UTP		

LANDER geotechnical

Comments:
Groundwater encountered at 1.4m (LOT 729)
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: RZ

Topsoil	Sand	Sandstone	Plutonic
Fill	Gravel	Siltstone	No Core
Clay	Organic	Limestone	
Silt	Pumice	Volcanic	

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 734 & 737

Vane Head:	Logged By:	Processor :	Date:
3195	AT	AT	07.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak/ residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
LOT 734						
TOPSOIL		0.0				
clayey SILT, trace fine gravel, orange/red mottled light brown. Very stiff, moist, low to medium plasticity [FILL]						
clayey SILT, orange/brown streaked light brown. Very stiff, moist, low plasticity [NATURAL]		0.5		191+		
		1.0		191+		
becoming light grey/brown streaked red						
becoming insensitive		1.5		177/135	1.3	
EOB at 2.0m. Target Depth.		2.0		177/101	1.8	
LOT 737						
TOPSOIL		0.0				
clayey SILT, red streaked orange/brown. Very stiff, moist, low plasticity [NATURAL]						
becoming non plastic		0.5		191+		
becoming insensitive		1.0		167/122	1.4	
		1.5		167/104	1.6	
EOB at 2.0m. Target Depth.		2.0		140/122	1.1	

LANDER geotechnical

Comments:
Groundwater not encountered. (unless noted)
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: AT

Topsoil	Sand	Sandstone	Plutonic		
Fill	Gravel	Siltstone	No Core		
Clay	Organic	Limestone			
Silt	Pumice	Volcanic			

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 739 & 741

Vane Head:	Logged By:	Processor :	Date:
2153	NM	AT	09.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak/ residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
LOT 739						
TOPSOIL		0.0				
clayey SILT, orange/red. Hard, moist, medium plasticity [NATURAL]		0.5		216+		
		1.0		216+		
		1.5		216+		
EOB at 2.0m. Target Depth.		2.0		216+		
LOT 741						
TOPSOIL		0.0				
clayey SILT, orange/red. Hard, moist, low plasticity [NATURAL]		0.5		216+		
becoming grey streaked orange/red		1.0		216+		
becoming very stiff, insensitive becoming wet		1.5		157/114	1.4	
EOB at 2.0m. Target Depth.		2.0		167/127	1.3	

LANDER geotechnical

Comments:
Groundwater not encountered. (unless noted)
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: RZ

Topsoil	Sand	Sandstone	Plutonic				
Fill	Gravel	Siltstone	No Core				
Clay	Organic	Limestone					
Silt	Pumice	Volcanic					

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 743 & 745

Vane Head:	Logged By:	Processor :	Date:
2153	NM	AT	08.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak/ residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
LOT 743						
TOPSOIL		0.0				
silty CLAY, orange. Hard, moist, medium plasticity, moderately sensitive						
becoming red streaked orange		0.5		201/96	2.1	
becoming light grey and red streaked orange						
becoming very stiff		1.0		167/77	2.2	
becoming insensitive		1.5		167/123	1.4	
EOB at 2.0m. Target Depth.		2.0		185/123	1.5	
LOT 745						
TOPSOIL		0.0				
clayey SILT, red/orange. Very stiff, moist, low plasticity, insensitive [NATURAL]						
becoming wet		0.5		157/96	1.6	
becoming moderately sensitive		1.0		182/56	3.3	
becoming hard		1.5		216+		
EOB at 2.0m. Target Depth.		2.0		216+		

LANDER geotechnical

Comments:
Groundwater not encountered. (unless noted)
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: RZ

Topsoil	Sand	Sandstone	Plutonic				
Fill	Gravel	Siltstone	No Core				
Clay	Organic	Limestone					
Silt	Pumice	Volcanic					

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN BLOCK STAGE 13A

Job Number: J00113

Auger Borehole Nos. LOT 748 & 751

Vane Head:	Logged By:	Processor :	Date:
2153	NM	AT	09.07.21

Borehole Location: mN | mE | Ground R.L.

Description: Refer to site plan

SOIL DESCRIPTION	Legend	Depth (m)	Standing Water Level	Vane Shear(kPa) peak/ residual	Soil Sensitivity	Sample and Laboratory / Other Test Details
LOT 748						
TOPSOIL		0.0				
clayey SILT, orange. Very stiff, moist, low plasticity, insensitive [NATURAL]						
		0.5		142/89	1.6	
		1.0		127/83	1.5	
		1.5		145/105	1.4	
at 2.0m becoming moderately sensitive						
EOB at 2.0m. Target Depth.		2.0		185/77	2.4	
LOT 751						
TOPSOIL		0.0				
clayey SILT, orange/brown. Very stiff, moist, low plasticity, moderately sensitive [NATURAL]						
		0.5		142/59	2.4	
becoming wet, with organic staining						
becoming orange/red						
becoming insensitive		1.0		147/123	1.2	
		1.5		123/74	1.7	
at 2.0m becoming hard						
EOB at 2.0m. Target Depth.		2.0		216+		

LANDER geotechnical

Comments:
Groundwater not encountered. (unless noted)
UTP = unable to penetrate.
EOB = end of borehole.

Borehole Diameter: 50mm

Checked: RZ

Topsoil	Sand	Sandstone	Plutonic
Fill	Gravel	Siltstone	No Core
Clay	Organic	Limestone	
Silt	Pumice	Volcanic	

Appendix 5

Construction Observation Records

09/10/19 - Stage 5 begins - Fill E/F

Wednesday, 9 October 2019 10:52 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	09/10/19 - 10:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to inspect gully muckout for Fill E and F. Gully stripped to generally inorganic stiff ground.

Small area of organics observed and contractor will chase this out.

Contractor also to install nominal toe key. Discussed with Trevor that this should be a buckets width wide at base and should extend across the face of the gully. Trevor to send photos once this is complete.

Photos from Trevor (10/10/19):

Photos from Trevor (14/10/19):

16/10/19 - Fill E/F

Wednesday, 16 October 2019 12:13 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	16/10/19 - 11AM
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site with Chris and met with Trevor and Dillan (who will be replacing Trevor soon).

Discussed likely outcomes for this season and next at Hitchen Stage 5 and also discussed toe key requirements - these being nominal keys 4-5m wide at base and keyed into the sides of the gullies.

Will return to site tomorrow morning to inspect remediated toe key in fill F which is being widened to meet the 5m width criteria.


MAERSK
SEALAND

17/10/19

Thursday, 17 October 2019 12:00 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	17/10/19 11:30PM
Author:	KM
Plant Operating:	1x 20T excavator
Weather:	Showers

Site Observations and Instructions:

Visited site to inspect excavation of toe key in Fill F. Key excavated 5m at base with very stiff material at base as per our requirements. Some water ponding at base which will require pumping prior to filling.

21/10/19

Monday, 21 October 2019 10:17 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	21/10/19 - 8:30AM
Author:	KM
Plant Operating:	Moxys and excavators
Weather:	

Site Observations and Instructions:

Visited site to check earthworks operations in Fill E/F areas. Toe key has been filled up and tesed since last visit and contractors are beginning to form permanent pond wall.

24/10/19 - Fill K

Thursday, 24 October 2019 3:02 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	24/10/19 -
Author:	
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at request of Dylan (Dines) to inspect stripping in area of Fill K / Cut 2. Only a small area within the area of the silt pond had been stripped back to very stiff natural ground. The gully for Fill K had no been mucked out yet, and no excavations to form the silt pond had been started either.

Discussed with Dylan that we should return to site once the gully is mucked out and we can carry out a shallow trial pit in the area of the proposed toe key prior to excavations.

29/10/19

Tuesday, 29 October 2019 10:13 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	29/10/19 - 10am
Author:	KM
Plant Operating:	
Weather:	

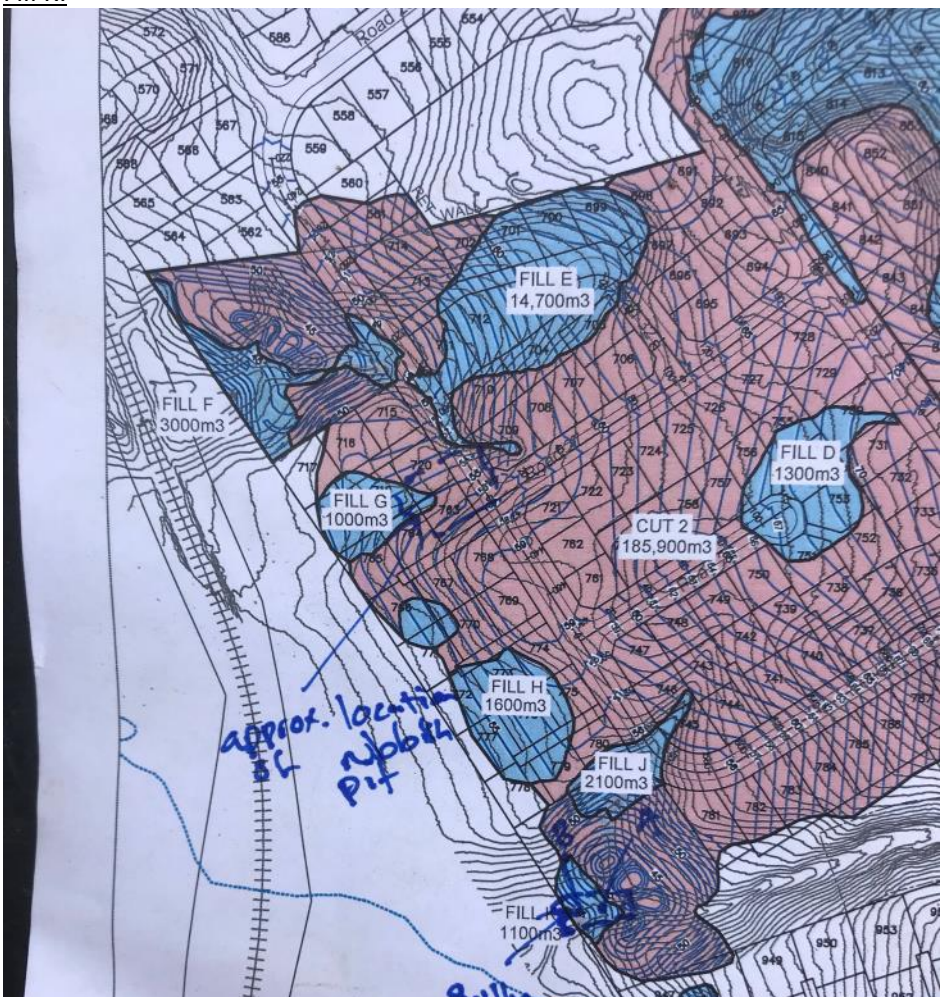
Site Observations and Instructions:

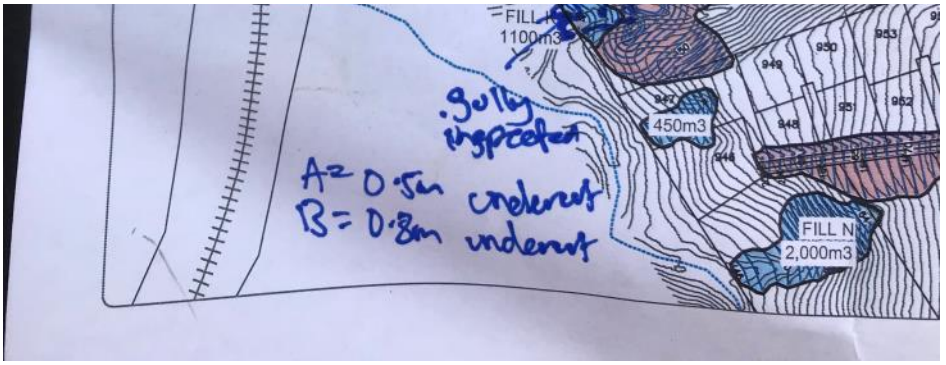
Visited site to inspect Fill K gully muckout. Inorganic, natural soils exposed throughout, however, soils were firm along a large part of the gully invert. Drilled two shallow hand augers which revealed stiff natural ground approximately 0.5m to 0.8m below current invert levels and we recommended an undercut to this depth. Refer plan attached.

Discussed the gully undercut with Dylan on site and he requested we do the undercut while we were on site to save time. See photos showing undercut of between approximately 0.5m and 1.2m.

Also found an old rubbish pit exposed which is marked out by the contractors. This will require undercutting also.

Fill K:




FILL
1100m3
Gully
inspected
A= 0.5m
B= 0.8m
450m3
FILL N
2,000m3

Rubbish pit:

Fill F walkover:

Fill K undercut/pit photos:

30/10/19

Wednesday, 30 October 2019 12:19 PM

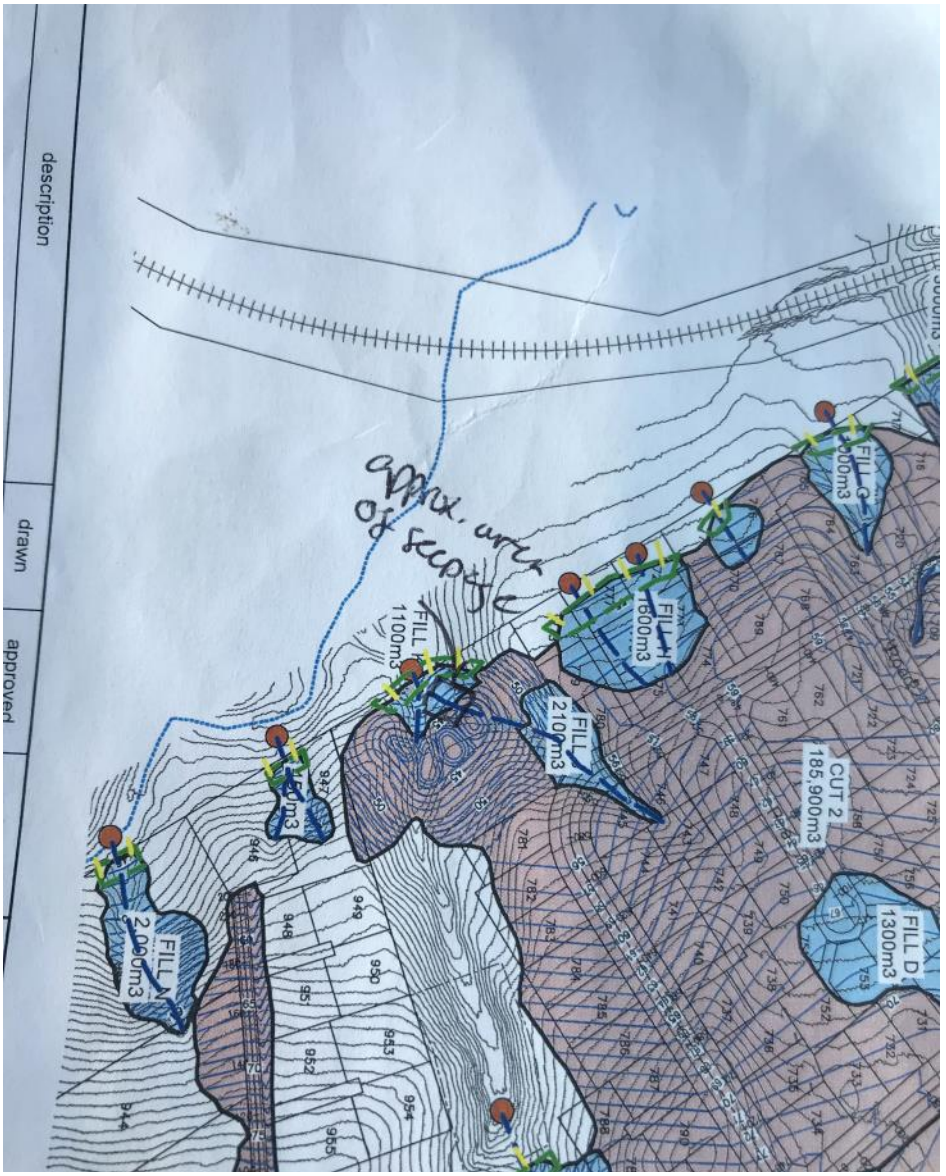
Site Inspection Record

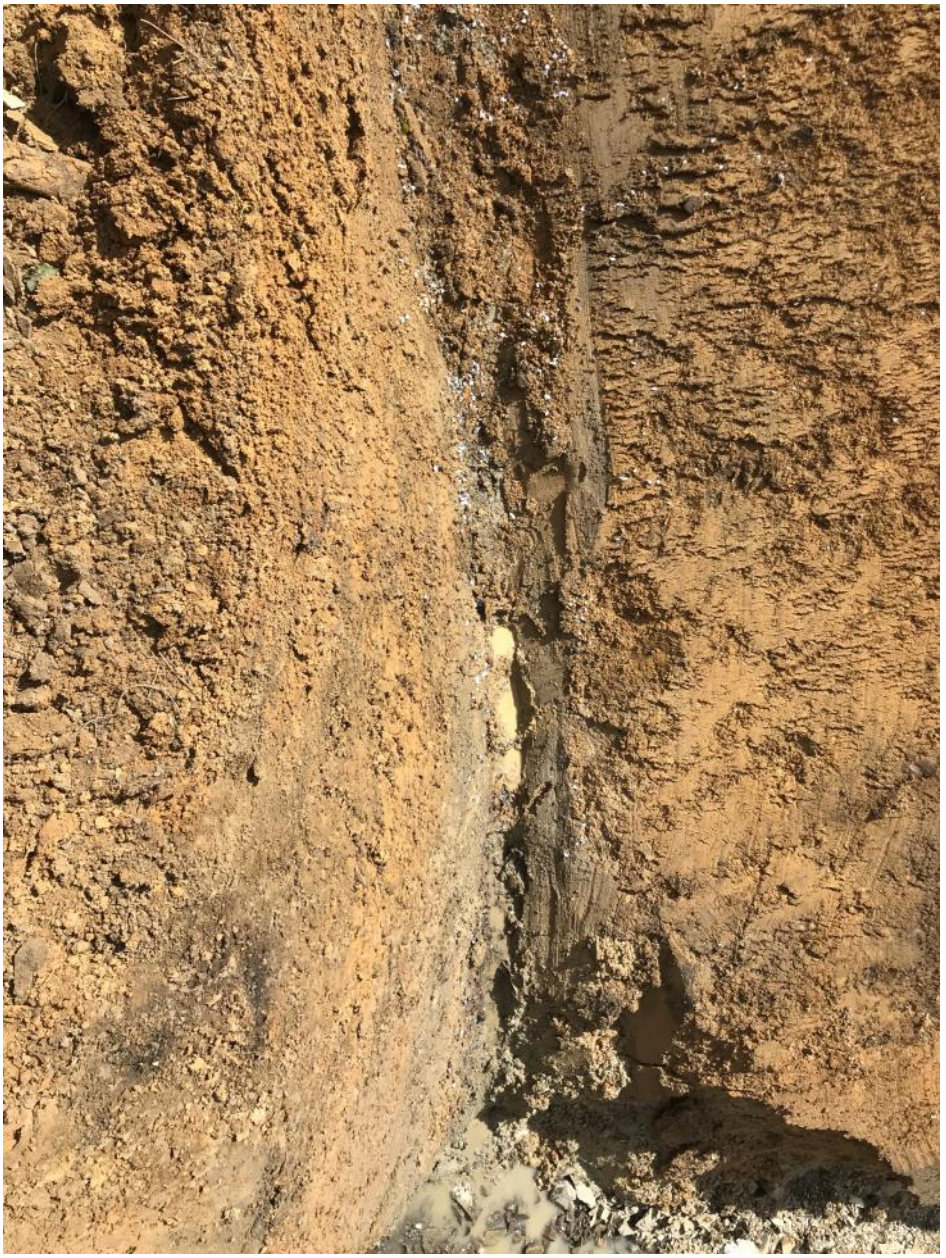
Project # & Name:	J00113 - Hitchen Block
Date & Time:	30/10/19 - 12pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to observe gully muckout and drain installation. Muckout was deeper than our previous recommendation due to a 1m clay cap needed below the pond.

There is a small area of seepage near the base of the gully muckout which showed some seepage. We recommended that an extra drain is installed here to connect into the main underfill, ensure a 1m clay cap beyond the pond is satisfied. We will prepare a CAN detailing this.





01/11/19 - Fill A gully

Friday, 1 November 2019 10:12 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	01/11/19 - 9:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at request of Dylan to provide guidance on REB shear key undercut requirements. I was not made aware that I would be looking at this before arriving on site.

Asked contractors/surveys to peg the far edge of the shear key alignment and also the silt pond so we can dig some trial pits next week. I will discuss a time to come to site with Chris next week.

