



Geotechnical Completion Report

HITCHEN BLOCK STAGES 11, 12 & 14, POKENO

For

DFH JOINT VENTURE LIMITED

31 March 2020

Ref No: J00113-Rev1

DFH Joint Venture Limited
PO Box 302 877
North Harbour 1330

Attention: Mr R Parkinson

Dear Russell

RE: Geotechnical Completion Report for Hitchen Block Stages 11, 12 & 14, 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



Shane 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 11, 12 & 14 of the Hitchen Block Residential Subdivision as follows:

Table 1: CivilPlan Consultants Limited As-Built Plans

Title	Reference No.	Date
As Built Contours	136701-11-AB200	December 2019
As Built Cut-Fill Contours	136701-11-AB201	December 2019
As Built Underfill Drains	136701-11-AB202	December 2019
As Built Stormwater Drainage (2 sheets)	136701-08-AB400 to AB401	February 2020
As Built Waste Water Drainage (2 sheets)	136701-08-AB402 to AB403	February 2020

This report covers the construction period November 2016 to December 2019. It is intended to be used for certification purposes as follows:

- 96 residential lots numbered 593 to 690.
- 2 new roads named Calder Crescent and Peacock Place.
- 9 jointly owned access lots numbered 10 to 18.
- 2 recreation/local purpose reserve areas numbered as Lots 1 and 2.

This stage of the subdivision is located as shown on the attached CivilPlan Consultants Limited as-built plans, and 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 10m.

2 RELATED REPORTS

Two Geotechnical Investigation Reports on the subject land were prepared by this Consultancy, reference J00323 (Earthworks Stage 3) and J00673 (Earthworks Stage 4), dated 30 June 2016 and 3 August 2017, respectively. The conclusions and recommendations of these reports have been reviewed during the preparation of this document, along with the following Geotechnical Completion Reports (prepared by Lander Geotechnical) 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
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

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 these stages commenced in April 2016 with construction of silt controls and subsequent stripping of topsoil within the Stage 11 area. The gully was stripped of mullock and soft sediments and an underfill drain was installed in the invert of the gully, comprising a 160mm diameter heavy-duty perforated drain coil, embedded in drainage media and wrapped in non-woven geotextile.

Following the winter shut down period, earthworks recommenced in November 2016 with construction of silt controls and subsequent stripping of topsoil within the stage 12 area. The gullies in stage 12 were stripped of mullock and soft sediments and several underfill drains were installed in the inverts of each gully, comprising a 160mm diameter heavy-duty perforated drain coil, embedded in drainage media and wrapped in non-woven geotextile.

Bulk earthworks operations then continued within stages 11 and 12 through until September 2017.

In May 2017, a small slip formed within the southern portions of Lots 624, 625 and 627 which was associated with temporary overland flows being directed and concentrated through these lots during a large storm event (causing scour and slippage). The temporary stormwater controls within this portion of the earthworks site were subsequently corrected and in February 2019 the slipped area was undercut and benched, with underfill drainage then installed prior to being backfilled with engineer certified fill.

In November 2018, earthworks operations commenced in the stage 14 area with the installation of silt controls and topsoil stripping, mucking out of gullies and installation of underfill drainage.

Bulk earthworks construction was mostly completed by late February 2019 and the lots were subsequently topsoiled. Civil construction (i.e. installation of underground service and formation of roads) then began and was completed by December 2019.

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 drains;
- Fill placement and plant performance upon the subgrade periodically throughout the bulk filling works.

4.2 Quality Control

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) | <u>Air Voids Percentage</u>
(As defined in NZS 4402) | |
| | Average value less than | 10% |
| | Maximum single value | 12% |
| (b) | <u>Undrained Shear Strength</u>
(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

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. The results of this testing are appended in Appendix 2.

5 PROJECT EVALUATION

5.1 Bearing Capacity and Settlement of Building Foundations

Following the completion of earthworks operations, we returned to the site in January 2019 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

Five sets of Expansive soil tests were carried out on representative samples retrieved across the subdivision stages within the zone of likely influence of shallow building foundations.

These limit tests were carried out in accordance with NZS 4402, "Methods of Testing Soils for Civil Engineering Purposes" test section 2 and were primarily intended to assess the Expansive Classes of the site materials as defined in AS 2870, "Residential Slabs and Footings – Construction". All test results are IANZ (International Accreditation New Zealand) endorsed and full details are in Appendix 3.

The AS 2870 (2011) Expansive Class for all lots is H1 (high) and a characteristic surface movement (y_s) of up to 60mm can be expected.

We recommend the final building platforms are trimmed and protected immediately using hardfill to minimise desiccation and the potential for post building construction heave beneath the floor slab/driveways, etc.

5.3 Lot Gradients and Building Line Restriction

The appended as built contours plan shows the area and lots 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 site gradients and our final walkover inspection, but there may be localised areas having such gradients that have not been shown on the plans.

In addition, there is a Building Line Restriction (BLR) within Lots 629, 630, 634 and 636 to 640. The BLR represents an approximately 10m setback from the steep slope immediately beyond the south-west boundary of these lots as was recommended as part of the Geotechnical Investigation Report encompassing these lots (reference J00323 (Earthworks Stage 3), dated 30 June 2016) using computer slope stability analyses.

With the exception of the areas with Lots 629, 630, 634 and 636 to 640 south-west (downslope) of the BLR, we are satisfied that the 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 areas described above within residential lots are presented in the Suitability Statement.

5.4 Fill Induced Settlement

As a result of our pre-fill inspections, 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 Underfill/Subsoil Drains

The appended As-Built Cut-Fill Contours and As-Built Underfill Drains plans show the alignments of underfill/subsoil drains installed.

These drains were placed at the base of the fill areas of prior to filling to intercept groundwater seepages and/or allow engineered fill placement as required by the project specifications.

The drains were intended to intercept localised groundwater seepages and springs during earthworks and to help provide general control over groundwater levels, and was installed as a precautionary measure, therefore they do not need specific maintenance.

These drains are shown to be typically deeper than 2m below finished ground level (being trenched deeper and capped with compacted clay backfill in some areas to maintain a minimum 2m of cover) within residential lots and given their depths, these drains present no foreseeable constraints for future shallow foundations.

Notwithstanding, it is recommended that future foundations or site development works preserve these drains. In the event that they are compromised by any future development of the aforementioned lots (albeit unlikely due drains media being deeper than 2m below existing ground levels), they should be reinstated under geotechnical engineering observational guidance.

5.6 Service Trenches

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

5.7 Overland Flowpaths

Lots 595, 603, 608, 624, 625, 628 and 629 contain overland flowpaths. The future owners of these lots shall ensure that all entrances to any dwelling shall be constructed to be a minimum of 150mm above the finished ground level and shape the surrounding finished ground levels in order to ensure positive drainage away from the entrances.

5.8 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 50mm and 250mm, with lots 602 and 603 recording topsoil readings of between 100mm and 400mm.

Site specific findings are presented in the Suitability Statement Summary.

5.9 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 Stages 11, 12 & 14 of the Hitchen Block subdivision.
2. The extent of preliminary investigations carried out to date are described in the Geotechnical Investigation Reports (reference J00113, dated 30 June 2016 and 3 August 2017), 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 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 as-built contours plans, lots 594, 595, 602, 603, 608, 615, 616, 617, 618, 620, 621, 622, 623, 624, 625, 627, 628 and 629 contain areas with gradients steeper than 1(v) in 4(h).

Any building development and/or earthworks proposals within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan are subject to specific geotechnical investigation and/or foundation design.

In addition, within Lots 629, 630, 634, 636, 637, 638, 639 and 640 there is a Building Line Restriction (BLR) which has been setback 10m from the south-western boundary of these lots due to the proximity to a steep slope.

Any building development and/or earthworks proposals to the south-west (downslope) of the BLR is subject to specific geotechnical investigation and slope stability assessments.

- (c) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for foundation design on all lots. Where a geotechnical bearing capacity greater than 300 kPa is required, (ie. outside the limits of NZS 3604 when piling is undertaken), further specific site investigation and design of foundations should be carried out prior to building consent application.
- (d) 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 degree 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.
- (e) The function of the underfill drains must not be impaired by any building development or landscaping works. In particular, any bored or driven piles must be positioned to avoid damaging

these drains. The drains are typically at a minimum depth of 2m below existing ground level (within residential lot areas) and should therefore not pose any risk to shallow building foundations constructed in accordance with the recommendations of this report.

- (f) The assessed AS 2870 Expansive Class for all lots is H1 (high).
- (g) Subject to the geotechnical restrictions, recommendations and expansive soil assessments associated with 3(b), 3(c), 3(d), 3(e) and 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 lots, foundation design may be carried out in accordance with AS 2870 (Class H1) or alternatively, a specific foundation and structural design may be undertaken by a Chartered Professional Engineer who should allow for expansive soil effects in the design. In this latter case, the minimum recommended foundation depth below cleared ground level following topsoil removal and benching of building platform areas is 900mm.

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

- 4. Road subgrades and lot accessway subgrades have been formed having due regard for slope stability and settlement, although available subgrade strengths are dependent on site conditions and on construction trafficking and variable results should be expected.
- 5. The recreation/ local purpose reserve areas (lots 1 and 2) have been formed to a geotechnical standard suitable for their 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 or for any other purpose without our prior review and agreement. It does not remove the necessity for the normal inspection of foundation conditions at the time of erection of any dwelling.

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

If you have any queries or require further information, please do not hesitate to contact the undersigned.

For and on behalf of Lander Geotechnical Consultants Limited

Prepared By:



Chris Edwards
Senior Engineering Geologist
CMEngNZ (PEngGeol)

Reviewed/ Authorised By:



Shane Lander
Principal Geotechnical Engineer
CMEngNZ, CEng., IntPE(NZ)

Table 3: Suitability Statement Summary

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
593	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	200	300	H1
594	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
595	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. All future owners shall ensure that all entrances to any dwelling shall be constructed to be a minimum of 150mm above the finished ground level and shape the surrounding finished ground levels in order to ensure positive drainage away from the entrances.	150	300	H1
596	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	200	300	H1
597	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	250	300	H1
598	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1
599	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
600	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
601	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
602	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	350-400	300	H1

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
603	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. All future owners shall ensure that all entrances to any dwelling shall be constructed to be a minimum of 150mm above the finished ground level and shape the surrounding finished ground levels in order to ensure positive drainage away from the entrances.	100-400	300	H1
604	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	150	300	H1
605	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
606	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1
607	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	100	300	H1
608	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. All future owners shall ensure that all entrances to any dwelling shall be constructed to be a minimum of 150mm above the finished ground level and shape the surrounding finished ground levels in order to ensure positive drainage away from the entrances.	150	300	H1
609	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	200	300	H1
610	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	200	300	H1
611	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	150	300	H1

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
612	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	150	300	H1
613	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	250	300	H1
614	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	200	300	H1
615	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	200	300	H1
616	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	250	300	H1
617	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1
618	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	200	300	H1
619	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	250	300	H1
620	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	200	300	H1

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
621	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	150	300	H1
622	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	200	300	H1
623	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
624	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details. All future owners shall ensure that all entrances to any dwelling shall be constructed to be a minimum of 150mm above the finished ground level and shape the surrounding finished ground levels in order to ensure positive drainage away from the entrances.	50	300	H1
625	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details. All future owners shall ensure that all entrances to any dwelling shall be constructed to be a minimum of 150mm above the finished ground level and shape the surrounding finished ground levels in order to ensure positive drainage away from the entrances.	100	300	H1

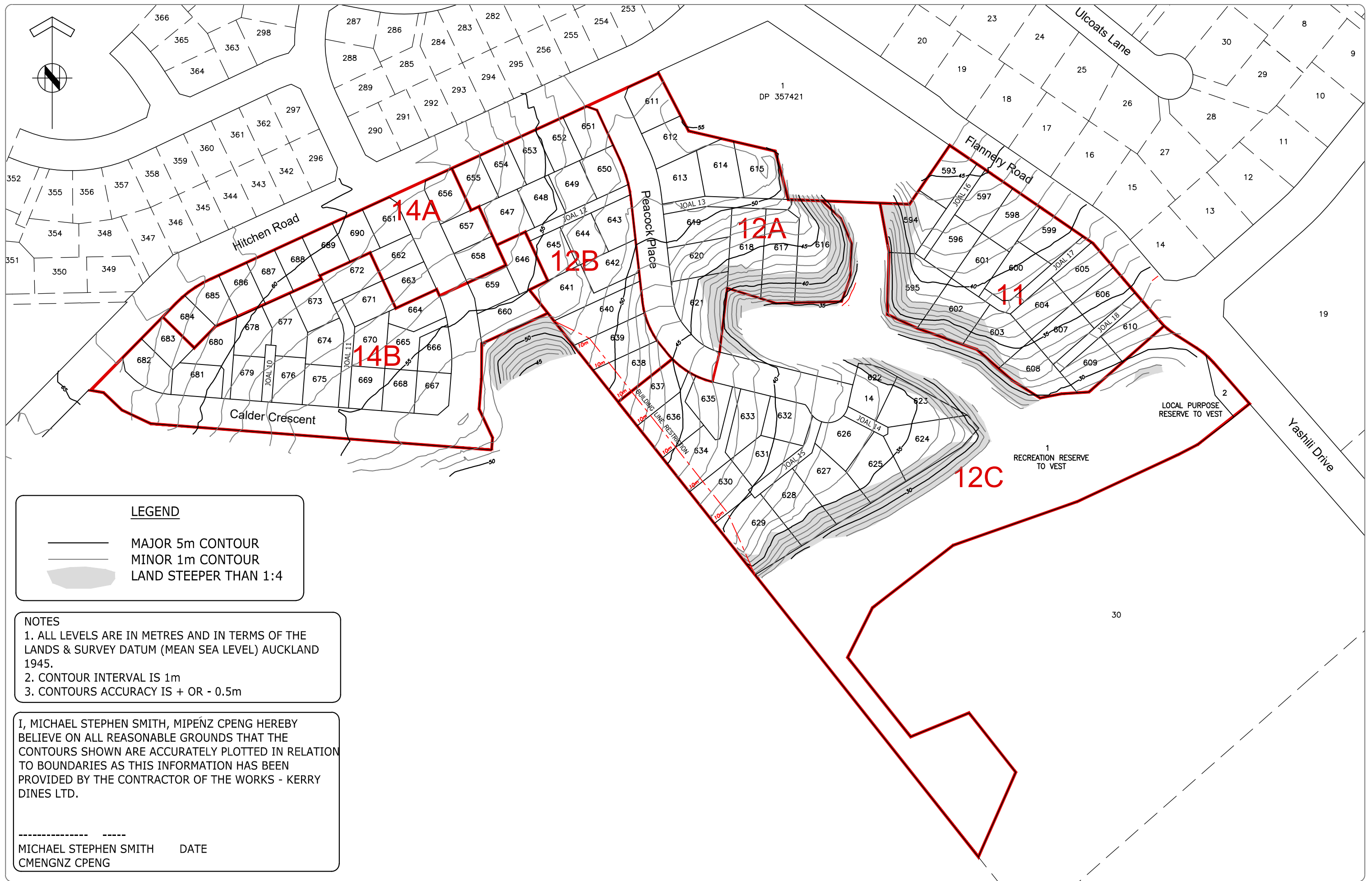
Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
626	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
627	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	150	300	H1
628	Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. All future owners shall ensure that all entrances to any dwelling shall be constructed to be a minimum of 150mm above the finished ground level and shape the surrounding finished ground levels in order to ensure positive drainage away from the entrances.	100	300	H1
629	Any building development and/or earthworks south-west (downslope) of the Building Line Restriction on the as-built contours plan is subject to specific geotechnical investigation and slope stability assessments. Any building development and/or earthworks within the zones shown to be steeper than 1(v) in 4(h) on the as-built contours plan is subject to specific geotechnical investigation and/or foundation design. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. All future owners shall ensure that all entrances to any dwelling shall be constructed to be a minimum of 150mm above the finished ground level and shape the surrounding finished ground levels in order to ensure positive drainage away from the entrances.	150	300	H1
630	Any building development and/or earthworks south-west (downslope) of the Building Line Restriction on the as-built contours plan is subject to specific geotechnical investigation and slope stability assessments. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
631	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
632	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
633	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
634	Any building development and/or earthworks south-west (downslope) of the Building Line Restriction on the as-built contours plan is subject to specific geotechnical investigation and slope stability assessments. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	200	300	H1
635	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
636	Any building development and/or earthworks south-west (downslope) of the Building Line Restriction on the as-built contours plan is subject to specific geotechnical investigation and slope stability assessments. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1
637	Any building development and/or earthworks south-west (downslope) of the Building Line Restriction on the as-built contours plan is subject to specific geotechnical investigation and slope stability assessments. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
638	Any building development and/or earthworks south-west (downslope) of the Building Line Restriction on the as-built contours plan is subject to specific geotechnical investigation and slope stability assessments. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1
639	Any building development and/or earthworks south-west (downslope) of the Building Line Restriction on the as-built contours plan is subject to specific geotechnical investigation and slope stability assessments. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
640	Any building development and/or earthworks south-west (downslope) of the Building Line Restriction on the as-built contours plan is subject to specific geotechnical investigation and slope stability assessments. Elsewhere, AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
641	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
642	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
643	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
644	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
645	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1
646	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
647	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
648	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
649	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	50	300	H1
650	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	50	300	H1
651	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	200	300	H1
652	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	100	300	H1
653	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
654	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
655	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
656	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
657	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
658	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
659	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
660	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	50	300	H1
661	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
662	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
663	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
664	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	100	300	H1
665	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	150	300	H1
666	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
667	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
668	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
669	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1
670	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
671	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	100	300	H1
672	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	50	300	H1
673	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	100	300	H1

Lot No.	Comments	Topsoil Depth (mm)	Ultimate Bearing (kPa)	AS2870 :2011 Class
674	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
675	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
676	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
677	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm. Function of underfill drains to be maintained (refer section 5.5 and 6(3e) for further details.	100	300	H1
678	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
679	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
680	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
681	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
682	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
683	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	50	300	H1
684	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	250	300	H1
685	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
686	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1
687	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1
688	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	150	300	H1
689	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1
690	AS 2870 foundation design or NZS 3604 with minimum footing depth 900 mm.	100	300	H1



LEGEND

- MAJOR 5m CONTOUR
- MINOR 1m CONTOUR
- LAND STEEPER THAN 1:4

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

 MICHAEL STEPHEN SMITH DATE
 CMENGNZ CPENG

REV	REVISION DETAILS	BY	DATE

PLOTTED:	DATE:	12-19
RJP	DATE:	12-19
APPROVED:	DATE:	12-19
MSS		

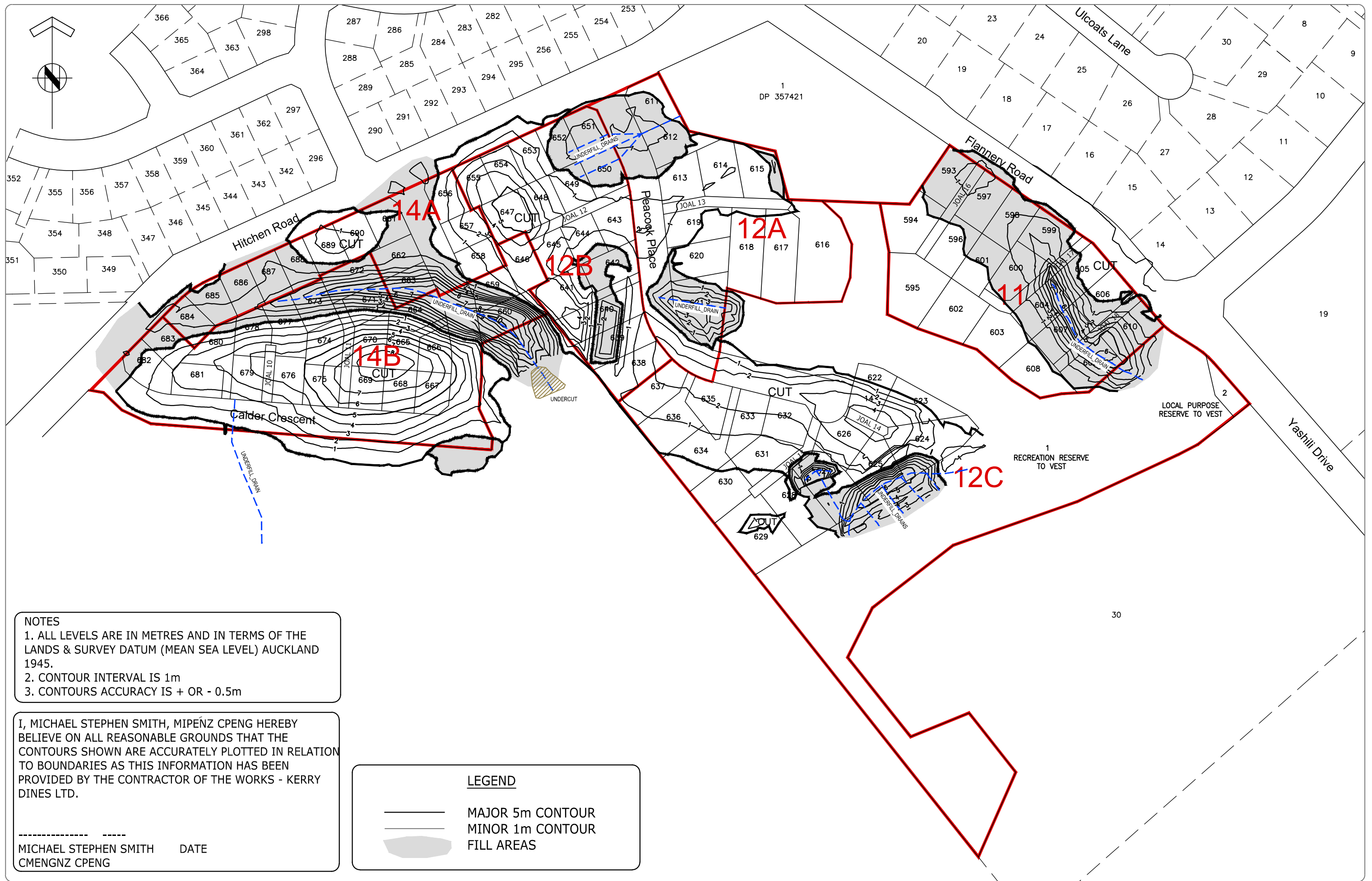
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CIVILPLAN
 CONSULTANTS
 Level 3 AMI Building, 15 Osterley Way, Manukau City. Phone: 2222445

PROJECT TITLE:
 DFH JOINT VENTURE
 HITCHEN STAGE 11,12 & 14 SUBDIVISIONS
 POKENO

SHEET TITLE:
 AS BUILT CONTOURS

ISSUE STATUS: **AS BUILT**
 SCALE: (A1/A3)
 1:1000 / 1:2000
 DRAWING NUMBER: **136701-11-AB200** REV: **A**



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, MIPÉNZ 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
 [Grey Fill] FILL AREAS

REV	REVISION DETAILS	BY	DATE

PLOTTED:	DATE:	12-19
RJP	DATE:	12-19
APPROVED:	DATE:	12-19
MSS	DATE:	12-19

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

PROJECT TITLE:
 DFH JOINT VENTURE
 HITCHEN STAGE 11,12 & 14 SUBDIVISIONS
 POKENO

SHEET TITLE:
 AS BUILT CUT-FILL CONTOURS

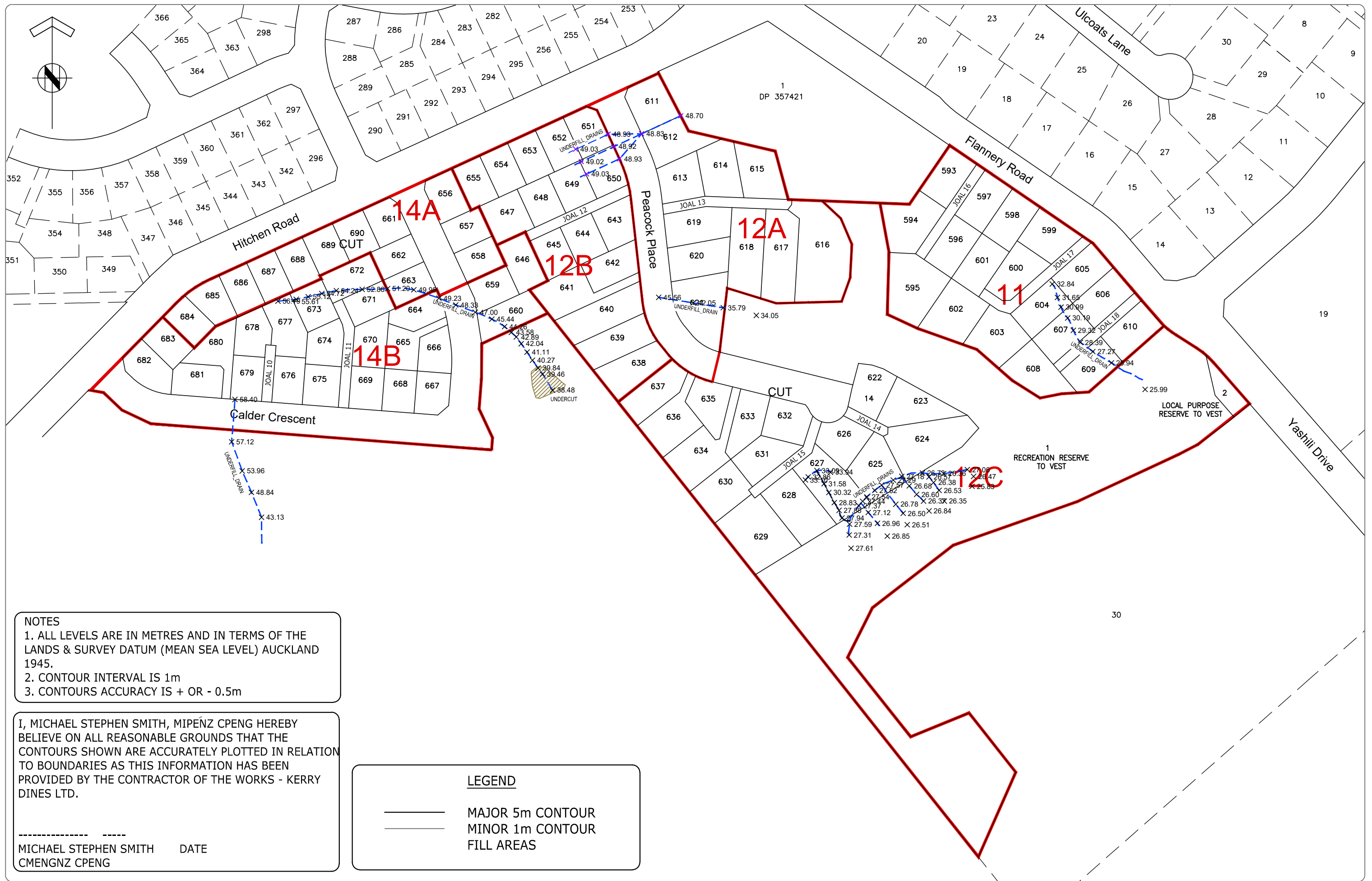
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1:1000 / 1:2000

DRAWING NUMBER: **136701-11-AB201** 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, MIPÉNZ 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
 [Hatched Area] FILL AREAS

REV	REVISION DETAILS	BY	DATE

PLOTTED: DATE: RJP 12-19 DRAWN: DATE: RJP 12-19 APPROVED: DATE: MSS 12-19	THIS DRAWING AND DESIGN REMAINS THE PROPERTY OF, AND MAY NOT BE REPRODUCED OR ALTERED, WITHOUT THE WRITTEN PERMISSION OF CIVILPLAN CONSULTANTS LIMITED. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORISED USE OF THIS DRAWING.
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PROJECT TITLE:
 DFH JOINT VENTURE
 HITCHEN STAGE 11,12 & 14 SUBDIVISIONS
 POKENO

SHEET TITLE:
 AS BUILT UNDERFILL DRAINS

ISSUE STATUS: **AS BUILT**

SCALE: (A1/A3) 0 20 40 60 80 100m
 1:1000 / 1:2000

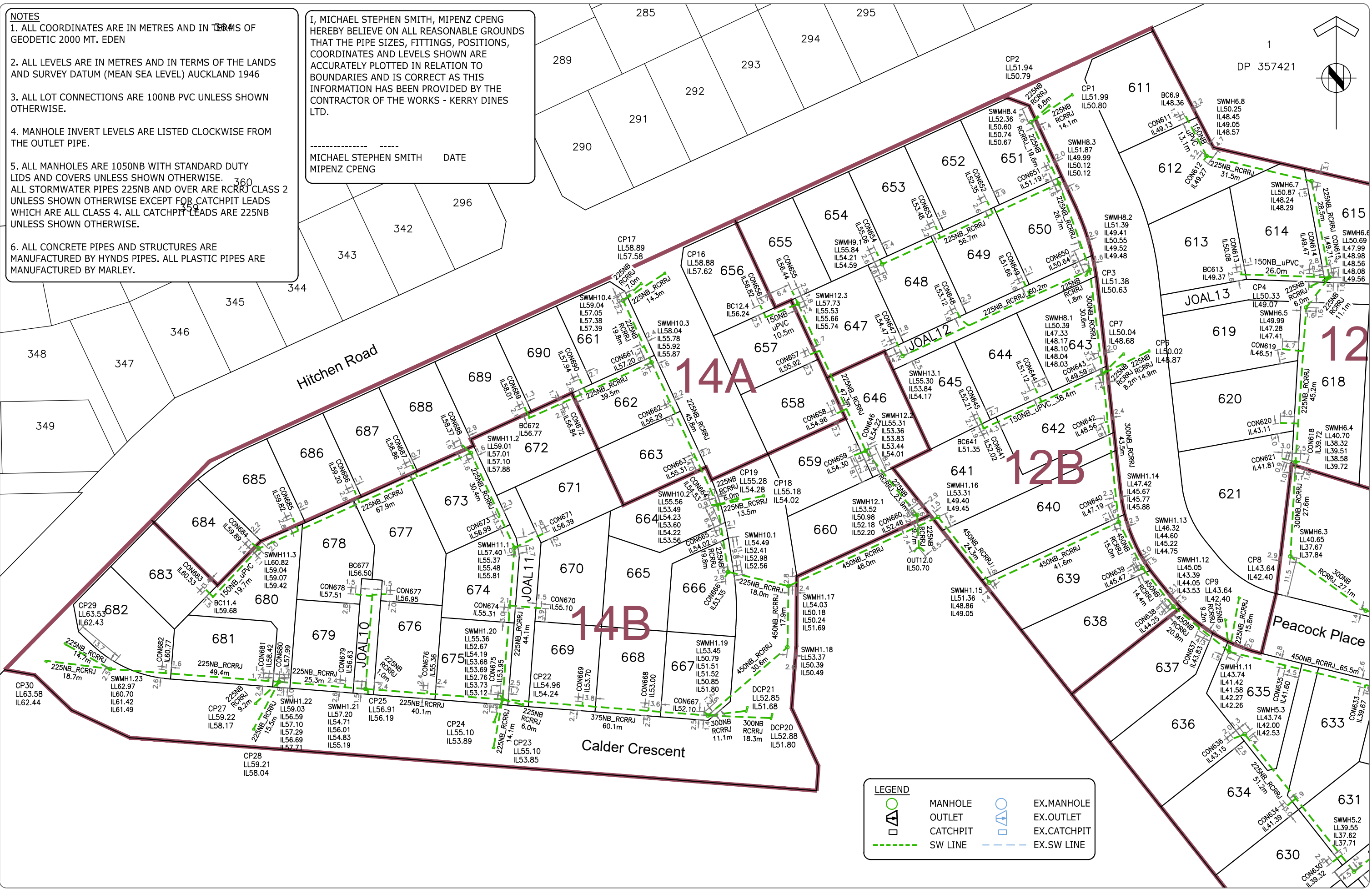
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NOTES

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.

I, MICHAEL STEPHEN SMITH, MIPENZ 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
MIPENZ CPENG



ISSUED FOR 224C	RJP	02-20
REVISION DETAILS	BY	DATE

DATE:	02-20
DATE:	02-20
DATE:	02-20

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PROJECT TITLE:
**DFH JOINT VENTURE
HITCHEN STAGES 11,12,14 SUBDIVISION
POKENO**

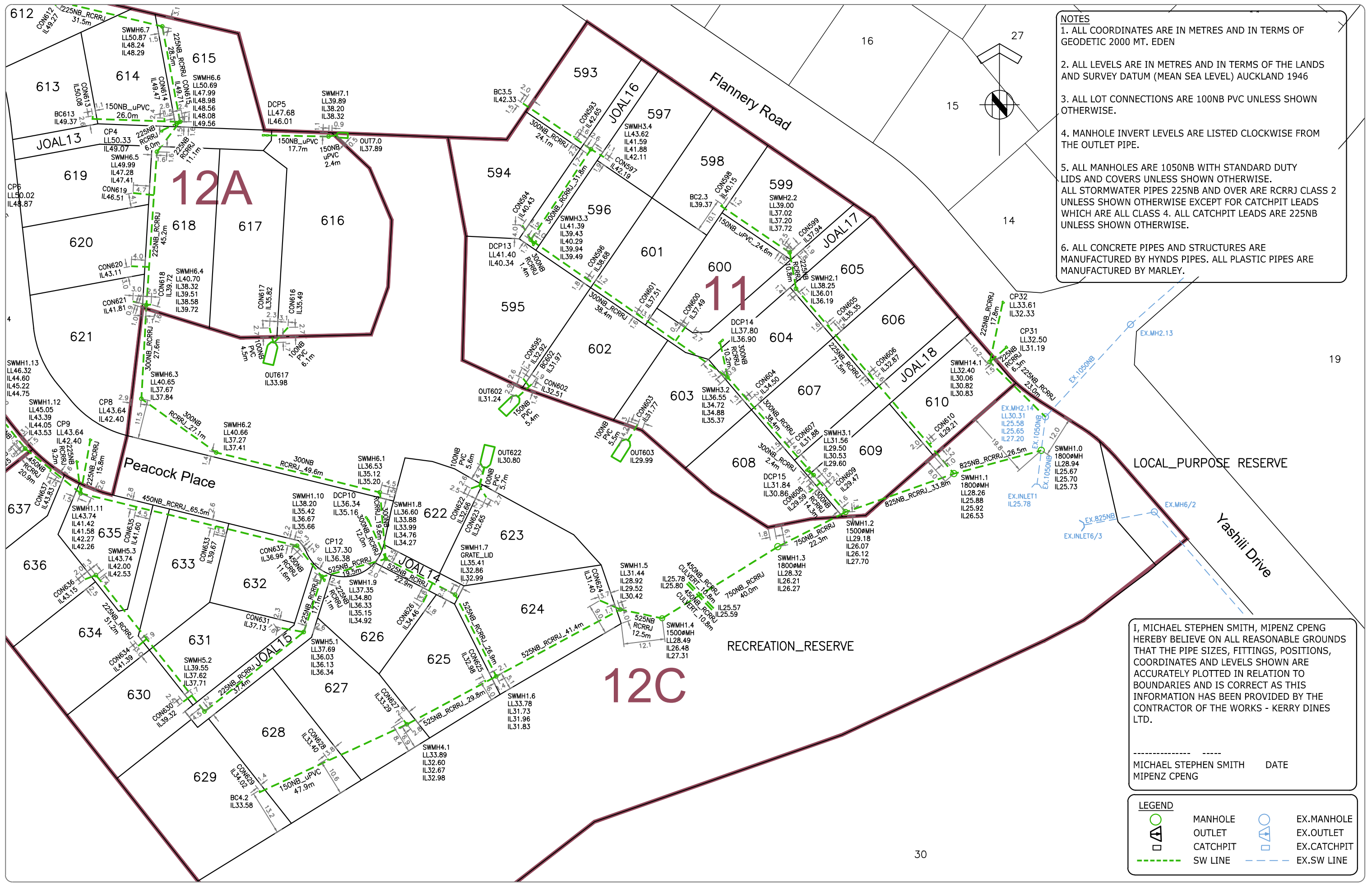
SHEET TITLE:
**AS BUILT
STORMWATER DRAINAGE
SHEET 1**

ISSUE STATUS:
AS BUILT

SCALE: (A1/A3)
1:500 / 1:1000

DRAWING NUMBER: **136701-11-AB400** REV: **A**

Filepath: P:\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 11\AS BUILT\136701-11-AB400.DWG



- NOTES**
1. ALL COORDINATES ARE IN METRES AND IN TERMS OF GEODETIC 2000 MT. EDEN
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I, MICHAEL STEPHEN SMITH, MIPENZ 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
 MIPENZ CPENG

LEGEND

	MANHOLE		EX.MANHOLE
	OUTLET		EX.OUTLET
	CATCHPIT		EX.CATCHPIT
	SW LINE		EX.SW LINE

ISSUED FOR 224C	RJP	02-20
REVISION DETAILS	BY	DATE

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RJP	02-20	
DRAWN:	DATE:	
RJP	02-20	
APPROVED:	DATE:	
MSS	02-20	

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

PROJECT TITLE:
**DFH JOINT VENTURE
 HITCHEN STAGES 11,12,14 SUBDIVISION
 POKENO**

SHEET TITLE:
**AS BUILT
 STORMWATER DRAINAGE
 SHEET 2**

ISSUE STATUS: **AS BUILT**
 SCALE: (A1/A3)
 1:500 / 1:1000
 DRAWING NUMBER: **136701-11-AB401** REV: **A**

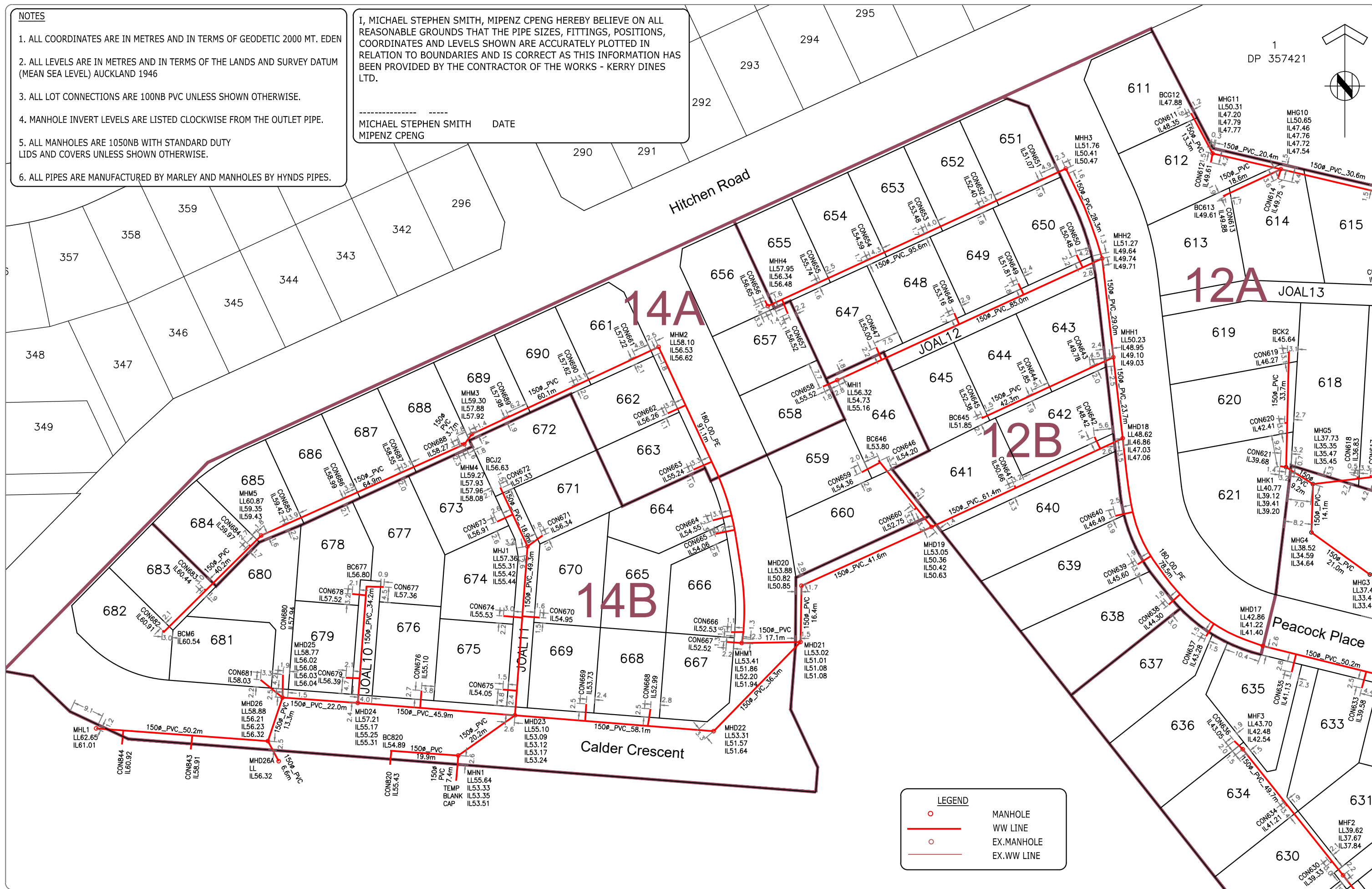
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NOTES

1. ALL COORDINATES ARE IN METRES AND IN TERMS OF GEODETIC 2000 MT. EDEN
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 MICHAEL STEPHEN SMITH DATE
 MIPENZ CPENG



ISSUED FOR 224C	RJP	02-20
REVISION DETAILS	BY	DATE

DATE:	02-20
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DATE:	02-20

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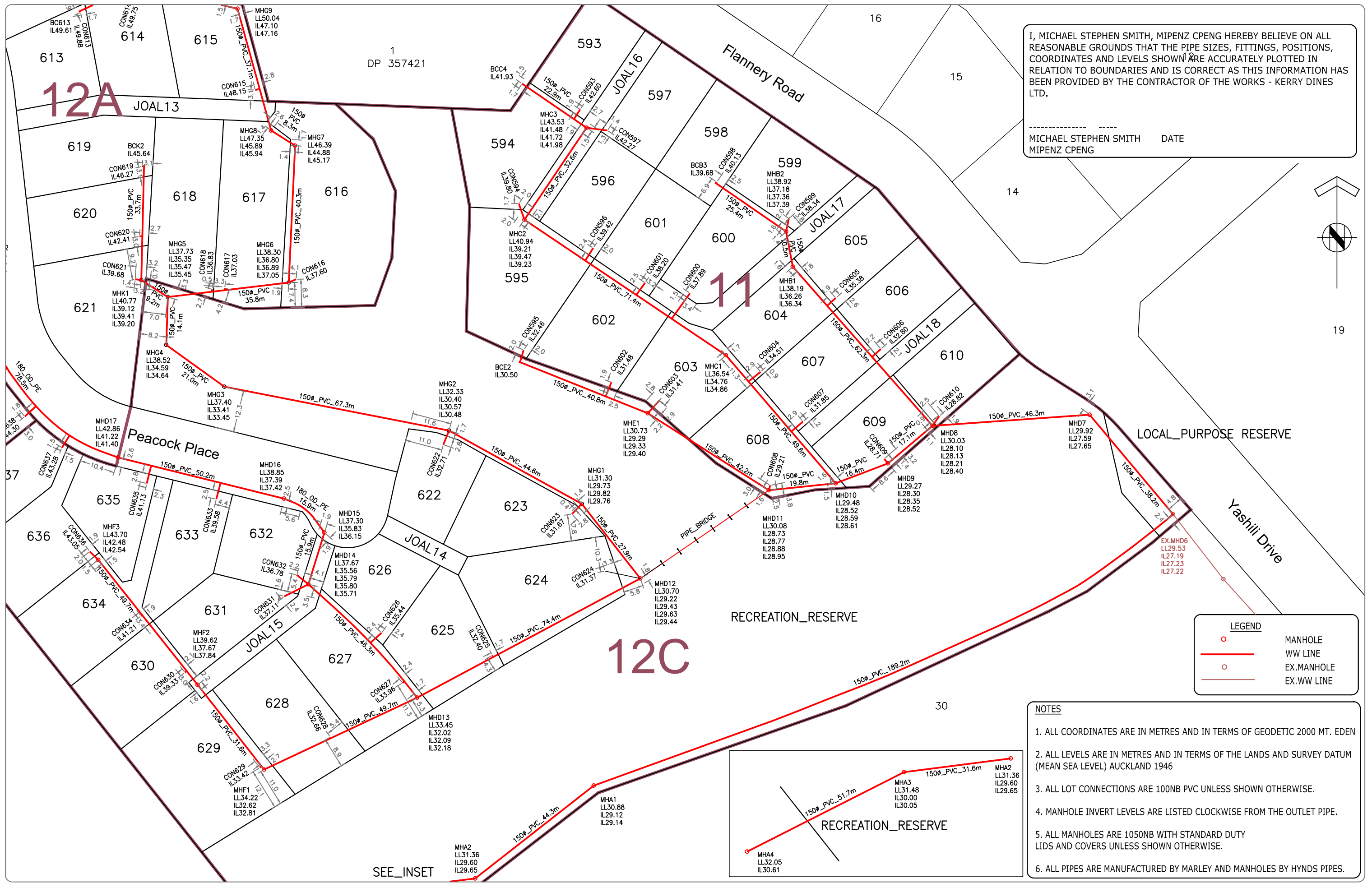
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 Level 3 AMI Building, 15 Osterley Way, Manukau City. Phone: 2222445

PROJECT TITLE:
**DFH JOINT VENTURE
 HITCHEN STAGES 11,12,14 SUBDIVISION
 POKENO**

SHEET TITLE:
**AS BUILT
 WASTE WATER DRAINAGE
 SHEET 1**

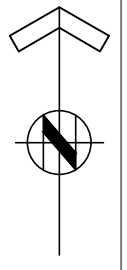
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I, MICHAEL STEPHEN SMITH, MIPENZ CPENG HEREBY BELIEVE ON ALL REASONABLE GROUNDS THAT THE PIPE SIZES, FITTINGS, POSITIONS, COORDINATES AND LEVELS SHOWN ARE ACCURATELY PLOTTED IN RELATION TO BOUNDARIES AND IS CORRECT AS THIS INFORMATION HAS BEEN PROVIDED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

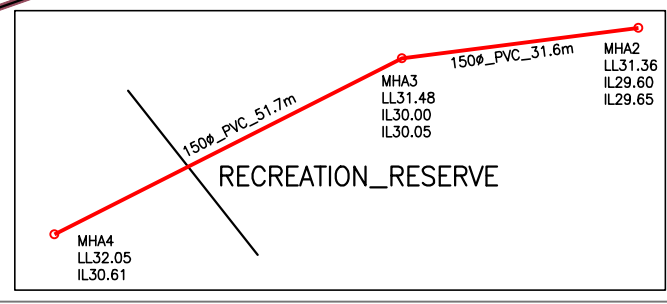
----- DATE
 MICHAEL STEPHEN SMITH
 MIPENZ CPENG



LEGEND

- MANHOLE
- WW LINE
- EX.MANHOLE
- EX.WW LINE

- NOTES**
1. ALL COORDINATES ARE IN METRES AND IN TERMS OF GEODETIC 2000 MT. EDEN
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 6. ALL PIPES ARE MANUFACTURED BY MARLEY AND MANHOLES BY HYNDS PIPES.