05/11/19

Tuesday, 5 November 2019 11:58 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	05/11/19 - 10am
Author:	KM
Plant Operating:	1x 20T excavator
Weather:	Fine

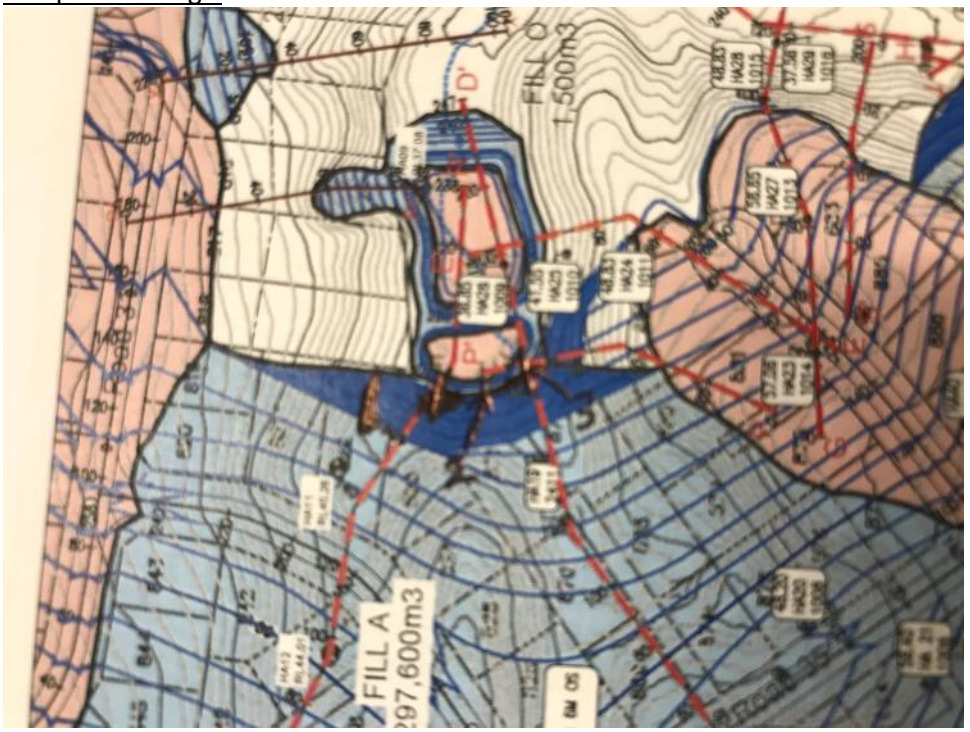
Site Observations and Instructions:

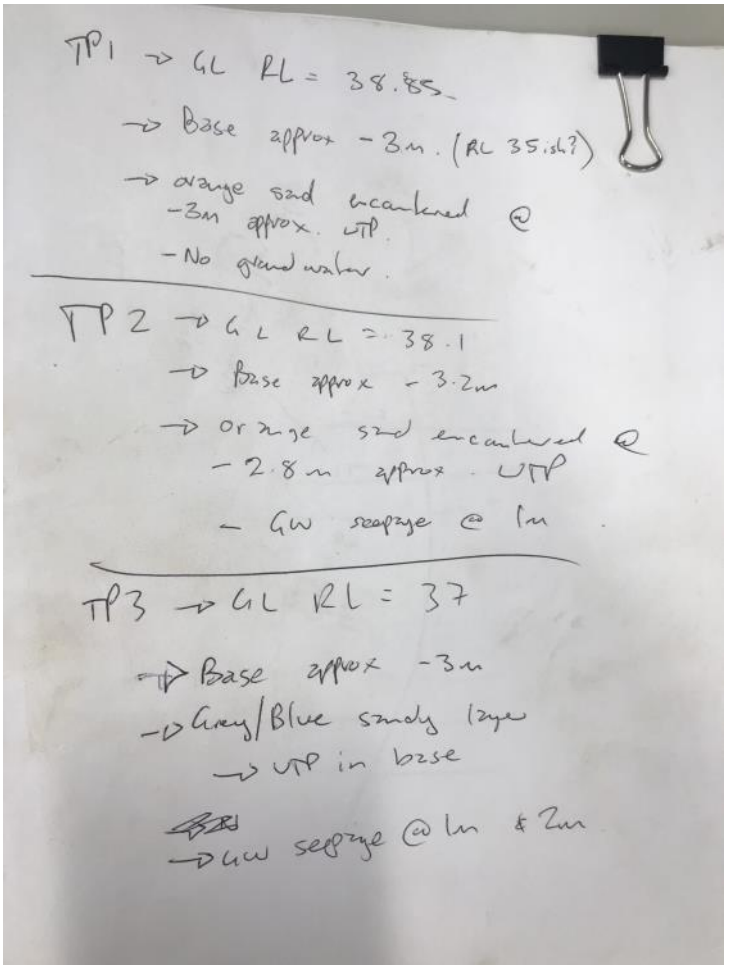
Visited site with Chris to carry out a series of trial pits at the toe of the REB1 fill batter. Our general logs are shown below, with hard natural soils (UTP) generally being encountered at around 3m to 3.5m depth below existing ground level.

The contractors will be continuing to excavate the first section of the gully undercut / installing drainage, and we will return to site at a later stage to prove the hard ground encountered (as our pits ended at the depths above due to digger reach).

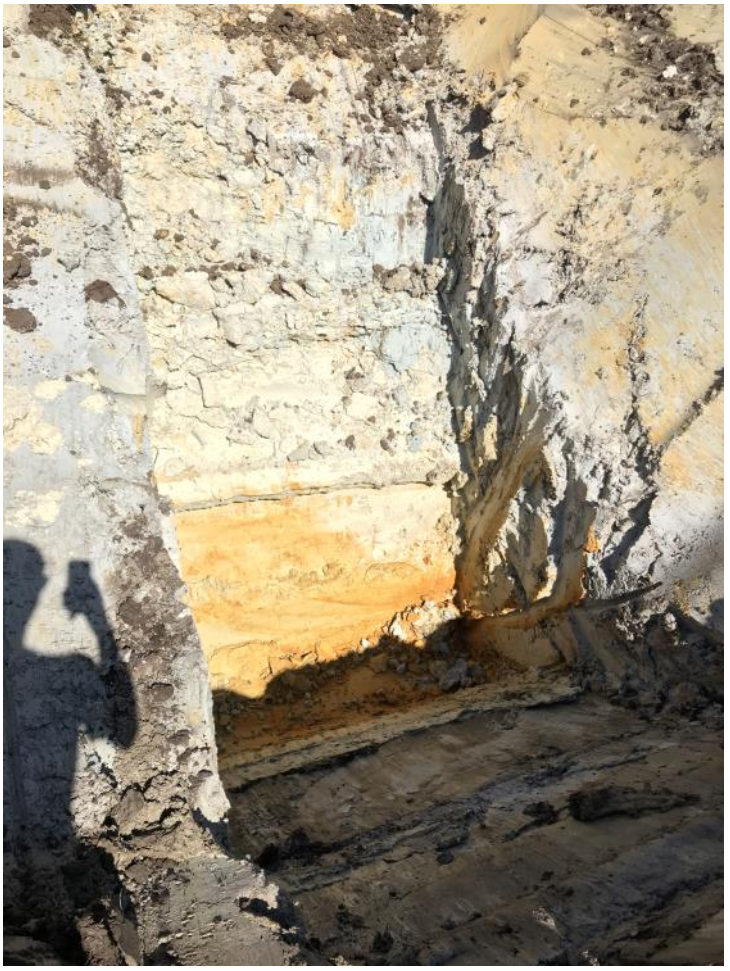
While on site we also visited the pond area in Fill K. There are groundwater seepages, however, are are at the base of the pond. Advised the contractors they should continue preparing the pond, with the likely outcome being a underfill drain connecting into the primary collector drain.

REB plan and logs:




TP1 → GL RL = 38.85
→ Base approx - 3m. (RL 35.8?)
→ orange sand encountered @ -3m approx. UTP
- No ground water.
TP2 → GL RL = 38.1
→ Base approx - 3.2m
→ orange sand encountered @ - 2.8m approx. UTP
- GW seepage @ 1m
TP3 → GL RL = 37
→ Base approx - 3m
→ Grey/Blue sandy layer
→ UTP in base
→ GW seepage @ 1m & 2m

TP1:



TP2:

TP3:

Fill K photos:

07/11/19 - Fill K and Fill A

Thursday, 7 November 2019 2:27 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	07/11/19 - 11:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at request of Dylan to carry out an inspection of the toe key in Fill K and also to conduct further trial pits below REB1 (to provide the hard layer below the shear key).

Fill K had been excavated approx. 3m depth and shear vanes in excess of 100kPa were recorded at the base of the key. The key is still to be excavated further, however, the lower level in the photos below (which is the be the final key depth) had sufficiently removed all gully mullock.

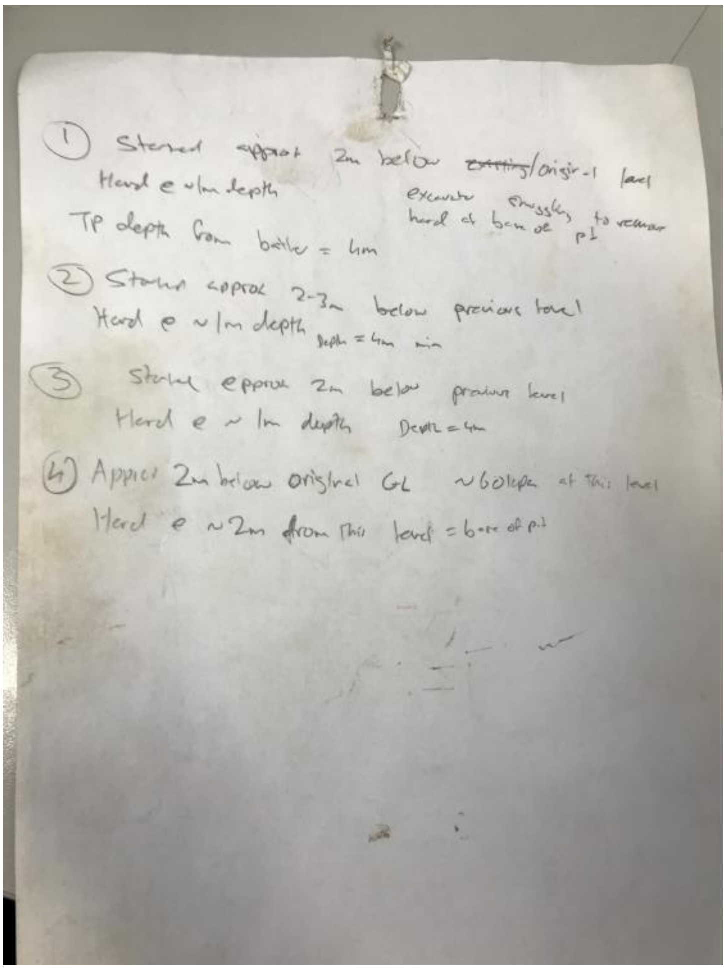
Carried out three trial pits within the area of the shear key and one within the pond area. The ground had been brought down approximately 2m from our previous visit when the initial trial pits were carried out. The additional pits found the hard layer identified during the previous visit at approximately 1m below the top of the pit, and this was proven for approximately 3m beyond this depth (the excavator was struggling to remove the material at the base of the pit with a rock bucket).

Within the pond area the contractors had already excavated about 2m - 2.5m from original ground level, exposing stiff ground at this level. The hard layer identified in the previous trial pits was identified approximately 2m from this level.

Fill K:

REB 1 area:


EX.CONSENT AUTH139144.02.01
FILL A
297,600m3
250m3
CUT 4
800m3
1:1 REINFORCED
EARTH BATTER
FILL O
1,500m3
1:1 REINFORCED
EARTH BATTER


(1) Started approx 2m below ~~existing~~/original level
Hard @ ~1m depth
excavator struggles to remove hard at base of pit
TP depth from batter = 4m
(2) Started approx 2-3m below previous level
Hard @ ~1m depth
Depth = 4m min
(3) Started approx 2m below previous level
Hard @ ~1m depth
Depth = 4m
(4) Approx 2m below original GL ~60kPa at this level
Hard @ ~2m from this level = base of pit

Pit 1:

Pit 2:

Pit 3:

Pond area:


HITACHI

12/11/19

Tuesday, 12 November 2019 4:25 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	12/11/19 - 2:30PM
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site with Chris and Shane to discuss construction methodology at REB1 shear key (involving subgrade depth of shear key and requirements for bench and drainage of key, especially into the ridge/flanks of the key).

There is still some work for Dines to do to facilitate access into this area. We will return to site once a section of the shear key has been opened to approve the subgrade.

15/11/19 - REB1 pond wall

Friday, 15 November 2019 4:29 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	15/11/19 - 4pm
Author:	KM
Plant Operating:	
Weather:	

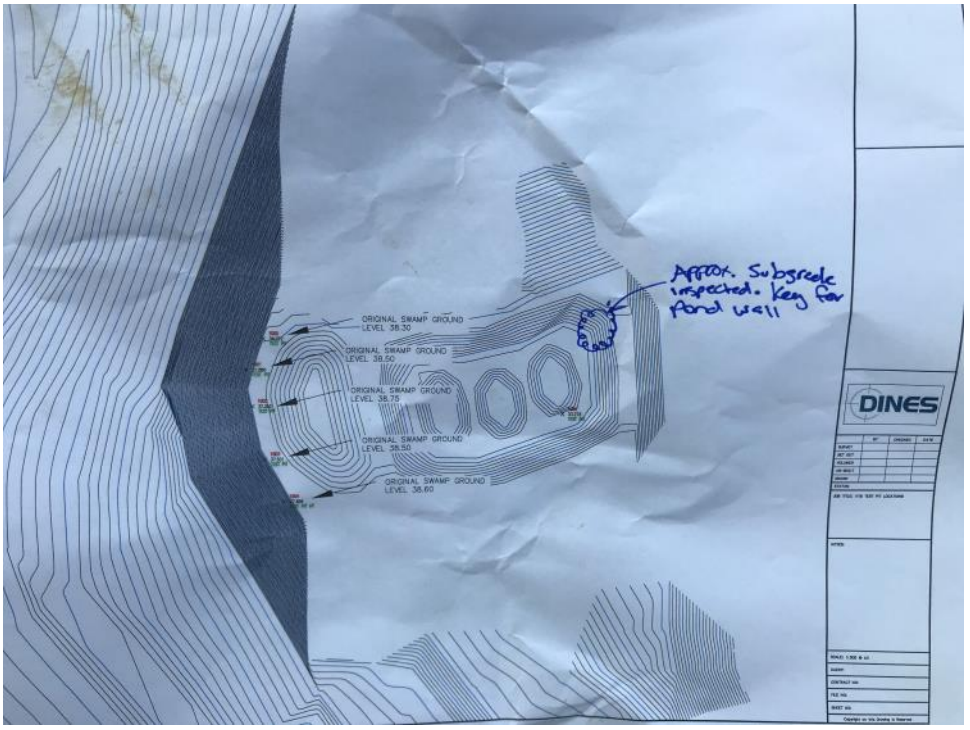
Site Observations and Instructions:

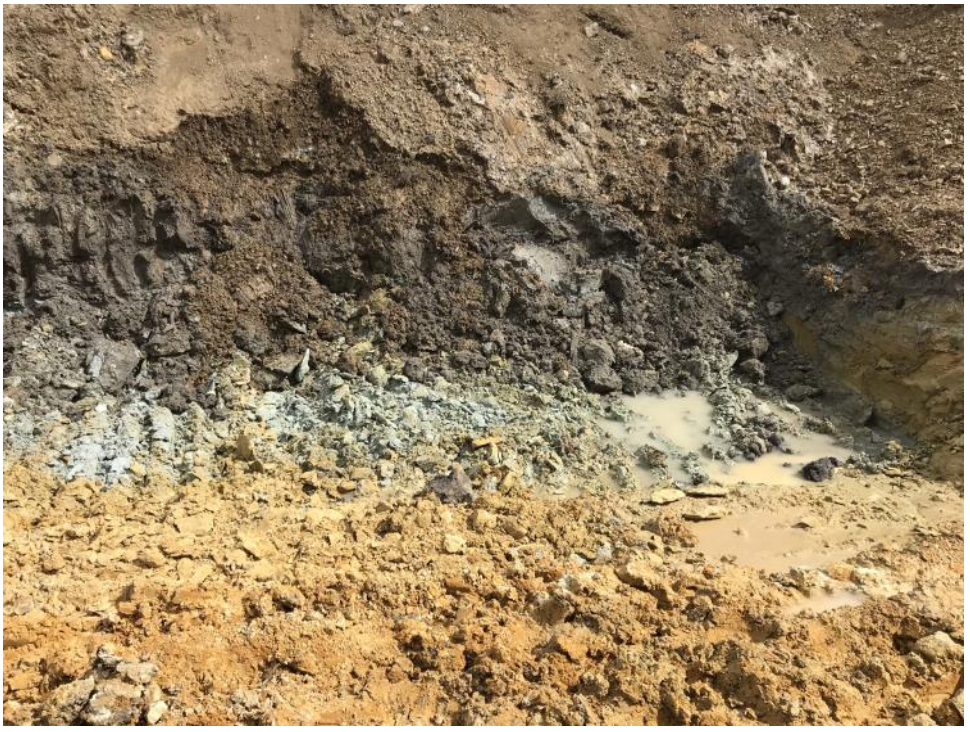
Visited site to inspect toe key embedment for pond wall below permanent pond at REB1.

Key had been excavated 1m into very stiff to hard ground (>170kPa).

Recommended hardfill be placed until above wet ground (say 0.5m to 1m) ensuring that as much clay is placed as possible to ensure a good lining around the pond. As told contractors that cleggs need to be carried out on top of the hardfill prior to compaction with clay.

Sides of batter are also sub-vertical. Recommended these be battered to a safe angle to provide a safe working area below.





20/11/19

Wednesday, 20 November 2019 2:37 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	20/11/19 - 2pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at request of Dylan to inspect pond wall key subgrade. Hard natural ground observed throughout and keyed minimum 1m into the hard ground.

Previous subgrade inspected had been backfilled with SPR.

Also discussed batter with contractors. They will be keying in with fill soon, however, they were advised to batter back / cover with plastic if it is be left open for much longer.

Ponds have been formed in Fill F / K areas. In Fill E the contractors are laying out the clay to dry.

22/11/19 - REB1 pond base

Friday, 22 November 2019 10:19 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	22/11/19 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at request of Dylan to inspect base of pond which will be filled approx. 0.5m to 1m to get to design level.

Ground had softened at the base of the pond due to water seepages. Recommended that a nominal undercut of say 0.2m to 0.5m be carried out (based on shallow hand augers drilled), ensuring the area remains drained (i.e. leave the pumps on while filling) to ensure the subgrade stays dry. We will need to inspect the final subgrade and so recommended this should be carried out in small stages with filling operations commencing immediately after we have seen the subgrade.

Also brought up the idea of laying some trenches to catch water seepages. I will discuss this with Chris later and prepare a CAN outlining our recommendations.

26/11/19

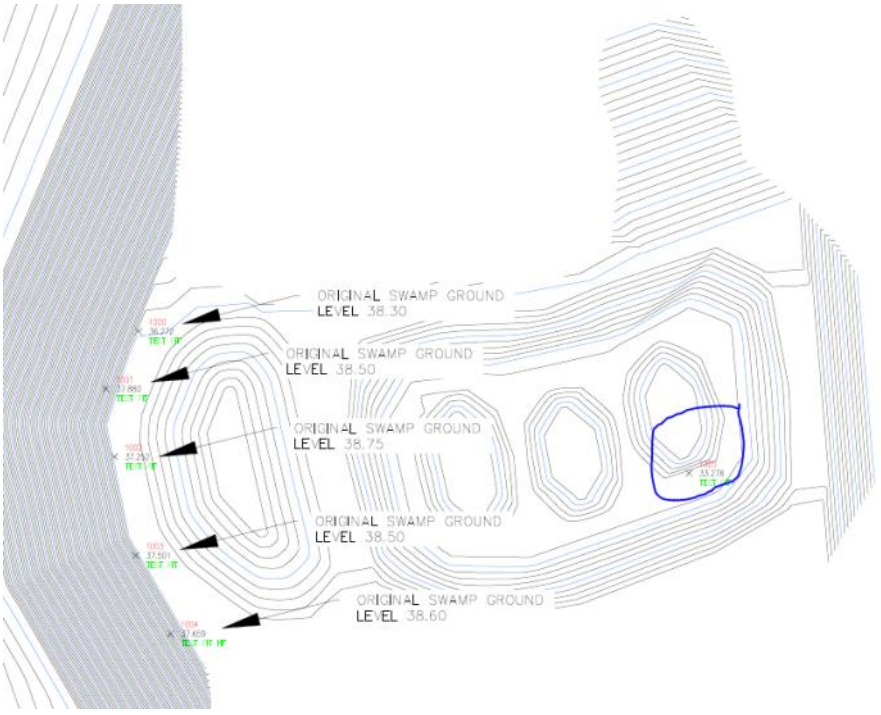
Tuesday, 26 November 2019 3:46 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	26/11/19 - 2:30pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to inspect first area of pond undercut (cut 4) as shown in blue on the plan below. Stiff natural ground in excess of 60kPa throughout. There is a small area of water ponding in the area of deepest cut and we recommended that that be pumped out / dug out prior to placing fill.