ISSUED FOR 224C	RJP	02-20
REVISION DETAILS	BY	DATE

PLOTTED: RJP	DATE: 02-20
DRAWN: RJP	DATE: 02-20
APPROVED: MSS	DATE: 02-20

CIVILPLAN CONSULTANTS

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

PROJECT TITLE:
**DFH JOINT VENTURE
 HITCHEN STAGES 11,12,14 SUBDIVISION
 POKENO**

SHEET TITLE:
**AS BUILT
 WASTE WATER DRAINAGE
 SHEET 1**

ISSUE STATUS: **AS BUILT**

SCALE: (A1/A3)
 1:500 / 1:1000

DRAWING NUMBER: **136701-11-AB403** REV: **A**

Filepath: P:\APPDATA\LOCAL\AUTODESK\C3D 2020\ENU\TEMPLATE C:\DATA\POKENO\HITCHEN\STAGE 11\AS BUILT\136701-11-AB402.DWG

EARTHWORKS FILL REPORT

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001); Nuclear Densometer Testing (in accordance with NZS 4407:1991 Test 4.2.1); Water Content Testing (in accordance with NZS 4402:1986 Test 2.1); Density Calculations (in accordance with NZS 4402:1986 Tests 4.1.1.5(b))

Project No: GENZETAM01177AA

Page: 1 of 2

Client: Lander Geotechnical Consultants Limited
PO Box 97 385
Manukau 2241

Principal: Chris Edwards

c.c. to: Shane Lander

Project: J00113 - Hitchen Block - Stage 2 Pokeno

Project Location: Pokeno



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

Approved Signatory: Eric Paton (Laboratory Manager)

Approved Signatory Signature: *E. Paton*

Date of Issue: 19/04/2016

IANZ Accredited Laboratory Number: 105

Date	Work Order :	Tested By	Test No.	Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density (t/m ³)	Air Voids %	Field Shear Strength in kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									200	216+	216+	216+						
11/04/2016	ETAM16W01166	AB	137	1.94	36.5	1.42	2.7	0.0	200	216+	216+	216+	Fill G	1778168	5875836	-	Clay	-2.5m to subgrade
11/04/2016	ETAM16W01166	AB	138	1.77	42.1	1.24	2.7	1.6	142	154	146	142	Fill G	1778213	5875778	-	Clay	-2.5m to subgrade
11/04/2016	ETAM16W01166	AB	139	1.72	40.0	1.23	2.7	5.5	UTP	UTP	UTP	UTP	Fill C	1778655	5875451	-	Clay	-2.0m from base of fill
11/04/2016	ETAM16W01166	AB	140	1.72	40.9	1.22	2.7	4.9	UTP	UTP	UTP	UTP	Fill C	1778639	5875458	-	Clay	-1.5m from base of fill
12/04/2016	ETAM16W01241	AB	141	1.72	45.1	1.18	2.7	2.9	UTP	UTP	UTP	UTP	Fill C	1778650	5875451	-	Clay	-2.3m from base of fill
12/04/2016	ETAM16W01241	AB	142	1.80	41.4	1.27	2.7	0.4	192	183	158	174	Fill G	1778192	5875869	-	Clay	-2.0m to subgrade

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM16W01166

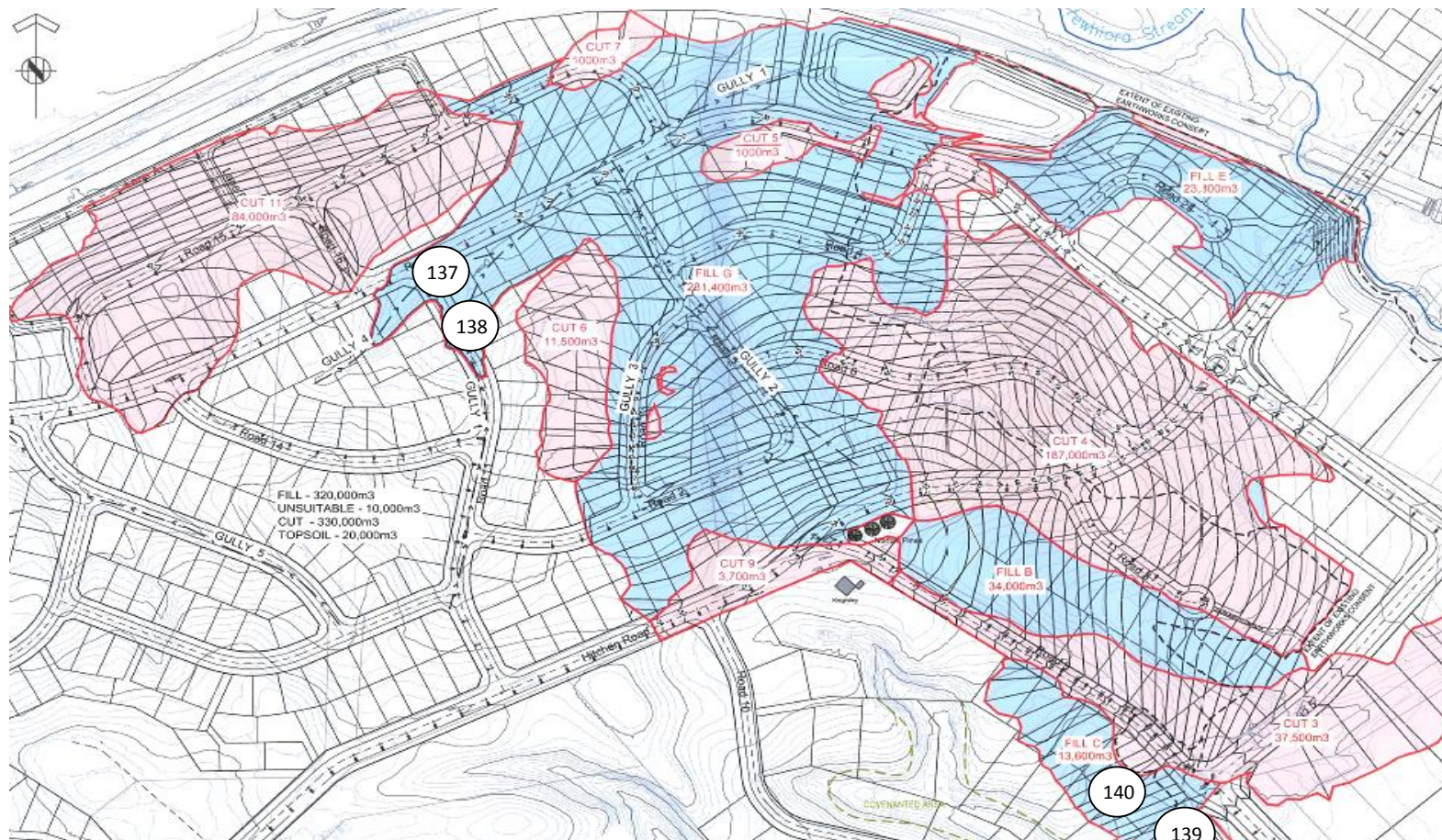
Page: 2 of 2

Project: J00113 - Hitchen Block - Stage 2 Pokeno

Location: Fill G and Fill C

Tested by: AB

Date tested: 11/04/2016



SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM16W01241

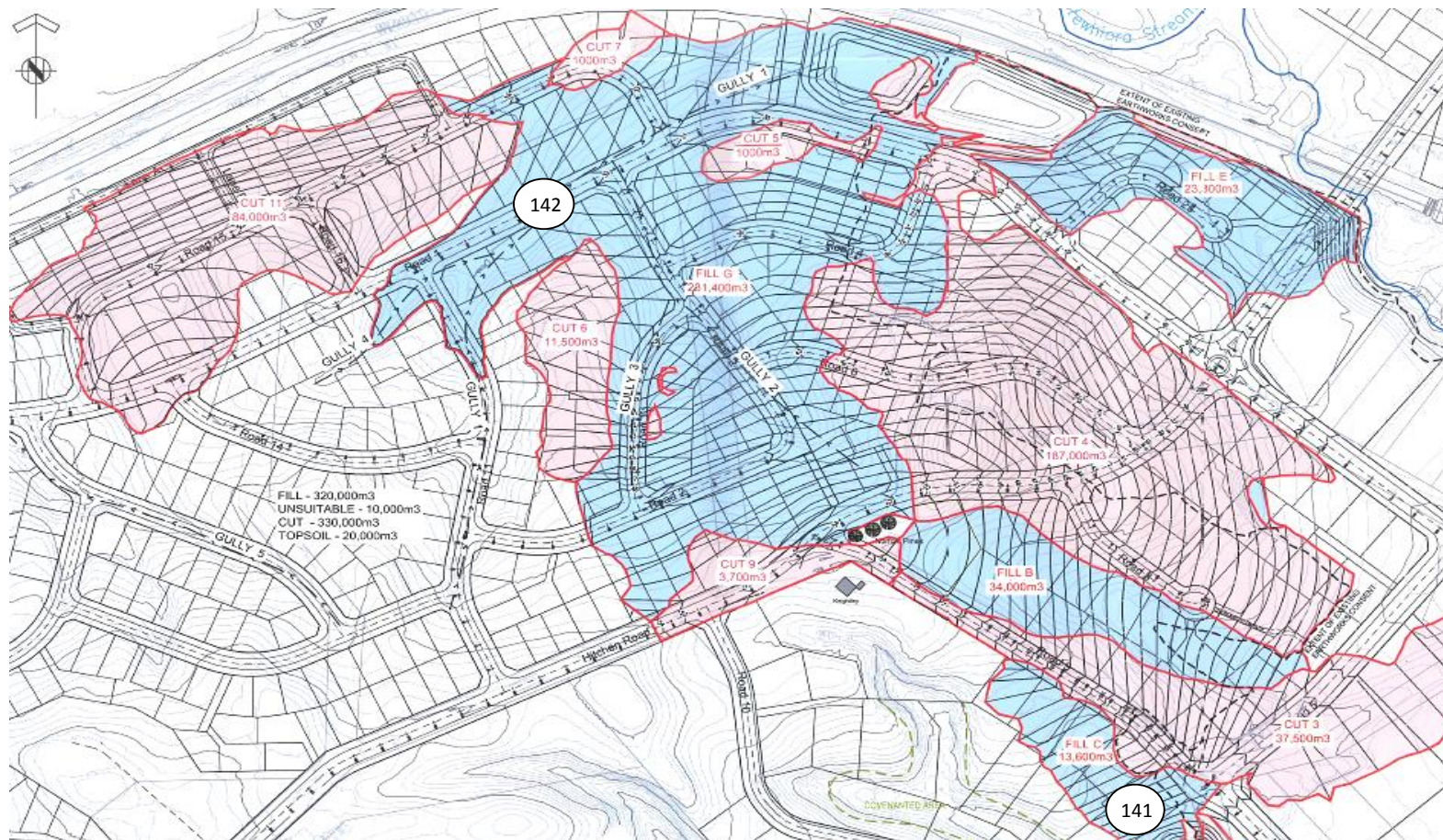
Page: 2 of 2

Project: J00113 - Hitchen Block - Stage 2 Pokeno

Location: Fill C and Fill G

Tested by: AB

Date tested: 12/04/2016



EARTHWORKS FILL REPORT

Test Methods : Shear Strength (using field Shear vane in accordance with NZGS 2001); Nuclear Densometer Testing (in accordance with NZS 4407:1991 Test 4.2.1); Water Content Testing (in accordance with NZS 4402:1986 Test 2.1); Density Calculations (in accordance with NZS 4402:1986 Tests 4.1.1.5(b))

Project No: GENZETAM01177AA

Page: 1 of 2

Client: Lander Geotechnical Consultants Limited
PO Box 97 385
Manukau 2241

Principal: Chris Edwards

c.c. to: Shane Lander

Project: J00113 - Hitchen Block - Stage 2 Pokeno

Project Location: Pokeno



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

Approved Signatory: Eric Paton (Laboratory Manager)

Approved Signatory Signature: *E. Paton*

Date of Issue: 1/05/2016

IANZ Accredited Laboratory Number: 105

Date	Work Order :	Tested By	Test No.	Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density (t/m ³)	Air Voids %	Field Shear Strength in kPa				Test Location	Easting	Northing	RL (m)	Material Tested	Comments
									142	142	150	154						
28/04/2016	ETAM16W01456	AB	143	1.82	37.9	1.32	2.7	1.1	142	142	150	154	Fill G	1778154	5875840	-	Clay	No RL
28/04/2016	ETAM16W01456	AB	144	1.80	35.0	1.33	2.7	3.9	165	183	UTP	UTP	Fill G	1778213	5875747	-	Clay	No RL
28/04/2016	ETAM16W01456	AB	145	1.72	48.2	1.16	2.7	1.1	142	150	142	140	Fill C	1778638	5875458	-	Clay	-3.5m to FL

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM16W01456

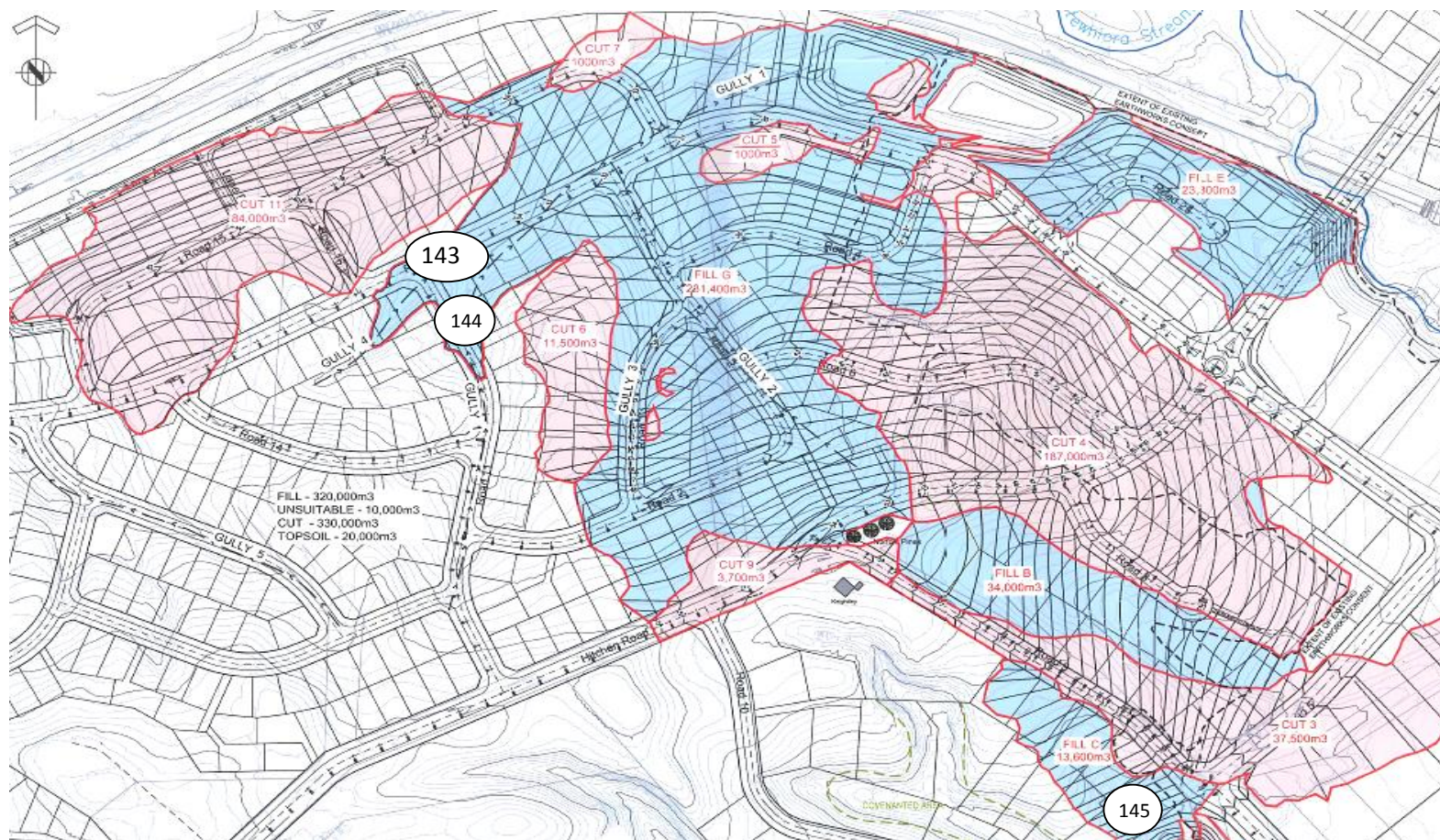
Page: 2 of 2

Project: J00113 - Hitchen Block - Stage 2 Pokeno

Location: Fill C and Fill G

Tested by: AB

Date tested: 28/04/2016



<p>Client: Lander Geotechnical Consultants Limited</p> <p>Address: PO Box 97 385, Manukau 2241</p> <p>Attention: Chris Edwards</p> <p>c.c.: -</p> <p>Project: J00113 - Hitchen Block - Stage 2 and 3, Pokeno</p> <p>Location: Pokeno</p>	<p>PROJECT CODE: GENZETAM01177AA</p> <p>Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="font-size: small;"> <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;"> <p><i>E. Paton</i></p> <p>Approved Signatory: Eric Paton</p> <p>Issue date: 5/12/2016</p> </div> </div>
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Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Density Calculations (in accordance with NZS 4402:1986 Tests 4.1.1.5(b)). Please note that Air Void calculations are not IANZ endorsed as part of this report.