HITACHI

27/11/19

Wednesday, 27 November 2019 4:21 PM

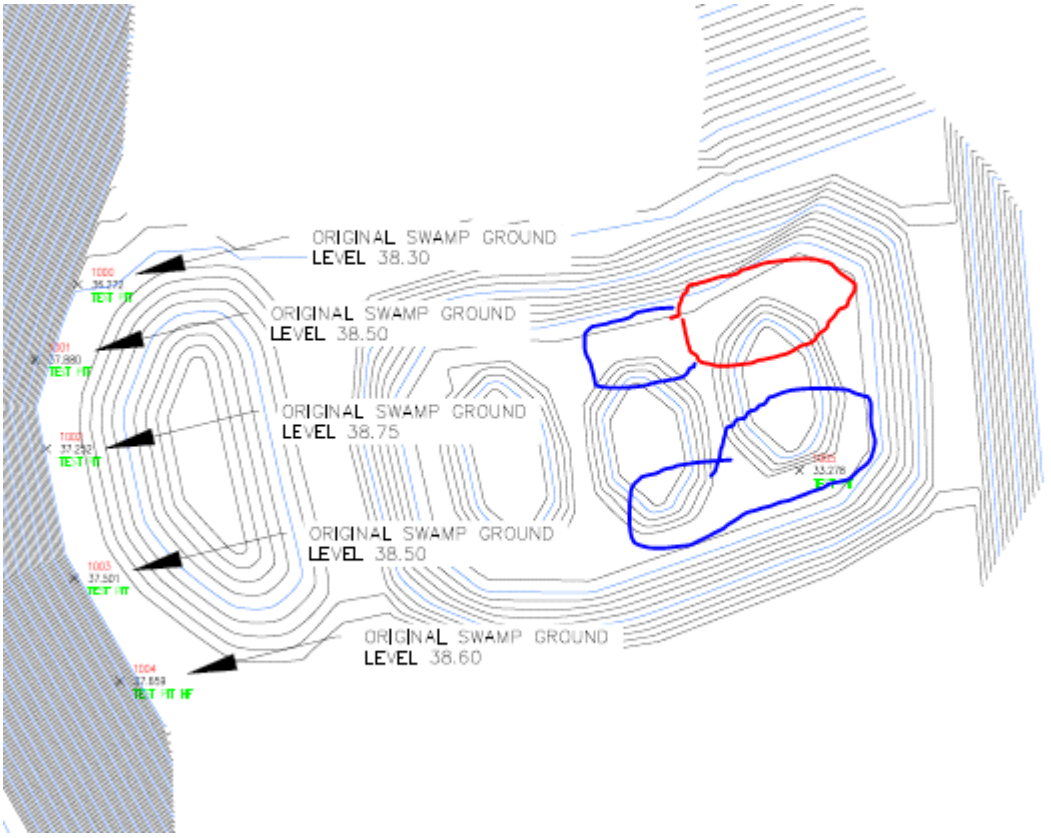
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	27/11/19 - 2:30pm
Author:	KM
Plant Operating:	2x20T excavators, 4x30T moxys
Weather:	

Site Observations and Instructions:

Visited site at request of Dylan to inspect next section of pond base subgrade to fill up to pond invert. Stiff to very stiff, inorganic natural ground exposed throughout (blue). The hardfill track still remains to be removed and we will look at this once they remove this. The area in red was not fully stripped yet, however, several areas were exposed with ground being consistent throughout. Asked contractor to send photos once complete so they commence filling to stabilise a small slip which had formed in the side of the bank.

Also had a look at fill G and Fill E. Fill G and surrounding areas of Cut 2 stripped back to competent natural ground. Fill E near design level. This area currently being used to dry out the wet materials coming from cut 2 pond.




HITACHI


HITACHI

Photos from Dylan 29/11/19:

29/11/19

Friday, 29 November 2019 3:41 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	29/11/19 - 12PM
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at request of Dylan to inspect next section of pond base fill subgrade. Very stiff ground throughout. Some areas had softened where water is ponding and we recommended that these areas be undercut to remove the softer soils. We have now seen almost all of the pond base. There is only a small area and Dylan will send photos once this is down to subgrade level.

Pond wall has been filled to near final level.

Photos from Dylan 2/12/19:

03/12/19

Tuesday, 3 December 2019 12:20 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	03/12/19 - 11pm
Author:	KM
Plant Operating:	
Weather:	

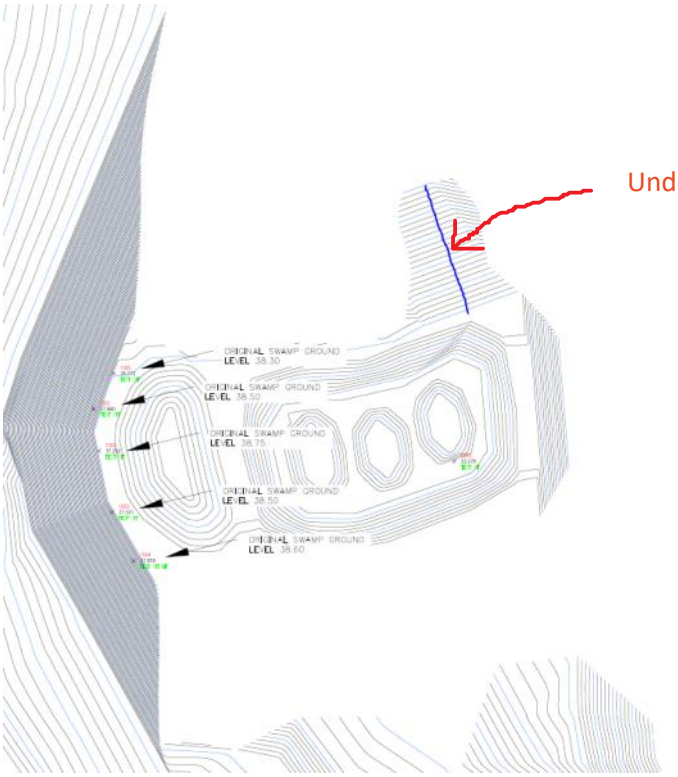
Site Observations and Instructions:

Visited site with Chris to see what is happening on site.

Observed start and outlet of underfill drain which outlets below Fill K.

Observed Cut 4 pond. This area has been filled with clear and is now near pond base invert level. While down here discussed a proposed fill batter which we recommended has an underfill drain installed to tap any groundwater pressures (area shown on the plan below).

Contractors also removing fill from an old rubbish pit found on site at the start of the season.



09/12/19 - Fill A

Monday, 9 December 2019 3:16 PM

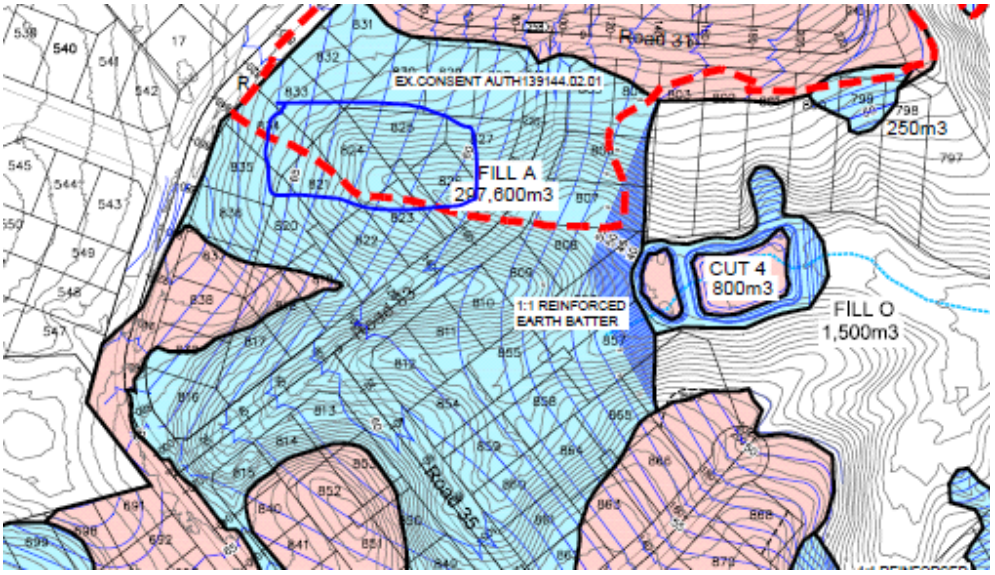
Site Inspection Record

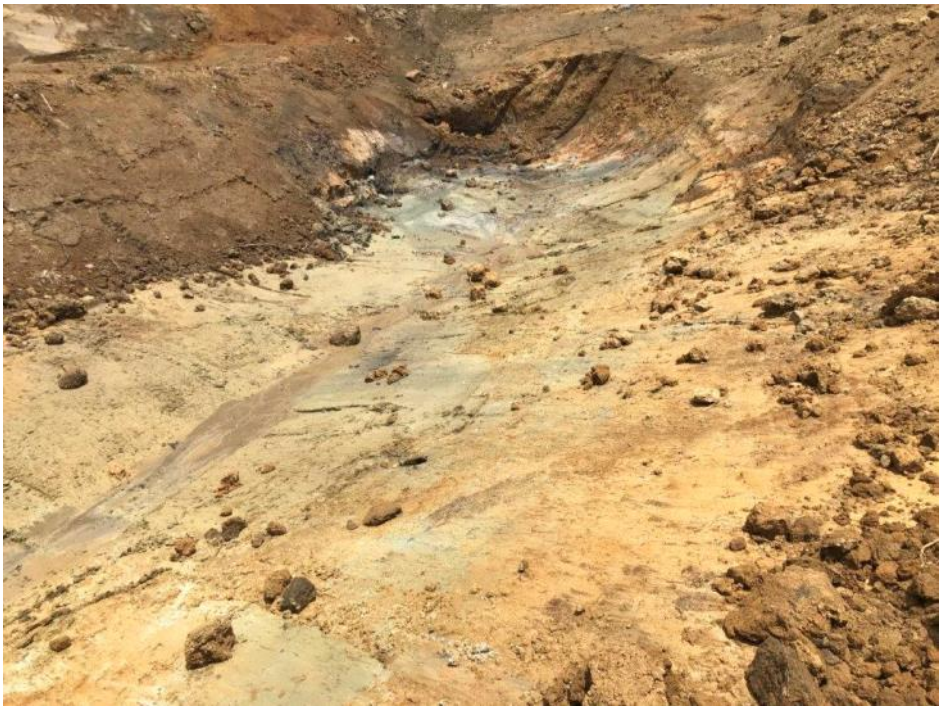
Project # & Name:	J00113 - Hitchen Block
Date & Time:	09/12/19 - 1:30pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect gully stripping in the area outlined on the plan below (Fill A).

Generally stiff ground was exposed throughout, however, at the base of the gully invert (lower half) water seepages were causes the ground to soften. We recommend an undercut of approx. 0.5m to 1m here prior to placement of the underfill drain. There is some material in place which is going to be undercut as there is seepage coming out below and the underfill drain will be aligned through here.






Groundwater seepage

10/12/19

Tuesday, 10 December 2019 1:19 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	10/12/19 - 12pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect muckout of lower portion of gully as per yesterdays recommendation. Generally stiff soils exposed at the base of the gully.

06/01/20

Monday, 6 January 2020 10:55 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	06/01/20 - 10:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to catch up on site works within the REB1 fill area. Contractors have filled up the areas sighted prior to the Christmas break. They will send through photos showing the removal of soft soils within the gully inverts.

Contractors plan to extend the underfill drainage so an inspection later this week is likely.

10/02/20

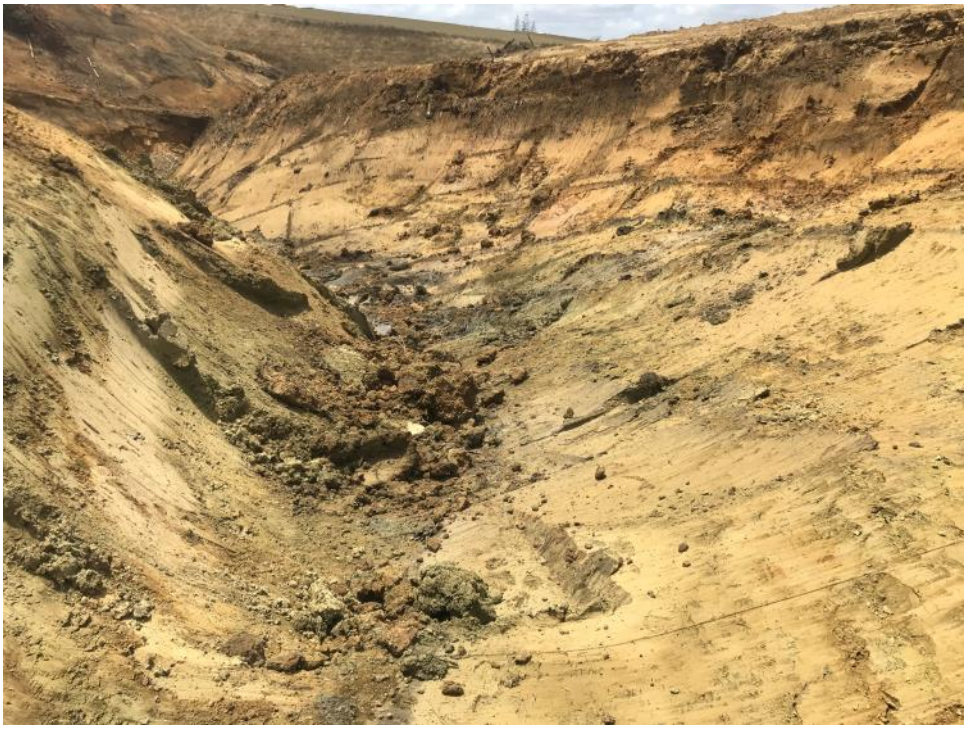
Friday, 10 January 2020 2:12 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	10/01/20 - 2pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect gully muckout in Fill A. Stiff to hard natural ground observed throughout.



13/01/20

Monday, 13 January 2020 3:28 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	13/01/20
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site witch Chris to observe general site earthworks.

Underfill drain has been placed within Fill A gully observed during previous inspection.

Elsewhere, the site is mostly in the same condition as our previous inspections.

15/01/20

Wednesday, 15 January 2020 1:43 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	15/01/20 - 8:45am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to catch up around the shear key in Fill A. Dylan was asking about drainage / outlet requirements. Confirmed that that underfill drains are to run beneath the MSE fill and the shear key.

21/01/20

Tuesday, 21 January 2020 2:14 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	21/01/20 - 1:30pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited old slip site with Dylan and discussed benching the slip debris out.

22/01/20

Wednesday, 22 January 2020 4:15 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	22/01/20 - 2pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site with Chris to meet with Dylan to discuss remediation of the slip that we inspected yesterday.

Advised Dylan that the slip should be fully benched out to the natural ground (i.e. removing all the slip debris) at which point we can observe and provide further recommendations. This will likely be to recommend a series of benched drains running parallel along the slope with one or two collector drains running along the extend of the slip area. We also advised that the lateral drains be installed within the vicinity of the existing chimney drain as per our design (this was never done during the earlier earthworks stage).

22/01/20

Thursday, 23 January 2020 12:02 p.m.

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	22/01/20 - 2pm
Author:	CE + KM
Plant Operating:	
Weather:	

Site Observations and Instructions:
CE - photos from my visit below. They appear to be progressing with REB1 pre construction work (i.e. filling in gullies upslope of it and remediating slip on site of Stage 4 which will be filled as part of REB1.

REB1 area

REB1

REB1

03/02/20

Monday, 3 February 2020 3:25 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	03/02/20 - 3pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect first portion of shear key excavation for REB1 / Fill A. Shear key excavated to 5m depth (which involved using a rock ripper). Advised contractors to excavate at least 0.5m into hard or until it can't be removed with a rock bucket. Also advised a plateau ready be carried out in the SPR when fill compaction commences.

05/02/20

Wednesday, 5 February 2020 2:39 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	06/02/20
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Inspected next section of shear key undercut. Hard materials exposed at base as per previous sighting.

12/02/20

Wednesday, 12 February 2020 1:51 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	12/02/20 - 1:30pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Shear key excavations proving hard.

19/02/20

Wednesday, 19 February 2020 2:19 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	19/02/20 - 1pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Shear key excavations completed. Competent hard ground exposed throughout. Plateau test being undertaken while we were on site.


HITACHI
DINES

26/02/20

Wednesday, 26 February 2020 10:29 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	26/02/20 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect top two benches into the remediated slip adjacent to REB1. Benches have been excavated into the natural ground and the contractors have further a small trench along the rear face to installed drainage. Attached below is their proposed plan.

Shear key filling still coming up. Photo below.


EXISTING NOVA COIL
DESIGN LATERAL
DESIGN LATERAL
EXISTING CHIMNEY DRAIN
DESIGN LATERAL
DESIGN LATERAL
XSECTION

27/02/20

Thursday, 27 February 2020 10:29 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	27/02/20 - 10:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Slip remediation works are continuing and they are down to the final bench. Drainage has been installed on the top two benches, with a collector also placed down to the second bench. The material on the bottom bench is a stiff, wet alluvium. Recommended to Dylan that the batter faces be supported by backfilling or temporary face support and also be covered with polythene if they are to remain open.

06/03/20

Friday, 6 March 2020 12:35 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	06/03/20 - 11am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to check in on shear key. The contractors are excavating the 2m beyond the fill batter now. Will return to site with Chris early next week to REB requirements.

Also checked outlets for Hitchen 11, 12, 14 GCR. All outlets correctly formed with concrete rip rap.


14A
12B
12A
11
14B
12C
Flannery Road
Yashili Drive
Calder Crescent
A6 Concrete riprap outlet observed
O= check outlet.
talk to Ali / Dylan.
NOTES
1. ALL LEVELS ARE IN METRES AND IN TERMS OF THE LANDS & SURVEY DATUM (MEAN SEA LEVEL) AUCKLAND 1946.
2. CONTOUR INTERVAL IS 1m
3. CONTOURS ACCURACY IS + OR - 0.5m
I, MICHAEL STEPHEN SMITH, MIPENZ 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
FILL AREAS
CIVILPLAN
CONSULTANTS
DFH JOINT VENTURE
HITCHEN STAGE 11,12 & 14 SUBDIVISIONS
POKENO
AS BUILT UNDERFILL DRAINS
136701-11-AB20

10/03/20

Wednesday, 11 March 2020 9:06 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	10/03/20 - 2:30pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site with Chris to discuss REB1 backfill, benching and grid requirements with Dylan, Mitchell and Miles. Discussed that all benches need to be at least 2m below original ground level to key in the fill batter

16/03/20

Monday, 16 March 2020 10:13 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	16/03/20 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

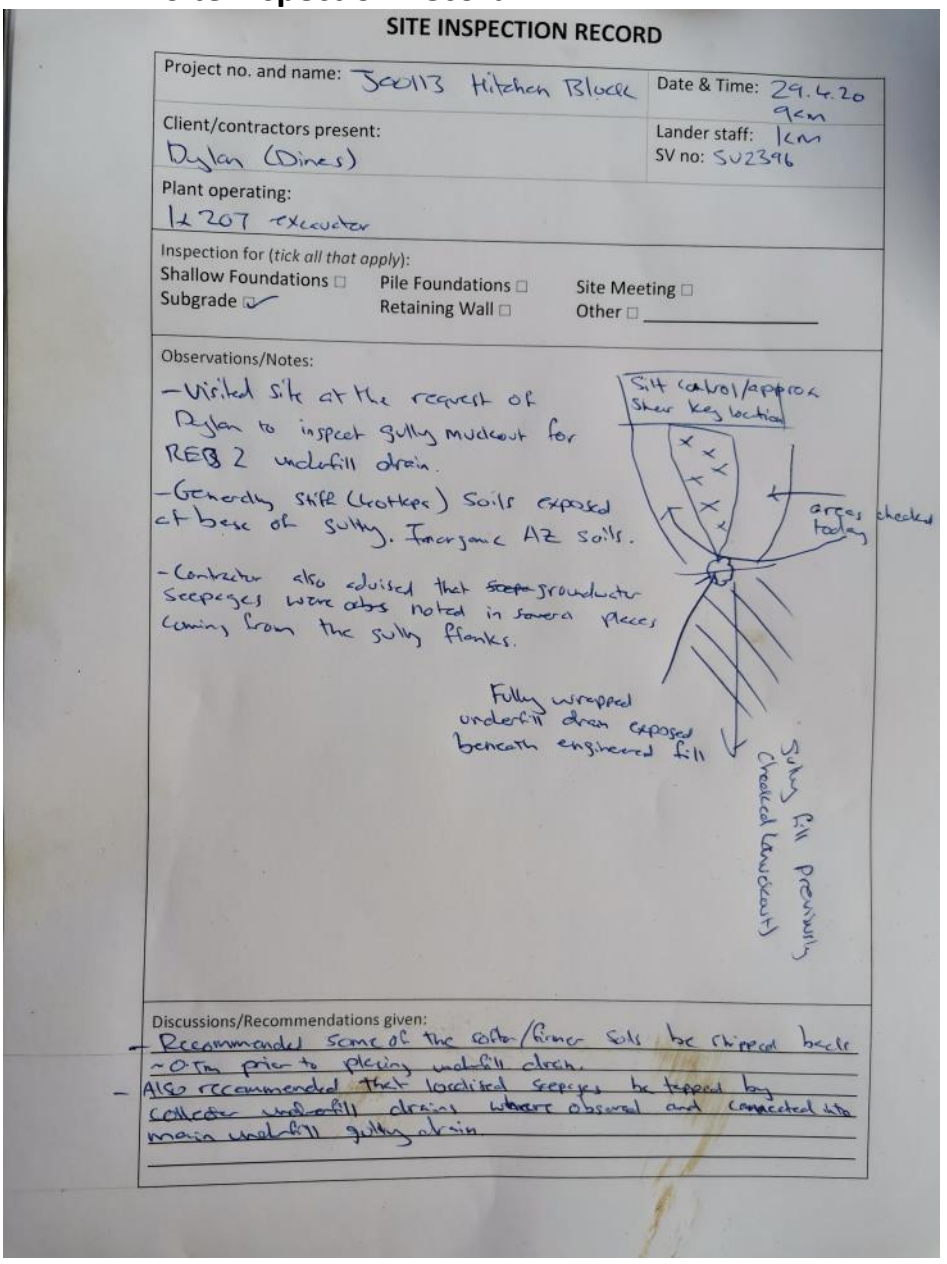
Visited sure at the request of Dylan to inspect first gully muckout for Fill B. Generally stiff ground is exposed at the base of the gully. The contractor was advised to strip wet/softer ground where encountered.