Date	Work Order No:	Tested by	Test No.	Layer	Material tested	Location	Chainage (m)	Offset (m)	Offset from	Easting	Northing	RL	Test Probe Depth (mm)	Comments (FL = Finished level)	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density	Air Voids (%)
															164	172	148	156					
30/11/2016	ETAM16W04108	AB	178	Fill	Silty CLAY	Fill C	-	-	-	1778639	5875460		150	~1.0m to Subgrade	164	172	148	156	1.70	52.9	1.11	2.7	0.1
30/11/2016	ETAM16W04108	AB	179	Fill	Silty CLAY	Fill C	-	-	-	1778614	5875457		150	~0.5m to Subgrade	152	160	156	148	1.83	33.5	1.37	2.7	3.3

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM16W04108

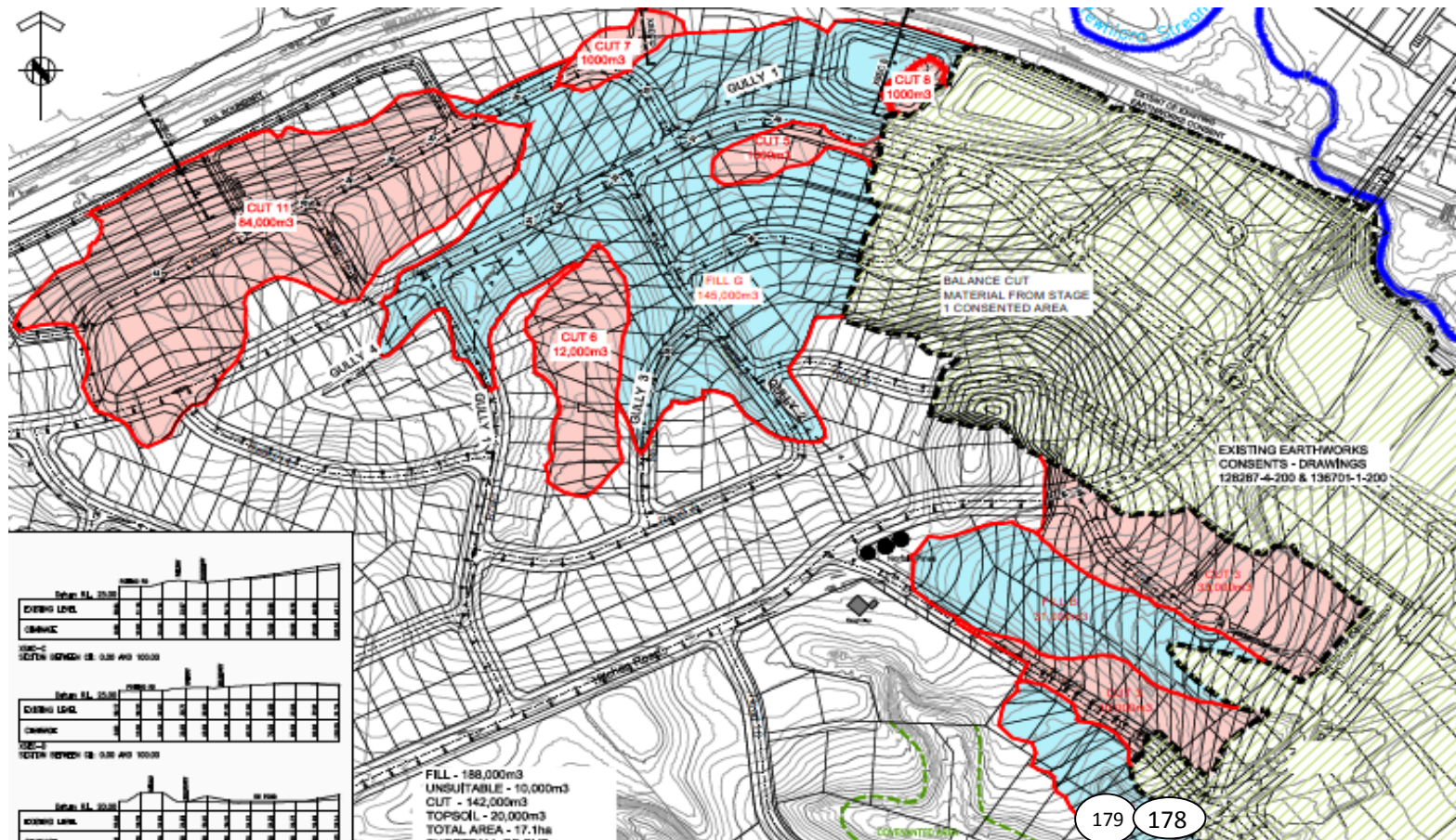
Page: 2 of 2

Project: J00113 - Hitchen Block - Stage 2 and 3, Pokeno

Location: Fill C

Tested by: AB

Date tested: 30/11/2016



<p>Client: Lander Geotechnical Consultants Limited</p> <p>Address: PO Box 97 385, Manukau 2241</p> <p>Attention: Chris Edwards</p> <p>c.c.: -</p> <p>Project: J00113 - Hitchen Block - Stage 2 and 3, Pokeno</p> <p>Location: Pokeno</p>	<p>PROJECT CODE: GENZETAM01177AA</p> <p>Page: 1 of 2</p> <div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;">  <p>IANZ ACCREDITED LABORATORY</p> </div> <div style="font-size: small;"> <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right;">  <p>Approved Signatory: Eric Paton Issue date: 7/12/2016</p> </div> </div>
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Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001); Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2); Water Content Testing (in accordance with NZS 4402:1986 Test 2.1); Density Calculations (in accordance with NZS 4402:1986 Tests 4.1.1.5(b)). Please note that Air Void calculations are not IANZ endorsed as part of this report.

Date	Work Order No:	Tested by	Test No.	Layer	Material tested	Location	Chainage (m)	Offset (m)	Offset from	Easting	Northing	RL	Test Probe Depth (mm)	Comments (FL = Finished level)	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (tm ³)	Solid Density	Air Voids (%)
															152	141	146	146					
5/12/2016	ETAM16W04179	AB	182	Fill	Silty CLAY	Fill F	-	-	-	1778064	5875725		150	1.0m to subgrade	152	141	146	146	1.80	39.8	1.29	2.7	1.0
5/12/2016	ETAM16W04179	AB	183	Fill	Silty CLAY	Fill F	-	-	-	1778206	5875685		150	-3.0m to subgrade	162	152	141	152	1.91	32.1	1.45	2.7	0.0
5/12/2016	ETAM16W04179	AB	184	Fill	Silty CLAY	Fill C	-	-	-	1778640	5875465		150	0.5m to subgrade	182	157	175	152	1.67	46.9	1.14	2.7	4.5
5/12/2016	ETAM16W04179	AB	185	Fill	Silty CLAY	Fill C	-	-	-	1778619	5875498		150	1.0m to subgrade	157	167	182	152	1.68	49.5	1.13	2.7	2.6

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM16W04179

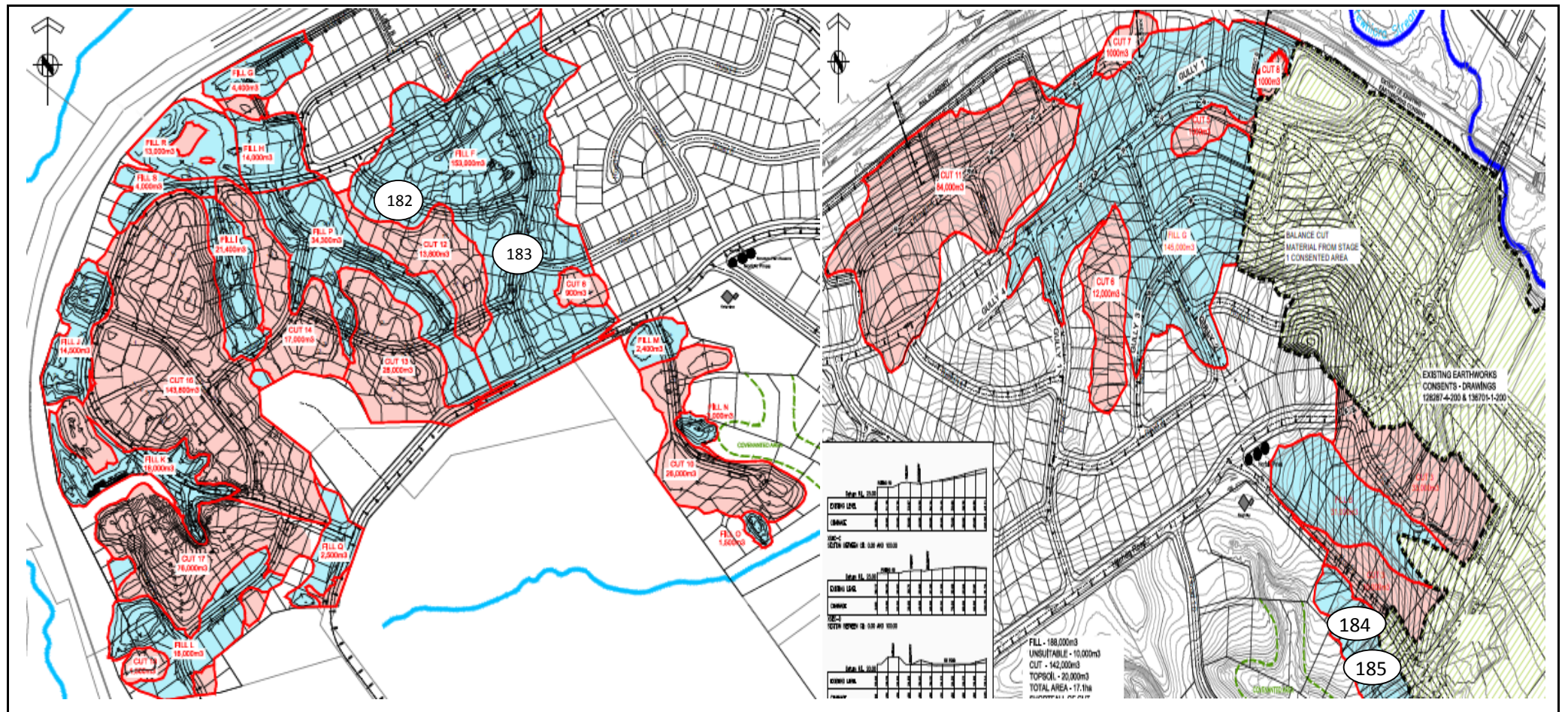
Page: 2 of 2

Project: J00113 - Hitchen Block - Stage 2 and 3, Pokeno

Location: Fill F & Fill C

Tested by: AB

Date tested: 5/12/2016



SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM16W04179

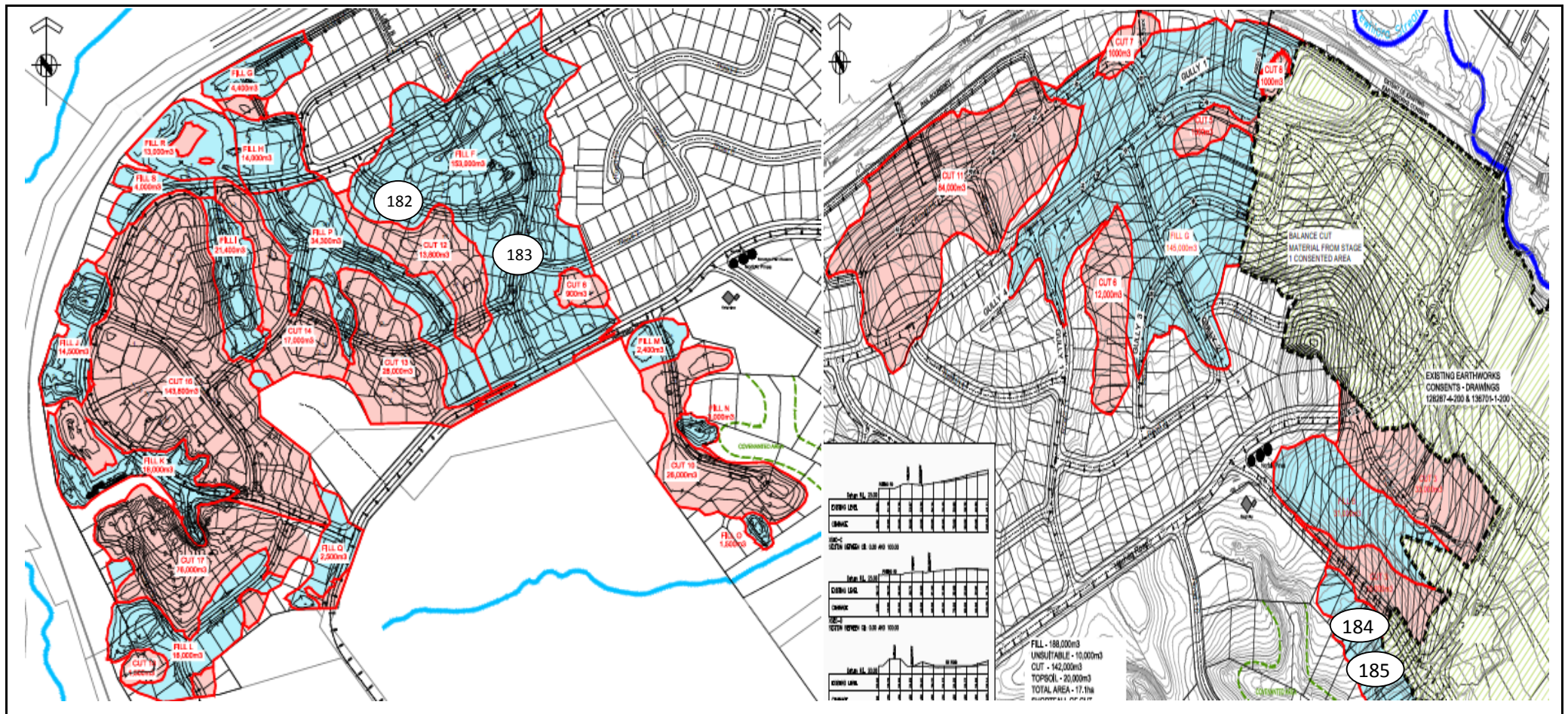
Page: 2 of 2



Project: J00113 - Hitchen Block - Stage 2 and 3, Pokeno

Location: Fill F

Tested by: AB

Date tested: 5/12/2016



<p>Client: Lander Geotechnical Consultants Limited</p> <p>Address: PO Box 97 385, Manukau 2241</p> <p>Attention: Chris Edwards</p> <p>c.c.: -</p> <p>Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno</p> <p>Location: Pokeno</p>	<p>PROJECT CODE: GENZETAM01177AA</p> <p>Page: 1 of 2</p> <div style="text-align: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right; margin-top: 20px;"> <p>Approved Signatory:  Cesar Pura</p> <p>Issue date: 9/03/2018</p> </div>
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Test method: Test Methods in accordance with: Shear Strength (using field Shear vane in accordance with NZGS 2001); Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2); Water Content Testing (in accordance with NZS 4402:1986 Test 2.1); Density Calculations (in accordance with NZS 4402:1986 Tests 4.1.1.5(b)). Please note that Air Void calculations are not IANZ endorsed as part of this report.

Date	Work Order No:	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL	Test Probe Depth (mm)	Comments (FL = Finished level)	Field Shear Strength in kPa				Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density	Air Voids (%)
												UTP	UTP	UTP	UTP					
5/03/2018	ETAM18W00863	BS	286	Fill	Silty CLAY	Grams Gully	1778723	5875380	-	150	500mm to Subgrade Level	220+	220+	220+	220+	1.89	27.6	1.48	2.7	4.3
5/03/2018	ETAM18W00863	BS	287	Fill	Silty CLAY	Grams Gully	1778768	5875321	-	150	At Finished Level	UTP	UTP	UTP	UTP	1.91	20.9	1.58	2.7	8.6

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM18W00863

Page: 2 of 2

Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno

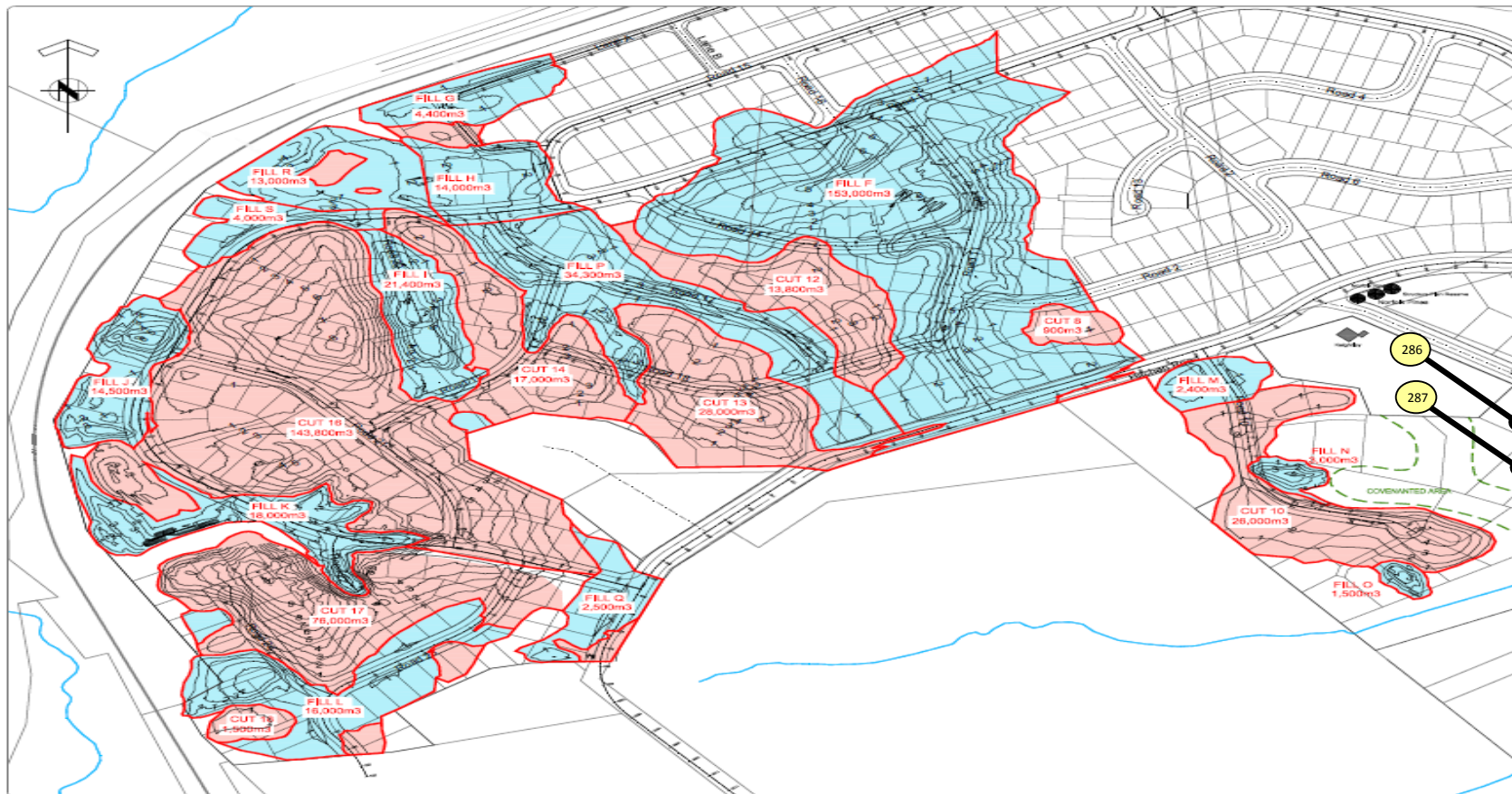
Location: As below

Tested by:

BS

Date tested:

5/03/2018



CUT - 308,000m³
FILL - 302,000m³
UNSUITABLE - 8,000m³
TOPSOIL - 60,000m³
TOTAL EARTHWORKS AREA - 30.3ha

1	ROAD FILL & FINISH	SEP 2018
2	ROAD FILL & FINISH	SEP 2018
3	ROAD FILL & FINISH	SEP 2018
4	ROAD FILL & FINISH	SEP 2018
5	ROAD FILL & FINISH	SEP 2018
6	ROAD FILL & FINISH	SEP 2018
7	ROAD FILL & FINISH	SEP 2018
8	ROAD FILL & FINISH	SEP 2018
9	ROAD FILL & FINISH	SEP 2018
10	ROAD FILL & FINISH	SEP 2018
11	ROAD FILL & FINISH	SEP 2018
12	ROAD FILL & FINISH	SEP 2018
13	ROAD FILL & FINISH	SEP 2018
14	ROAD FILL & FINISH	SEP 2018
15	ROAD FILL & FINISH	SEP 2018
16	ROAD FILL & FINISH	SEP 2018
17	ROAD FILL & FINISH	SEP 2018
18	ROAD FILL & FINISH	SEP 2018
19	ROAD FILL & FINISH	SEP 2018
20	ROAD FILL & FINISH	SEP 2018
21	ROAD FILL & FINISH	SEP 2018
22	ROAD FILL & FINISH	SEP 2018
23	ROAD FILL & FINISH	SEP 2018
24	ROAD FILL & FINISH	SEP 2018
25	ROAD FILL & FINISH	SEP 2018
26	ROAD FILL & FINISH	SEP 2018
27	ROAD FILL & FINISH	SEP 2018
28	ROAD FILL & FINISH	SEP 2018
29	ROAD FILL & FINISH	SEP 2018
30	ROAD FILL & FINISH	SEP 2018
31	ROAD FILL & FINISH	SEP 2018
32	ROAD FILL & FINISH	SEP 2018
33	ROAD FILL & FINISH	SEP 2018
34	ROAD FILL & FINISH	SEP 2018
35	ROAD FILL & FINISH	SEP 2018
36	ROAD FILL & FINISH	SEP 2018
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42	ROAD FILL & FINISH	SEP 2018
43	ROAD FILL & FINISH	SEP 2018
44	ROAD FILL & FINISH	SEP 2018
45	ROAD FILL & FINISH	SEP 2018
46	ROAD FILL & FINISH	SEP 2018
47	ROAD FILL & FINISH	SEP 2018
48	ROAD FILL & FINISH	SEP 2018
49	ROAD FILL & FINISH	SEP 2018
50	ROAD FILL & FINISH	SEP 2018

CIVILPLAN CONSULTANTS
Level 3 and 4, 110 Shirley Way, Manukau City, Phone: 23222222

PROJECT TITLE: DFH JOINT VENTURE HITCHEN BLOCK EARTHWORKS POKENO



ISSUE TITLE: STAGE 3 EARTHWORKS PLAN OVERALL CUT FILL PLAN

ISSUE STATUS: RESOURCE CONSENT

SCALE: 1:1500 AS 1:3500 A3

DATE: 136701-03-202

PROJECT: B

<p>Client: Lander Geotechnical Consultants Limited Address: PO Box 97 385, Manukau 2241 Attention: Chris Edwards c.c.: Michael Chan Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno Location: Pokeno</p>	<p>PROJECT CODE: GENZETAM01177AA Page: 1 of 2</p> <div style="display: flex; align-items: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right; margin-top: 20px;"> <p>Approved Signatory:  Cesar Pura Issue date: 1/11/2018</p> </div>
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Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No.	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL (m)	Test Probe Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density (t/m ³) Assumed	Air Voids (%)
												UTP = Unable to penetrate								
10/10/2018	ETAM18W04609	BS	306	Fill	Silty CLAY	Refer to plan	1778164	5875516	-	150	At Finished Level	170	170	237+	237+	1.67	47.5	1.14	2.7	4
10/10/2018	ETAM18W04609	BS	307	Fill	Silty CLAY	Refer to plan	1778154	5875501	-	150	At Finished Level	144	144	144	140	1.72	40.4	1.23	2.7	5

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM18W04609

Page: 2 of 2

Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno

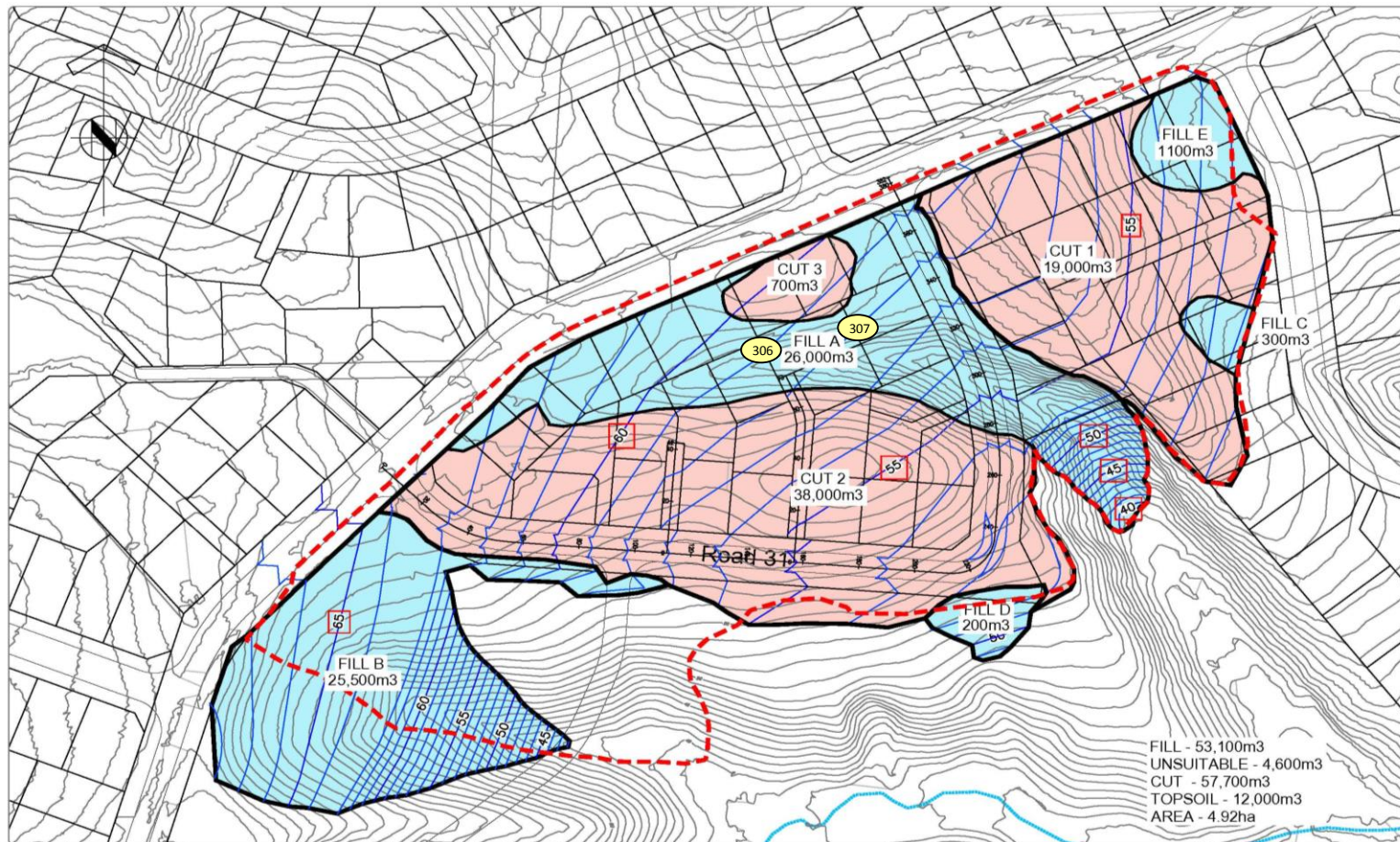
Location: As below



Tested by:

BS

Date tested:

10/10/2018



<p>Client: Lander Geotechnical Consultants Limited</p> <p>Address: PO Box 97 385, Manukau 2241</p> <p>Attention: Chris Edwards</p> <p>c.c.: Michael Chan</p> <p>Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno</p> <p>Location: Pokeno</p>	<p>PROJECT CODE: GENZETAM01177AA</p> <p>Page: 1 of 2</p> <div style="display: flex; align-items: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right; margin-top: 20px;"> <p>Approved Signatory:  Cesar Pura</p> <p>Issue date: 6/12/2018</p> </div>
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Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No.	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL (m)	Test Probe Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density (t/m ³) Assumed	Air Voids (%)
												UTP = Unable to penetrate								
30/11/2018	ETAM18W05366	SC	310	Fill	Silty CLAY	Fill B	1778100	5875349	-	150		206	206	231+	231+	1.73	39.6	1.24	2.7	5
30/11/2018	ETAM18W05366	SC	311	Fill	Silty CLAY	Fill B	1778066	5875353	-	150		206	206	206	206	1.82	32.1	1.38	2.7	5

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM18W05366

Page: 2 of 2

Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno

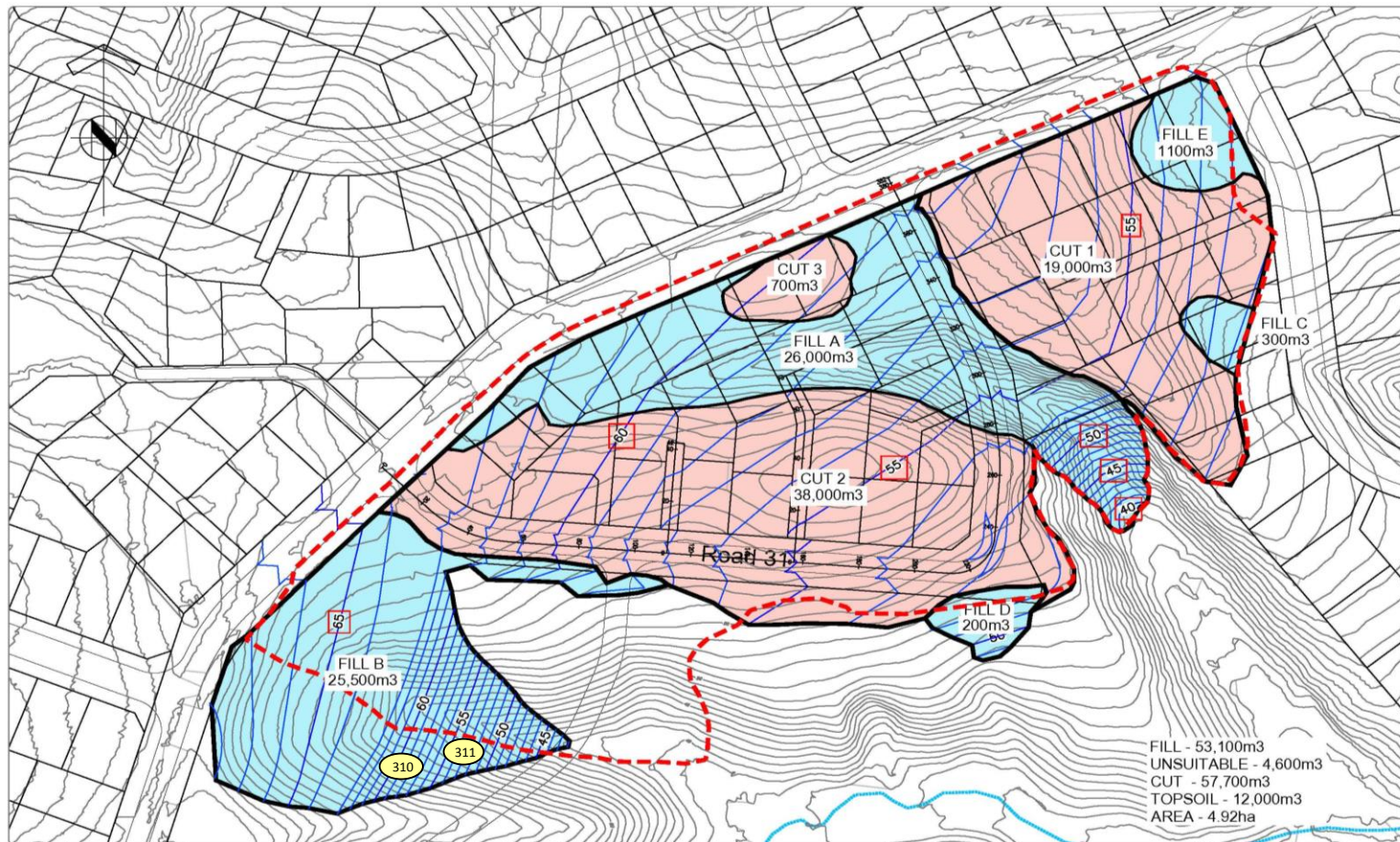
Location: As below



Tested by:

SC

Date tested:

30/11/2018



<p>Client: Lander Geotechnical Consultants Limited</p> <p>Address: PO Box 97 385, Manukau 2241</p> <p>Attention: Chris Edwards</p> <p>c.c.: Michael Chan</p> <p>Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno</p> <p>Location: Pokeno</p>	<p>PROJECT CODE: GENZETAM01177AA</p> <p>Page: 1 of 2</p> <div style="display: flex; align-items: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right; margin-top: 20px;"> <p>Approved Signatory:  Cesar Pura</p> <p>Issue date: 12/12/2018</p> </div>
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Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No.	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL (m)	Test Probe Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density (t/m ³) Assumed	Air Voids (%)
												UTP = Unable to penetrate								
10/12/2018	ETAM18W05511	SC	312	Fill	Silty CLAY	Fill B	1778070	5875360	-	150		231+	231+	231+	231+	1.79	35.7	1.32	2.7	4
10/12/2018	ETAM18W05511	SC	313	Fill	Silty CLAY	Fill B	1778042	5875371	-	150		231+	231+	231+	231+	1.77	43.3	1.23	2.7	1

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM18W05511

Page: 2 of 2

Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno

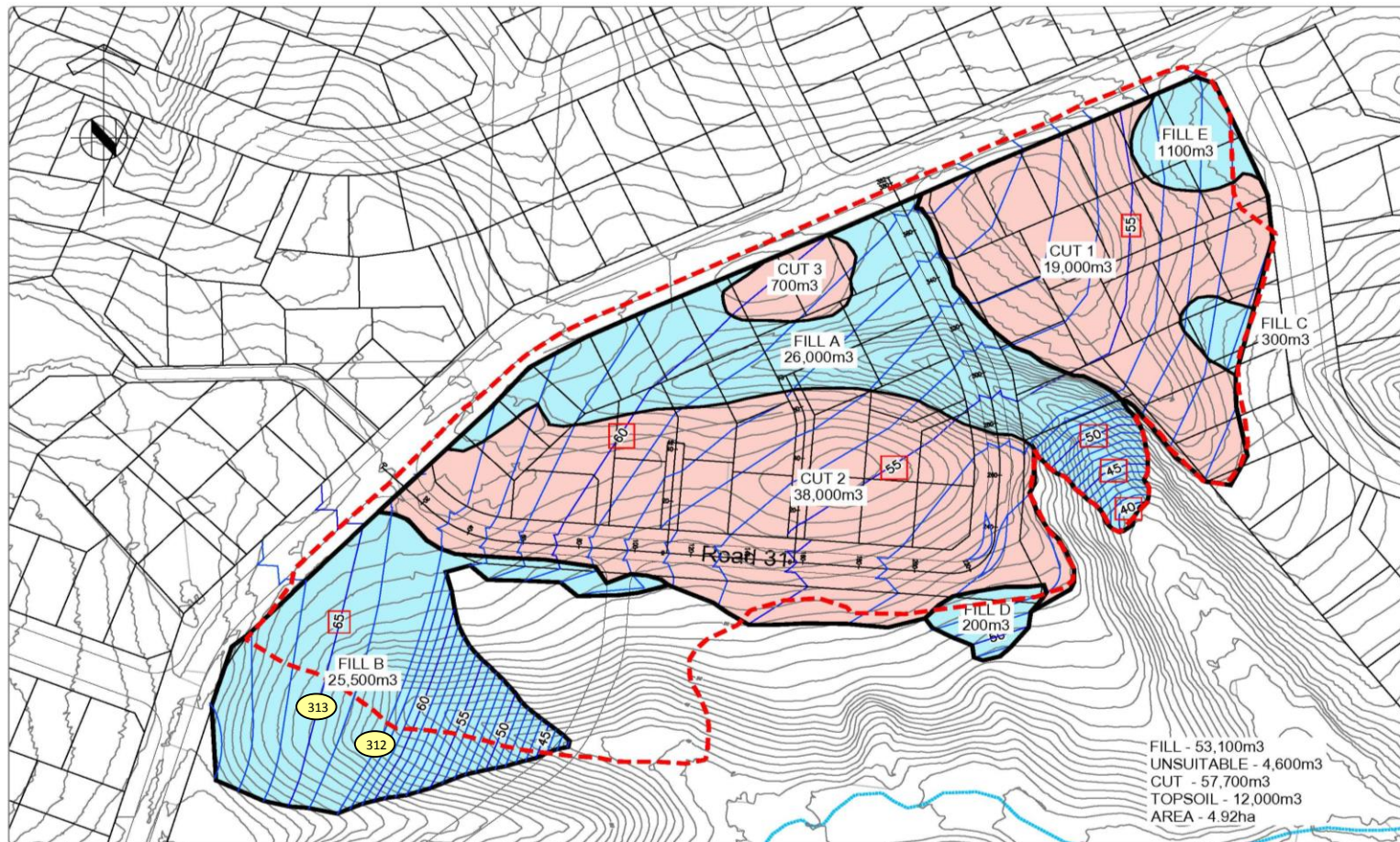
Location: As below


Tested by:

SC

Date tested:

10/12/2018



Client: Stockman General Contractors Address: PO Box 199 Clevedon 2248 Attention: Chris Edwards c.c.: Michael Chan Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno Location: Pokeno										PROJECT CODE: GENZETAM01177AA Page: 1 of 2  Tests indicated as not accredited are outside the scope of the laboratory's accreditation Approved Signatory: Cesar Pura Issue date: 17/12/2018										
Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No:	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL (m)	Test Probe Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density (t/m ³)	Air Voids (%)
12/12/2018	ETAM18W05608	SC	314	Fill	Silty CLAY	Fill B	1778054	5875348	-	150		231+	231+	191	191	1.75	35.0	1.30	2.70	7
12/12/2018	ETAM18W05608	SC	315	Fill	Silty CLAY	Fill B	1778039	5875355	-	150		231+	231+	231+	231+	1.86	32.9	1.40	2.70	2

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM18W05608

Page: 2 of 2

Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno

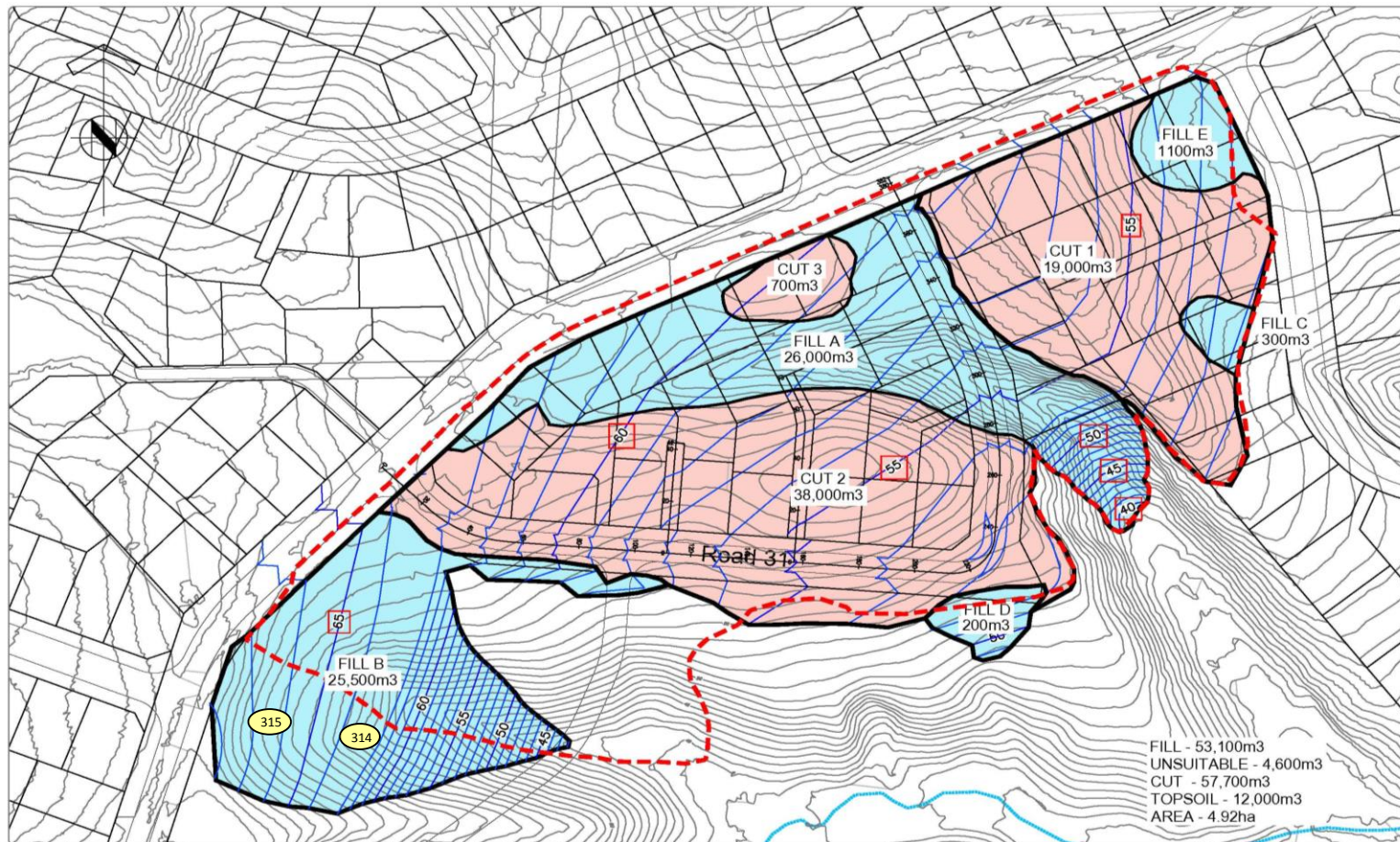
Location: As below


Tested by:

SC

Date tested:

12/12/2018



Client: Stockman General Contractors Address: PO Box 199 Clevedon 2248 Attention: Chris Edwards c.c.: Michael Chan Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno Location: Pokeno										PROJECT CODE: GENZETAM01177AA Page: 1 of 2  Tests indicated as not accredited are outside the scope of the laboratory's accreditation Approved Signatory: Cesar Pura Issue date: 18/12/2018										
Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No:	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL (m)	Test Probe Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density (t/m ³)	Air Voids (%)
14/12/2018	ETAM18W05626	SC	316	Fill	Silty CLAY	Fill B	1778087	5875362	-	150		231+	231+	231+	231+	1.81	37.3	1.31	2.70	2
14/12/2018	ETAM18W05626	SC	317	Fill	Silty CLAY	Fill B	1778065	5875375	-	150		231+	231+	231+	231+	1.81	41.6	1.28	2.70	0

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM18W05626

Page: 2 of 2

Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno

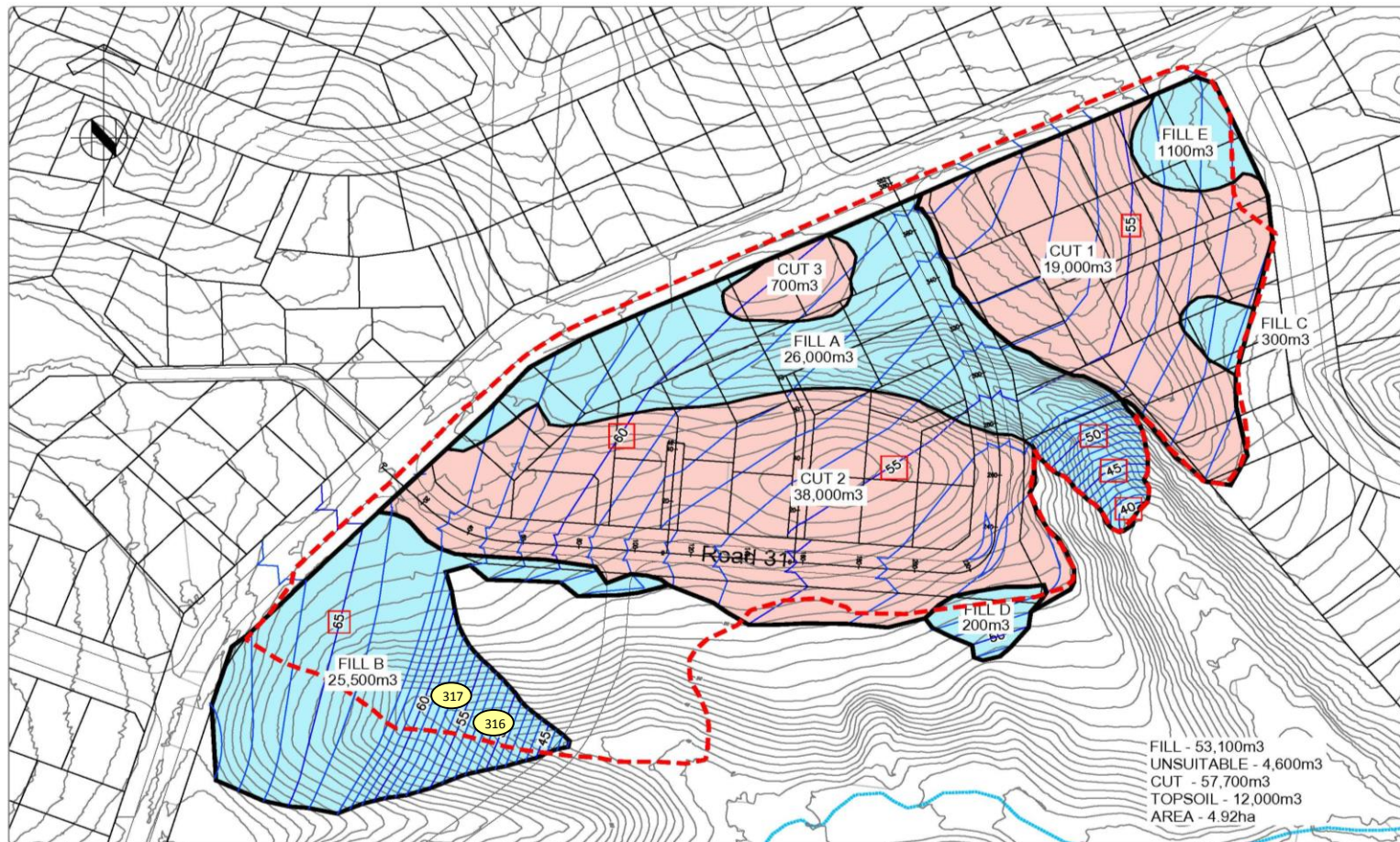
Location: As below


Tested by:

SC

Date tested:

14/12/2018



Client: Stockman General Contractors Address: PO Box 199 Clevedon 2248 Attention: Chris Edwards c.c.: Michael Chan Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno Location: Pokeno										PROJECT CODE: GENZETAM01177AA Page: 1 of 2  Tests indicated as not accredited are outside the scope of the laboratory's accreditation Approved Signatory: Cesar Pura Issue date: 21/12/2018										
Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.																				
Date	Work Order No:	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL (m)	Test Probe Depth (mm)	Comments	Field Shear Strength in kPa UTP = Unable to penetrate				Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density (t/m ³)	Air Voids (%)
19/12/2018	ETAM18W05793	SC	318	Fill	Silty CLAY	Fill B	1778041	5875374	-	150		UTP	UTP	231+	231+	1.66	40.3	1.18	2.70	9
19/12/2018	ETAM18W05793	SC	319	Fill	Silty CLAY	Fill B	1778072	5875357	-	150		231+	231+	UTP	UTP	1.80	35.7	1.33	2.70	3

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM18W05793

Page: 2 of 2

Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno

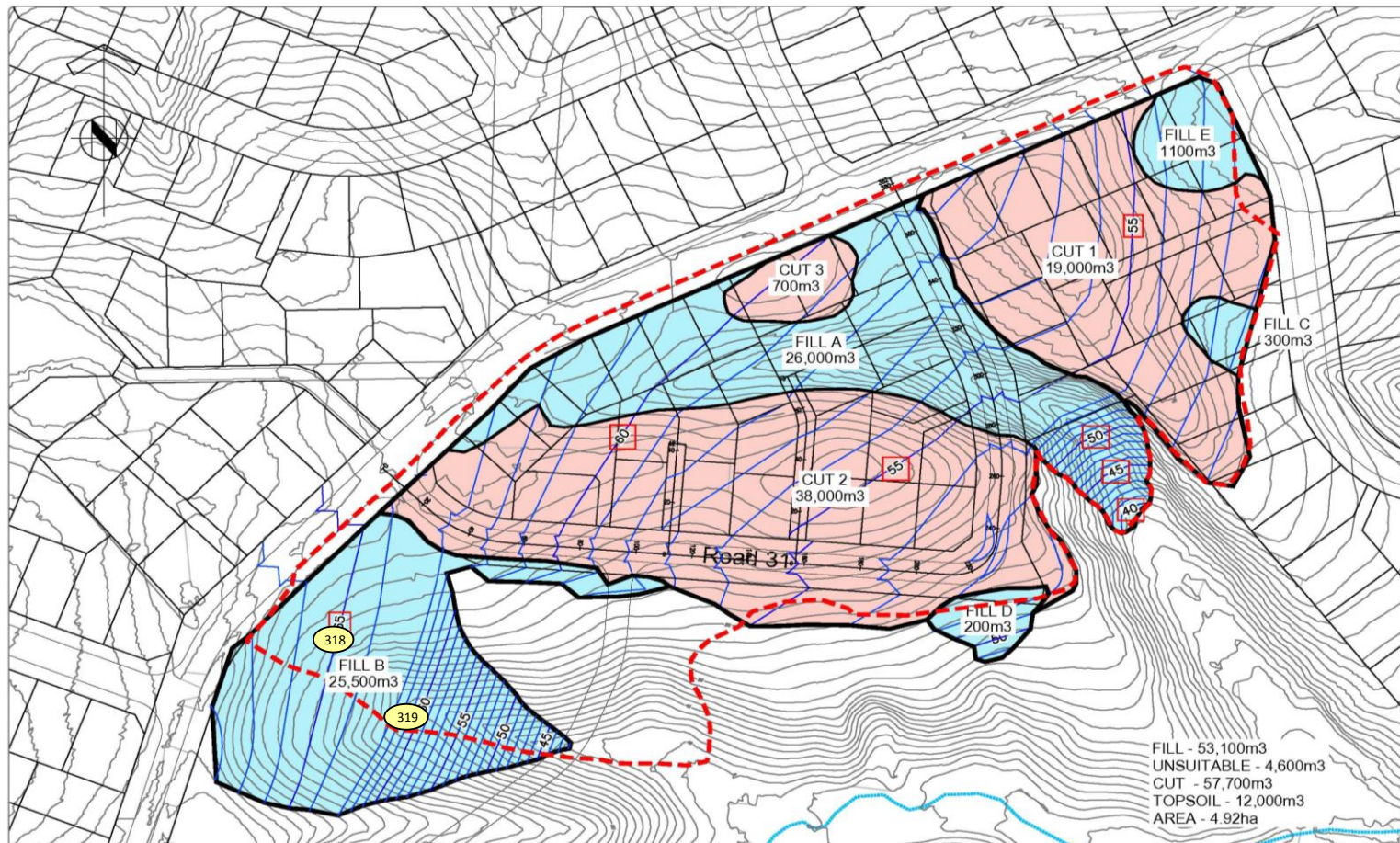
Location: As below



Tested by:

SC

Date tested:

19/12/2018



<p>Client: Stockman General Contractors Address: PO Box 199 Clevedon 2248 Attention: Chris Edwards c.c.: Michael Chan Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno Location: Pokeno</p>	<p>PROJECT CODE: GENZETAM01177AA Page: 1 of 2</p> <div style="display: flex; align-items: center;">  <p>Tests indicated as not accredited are outside the scope of the laboratory's accreditation</p> </div> <div style="text-align: right; margin-top: 20px;"> <p>Approved Signatory:  Cesar Pura Issue date: 11/01/2019</p> </div>
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Test method: Test Methods in accordance with: *Shear Strength (using field Shear vane in accordance with NZGS 2001): Nuclear Densometer Testing (in accordance with NZS 4407:2015 Test 4.2): Water Content Testing (in accordance with NZS 4402:1986 Test 2.1): Moisture contents and dry densities are corrected against oven dried moisture content testing.

Date	Work Order No:	Tested by	Test No.	Layer	Material tested	Location	Easting	Northing	RL (m)	Test Probe Depth (mm)	Comments	Field Shear Strength in kPa				Wet Density (t/m ³)	Oven Water Content (%)	Dry Density (t/m ³)	Solid Density (t/m ³)	Air Voids (%)
												UTP = Unable to penetrate								
8/01/2019	ETAM19W00065	JJ & MP	320	Fill	CLAY	Fill B	1778060	5875385	-	150	4.0m to Finished Level	UTP	UTP	UTP	227+	1.77	41.5	1.25	2.70	2
8/01/2019	ETAM19W00065	JJ & MP	321	Fill	CLAY	Fill B	1778059	5875378	-	150	4.0m to Finished Level	135	143	143	147	1.70	44.7	1.17	2.70	4

SITE PLAN

NOT TO SCALE

Project No: GENZETAM01177AA

Work Order No: ETAM19W00065

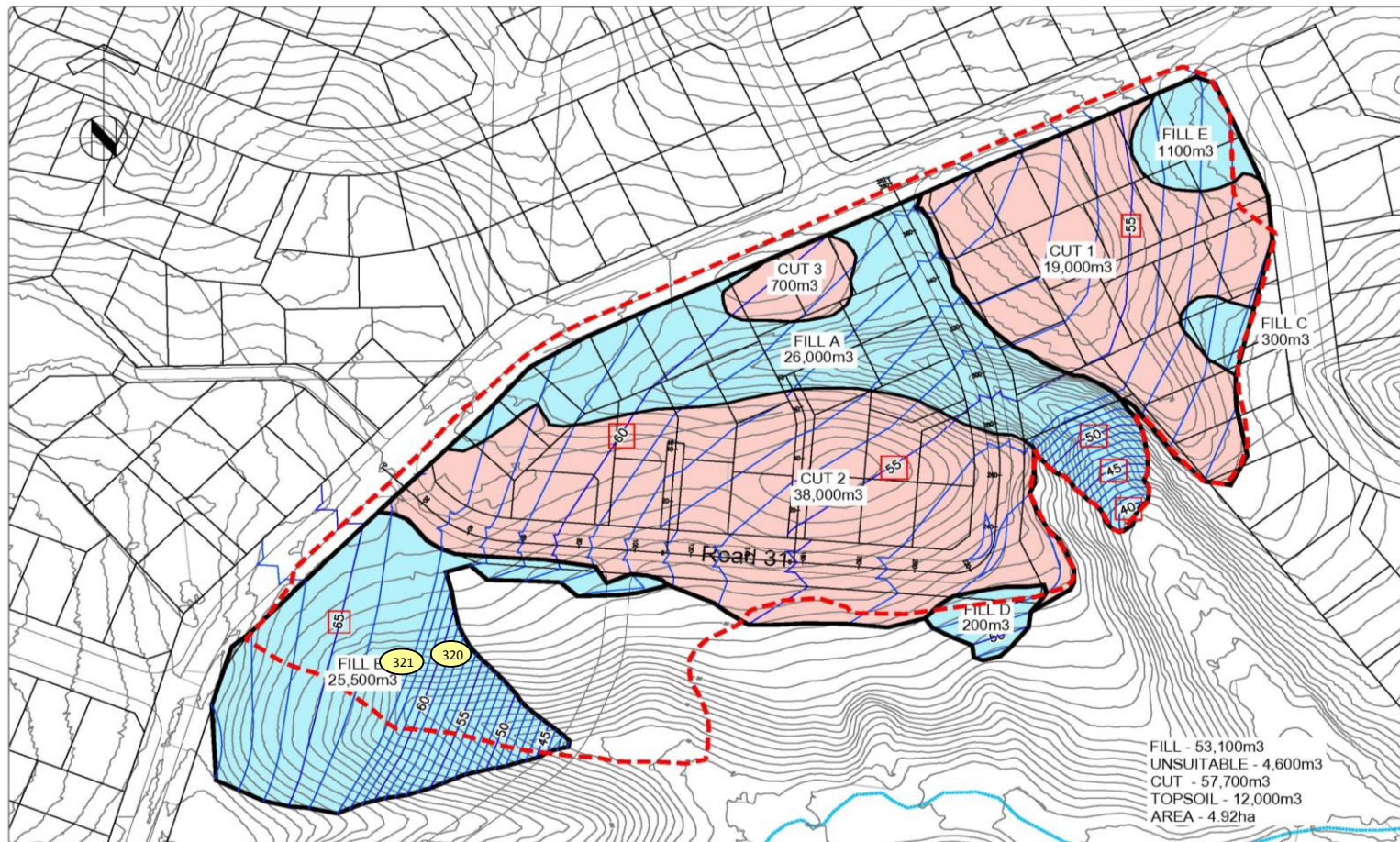
Page: 2 of 2

Project: J00113 - Hitchen Block - Stages 1, 2 and 3, Pokeno

Location: As below

Tested by: JJ & MP

Date tested: 8/01/2019



Lander Geotechnical
PO Box 97 385
Manukau
Auckland 2241

Attention: Shane Lander

Dear Shane

Hitchens Block, Pokeno - Stages 3 & 4 Earthworks Testing Site Report

Customer's Instructions

We were instructed to:

Complete nuclear densometer and shear vane testing on earthworks at the above mentioned site when requested and report the results.

Specifications

As per email from Mike (Lander Geotechnical) on the 8/01/2019 the specification for Earthworks 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.

Dates of Procedures

Testing was carried out from the 10/01/2019 to the 20/02/2019.

Locations

Testing was carried out as instructed by the contractor on site. Test locations were selected on site by the Geotechnics technician on behalf of 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 4.2.1 - Method using a nuclear surface moisture-density gauge (Direct Transmission Mode) – NDM

NZS 4402:1986 Test 2.1 - Determination of water content

Material Description

Material descriptions are provided in the attached results.

Results

The following is attached:

Appendix A – Stage 3 & 4 Earthworks Testing and Location Plans.

Appendix B – Stage 3 Slip Remediation Testing and Location Plans.

Test Remarks

NDM – Direct Transmission

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

Nuclear densometers are calibrated for a bulk density range of 1,728 kg/m³ to 2,756 kg/m³. 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/m³ 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.

Oven calculated air voids (%) have been reported as zero if negative. The calculation of air voids is based on wet density, moisture content and the solid density. The wet density is measured by the nuclear densometer and the moisture content by oven drying. The calculation of air voids is not part of the test in NZS 4407 and is therefore not covered under the IANZ endorsement of this report.

Determination of Water Content

Samples used for the determination of the water content were sampled in conjunction with nuclear densometer testing and disposed of 24 hours after testing.

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.

We provide the results for your interpretation and inference.

Descriptions are enclosed for your information, but 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:



.....
Josh Allan
Projects Manager

Authorised for Geotechnics by:



.....
Vic O'Connor
Project Director
Approved Signatory

Report checked by:



.....
Seven Baker
CMT Field Technician



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

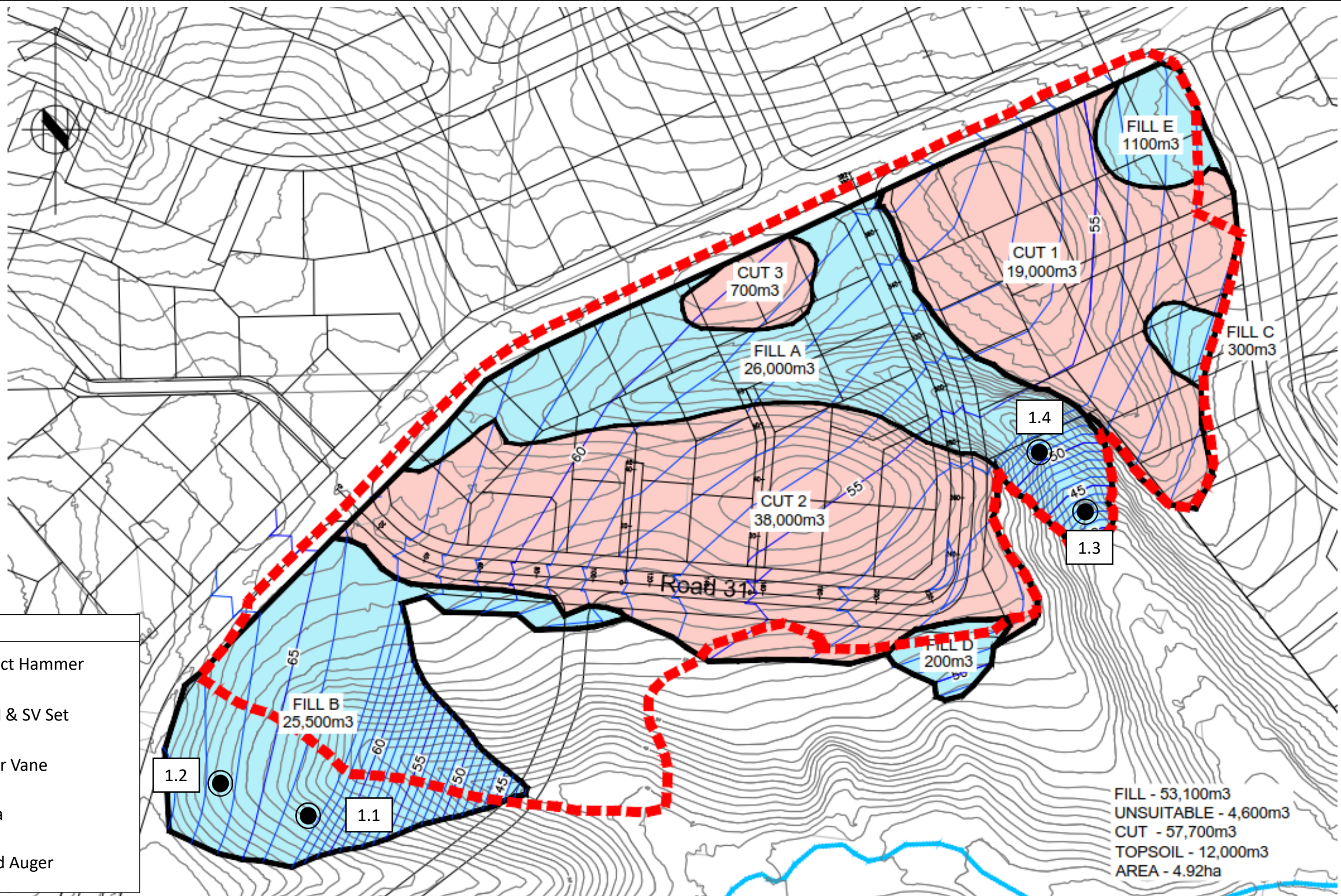
11-Mar-20

t:\geotechnicsgroup\projects\1009213\1009213.0050 - hitchens block, pokeno\workingmaterial\20200311 jra rpt1.docx

Appendix A: Stages 3 & 4 Testing Results & Test Plans

Job #	1009213.0050.0.0/1
Entered By	VIVE / JRA
Checked By	VIVE / JRA
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
							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	
1.1	JRA	10/01/2019	Gully 2 - Fill Area B	~3.2m below FL	Clay SILT	NDM / SV	1.65	44.7	7.0	1.68	42.5	6.2	1.66	43.6	6.6	2.70	42.0	1.17	7.4	-	196	187	>211	>211	>201	-	-	P		
1.2						NDM / SV	1.79	36.0	3.9	1.79	36.9	3.3	1.79	36.5	3.6	2.70	42.5	1.26	0.1	-	136	130	187	196	162	-	-	P		
1.3			Gully 1 - Fill Area A	~2m placed		NDM / SV	1.82	33.7	3.8	1.80	33.3	4.8	1.81	33.5	4.3	2.70	31.0	1.38	5.9	-	>211	>211	>211	>211	>211	-	-	P		
1.4						~1.5m placed	NDM / SV	1.82	38.5	1.0	1.81	38.3	1.2	1.81	38.4	1.1	2.70	40.6	1.29	0.0	-	>211	>211	>211	>211	>211	-	-	P	
2.1	JRA / VIVE	17/01/2019	Gully 2 - Fill Area B	~1.5m below FL	Clay SILT	NDM / SV	1.80	35.1	3.8	1.80	34.9	3.8	1.80	35.0	3.8	2.70	33.3	1.35	4.9	-	193	>211	UTP	UTP	>202	-	-	P		
2.2						Gully 1 - Fill Area A	~4.5m below FL	NDM / SV	1.75	39.7	4.0	1.72	35.8	8.0	1.73	37.8	6.0	2.70	37.3	1.26	6.3	-	196	193	196	UTP	195	-	-	P
3.1	JRA / VIVE	21/01/2019	Gully 1 - Fill Area A	~2.5m below FL	Clay SILT	NDM / SV	1.74	32.0	8.9	1.75	32.0	8.5	1.75	32.0	8.7	2.70	34.6	1.30	7.1	-	163	166	UTP	UTP	165	-	-	P		
3.2						~1.5m below FL	NDM / SV	1.77	33.2	6.8	1.78	32.7	6.4	1.77	33.0	6.6	2.70	38.8	1.28	3.0	-	UTP	UTP	136	UTP	136	-	-	P	
4.1	JRA / VIVE	23/01/2019	Gully 1 - Fill Area A	~5m below FL	Clay SILT	NDM / SV	1.67	44.9	5.4	1.69	41.7	6.0	1.68	43.3	5.7	2.70	50.6	1.12	2.1	-	UTP	>211	UTP	UTP	>211	-	-	P		
4.2						Gully 2 - Fill Area B	~1m below FL	NDM / SV	1.76	40.0	3.4	1.75	33.8	7.4	1.75	36.9	5.4	2.70	43.9	1.22	1.4	3.8	UTP	UTP	UTP	196	196	>189	-	-
5.1	VIVE	30/01/2019	Gully 1 - Fill Area A	~1.5m below SG	Clay SILT	NDM / SV	1.74	39.0	4.8	1.74	39.0	5.0	1.74	39.0	4.9	2.70	37.7	1.26	5.6	3.6	187	>211	190	>211	>200	>189	-	-	P	
5.2						NDM / SV	1.77	34.6	5.8	1.77	35.6	5.5	1.77	35.1	5.6	2.70	40.0	1.26	2.7	3.9	178	205	190	151	181	>191	-	-	P	
6.1	VIVE	1/02/2019	Gully 1 - Fill Area A	~0.5m below FL	Clay SILT	NDM / SV	1.71	32.6	10.1	1.70	34.7	9.3	1.71	33.7	9.7	2.70	35.0	1.26	8.9	4.2	145	>211	175	184	>179	>188	-	-	P	
6.2						NDM / SV	1.73	35.1	7.9	1.69	35.9	9.1	1.71	35.5	8.5	2.70	42.0	1.20	4.8	4.7	142	133	>211	187	>168	>183	-	-	P	
7.1	VIVE	4/02/2019	Gully 1 - Fill Area A	~4m below FL	Clay SILT	NDM / SV	1.75	38.6	4.7	1.74	40.3	4.3	1.74	39.5	4.5	2.70	41.4	1.23	3.4	4.5	>211	>211	196	>211	>207	>184	-	-	P	
7.2						NDM / SV	1.70	32.9	10.5	1.75	36.4	5.9	1.72	34.7	8.2	2.70	38.7	1.24	5.8	4.5	>211	>211	>211	UTP	>211	>185	-	-	P	
8.1	VIVE	7/02/2019	Gully 1 - Fill Area A	~1m below FL	Clay SILT	NDM / SV	1.68	38.2	8.6	1.68	38.6	8.4	1.68	38.4	8.5	2.70	37.3	1.22	9.1	4.7	>211	>211	>211	>211	>190	-	-	P		
8.2						NDM / SV	1.73	38.5	5.4	1.75	39.2	4.3	1.74	38.9	4.9	2.70	35.6	1.28	6.8	5.1	151	172	>211	>211	>186	>195	-	-	P	
9.1	VIVE	11/02/2019	Gully 1 - Fill Area A	~0.5m below FL	Clay SILT	NDM / SV	1.76	40.0	2.9	1.78	38.7	2.9	1.77	39.4	2.9	2.70	37.4	1.29	4.0	5.3	>211	>211	>211	169	>201	>194	-	-	P	
9.2						Gully 2 - Fill Area B	~1m below FL	NDM / SV	1.79	32.0	6.5	1.79	31.2	7.1	1.79	31.6	6.8	2.70	33.0	1.34	5.9	5.7	>211	>211	202	205	>207	>195	-	-
10.1	JRA	13/02/2019	Gully 2 - Fill Area B	~FL	Clay SILT	NDM / SV	1.77	36.5	4.6	1.77	36.7	4.4	1.77	36.6	4.5	2.70	36.9	1.29	4.3	5.6	>211	>211	>211	>211	>196	-	-	P		
10.2						NDM / SV	1.80	38.5	2.0	1.80	36.6	3.1	1.80	37.6	2.6	2.70	40.8	1.28	0.7	5.4	>211	199	>211	>211	>208	>199	-	-	P	