Also discussed installing another underfill drain up the gully branches as there has been some groundwater seepage / slippage observed which the contractor has cleared out prior to our visit. Advised we can look at this which stripping operations commence in this area.

29/04/20

Wednesday, 29 April 2020 9:25 AM

Site Inspection Record



SITE INSPECTION RECORD

Project no. and name: Jc0113 Hitchen Block

Date & Time: 29.4.20 9am

Client/contractors present: Dylan (Dines)

Lander staff: 1cm

SV no: SU2396

Plant operating: 1x 20T excavator

Inspection for (*tick all that apply*):

Shallow Foundations ☐ Pile Foundations ☐ Site Meeting ☐

Subgrade ☑ Retaining Wall ☐ Other ☐ _____

Observations/Notes:

- Visited site at the request of Dylan to inspect gully mudcourt for RE8 2 underfill drain.
- Generally stiff (brattices) soils exposed at base of gully. Inorganic AZ soils.
- Contractor also advised that ~~seep~~ groundwater seepages were also noted in several places coming from the gully flanks.

Discussions/Recommendations given:

- Recommended some of the soft/firmer soils be stripped back ~0.5m prior to placing underfill drain.
- Also recommended that localised seepages be topped by collector underfill drains where observed and connected to main underfill gully drain.


Product Grade StrataGrid SG 700
Manufactured by Strata Geosystems (I
Manufactured in India
Distributed by Cirtex Industries Ltd.
Roll Number 0051RA124RH1U0203
Roll Size 380.0 Sq. Metres
Roll Weight 227.8 Kg
NZTA Product Acceptance
No 1
0051RA124RH1U0203
STRATA
Geosystems (India) Pvt Ltd
www.strataindia.com

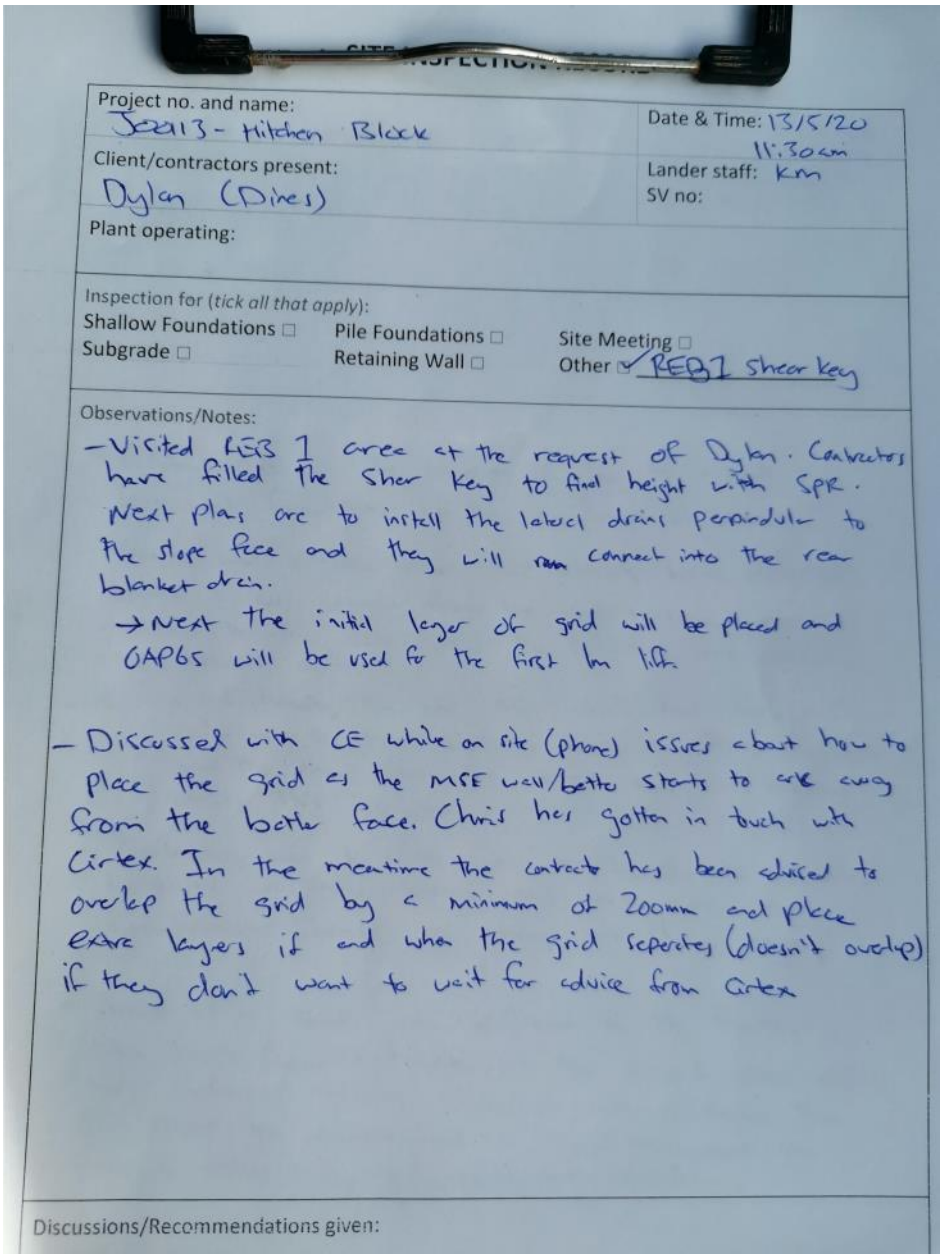

Duragrid X 20/20
Duragrid X 20/20 3.95m x 50m Roll
Serial Number:

13/03/20

Wednesday, 13 May 2020 12:25 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block



Project no. and name: J0013 - Hitchen Block

Date & Time: 13/5/20 11:30am

Client/contractors present: Dylan (Dines)

Lander staff: KM

SV no:

Plant operating:

Inspection for (*tick all that apply*):

Shallow Foundations ☐ Pile Foundations ☐ Site Meeting ☐

Subgrade ☐ Retaining Wall ☐ Other ☑ REG1 Sheer key

Observations/Notes:

- Visited REG 1 area at the request of Dylan. Contractors have filled the Sher Key to final height with SPR. Next plan are to install the lateral drain perpindular to the slope face and they will ~~ran~~ connect into the rear blanket drain.
  → Next the initial layer of grid will be placed and OAP65 will be used for the first 1m lift.

- Discussed with CE while on site (phone) issues about how to place the grid as the MSE wall/batter starts to ark away from the batter face. Chris has gotten in touch with Cirtex. In the meantime the contractor has been advised to overlap the grid by a minimum of 200mm and place extra layers if and when the grid seperates (doesn't overlap) if they don't want to wait for advice from Cirtex

Discussions/Recommendations given:

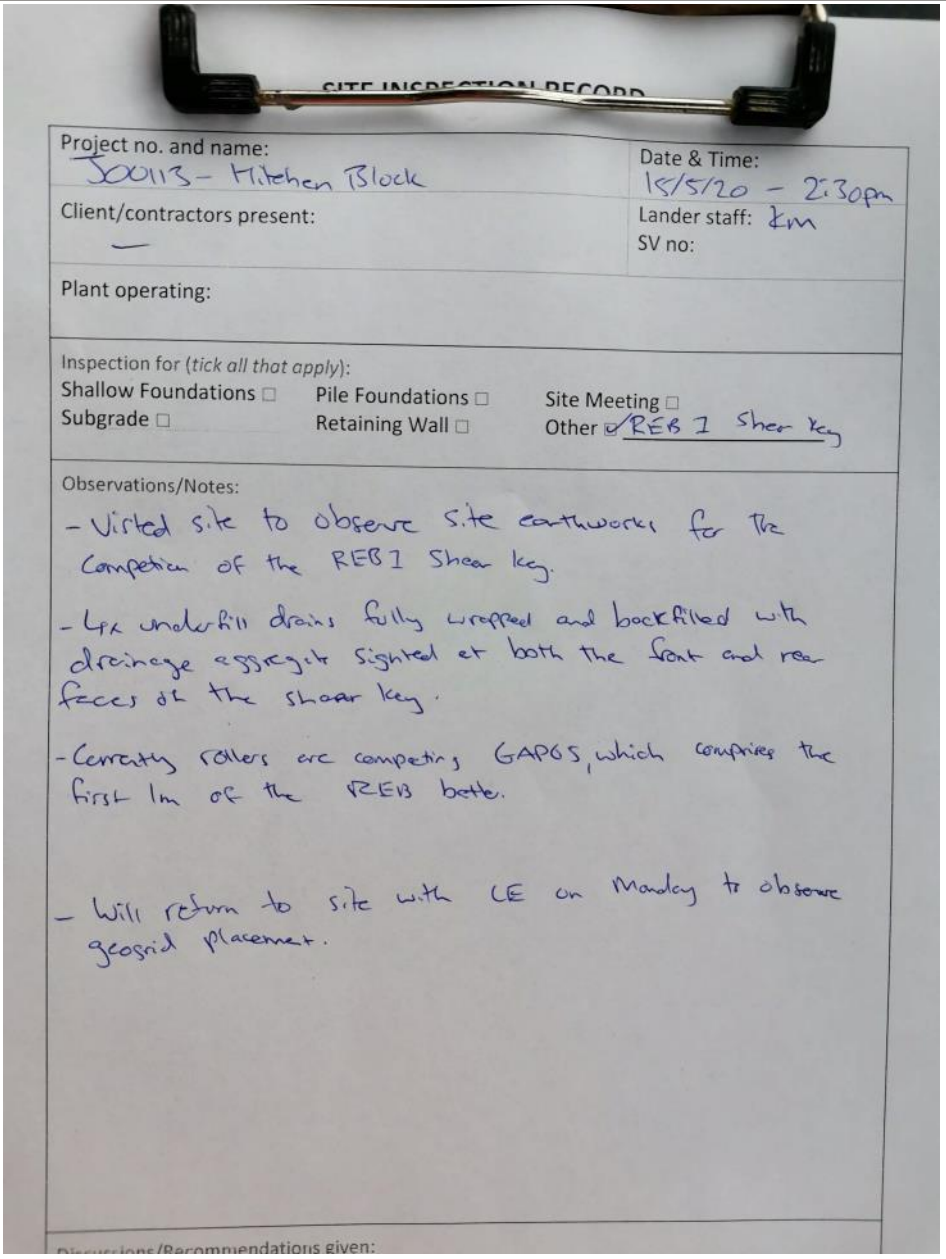

HITACHI

15/05/20

Friday, 15 May 2020 4:26 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block



SITE INSPECTION RECORD

Project no. and name: J00113 - Hitchen Block	Date & Time: 15/5/20 - 2:30pm
Client/contractors present: —	Lander staff: KM SV no:
Plant operating:	

Inspection for (*tick all that apply*):

Shallow Foundations ☐ Pile Foundations ☐ Site Meeting ☐

Subgrade ☐ Retaining Wall ☐ Other ☑ REB 1 Shear Key

Observations/Notes:

- Visited site to observe site earthworks for the Competion of the REB 1 Shear key.
- 4x underfill drains fully wrapped and backfilled with drainage aggregate sighted at both the front and rear faces of the shear key.
- Correctly rollers are competing GAP65, which comprises the first 1m of the REB batle.
- Will return to site with CE on Monday to observe geogrid placement.

Discussions/Recommendations given:

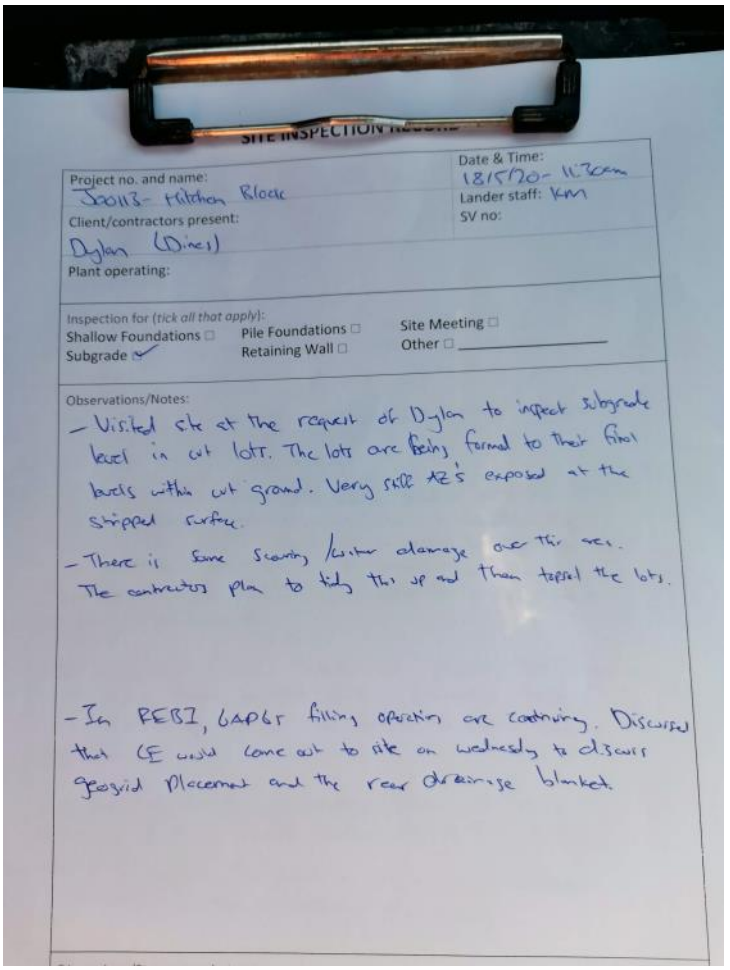

HITACHI

18/05/20

Monday, 18 May 2020 3:31 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block



SITE INSPECTION RECORD

Project no. and name: J00113 - Hitchen Block

Date & Time: 18/5/20 - 11:30am

Client/contractors present: Dylan (Direct)

Lander staff: KM

SV no:

Plant operating:

Inspection for (tick all that apply):

Shallow Foundations ☐ Pile Foundations ☐ Site Meeting ☐

Subgrade ✓ Retaining Wall ☐ Other ☐ _____

Observations/Notes:

- Visited site at the request of Dylan to inspect subgrade level in cut lots. The lots are being formed to their final levels within cut ground. Very stiff XZ's exposed at the stripped surface.
- There is some scouring/water damage over the area. The contractors plan to tidy this up and then topsoil the lots.

- In REB1, GAP6r filling operations are continuing. Discussed that CE could come out to site on wednesday to observe geogrid placement and the rear drainage blanket.


BELL

21/05/20

Thursday, 21 May 2020 9:59 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block

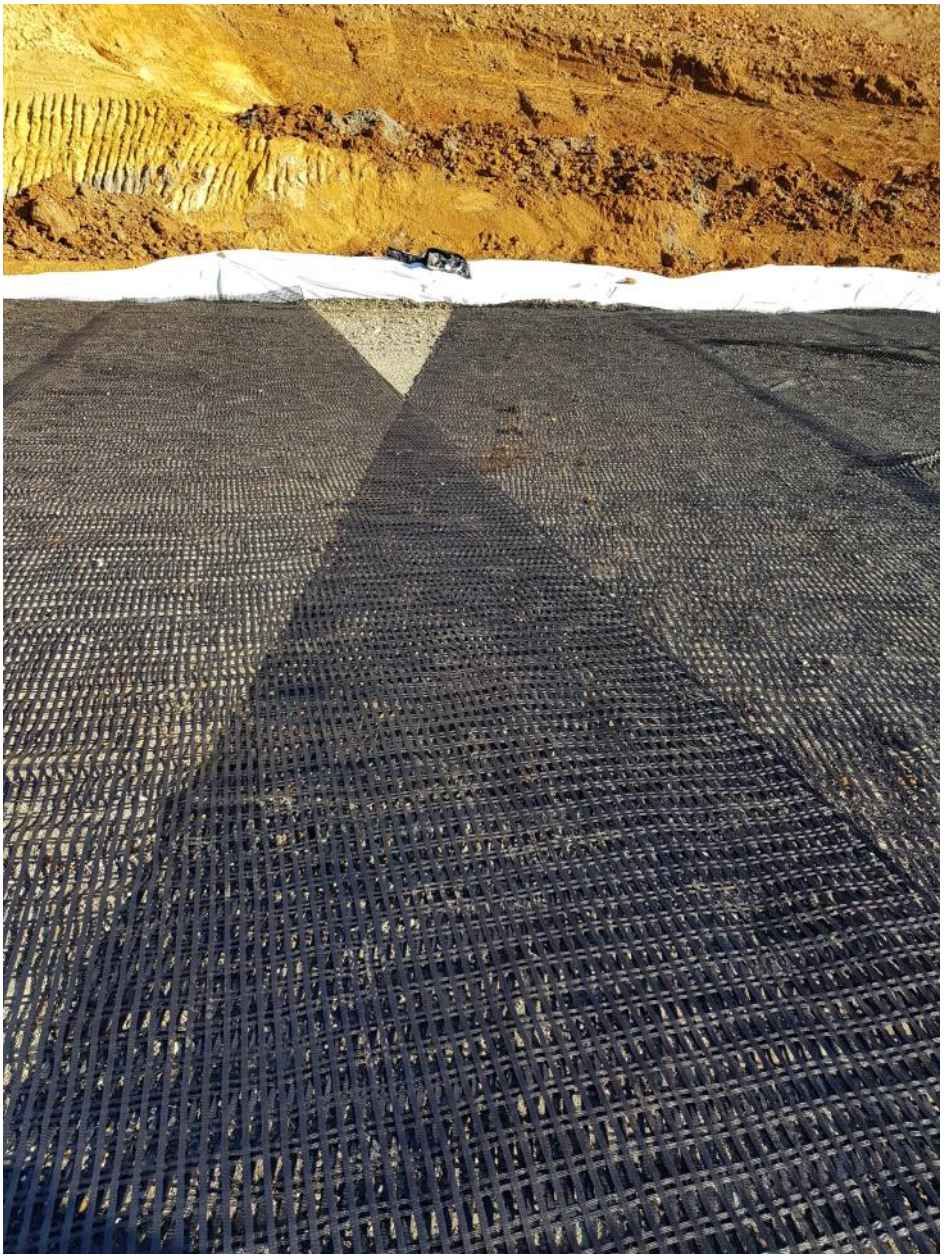
21/05/20

Thursday, 21 May 2020 2:06 p.m.

Site Inspection Record

Project:	J00463 - 125B Murphys Rd
Date & Time:	21/05/20, 9am
Author:	KM / CE
Plant Operating:	
Weather:	Fine

Site Observations and Instructions:
Meeting with Dylan to observe second layer of primary grid on REB1. They are having issues with grid coverage as the wall goes round the curve. Have queried this with Michael Sorrenson and will get him to comment on the best way to fix this issue. Meeting with Cirtex set up for tomorrow morning to discuss this, no more grid to be placed until issue resolved.



22/05/20

Friday, 22 May 2020 11:03 a.m.

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	22/05/20 9am
Author:	CE/ KM
Plant Operating:	
Weather:	Fine

Site Observations and Instructions:
Meet with Dylan and Cirtex (Paul Lombard) to discuss placement of geogrid for REB 1

The contractor had re-laid the primary grid layer.

Discussed the requirements for the grid as follows:

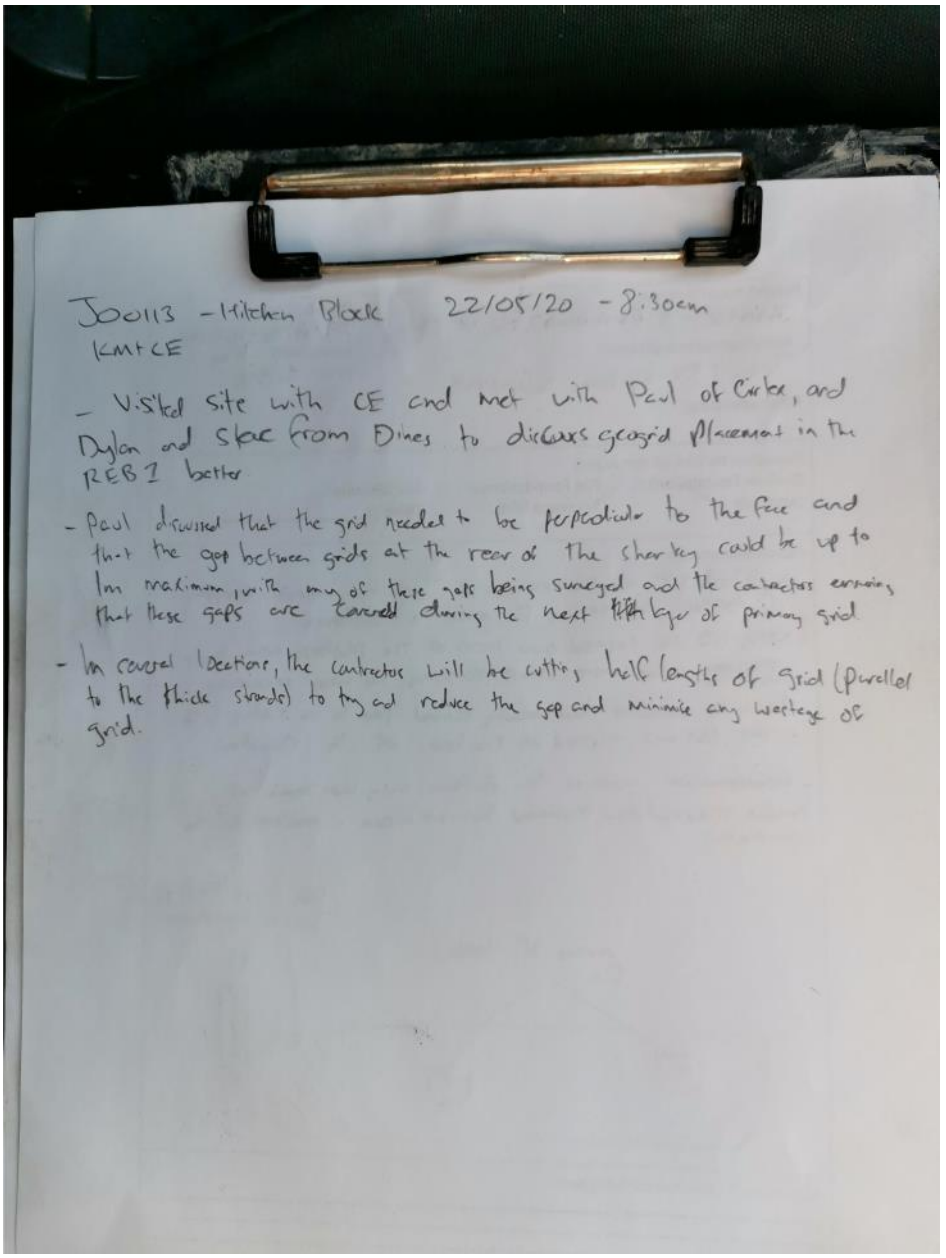
1. On straight sections of slope maintain a 200mm to 300mm overlap
2. On curved sections, increase the overlap at the face to up to 1m and minimise the 'wedge' of area at the rear of the reinforced section where there is no grid covering to less than 1m
3. On the next lift of grid (800mm) the areas where 'wedges' were are to be covered. A CAN to be sent on this matter.
4. 

22/05/20

Friday, 22 May 2020 11:28 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block



27/05/20

Wednesday, 27 May 2020 12:51 p.m.

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	27/05/20
Author:	CE
Plant Operating:	
Weather:	Showers

Site Observations and Instructions:
Stopped by to observe construction of REB1. See photos below. Grid layer appears to have been placed as per our directions last week and is now being overlaid with hardfill.

24/06/20

Wednesday, 24 June 2020 11:39 a.m.

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	24/06/20 10am
Author:	CE
Plant Operating:	
Weather:	

Site Observations and Instructions:
Quick stop by to see progress of REB1. Looks like they have stopped due to the weather.

30/07/20 - Stage 12D

Thursday, 30 July 2020 3:07 p.m.

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	30/07/20
Author:	TT
Plant Operating:	
Weather:	Fine

Site Observations and Instructions:

Observed muck out of portion of gully circled below. Decant to be formed here to allow further earthworks up slope within gully. Muck out looked suitable with benches to be formed 2 compactors width in flanks to lock this fill batter in. Batter only temporary until next season when earthworks occur downslope. Underfill drain to be placed through this area (discussed specs which are consistent with other drains across site) that will lead into the earthworks upslope and eventually downslope as well. Fill materials to cut from cut area above which looked fine to use. Testing to take place every 1m lift. Contractor to get in touch when gully upslope is being stripped.


HITACHI


HITACHI

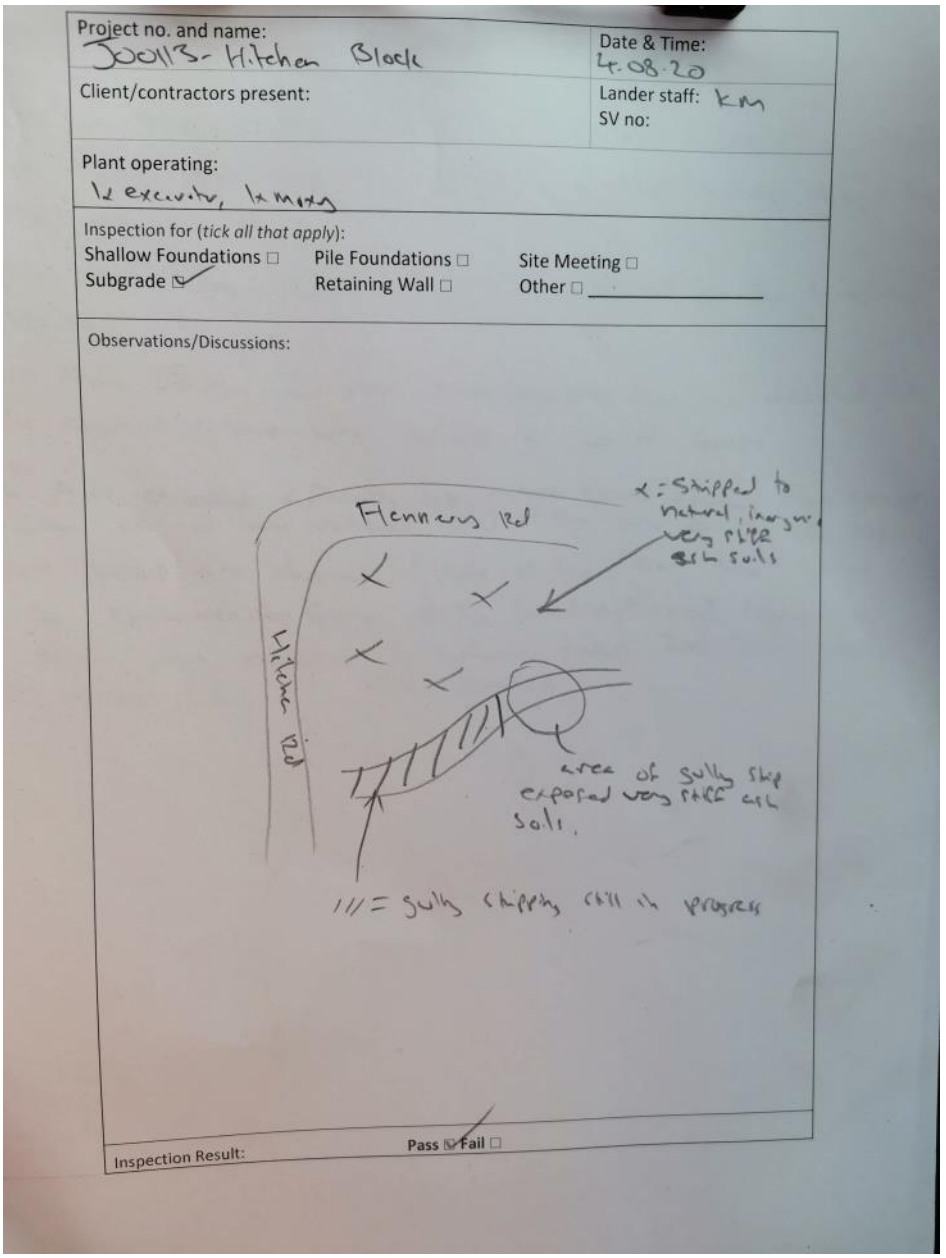
04/08/20 - Stage 12D

Tuesday, 4 August 2020 8:15 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block

Site Observations and Instructions:



08/09/20 - REB1

Tuesday, 8 September 2020 11:28 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	08/09/20 - 11:15am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Jobl13 - Hitchen Stage 5 08.09.20 - 11.15cm Km

- Visited site to catch up on earthworks at Hitchen Block.
- Caught up with Trevor and discussed earthworks. Dincs have recently started Placing fill in REB1, with testing ongoing with Geotechnics.
- Currently enabling works are underway to extend rear face of batter to allow a compactor to fit against the rear batter face.
- Next layer of grid is planned for tomorrow and we will return to inspect.

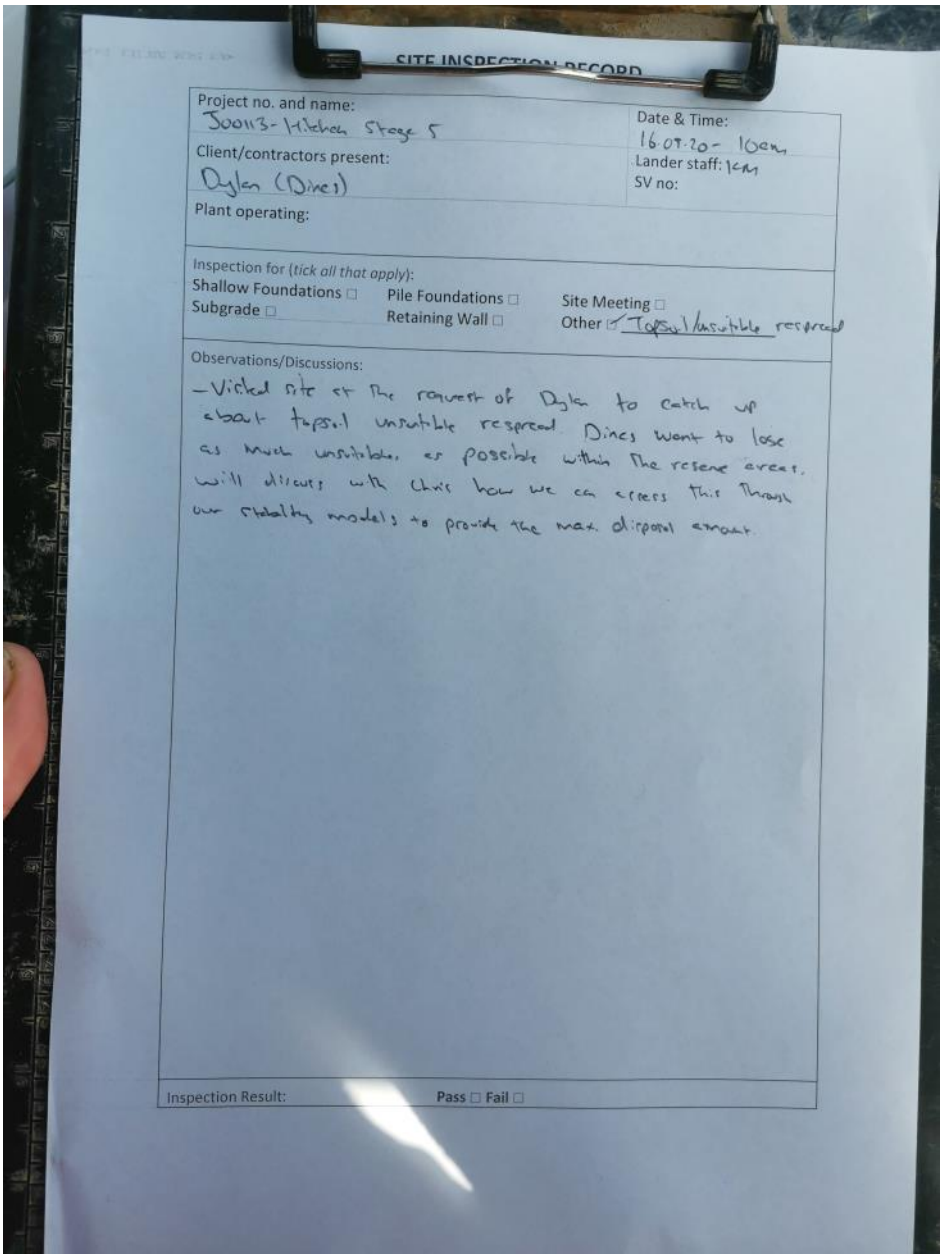
16/09/20

Wednesday, 16 September 2020 10:15 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block

Site Observations and Instructions:



SITE INSPECTION RECORD

Project no. and name: J00113 - Hitchen Stage 5

Date & Time: 16.09.20 - 10am

Client/contractors present: Dylan (Dines)

Lander staff: Ian

SV no:

Plant operating:

Inspection for (*tick all that apply*):
Shallow Foundations ☐ Pile Foundations ☐ Site Meeting ☐
Subgrade ☐ Retaining Wall ☐ Other ☑ Topsoil/unsuitable respread

Observations/Discussions:
- Visited site at the request of Dylan to catch up about topsoil unsuitable respread. Dines want to lose as much unsuitable as possible within the reserve areas. Will discuss with Chris how we can assess this through our stability models to provide the max. disposal amount.

Inspection Result: Pass ☐ Fail ☐

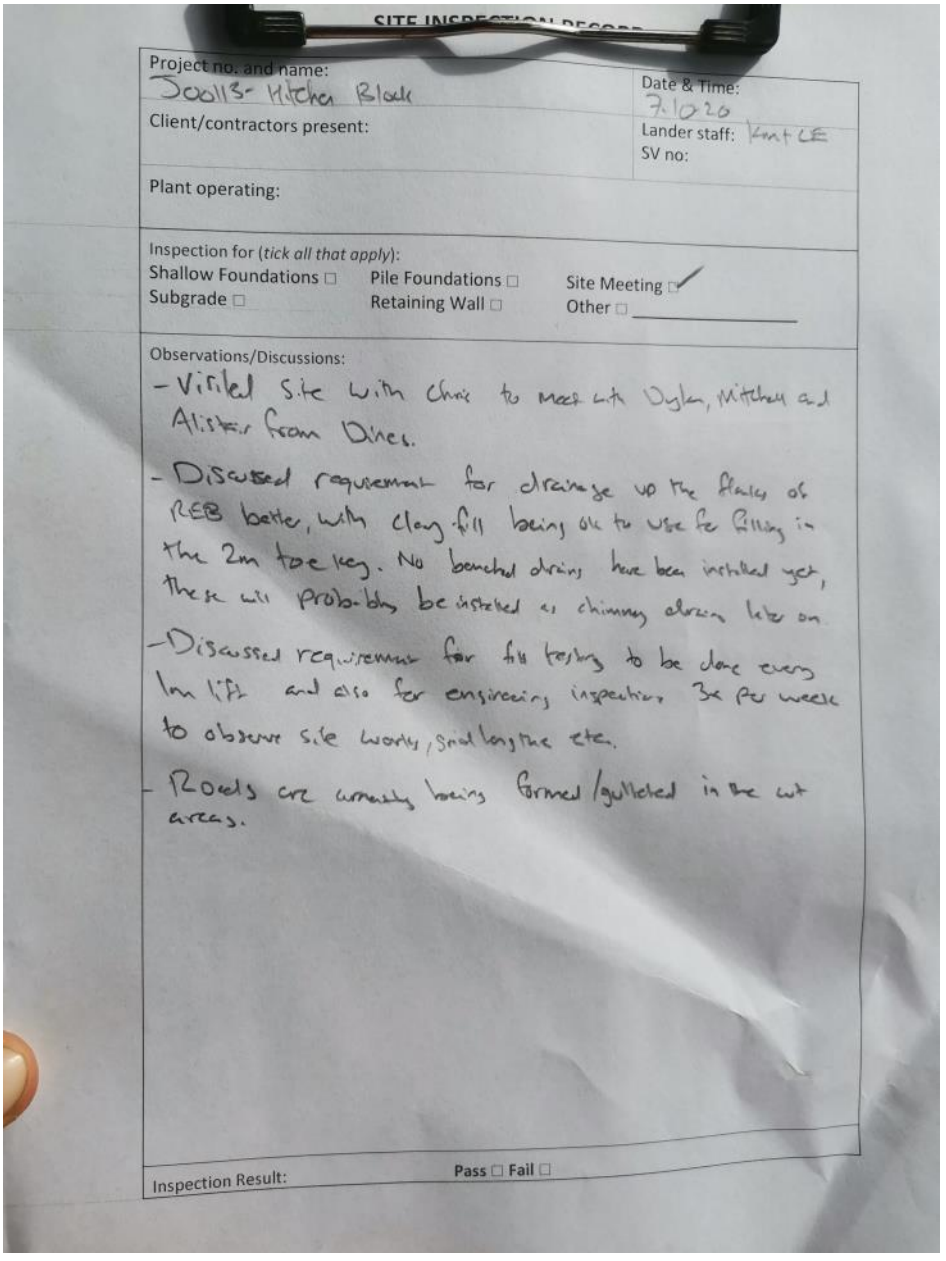
07/10/20

Wednesday, 7 October 2020 9:45 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block

Site Observations and Instructions:



SITE INSPECTION RECORD

Project no. and name: J0011 3- Hitchen Block

Date & Time: 7.10.20

Client/contractors present:

Lander staff: Kent LE

SV no:

Plant operating:

Inspection for (*tick all that apply*):
Shallow Foundations ☐ Pile Foundations ☐ Site Meeting ☑
Subgrade ☐ Retaining Wall ☐ Other ☐ _____

Observations/Discussions:

- Visited site with Chris to meet with Dylan, Mitchell and Alister from Dines.
- Discussed requirement for drainage up the flanks of REB batter, with clay fill being ok to use for filling in the 2m toe key. No benched drains have been installed yet, these will probably be installed as chimney drains later on.
- Discussed requirement for fill testing to be done every 1m lift and also for engineering inspection 3x per week to observe site works, subgrade etc.
- Roads are currently being formed/guttered in the cut areas.

Inspection Result: Pass ☐ Fail ☐


STRATA


HITACHI
DINES

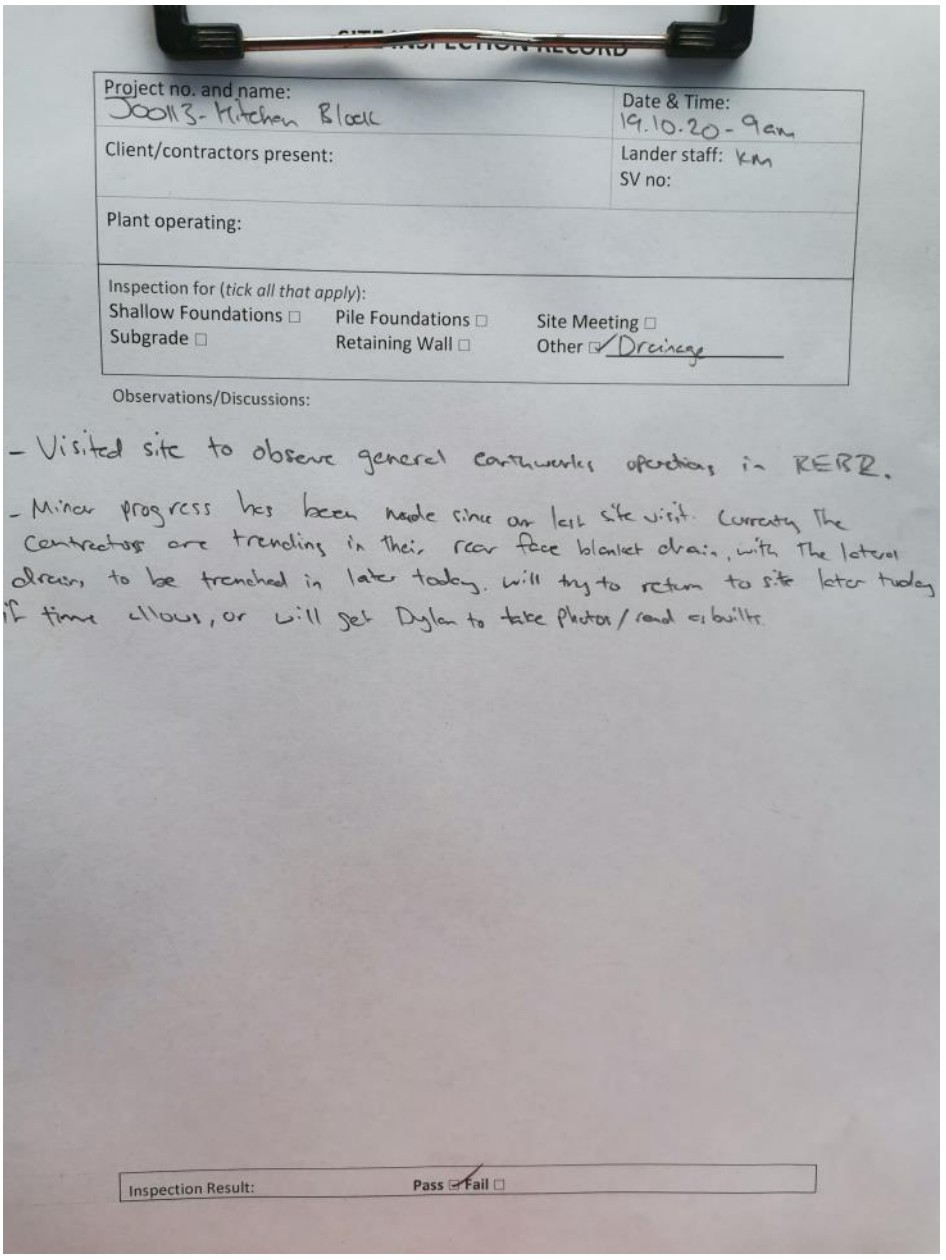
19/10/20

Monday, 19 October 2020 9:39 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block

Site Observations and Instructions:



Project no. and name: J0113 - Hitchen Block

Date & Time: 19.10.20 - 9am

Client/contractors present:

Lander staff: KM
SV no:

Plant operating:

Inspection for (*tick all that apply*):
Shallow Foundations ☐ Pile Foundations ☐ Site Meeting ☐
Subgrade ☐ Retaining Wall ☐ Other ☑ Drainage

Observations/Discussions:

- Visited site to observe general earthworks operations in RERR.
- Minor progress has been made since our last site visit. Currently the contractors are trenching in their rear face blanket drain, with the lateral drains to be trenched in later today. Will try to return to site later today if time allows, or will get Dylan to take photos / read as built.