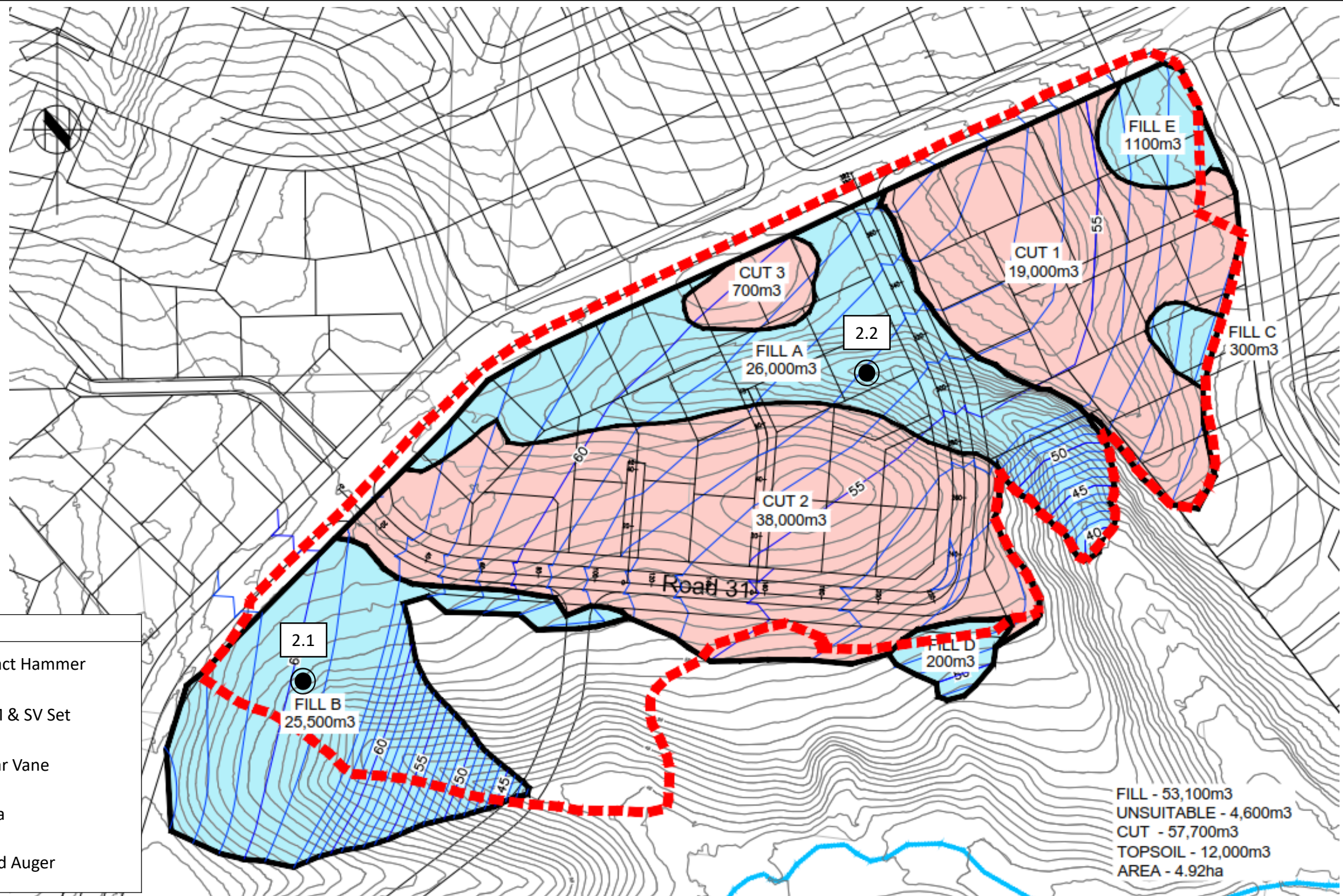


Test Location Plan






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		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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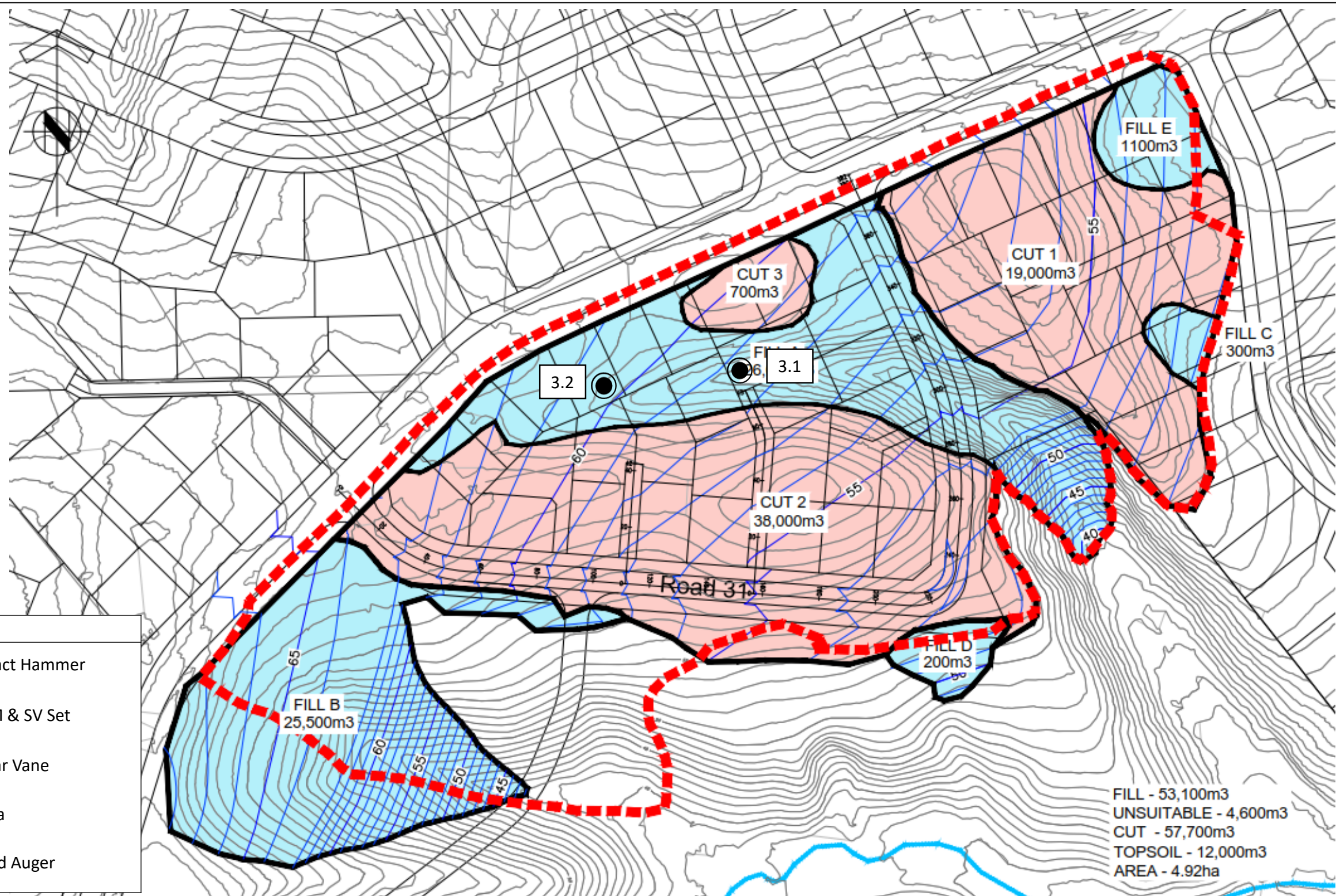
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-  NDM & SV Set
-  Shear Vane
-  Scala
-  Hand Auger

Test Location Plan






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		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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Legend:

-  Impact Hammer
-  NDM & SV Set
-  Shear Vane
-  Scala
-  Hand Auger

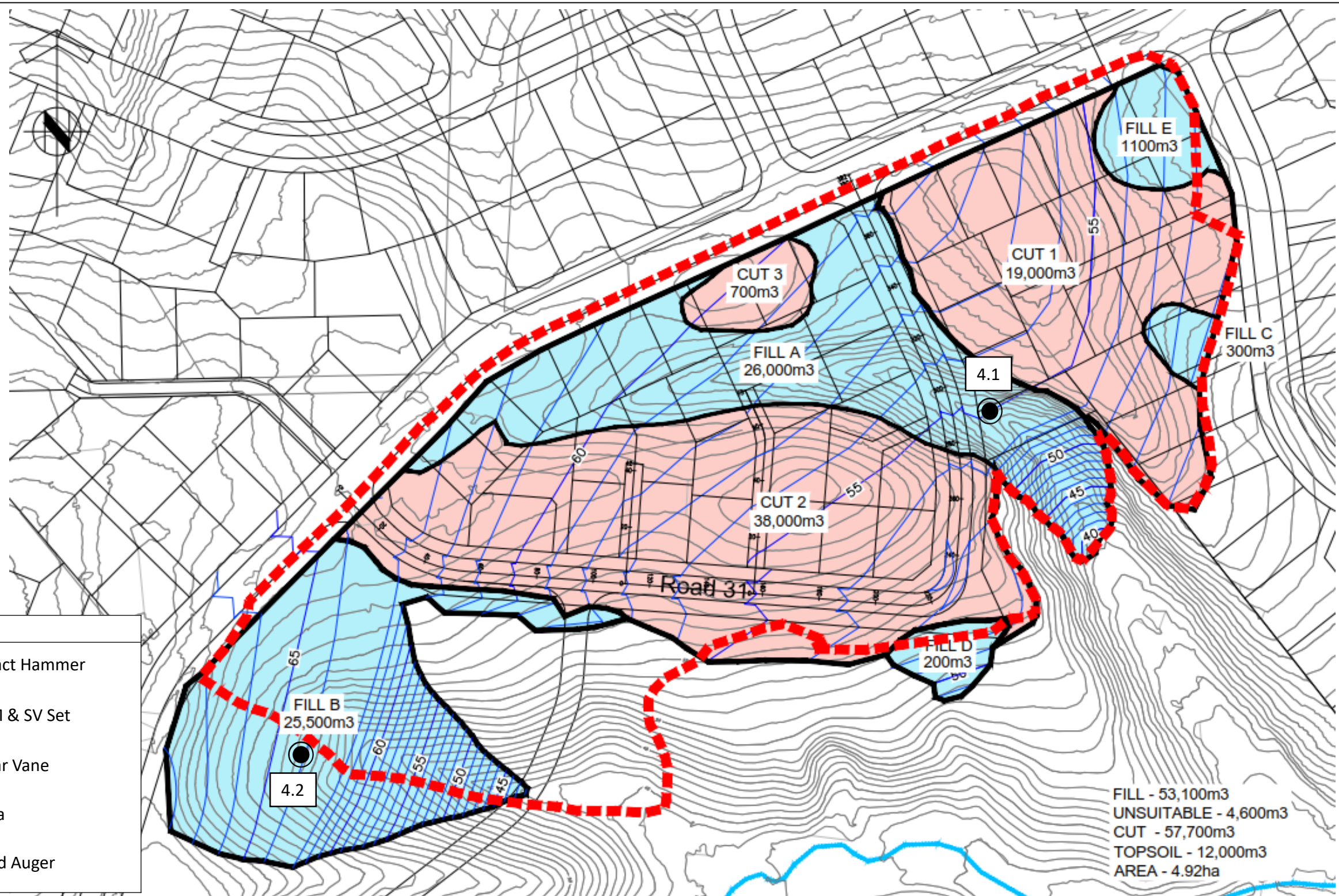
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 UNSUITABLE - 4,600m³
 CUT - 57,700m³
 TOPSOIL - 12,000m³
 AREA - 4.92ha

Test Location Plan






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		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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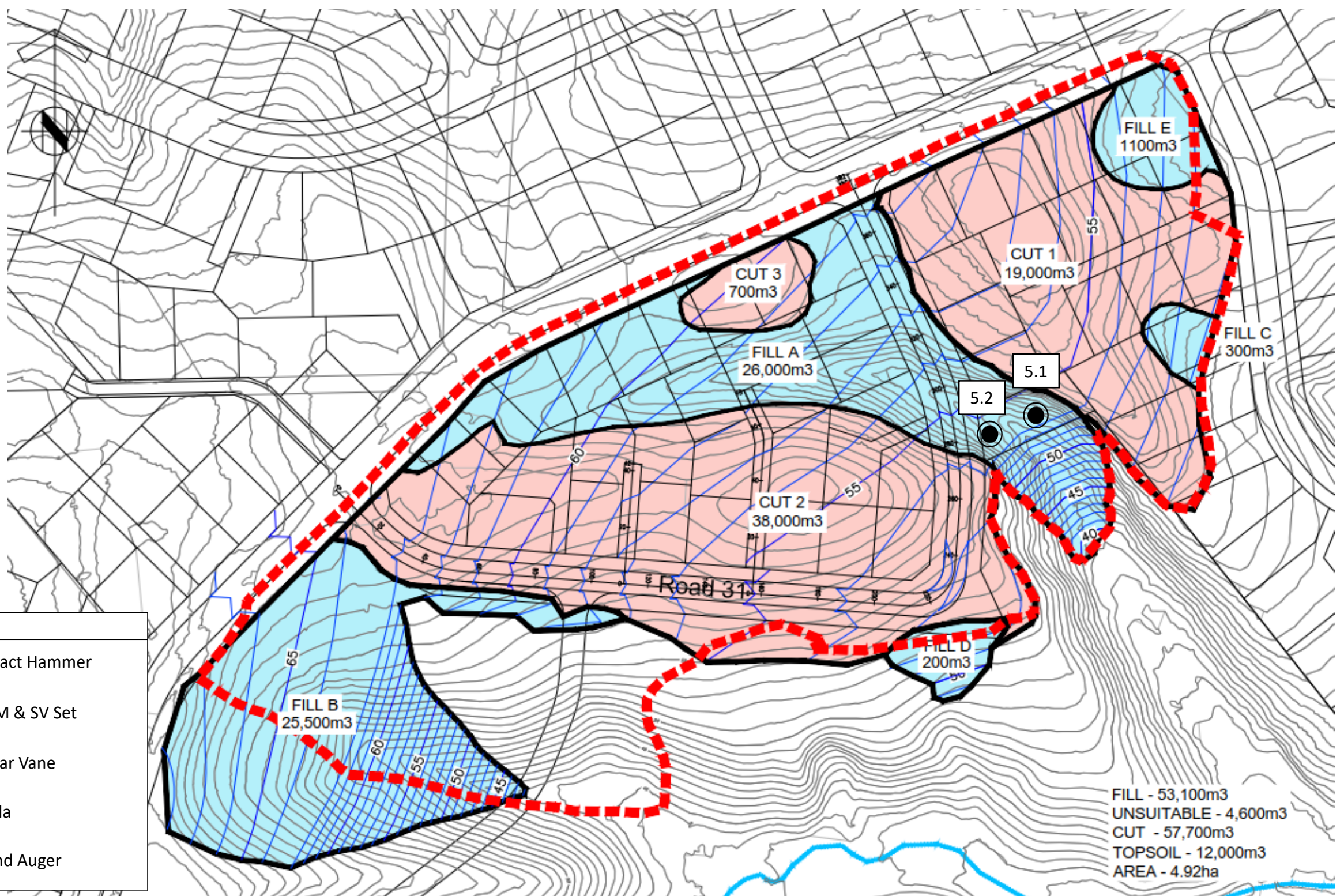
FILL - 53,100m³
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Test Location Plan

Site:	Hitchens Stage 3 & 4	Job Name:	Hitchens Block, Pokeno	Drawn:	JRA	Date:	23/1/19
Location:	Fill Area A and B	Job No.:	1009213.0050.0.0/1	URN:	4	Date:	23/1/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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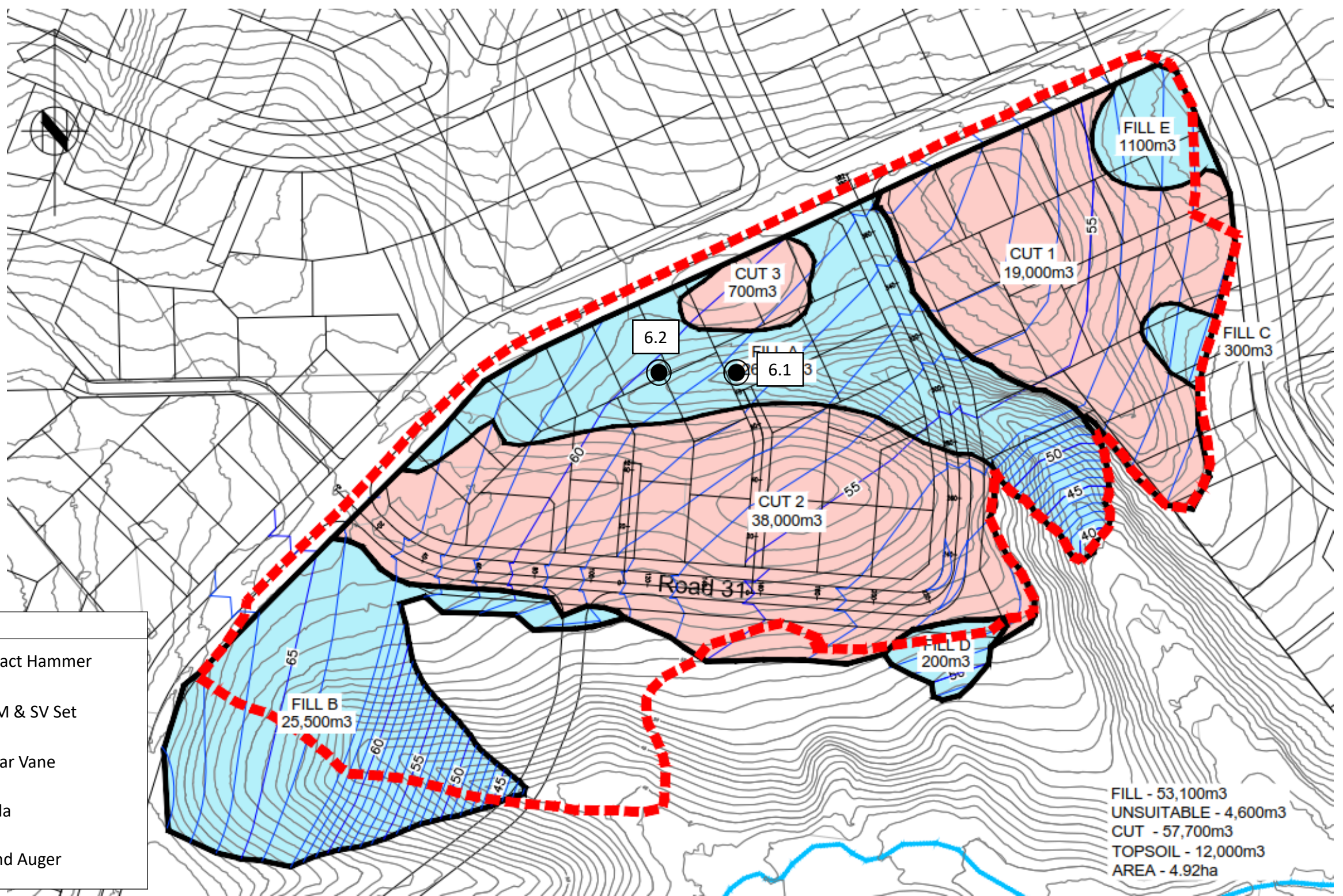