Inspection Result: Pass ☑ Fail ☐

23/10/20

Friday, 23 October 2020 1:19 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	23/10/20 - 9am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to observe earthworks operations in REB1. Clay fill is progressing and they had just covered up a layer of grid at the time of our inspection. Batter slope appears to be approx. 1(v) in 1(h) as per the design.

28/10/20 - REB1 / 12D

Wednesday, 28 October 2020 1:38 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	28/10/20 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to observe earthworks in REB1. Contractors had finished fill placement ready for the next layer of primary geogrid placement. The fill batter is now entering zone 2 and SG500 grid is being used for these portions of the batter as per our design.

Rear drain blanket trench was open and the top of the blanket and metal backfill was present, as well as the rear of the grid in approx. 0.4m layers.

Earthworks are also commencing in the large slip area at the far end of the site. Silt controls are currently being formed for these works prior to stripping operations commencing.

In Stage 12D, earthworks filling operations are progressing, and the underfill drain is likely to be extended in the next week or two.

03/11/20

Tuesday, 3 November 2020 6:27 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block

Site Observations and Instructions:

Project no. and name: 30113 - Hitchen Road	Date & Time: 3.11.20 - 1pm
Client/contractors present:	Lander staff: KM SV no:
Plant operating:	

Inspection for (*tick all that apply*):
Shallow Foundations ☐ Pile Foundations ☐ Site Meeting ☐
Subgrade ☐ Retaining Wall ☐ Other ☑ REB1

Observations/Discussions:

- Visited Hitchen 120 to inspect earthworks operations. Fill placement is in progress and they are planning on opening up the remainder of the gully once they have a spell of fine weather.

- REB1 earthworks are still in progress. At the time of inspection the contractors were preparing their benches ready for the placement of the next layer of fill, which is likely to be tomorrow morning.

- Silt pond excavations are still underway at the far end of site (reliet slip area)

Inspection Result: Pass ☑ Fail ☐


HITACHI

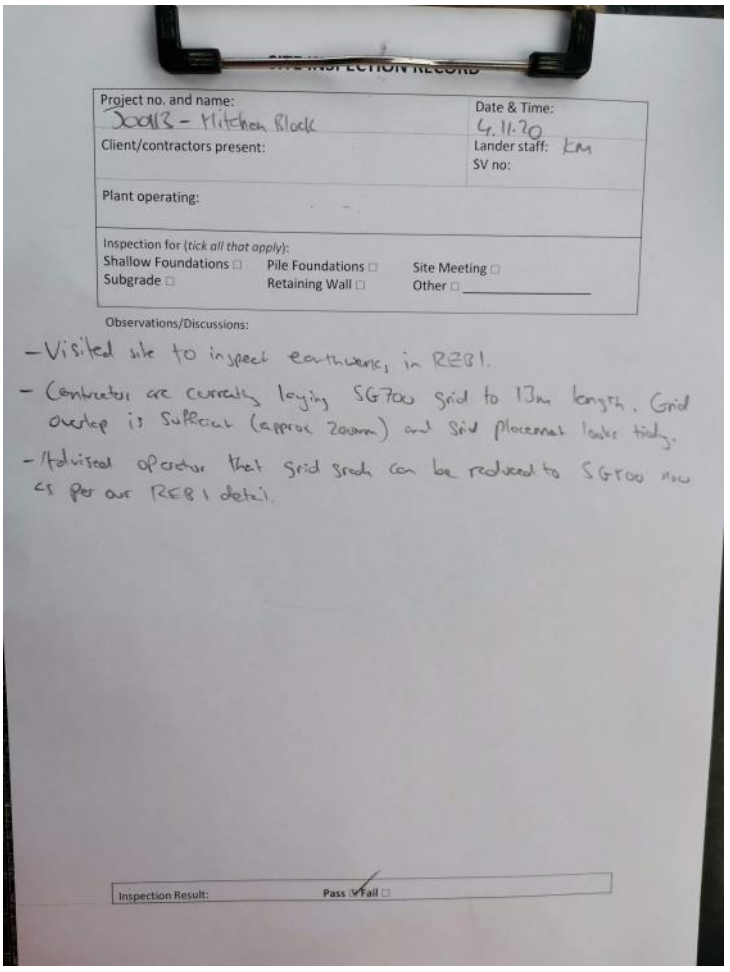
04/11/20 - REB1

Wednesday, 4 November 2020 2:10 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block

Site Observations and Instructions:



Project no. and name: J0013 - Hitchen Block
Date & Time: 4.11.20
Client/contractors present:
Lander staff: KM
SV no:
Plant operating:
Inspection for (tick all that apply):
Shallow Foundations ☐ Pile Foundations ☐ Site Meeting ☐
Subgrade ☐ Retaining Wall ☐ Other ☐ _____
Observations/Discussions:
- Visited site to inspect earthworks in REB1.
- Contractor are currently laying SG700 grid to 13m length. Grid overlap is sufficient (approx 200mm) and grid placement looks tidy.
- Advised operator that grid spech can be reduced to SG400 now as per our REB1 detail.
Inspection Result: Pass ☑ Fail ☐

13/11/20

Friday, 13 November 2020 1:04 p.m.

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	13/11/20, 1pm
Author:	CE
Plant Operating:	
Weather:	Fine

Site Observations and Instructions:
Works have re-started on REB1 after the wet weather. Contractor was about to commence placement of another grid layer. Clay material still being dried out/ conditioned.

16/11/20 - AM

Monday, 16 November 2020 3:07 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	16/11/20 - 11:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to observe earthworks operations in REB1. The REB is now up to chainage 49.5 and a layer of intermediate grid had just been placed and covered by clay. The next bench was being prepared at the time of inspection. Contractor informed that the next grid would likely be placed tomorrow morning so will do another inspection of the grid then.

Was also informed that the lateral drain was trenched and installed mid-last week, for which we received the as-builts. Advised we should try inspect the next section of drainage installation if possible.


HITACHI

16/11/20 - PM - Stage 12D

Monday, 16 November 2020 3:19 PM

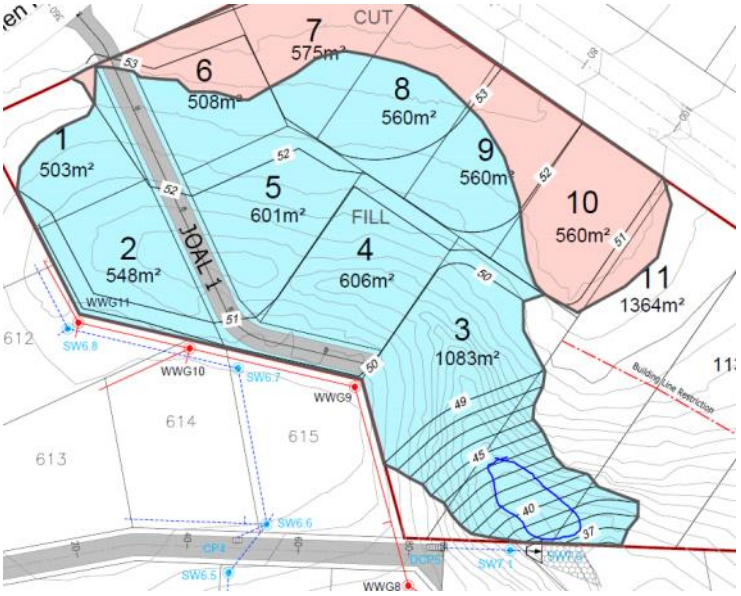
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	16/11/20 - 1:30pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to observe the gully muckout within Stage 12D. The muckout is commencing from the lower portion of the gully and will tie in with the existing underfill drain once some engineered fill has been placed in the area to allow digger access. Approx. area sighted shown in blue annotation below. Will return to site tomorrow to observe progress here.

Also inspected the removal the stockpile materials within Fill D. Very stiff, orange/brown ash soils were exposed consistent with the stripped soils previously sighted within the adjacent cut areas.



17/11/20

Tuesday, 17 November 2020 4:55 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	17/11/20 - 12:30pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to observer general earthworks operations. Within Stage 12D the base of the gully had been mucked out slightly further upslope and the drain coil and bidim cloth were in place at the base of the muckout. SPR was being placed over the drain to be compacted.

Within REB1 clay fill was still being compacted. It appeared that the geogrid had already been placed.

18/11/20 - REB2

Wednesday, 18 November 2020 3:46 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	18/11/20 - 12:30pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect the undercut for the shear key in REB2. The contractors had cut down approx 4m from original ground level and had excavated down to hard orange silts.

Checked these works against our model which confirmed that the approximate depths and materials were consistent with our model. Informed Dylan that shear key operations could continue as planned, but 2 or 3 trial pits will be required in the base of the shear key once it has been opened up to further validate the ground conditions beneath the base of the shear key.


HITACHI

20/11/20 - REB1&2, Stage 12D

Friday, 20 November 2020 12:41 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	20/11/20 - 11am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Stage 10:

Visited site to inspect that underfill drain outlets have been installed. Both drains were sighted and have been formed as scruffy dome or rip-rap channel outlets.

REB2:

Observed shear key operations in this gully. The shear key looked that same as our previous inpsection, and the gully is still being mucked out for the shear key. From what we can see the base appears hard, however, we waven't been able to test the base of the shear key yet due to the muckout still needing to progress.

Informed the contractors that we will inpsect once a larger section of the shear key has been opened up, and that they will need to create a level surface for the shear key and then bench up the sides of the gully when backfilling with hardfill.

REB1:

Primary geogrid has been laid out to 13m length. Grid layout and overlap is sufficient. The rear fill drain was also being connected and has been sufficiently linked up.

Stage 12D:

Not much progress has been made since our last inspection in this area. The SPR in the base of the gully is still loose and requires compaction. The contractor is planning to bring a pad-foot roller down to this area to start backfilling the gully.

24/11/20 - REB2

Tuesday, 24 November 2020 3:53 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	24/11/20 - 12pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect earthworks operations in REB2 shear key.

The shear key has been opened up slightly more since our last inspection, however, more works are still required to enable proper access into the shear key. Once this has been done we will observe a series of trial pits along the base of the shear key to confirm the ground model.


HITACHI

30/11/20 - Stage 12D

Monday, 30 November 2020 12:58 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	30/11/20 - 9:45am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to inspect earthworks operations in Stage 12D area.

Not much progress has been made since our previous inspection and there is spoil along the gully which is still to be cleared. Also discussed that a toe key is required at the base of the proposed fill batter, which the contractors are proposing to install prior to building the fill batter.

Also discussed the stripping in Lots 611 and 612 which Russell emailed about last week. This area is still covered by a topsoil stockpile. Advised the operator to get Dylan to get us in for an inspection prior to placing fill in this area.

03/12/20

Thursday, 3 December 2020 7:30 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	03/12/20 - 1:15pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Trevor to discuss toe key requirements for the Sage 12D fill batter. Discussed that the toe key needs to be embedded 0.5m into very stiff, 100kPa soils, and needs to extend along the face of the batter and be benched up the sides of the fill. Dines are going to use SPR in the base of the toe key and then use clay fill once above the water / underfill drain line. The toe key will likely be ready for us to inspect early next week.

The remained of the gully is still being stripped, and excess spoil is still placed along the gully waiting to be loaded out. There is a vertical cut along the gully flank which is located just below an existing dwelling. Advised this should be backfilled and supported in the short term to provide stability to the dwelling.

Filling has also occurred over lots 612 and 613 from the adjacent GCR stage. We will drill several 2m boreholes here to confirm adequate stripping. Asked Trevor to also organise a fill test in this area for inclusion in our addendum GCR letter.


HITACHI

07/12/20

Monday, 7 December 2020 4:48 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	07/12/20 - 7:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Trevor to determine extent of toe key in Stage 12D. Decided that the key should run along the toe of the batter, be 3m wide and at least 0.5m deep into very stiff natural soils. The key will be backfilled with SPR and the underfill drain will then run on top of the key (i.e. along the gully floor) and outlet into the gully below.

The gully has also been stripped and the underfill drain is to be placed next.

Dines has also placed some temporary fill in the cut that was open below the existing house.

08/12/20 - REB2, Stage 12D

Tuesday, 8 December 2020 2:05 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	08/12/20 - 8:45am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect the following:

REB2:

The front/downslope part of the shear key has been excavated to depth, with hard, orange/brown silty soils exposed at the base. A trial pit was excavated with the rock bucket and went to a depth of approximately 2m before it became too hard to excavate further.

A small section of softened soils remains to be removed in part of the base.

A section of the existing underfill drain behind the shear key has been flattened due to plant tracking over this area. Advised that this section of the underfill drain would need to be chased out and a new drain relayed here. The contractor also had concerns about the soils under the drain being soft, so we will look at this when the gully has been opened up.

12D:

Toe key construction is still in progress. The contractors have excavated down approximately 3m and have encountered slop. Advised them the clean this out and continue to muck out the area to very stiff soils as per our detail.

REB2:


HITACHI

REB1 progress:

12D toe key:

Damaged underfill drain in REB2:


HITACHI
E30F

09/12/20 - REB1&2, Stage 12D

Wednesday, 9 December 2020 3:08 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	09/12/20 - 11am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect the following:

- Inspected toe key in Stage 12D. Contractors have excavated to approx. 4m with no improvement in ground conditions. Advised that they could place a 500mm raft of compacted SPR to allow them to start backfilling.
- Inspected shear key excavations in REB2. Hard ground exposed throughout along the base of the key which had been further excavated since yesterday. Advised that backfilling can commence with SPR100 once they have pumped the water out of the excavation. Plateau test from REB1 will still remain relevant.

REB 2 shear key:

REB 1 area:

Stage 12D:

10/12/20 - Stage 12D

Thursday, 10 December 2020 12:45 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	10/12/20 - 10:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to check on toe key works in Stage 12D. The first section of the toe key has been backfilled with hardfill.

Also, drilled at hand auger in Lot 612. Encountered approx. 0.6m of fill overlying very stiff, natural ash soils.

14/12/20 - Welded tuff area

Monday, 14 December 2020 1:39 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	14/12/20
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect an area of cut which the contractors are struggling to excavate. Dylan was concerned that the material may cause limitation for future end-users / builders. Dines were querying whether an undercut backfilled with certified clay would be a good solution.

On site, the material comprised of a welded tuff. Advised that I would talk to Chris or Shane before providing any advice.

Client : DFH JOINT VENTURE LIMITED

Project Location : HITCHEN ROAD STAGE 5, POKENO

Job Number: J00741

Machine Borehole No. MH01

Sheet 2 of 2

Vane Head: 2007 | Logged By: KM | Processor : RG | Start Date: 19.03.18 | Finish Date: 19.03.18

Borehole Location: mN mE | Description: Refer to site plan | Ground R.L. | Orientation: vertical

Stratigraphy	CORE DESCRIPTION	Legend	Depth (m)	DEFECTS	Groundwater / Piezometer	Drilling Method & Casing	Recovery (%)	RQD (%)	Sample and Laboratory Test Details	Vane Dial / Sensitivity & SPT
Tuff	encountered medium gravel sized silt carbonaceous inclusions		8.5			OPEN BARREL	41			
			9.0						Sample 9 Disturbed 9.0-9.1m	UTP SPT at 9.0-9.45m 7/9/12 N=21
			9.5	Piezometer Screened from 1.0m to 6.0m			SPT			
	becoming dark grey and orange/brown mottled brown/grey		10.0				92			
			10.5				SPT			UTP SPT at 10.5-10.95m 10/10/7 N=17
	with moderately thin bed of SILT		11.0							
	with very thin bed of stiff silty CLAY		11.5				76			
			12.0				SPT			UTP SPT at 12.0-12.45m 9,13,15 N=28
			12.5							
			13.0				100			
	becoming dense		13.5				SPT			UTP SPT at 13.5-13.95m 9/13/18 N=31
			14.0							
			14.5				94			
	at 15.0m, becoming medium dense		15.0				SPT			UTP SPT at 15.0-15.45m 10/12/14 N=26
	EOB at 15.0m. Target Depth. No Groundwater Measured in Piezometer		15.5							
			16.0							

LANDER geotechnical

Comments: Core loss from 7.95m-8.65m

Driller: Pro-Drill | Rig: Tractor

Drilling Fluid: water | Checked: KM

Topsoil, Fill, Clay, Silt, Sand, Gravel, Organic, Pumice, Sandstone, Siltstone, Limestone, Volcanic, Plutonic, No Core

15/12/20 - Stage 12D

Tuesday, 15 December 2020 2:24 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	15/12/20 - 12pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to inspect 12D toe key. Contractor had already filled with SPR to 1.5m without getting us to inspect or getting fill testing so asked them to dig back to subgrade in the centre. Firm soils exposed at the base, however, the toe key will be about 2-3m thick so no undercut was recommended. Contractors said they needed to backfill the area immediately. We advised that they need to give adequate notice for geotech and fill test inspection in this case.

Also, inspected stripping over Lots 612 & 612. Generally very stiff natural ash soils were exposed, however, some topsoil/rubbish was observed which we recommended be undercut to natural ground. Will look at this again tomorrow afternoon with Chris.

12D topsoil stripping:

12D fill/toe key area:

16/12/20 - REB1&2, welded tuff area, Stage 12D

Wednesday, 16 December 2020 5:56 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	16/12/20 - 1pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site with Chris and Shane for a senior/principals site visit. Observed the following:

- Welded tuff materials are still being cut behind the site office. We need to discuss with Russell options here. Ether the materials can be left in place and the end users will need undercut the materials with bigger diggers etc when doing footings and drainage lines, or the material can be undercut by approx. 0.6-1m and backfilled with certified clay, however, this will raise the expansive class in these lots (which would currently be good ground).
- REB2 shear key excavations. They have filled about 2m and have missed testing again. Advised Dylan to excavate some areas down to 1m for a test prior to placing further fills. Will inform Josh.
- REB1 is near level and is set to be completed in the new year. Will catch up with Trevor on the first week back to organise inspections for the final geogrid layers here to ensure they are placed properly around drainage lines.
- Stage 12D toe key. The contractors failed their previous test here, achieved CIV readings of around 10. They removed the material, discarded the wetter SPR and refilled with a heavier roller. Josh to retest. The model also needs to be rechecked to confirm minimum toe key requirements are adequate.
- Also observed the stripping area in lots 611 and 612. Rubbish/pre-existing fills are still present. Reiterated that these materials be fully undercut. Will return to site tomorrow to observe general earthworks operations.

17/12/20 - Stage 12D

Thursday, 17 December 2020 1:23 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	17/12/20 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Inspected backfill in 12D toe key. Compaction appears to be going well with no obvious deflections noted under a 12T smooth drum roller. The latest fill test passed on both clegg hammer and backscatter testing.

Also observed undercutting of topsoil/pre-existing fill in the top section of Stage 12D. The base of the undercut is generally down to natural ground, although there is some minor topsoil mottling to chase out. The existing fill cut shows a layer of topsoil within the fill placed by Dines which is within 2m of surface level. Advised that this should be undercut and removed from the fill. Will return to site again tomorrow morning to inspect.


PORTER HIRE

18/12/20 - REB1&2, Stage 12D

Friday, 18 December 2020 12:21 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	18/12/20 - 10:45am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Inspected the following at the request of Dylan:

- At top of Stage 12D, topsoil horizon has been chased out and is ready to be filled again.
- At Stage 12D toe key, they have filled up another metre and are waiting for the next test. Hardfill surface appears well compacted visually. Asked Dylan to get the extent of the key surveyed to ensure that the key matches the full extent of the fill batter.
- At REB1, geogrid is being laid out, with grid lengths of around 5m and 14m being recorded as per our design for the top layers.
- At REB2 shear key, contractor has informed that additional testing was undertaken at 1m and 2m fill heights. Also observed stripping to the base of the key in the rear portions. Hard surface encountered here. A trial pit at the base was only able to be excavated approximately 1m with a rock bucket, consistent with the previous test.

REB1:

Stage 12D toe key:

REB 2 shear key:


BELL

12D topsoil horizon stripping:

21/12/20 - Stage 12D

Monday, 21 December 2020 2:09 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	21/12/20 - 12:15pm
Author:	
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at request of Dylan to observe site works prior to the Christmas break. Not much has progressed since our previous visit. Toe key has been completed and clay fill for the 1(v) in 3(h) batter is now commencing.

Also requested that some more fill be placed to buttress the site cut at the top of the gully flank to ensure stability is maintained to the house.

06/01/21 - REB2, Fill K, welded tuff area

Wednesday, 6 January 2021 4:22 PM

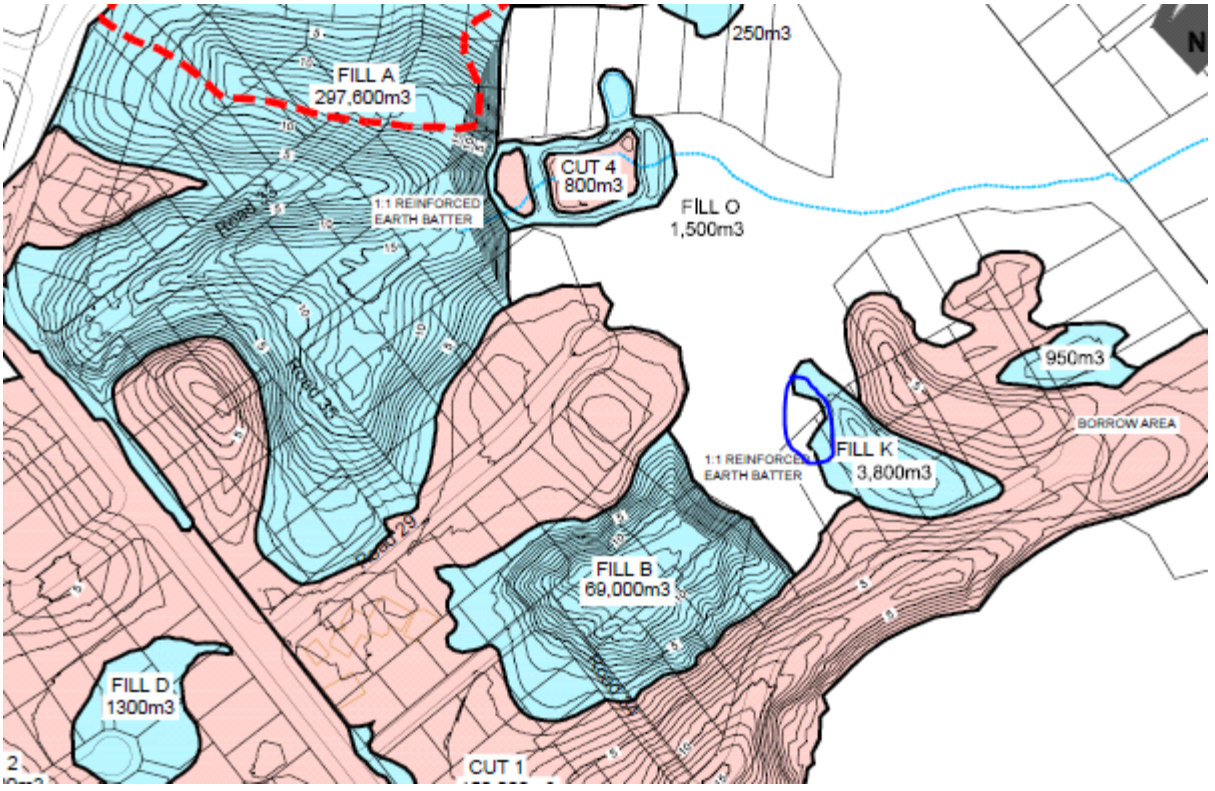
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	06/01/20 - 2pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Trevor to inspect the following areas:

- REB 2 shear key: Inspected the excavation to the base of the shear key in the rear/southern corner of the key. Hard, orange silts exposed consistent with the previous observations. There is still an area in front of the key which needs to be fully pumped out an backfilled also.
- Extent of works adjacent to Fill K: Approximate area shown in blue on the annotated drawing below. Trevor discussed that the area is to be extended down to the main gully now. Advised that any stripping needs to be down to the stiff natural ground and any mullock or colluvium removed. Further advice to be given once the area is opened up and we can observe ground conditions. Trevor will send some plans through to us for our initial thoughts on what engineering solution may be required.
- Welded tuff area: The contractors have about 1m of further cut required to achieve design subgrade level. Trevor advised that they will survey the welded tuff once they reach this depth so we can advise Dines.



Welded tuff area

Addition to extent of works

REB2 shear key

12/01/21 - REB2, old slip area

Wednesday, 13 January 2021 12:45 PM

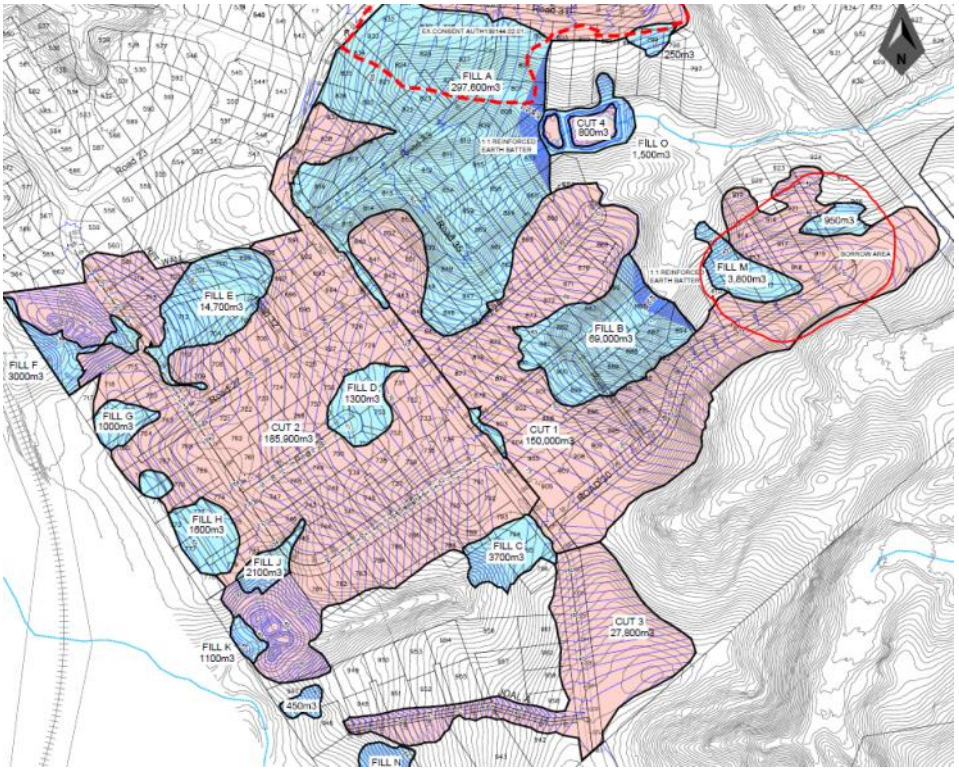
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	12/01/21 - 2:45pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect stripping for cut 1 in the approximate area outlined in red on the image below. Cut exposed very stiff natural ground. No seepages or soft ground observed though this area. Minor fills to be placed in this area next.

Also inspected REB 2 shear key progress. Backfill of the shear key in progress. Fill testing was being carried out at the time of our inspection of the area beyond the key where the groundwater was being pumped from.




0800 40 38 38
novus
glass


0800 10 35 35
novus glass
0800 10 35 50
novus glass

13/01/21 - REB1&2

Wednesday, 13 January 2021 4:31 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	13/01/21 - 2:30pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site with Chris to carry out general inspection of the site.

In REB1, drainage is being installed and the contractors have followed our advice by only cutting the grid perpendicular to the slope face and installation additional perforated drainage in the service trench as an additional measure.

REB 2 shear is continuing with backfill operations.

Observed cut 1 stripping (which was observed with Dylan yesterday). Will have a look at recent reporting and assessments that Matt has done recently with Chris tomorrow to determine if there are any additional requirements here.


HYNDS


HITACHI


HITACHI

15/01/21 - REB2

Friday, 15 January 2021 2:06 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	15/01/21 - 12:15pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect the final section for the base of the REB2 shear key. The shear key was extended down to the hard, orange silty materials previously identified at the base of the shear key. A scratch with diggers rock bucket confirmed hard materials.

On site Mitchell confirmed that 1.4m of SPR hardfill is required until the base of the GAP65 layer at the base of the REB batter.

Mitchell is also planning on the setout for the counterfort drains next week. Advised we will inspect the setout and modify this if required.

18/01/21 - REB1

Monday, 18 January 2021 4:52 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	18/01/21 - 11am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Trevor to catch up on site wide earthworks that occurred while he was on leave last week.

Visited the old slip adjacent to the silt pond below REB1. Dines plan to start remediating this area and placing a minor fill batter. Advised that an underfill drain is required here below the fill. The plan is the bench up the existing feature, ensuring any old slip debris or otherwise unsuitable soils are removed prior to fills being placed. Advised that we should be on hand regularly for inspections while these works are being carried out.

Elsewhere, not much has progressed since last weeks inspections. Some clay is being laid out to dry in the large cut area adjacent to the REB2 shear key.

25/01/21 - REB2, old slip area

Monday, 25 January 2021 12:45 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	25/01/21 - 10:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to inspect the following:

- Observed placement of underfill drain within Fill M. Advised contractors that they could remove the top half of the drain as this is above the natural gully feature.
- Contractors wanted to know whether they should put an underfill drain in the eastern part of Fill M. 1.5m of clay capping is proposed. Advised the contractors to trench this in 0.5m to enusre a 2m cover is maintained to avoid any tags on the lots (920, 926, 927).
- Observed stripping operations below proposed Fill C. The topsoil strip revealed hard ash soils and tuff materials consistent with the materials observed in our trial pits from the GIR. Advised that an underfill drain should be trenched in here similar to below Fill M.
- Observed muckout of organic and soft alluvium materials below the underfill drainage line upslope of the REB2 shear key. The contractor had excavated down to the hard materials exposed at the base of the shear key. Advised him that this could be reduced to the base of any major organic layers, provided that the inorganic soils are competent enough the place and compact engineered certified fills upon. Will return in a day or two to observe progress.


HITACHI

26/01/21 - REB2

Tuesday, 26 January 2021 1:44 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	26/01/21 - 11am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect REB2 earthworks operations.

The undercut of organic alluvium has now been backfilled with SPR and the undercut had extended back into the gully to intercept the undisturbed/intact underfill drain. A drainage line has been trenched through the centre of the shear key to allow this drain to outlet into the main gully. The contractors plan to place two coils in this trench for redundancy.

27/01/21 - REB2, Stage 12D

Wednesday, 27 January 2021 2:03 PM

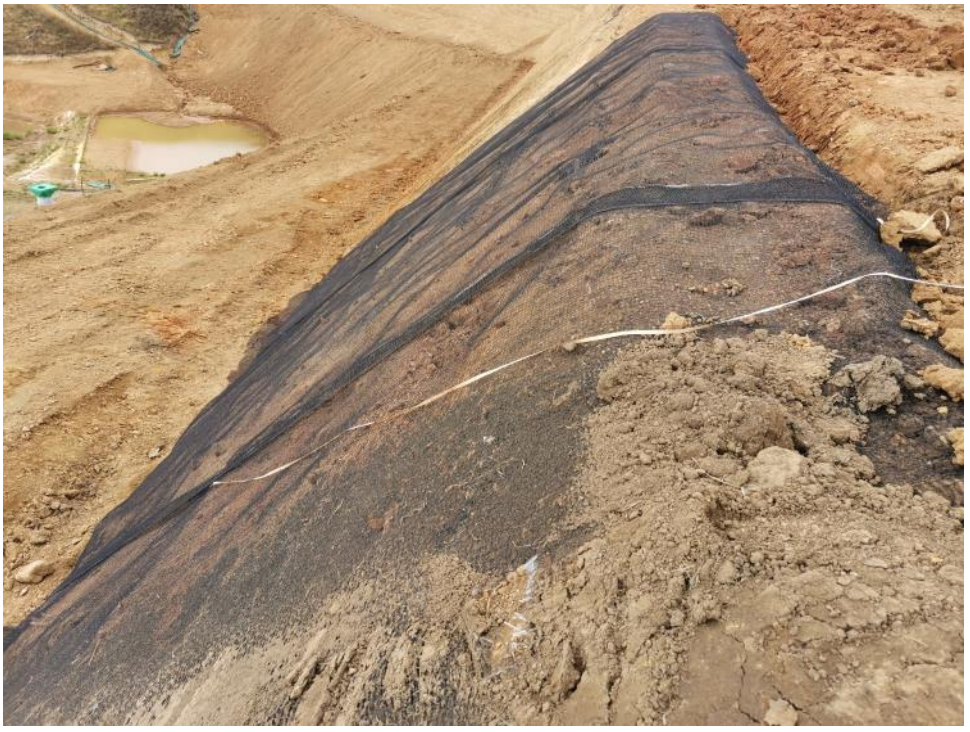
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	27/01/21 - 10:15am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to inspect general earthworks operations. Observations and recommendations as follows:

- Within Stage 12D the 1(v) in 3(h) batter has been formed to final height and has been trimmed and topsoiled.
- Stripping has commenced up the flanks of the gully in REB2 for preparation of the fill batter placement. Recommended the installation of 3 additional underfill drains in areas of seepage, two up the eastern flank and one up the southern (rear) which will connect into the existing underfill drain.
- Discussed that benching into the flanks will require an average bench depth of 2m which Dines have already programmed up.
- Will meet on Friday with Cirtex and Chris to discuss topsoiling the face of REB1 as the contractors are having difficulty getting the topsoil to stay in place.



29/01/21 - REB1&2

Friday, January 29, 2021 5:27 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	29/01/21 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site with Chris to inspect the construction of the REB1 batter. Discussed that it would be difficult to get a 150mm layer of topsoil to bind to the face / the fortrak grid system. Will organise for Cirtex to inspect and provide advice.

At REB 2, construction of the shear key is almost complete and several underfill drains have been installed as per our recommendations.

Also inspected final works for lots 611 and 612, adjacent to stage 12D. Both lots have been topsoiled, with 100mm of topsoil measured in both lots.


HITACHI

05/02/21 - REB 1

Friday, 5 February 2021 2:52 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	05/02/21 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to meet with Grant (Cirtex) and Dylan to discuss the facing for REB1.

Grant advised the product Dines are using is not the best for such a steep slope, however, he is going to discuss options with others at Cirtex and provide further advice as to how the facing mat should be installed and how they are joined down the slope.

Also inspected REB2 - the 1m GAP65 layer has been placed and tested via clegg hammer, and the 19m long layer of grid is laid over top as per our design recommendations.


HIDROMEK

Advice email from Cirtex:

Kyle Meffan

From: Grant Suckling | Cirtex Industries Ltd <grant@cirtex.co.nz>
Sent: Tuesday, 9 February 2021 5:55 AM
To: Kyle Meffan
Cc: DylanH@dinesgroup.co.nz; trevorm@dinesgroup.co.nz
Subject: CIRTEX - Hitchen Road Topsoil Batter

Hello Kyle,

Good to meet with you onsite last week. The Fortrac 3D on the first cut looks good, some additional small pins on overlaps may help hold he Fortrac in place while topsoil is placed. The purpose of the Frotrac is to initially help retain top soil then long term is to reinforce the root zone of the vegetation to stop vegetation sliding off the face. The top soil being currently used is very dry and powdery so very little soil retention is being achieved. As discussed there is an area at one end where wetter soil had been packed on with excavator which may help achieve a better outcome with the vegetation long term.

As to placing he next runs of Fortrac 3D we would suggest the Fortrac is pinned in the 300mm x 300mm V Trench already cut with Platipus Anchors or 400mm DuraMat Pins. The advantage of the Platipus Anchors being higher pull out resistance and also the anchor plate that would hold the Fortrac better.

https://cirtexcivil.co.nz/product/platipus-args-anchors/
https://cirtexcivil.co.nz/product/duramat-pins/

Cirtex does not get involved with hydro-seeding however Jon Tomsett from Cirtex has had a lot of experience in the past and has some suggestions:

Grant,

Assuming the goal on these slopes is long term grass establishment I would recommend the following:
Engage a reputable Hydroseeding contractor to tailor an application with a broad spectrum seed mix inclusive of Kikuyu for long term establishment and stability. The immediate application ideally will include a heavy application and tackifier that will assist with bonding the lose topsoil providing some protection against a significant rainfall event.
I would then suggest applying a tackified hay mulch over the top to retain moisture and encourage germination and establishment in these drier months. A Hessian overlay could be considered but a Hay mulch would be my preference if a contractor is comfortable they can achieve coverage.

Happy to come to site or discuss further if required.

Do not hesitate to contact me if you have any questions.

Kind Regards,

Grant Suckling
Technical Sales

T 0800 247 839
W www.cirtexcivil.co.nz

09/02/21 - REB2

Tuesday, 9 February 2021 4:46 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	09/02/21 - 9:30am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site to observe earthworks progress over the weekend, however, not much had been done since last week.

There is still one more layer of GAP65 to place in REB2 prior to clay filling starting.

11/02/21 - REB1&2,welded tuff area

Thursday, 11 February 2021 1:02 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	11/02/21 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Visited site at the request of Dylan to inspect site works. The following observations were made:

- Within the area of welded tuff, Dines have decided to change the subgrade levels and build up the area with terraced platforms utilising clay fills. Competent, hard subgrade exposed at base suitable to place fill upon.
- Within REB2, the 1m GAP65 layer is now complete and clay filling is about to commence. The rear blanked drain is being installed, however, the main underfill drain has been severed and the contractors were advised to repair this prior to backfilling.
- At the REB1 wall face, the contractors are still having difficulty placing topsoil along the facing. Advised the contractor to keep talking to Cirtex and their hydroseeders for advice as necessary.
- The old slip above the REB1 silt pond is about to be backfilled. Advised contractors to trench in an underfill drain prior to benching into the slope and filling. The underfill drain will outlet at the same point at the REB underfill drains, but with a different outlet point.


ZAXIS200LC

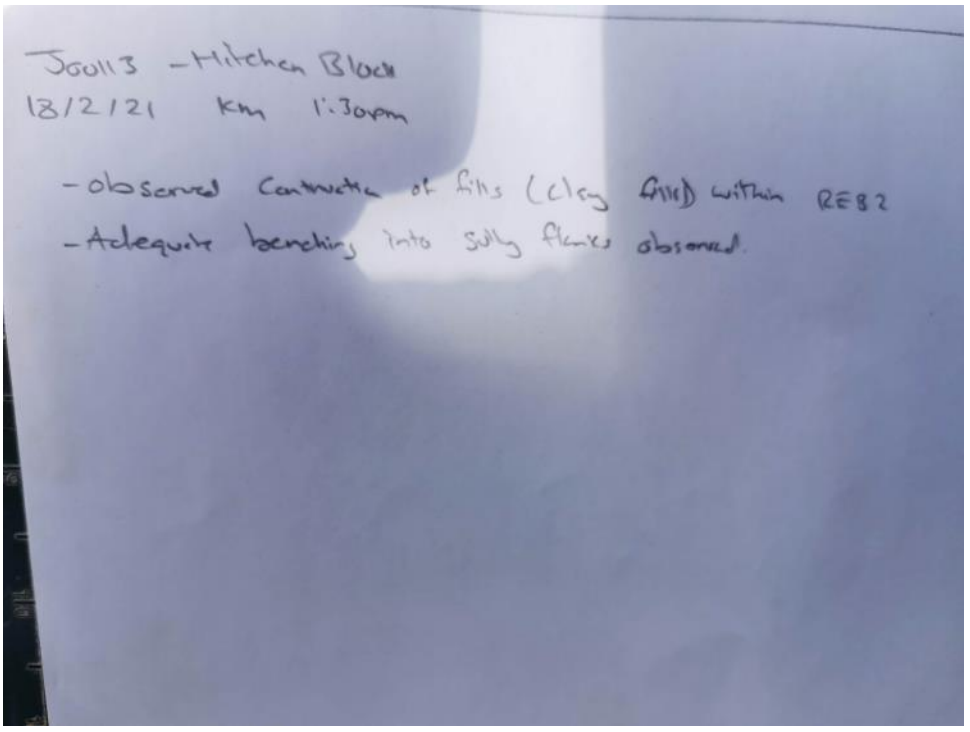
19/02/21 - REB2

Friday, 19 February 2021 8:42 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block

Site Observations and Instructions:



24/02/21 - REB1&2

Wednesday, 24 February 2021 12:11 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	24/02/21 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

- Fills are progressing in REB2. All 4x underfill drains can still be observed at the toe of the batter.
- Slip remediation works progressing below DEB10 (adjacent to REB1 silt pond). Underfill drain observed below current fill batter as per our recommendations.

26/02/21 - REB2

Friday, 26 February 2021 4:42 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	26/02/21 - 2pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

- Observed progress of REB2 batter fill operations.
- Geogrid laid out to approx. 19m length as per our design. A gap remains in the centre section which is to be picked up and covered at the next primary grid lift.
- Fill compaction results have generally been passing, after a series of failed fill tests a few weeks ago (failed on air voids).
- Adequate benching exposed along the gully flanks.

08/03/21 - REB2, Stage 12D

Monday, 8 March 2021 1:08 PM

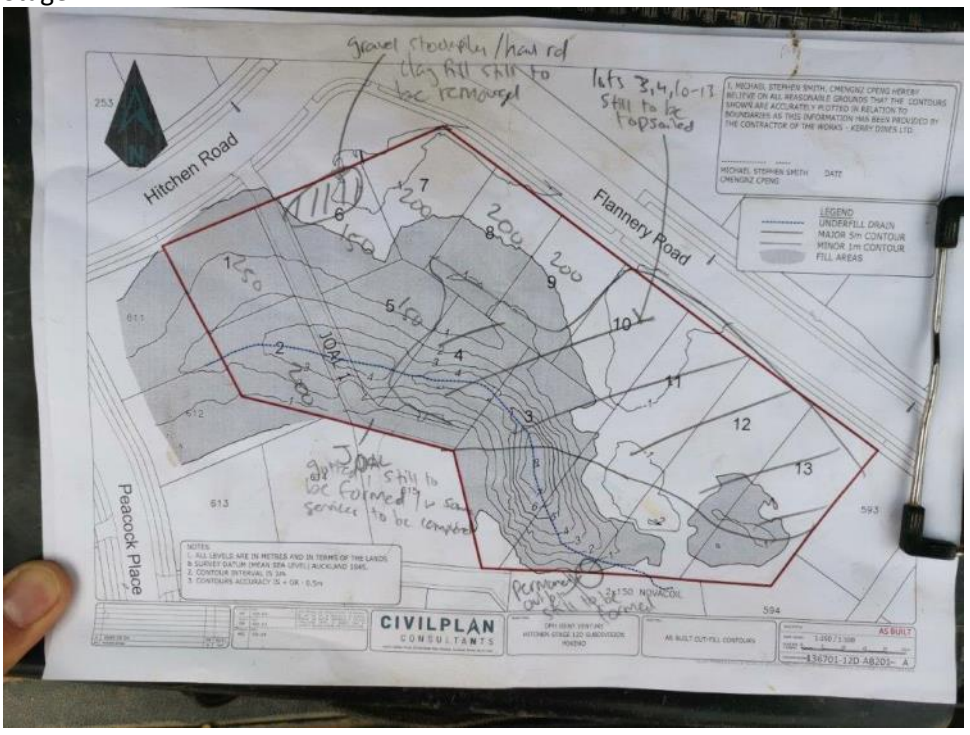
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	08/03/21 - 10:15am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

- REB2 fill placement is progressing. 2m face tightening grid currently exposed and waiting for the next layer of clay fill.
- At stage 12D carried out topsoil measurements. The following still needs to be addressed:
  - No permanent concrete outlet formed for underfill drain at toe of batter.
  - Lots 3,4, 10-13 are still to be topsoiled
  - Stockpile of gravel / loose clay present adjacent to JOAL within lot 6, to be cleared and topsoiled

Stage 12D:



REB2:

12/03/21 - REB1, REB2

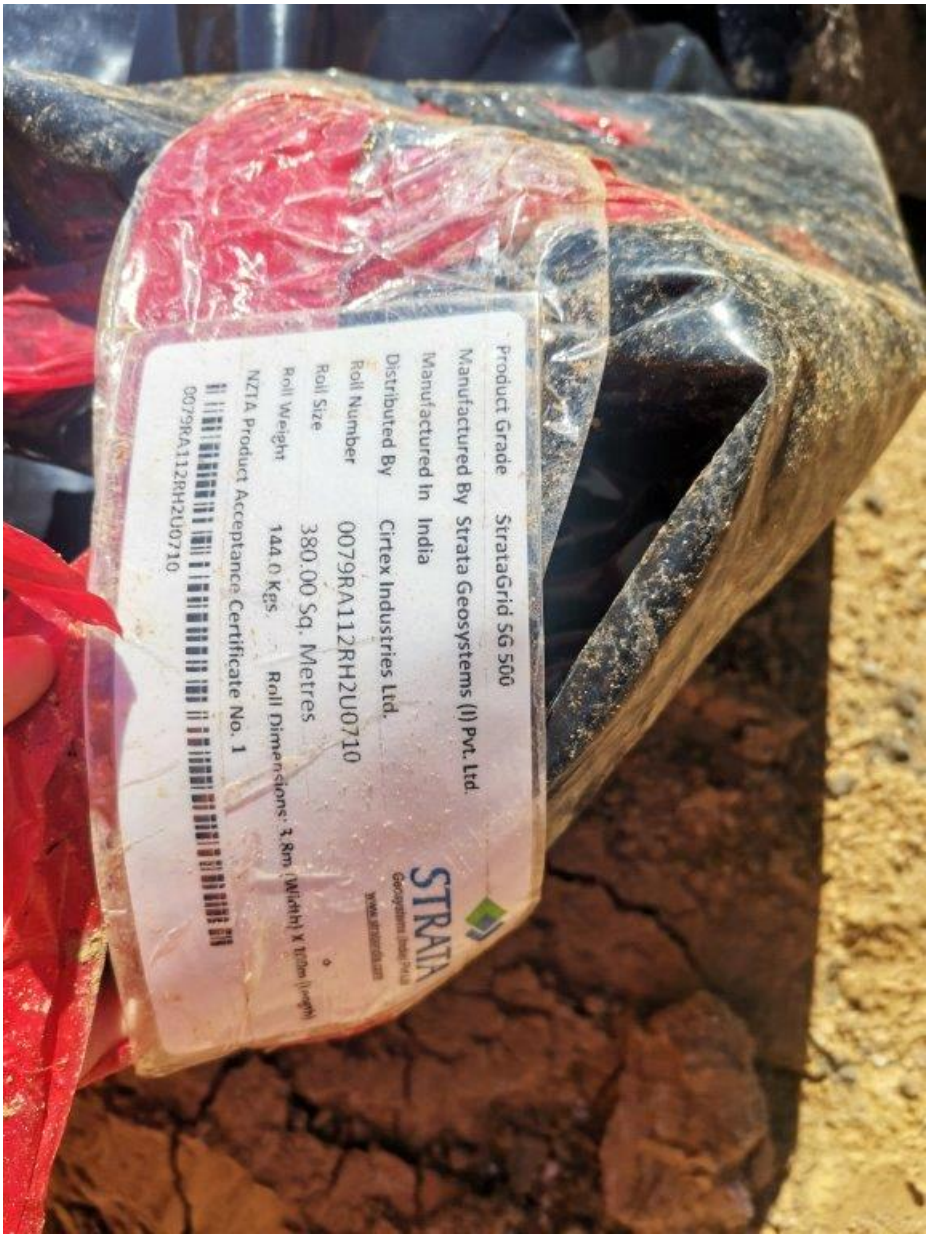
Friday, 12 March 2021 4:29 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	12/03/21 - 1pm
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

- Filling is now complete in the old slip adjacent to the stormwater pond below REB1. The area is now being trimmed and topsoiling is planned soon.
- Inspected filling operations in REB2. The REB is now in the middle grid area and 10m lengths of SG500 grid were recorded throughout.
- Cut progressing above REB2.


Product Grade StrataGrid SG 500
Manufactured By Strata Geosystems (I) Pvt. Ltd.
Manufactured In India
Distributed By Cirtex Industries Ltd.
Roll Number 0079RA112RH2U0710
Roll Size 380.00 Sq. Metres
Roll Weight 144.0 Kgs.
NZTA Product Acceptance Certificate No. 1
0079RA112RH2U0710

24/03/21 - Fill M&O, REB2,

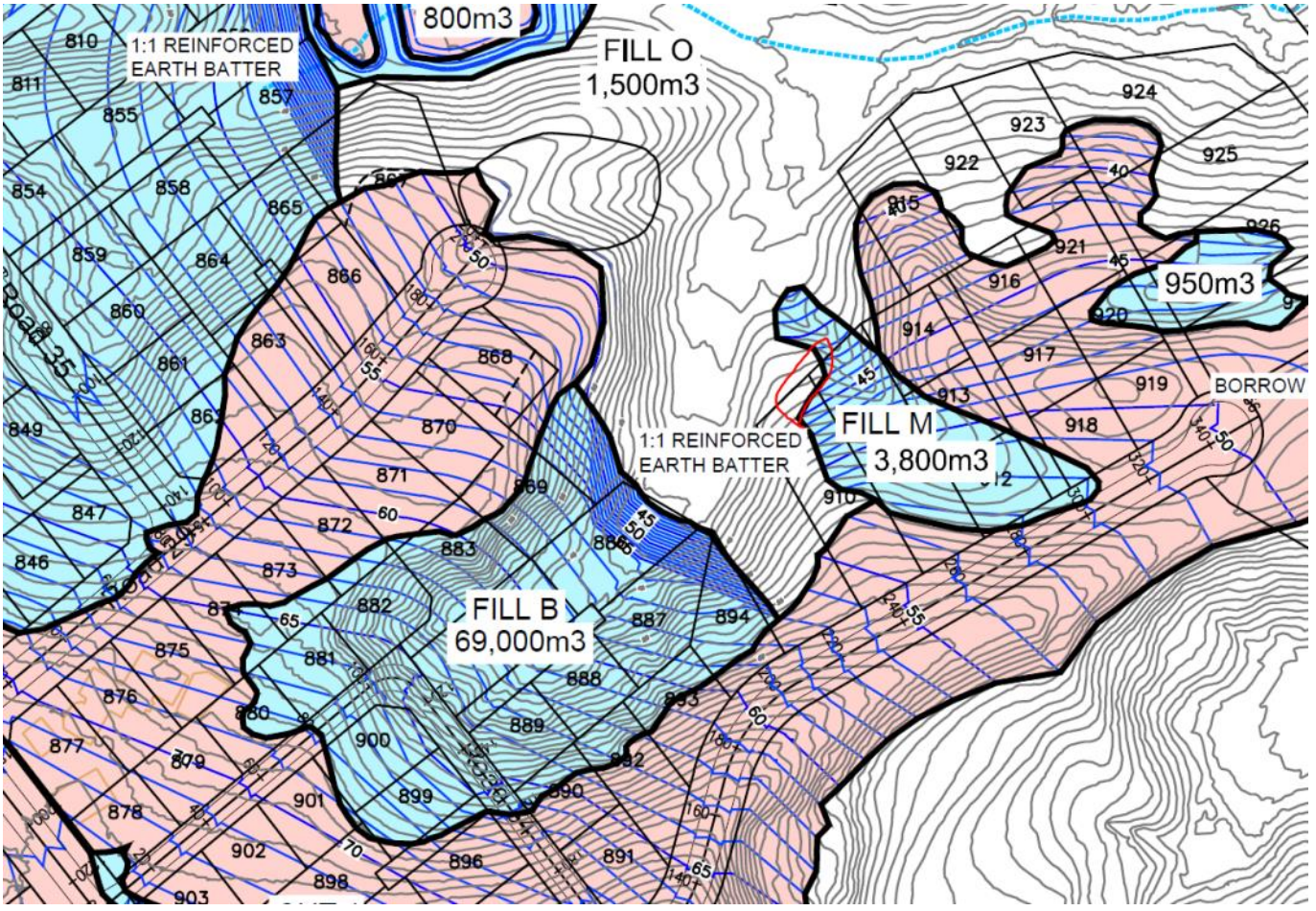
Wednesday, 24 March 2021 3:25 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	24/03/21 - 9am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

- Inspected topsoil stripping in Fill O. Approximate location shown by black annotation. Very stiff ash soils exposed throughout. Recommended that an underfill drain to be placed along the existing overland flowpath here.
- Observed progress of REB 2 fill works. Approx. 3.5m of fill left to place before trimming of the 1(v) in 1(h) batter begins. Rear face drain is now complete, with the final section of this drain being installed today.
- Observed permanent stormwater pond below Fill M, approximate position shown in red below. Contractors had mucked out the pond and backfilled without notifying us. Several trial pits dug in this area which identified SPR to beyond 3m and at least 1.5-2m below the adjacent fully invert.



25/03/21 - Trevors photos of REB2 / Fill M pond

Thursday, 25 March 2021 8:48 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	
Author:	
Plant Operating:	
Weather:	

Site Observations and Instructions:

26/03/21 - Fill M&O, REB2

Friday, 26 March 2021 12:42 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	26/03/21 -
Author:	
Plant Operating:	
Weather:	

Site Observations and Instructions:

- Filling operations continuing in REB 2. Another layer of primary grid was in the process of being laid out. Grid measured at 10m as per the design.
- Trial pits in the Fill M stormwater pond have been partially backfilled with SPR and fill testing has come back indicating adequate compaction and density. The contractors intend to backfill the remainder of the pond with at least 1m of clay as per our advice. Pond construction will be finalised next season.
- Fill O underfill drain has not been installed yet due to bad weather forecast next week.

07/04/21 - REB1, REB2

Wednesday, 7 April 2021 2:25 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	07/04/21 - 12pm
Author:	KM + CE
Plant Operating:	
Weather:	

Site Observations and Instructions:

- REB 1 face is currently being trimmed. The contractors are working along a bench at approx. mid slope height and trimming back to design level. No grid was observed on the face of the excavation. Requested that up to date as-builts be supplied to us to ensure that design requirements are being met
- REB 2 has been filled to near full height and a layer of secondary grid was exposed at the time of inspection.

16/04/21 - Stage 12D

Friday, 16 April 2021 4:50 PM

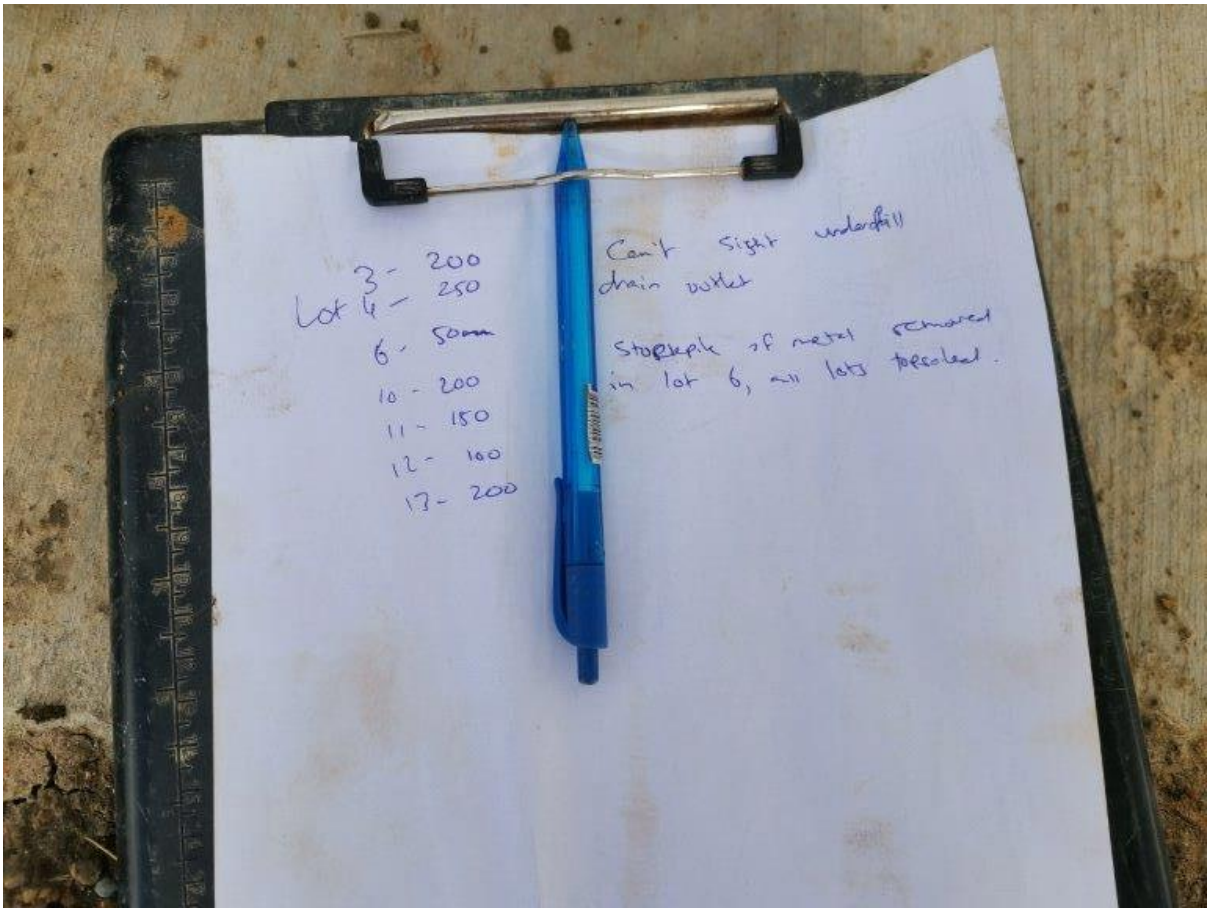
Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	16/04/21 - 10am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

Refer photos below.

Telecom with Trevor, discussed that underfill drain was not visible. He is going to install a solid pipe to avoid blockage of the drain through the topsoil at the toe of the 1(v) in 3(h) batter, and then form the permanent outlet structure at the end of the solid pipe. Advised to return on Monday to sight this.



20/04/21 - Stage 12D, REB2, Fill M

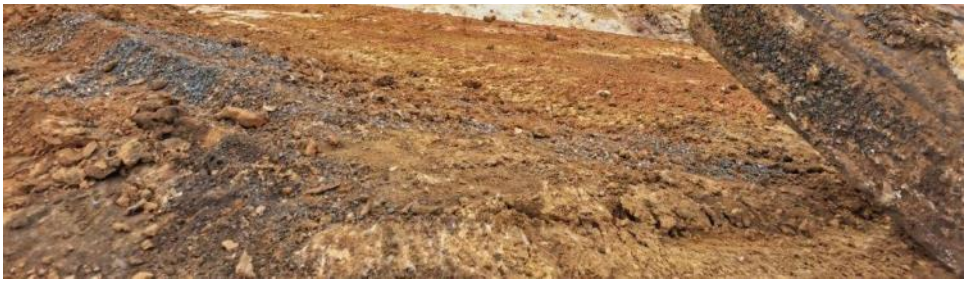
Tuesday, 20 April 2021 11:59 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	20/04/21 - 8am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

- Sighted underfill and permanent outlet structure in Stage 12D.
- Filling progressing in REB2, with fill placement near final subgrade level. Several more layers of fill to be placed near the crest to meet design heights.
- Underfill drain in Fill M is to outlet into the permanent stormwater pond. Advised that this should be protected with a rock channel or similar to present scour along the side of the pond.



30/04/21

Friday, 30 April 2021 1:16 PM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	30/04/21 - 10:15am
Author:	KM
Plant Operating:	
Weather:	

Site Observations and Instructions:

- Received a phone call from Mitchell Rutter (surveyor) this morning advising that the second to last layer of primary grid has been placed using SS20 secondary grid instead. Advised that this should be removed and the appropriate primary grid be placed. He said they would undercut the clay fill over this layer and install the correct grid.
- Primary grid had already been placed and covered at the time of arrival on site. Secondary grid was being trimmed and excavation was at least 2m wide as per the design.

28/05/21 - REB1 & 2, Stage 13

Friday, 28 May 2021 11:03 AM

Site Inspection Record

Project # & Name:	J00113 - Hitchen Block
Date & Time:	28/05/21 - 10am
Author:	
Plant Operating:	
Weather:	

Site Observations and Instructions:

Observed progress at Hitchen Block. Observations as follows:

- REB 1 has been formed to a 1(v) in 1(h) face and has been hydroseeded. The initial section of hydroseeding is showing good vegetation cover.

  Below REB 1, connection of the underfill drains into the manholes is about to commence. Dines will place 2x solid pipes between the manholes and a perforated novacoil within the same trench wrapping around the outside of the manhole to ensure any additional water seepages are captured.

- REB 2 has also been formed at a 1(v) in 1(h) face. Hydroseeding still planned.

  Both REB's required check dam installation.

- Stage 13 nearly complete. Observed permanent underfill drain outlet beneath the permanent stormwater pond.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