Test Location Plan






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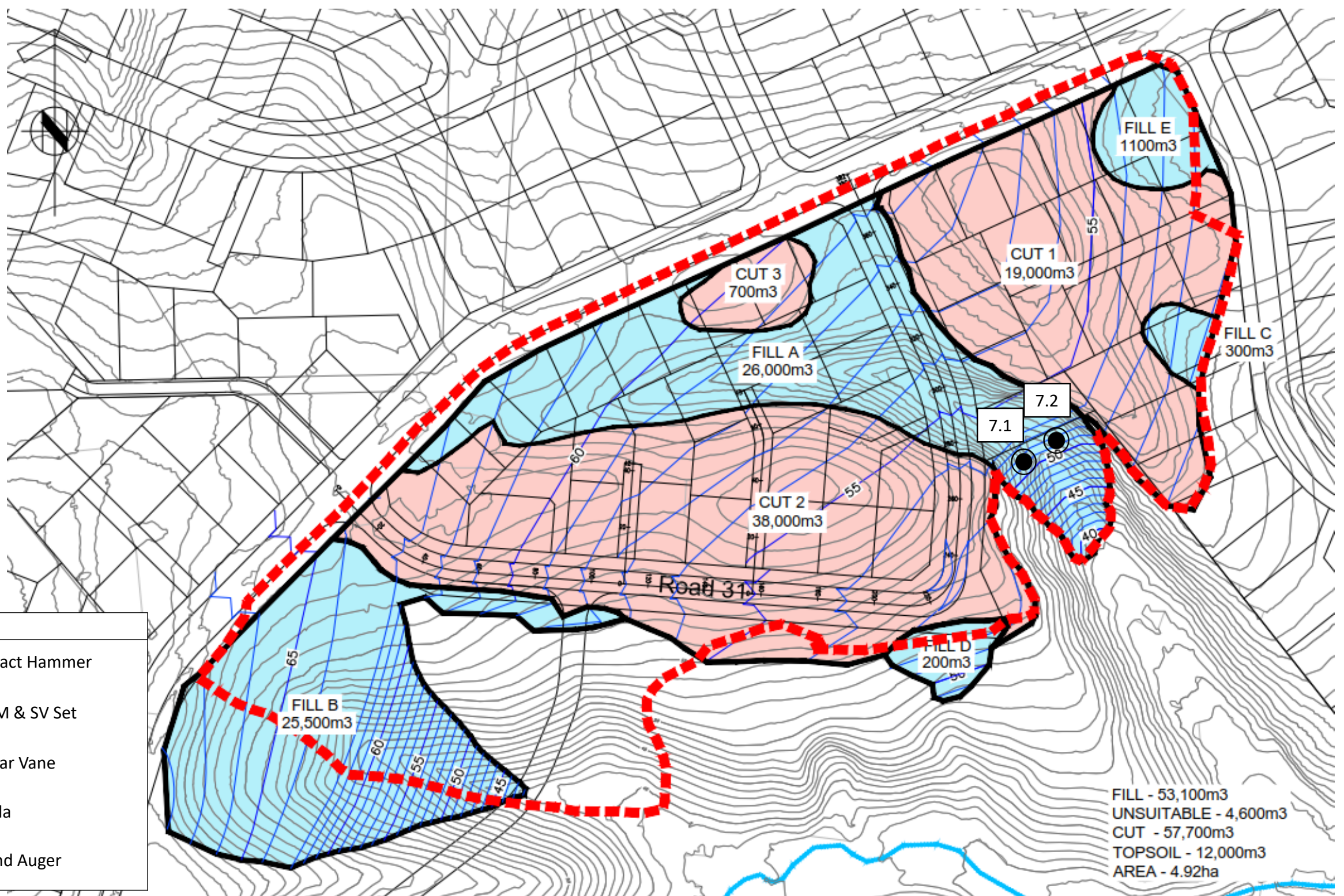
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-  Scala
-  Hand Auger

Test Location Plan






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Legend:

-  Impact Hammer
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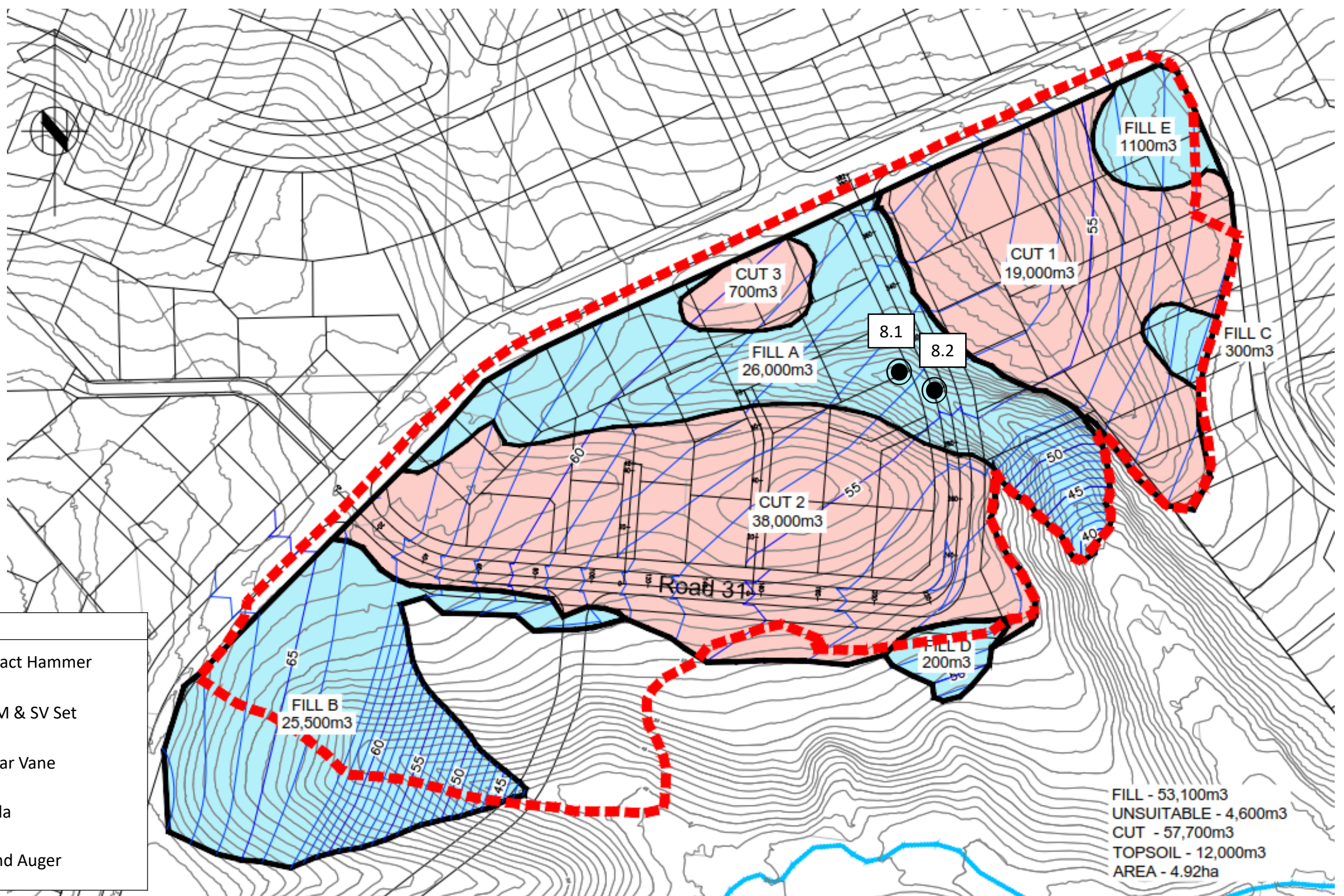
FILL - 53,100m³
 UNSUITABLE - 4,600m³
 CUT - 57,700m³
 TOPSOIL - 12,000m³
 AREA - 4.92ha

Test Location Plan






Site:	Hitchens Stage 3 & 4	Job Name:	Hitchens Block, Pokeno	Drawn:	VIVE	Date:	4/02/19
Location:	Fill Area A	Job No.:	1009213.0050.0.0/1	URN:	7	Date:	4/02/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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Legend:

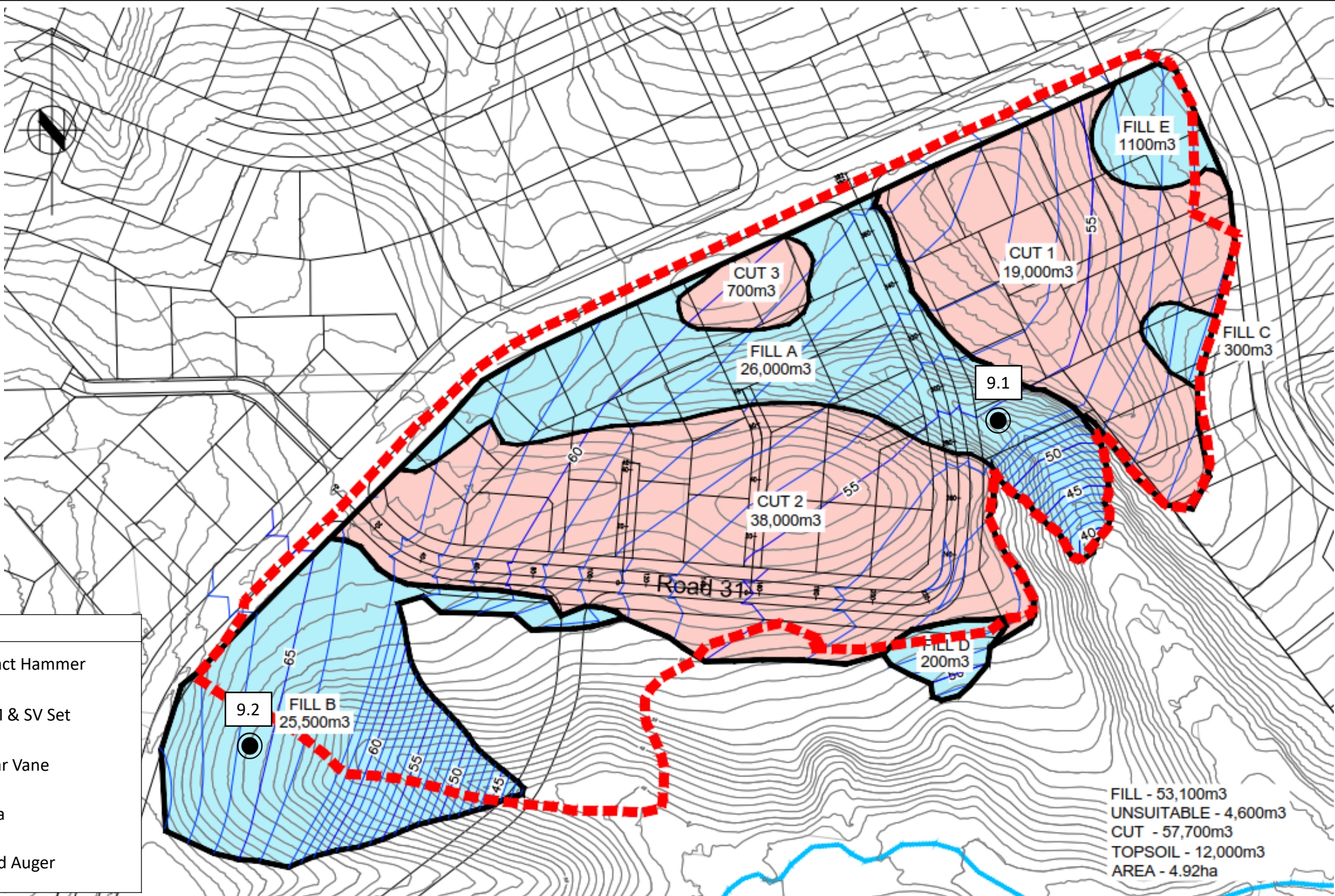
-  Impact Hammer
-  NDM & SV Set
-  Shear Vane
-  Scala
-  Hand Auger






Test Location Plan

Site:	Hitchens Stage 3 & 4	Job Name:	Hitchens Block, Pokeno	Drawn:	VIVE	Date:	7/02/19
Location:	Fill Area A	Job No.:	1009213.0050.0.0/1	URN:	8	Date:	7/02/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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- Legend:**
-  Impact Hammer
 -  NDM & SV Set
 -  Shear Vane
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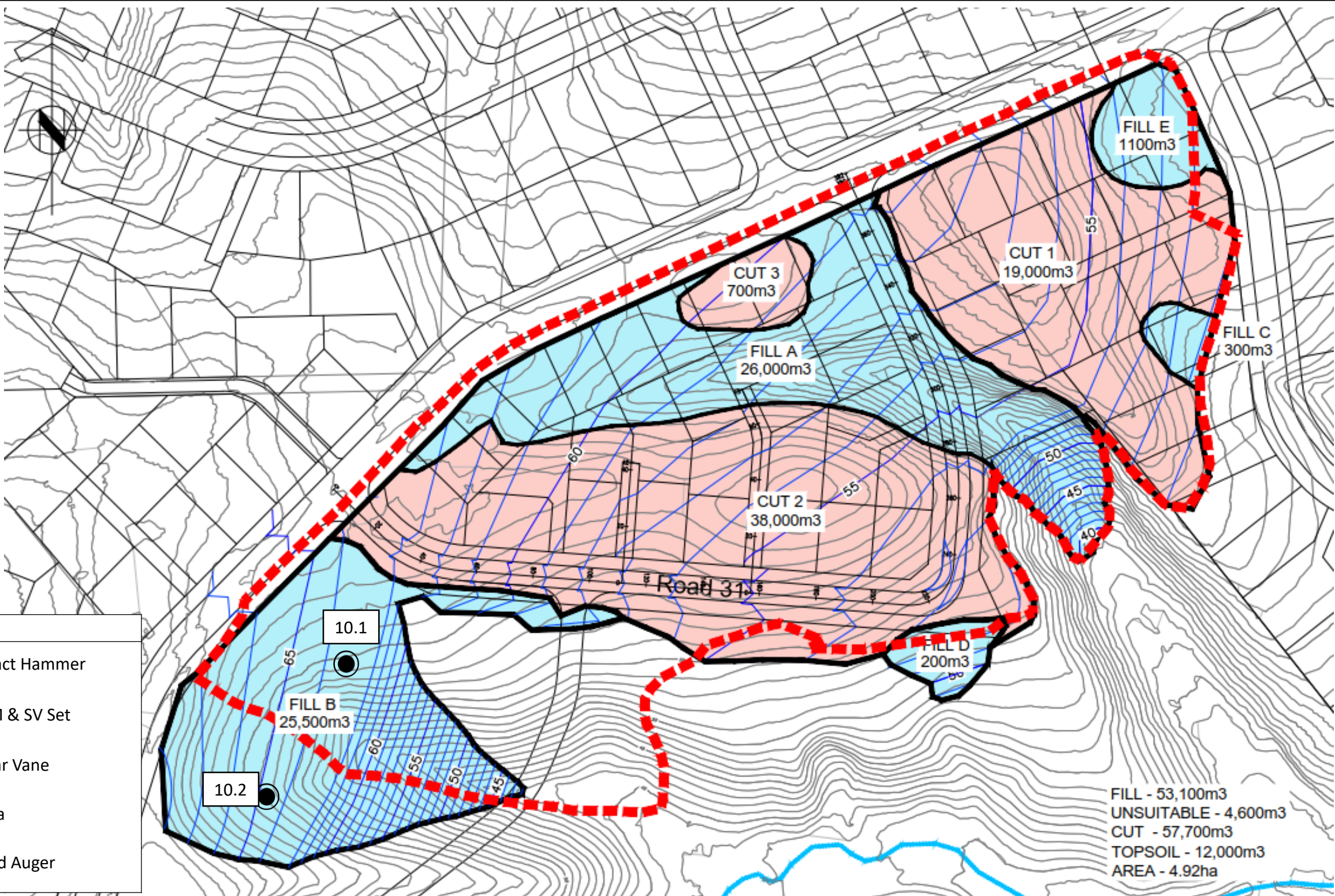
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Site:	Hitchens Stage 3 & 4	Job Name:	Hitchens Block, Pokeno	Drawn:	VIVE	Date:	11/02/19
Location:	Fill Area A and B	Job No.:	1009213.0050.0.0/1	URN:	9	Date:	11/02/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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 TOPSOIL - 12,000m³
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Test Location Plan

Site:	Hitchens Stage 3 & 4	Job Name:	Hitchens Block, Pokeno	Drawn:	VIVE	Date:	13/02/19
Location:	Fill Area B	Job No.:	1009213.0050.0.0/1	URN:	10	Date:	13/02/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



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Appendix B: Stage 3 Slip Remediation and Test Plans

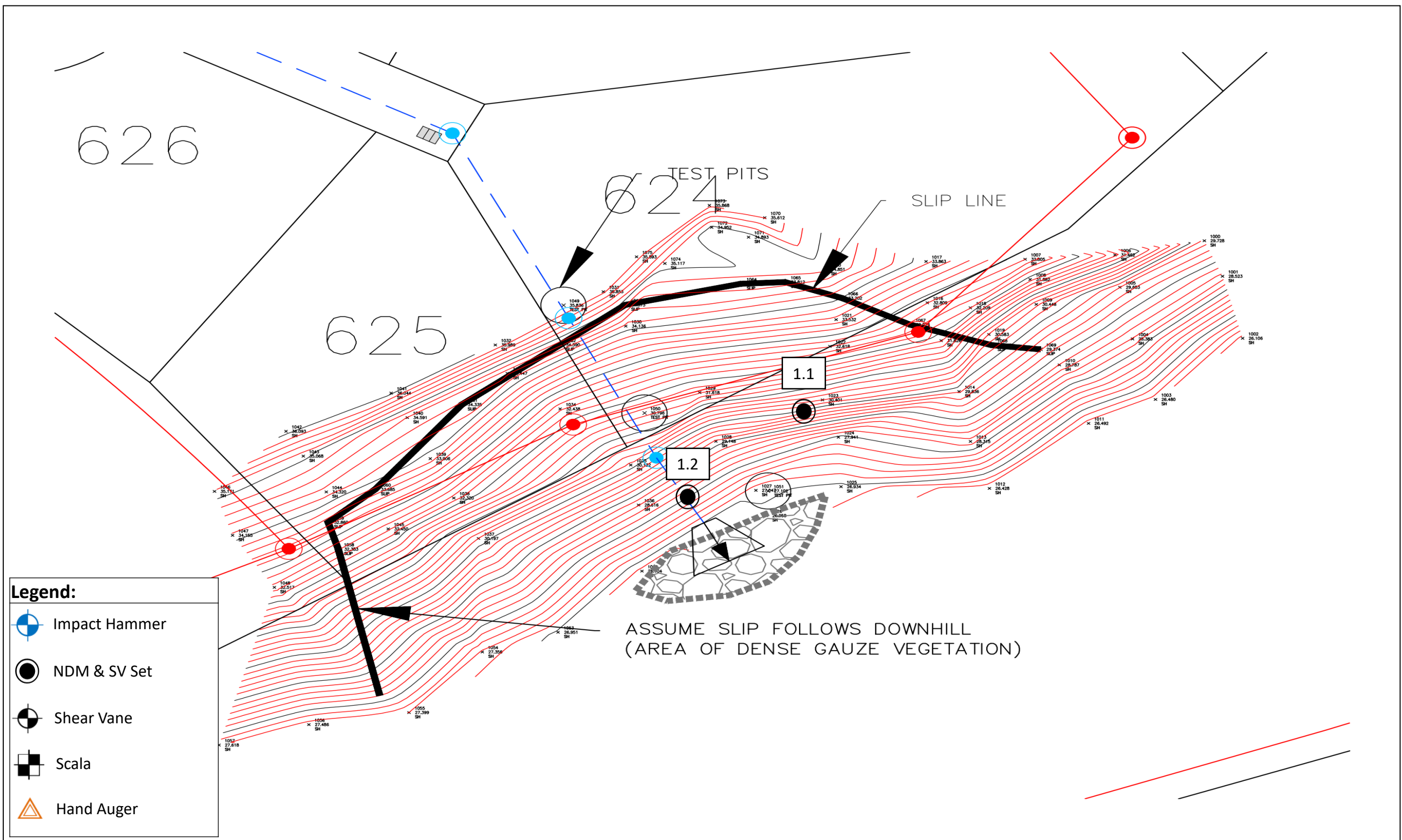


Job: Hitchens Block, Pokeno - Stage 3, Slip Area






Client: Lander Geotechnical

Job #	1009213.0050.0.0/1
Entered By	JRA / VIVE
Checked By	JRA / VIVE
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	Shear Vane Reading (kPa)					Average SV	Retest URN	PASS / FAIL		Comments
							Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)	Wet Density (t/m³)	Moisture Content (%)	Air Voids (%)			Oven Dry Density (t/m³)	Average Air Voids (%)		Reading 1	Reading 2	Reading 3	Reading 4	Average SV (4 x Tests)			(P) Pass	(F) Fail	
1.1	VIVE	1/02/2019	Stage 3 - Slip Remediation Area	RL 60.65	Clay SILT	NDM / SV	1.79	39.8	1.6	1.79	38.4	2.7	1.79	39.1	2.1	2.70	37.4	1.30	3.1	-	139	>211	>211	>211	>193	-	-	P	Surveyor provided RLS	
1.2						NDM / SV	1.77	35.6	5.3	1.76	36.7	5.2	1.76	36.2	5.3	2.70	36.7	1.29	4.9	-	181	133	127	166	152	-	-	P		
2.1	VIVE	7/02/2019	Stage 3 - Slip Remediation Area	RL ~61.5	Clay SILT	NDM / SV	1.72	33.9	8.9	1.71	33.5	9.8	1.71	33.7	9.3	2.70	30.6	1.31	11.3	-	>211	>211	>211	>211	>211	-	-	P		
2.2						NDM / SV	1.76	29.1	9.8	1.75	30.7	9.3	1.76	29.9	9.5	2.70	27.9	1.37	10.9	-	>211	>211	196	>211	>207	-	-	P		
3.1	VIVE	11/02/2019	Stage 3 - Slip Remediation Area	RL ~62.5	Clay SILT	NDM / SV	1.82	27.4	8.0	1.82	26.8	8.4	1.82	27.1	8.2	2.70	29.7	1.40	6.4	-	UTP	UTP	UTP	UTP	UTP	-	-	P		
4.1	JRA	13/02/2019	Stage 3 - Slip Remediation Area	RL ~63.5	Clay SILT	NDM / SV	1.93	33.1	0.0	1.93	33.2	0.0	1.93	33.2	0.0	2.70	30.2	1.48	0.4	-	193	>211	>211	>211	>207	-	-	P		
5.1	VIVE	15/02/2019	Stage 3 - Slip Remediation Area	RL ~64.5	Clay SILT	NDM / SV	1.63	45.3	7.4	1.64	45.6	7.1	1.64	45.5	7.3	2.70	50.9	1.08	4.7	-	175	>211	151	175	>178	-	-	P		
6.1	VIVE	20/02/2019	Stage 3 - Slip Remediation Area	RL ~65.5	Clay SILT	NDM / SV	1.80	38.3	1.7	1.82	37.6	1.5	1.81	38.0	1.6	2.70	38.5	1.31	1.3	5.4	151	160	145	145	150	>185	-	P		



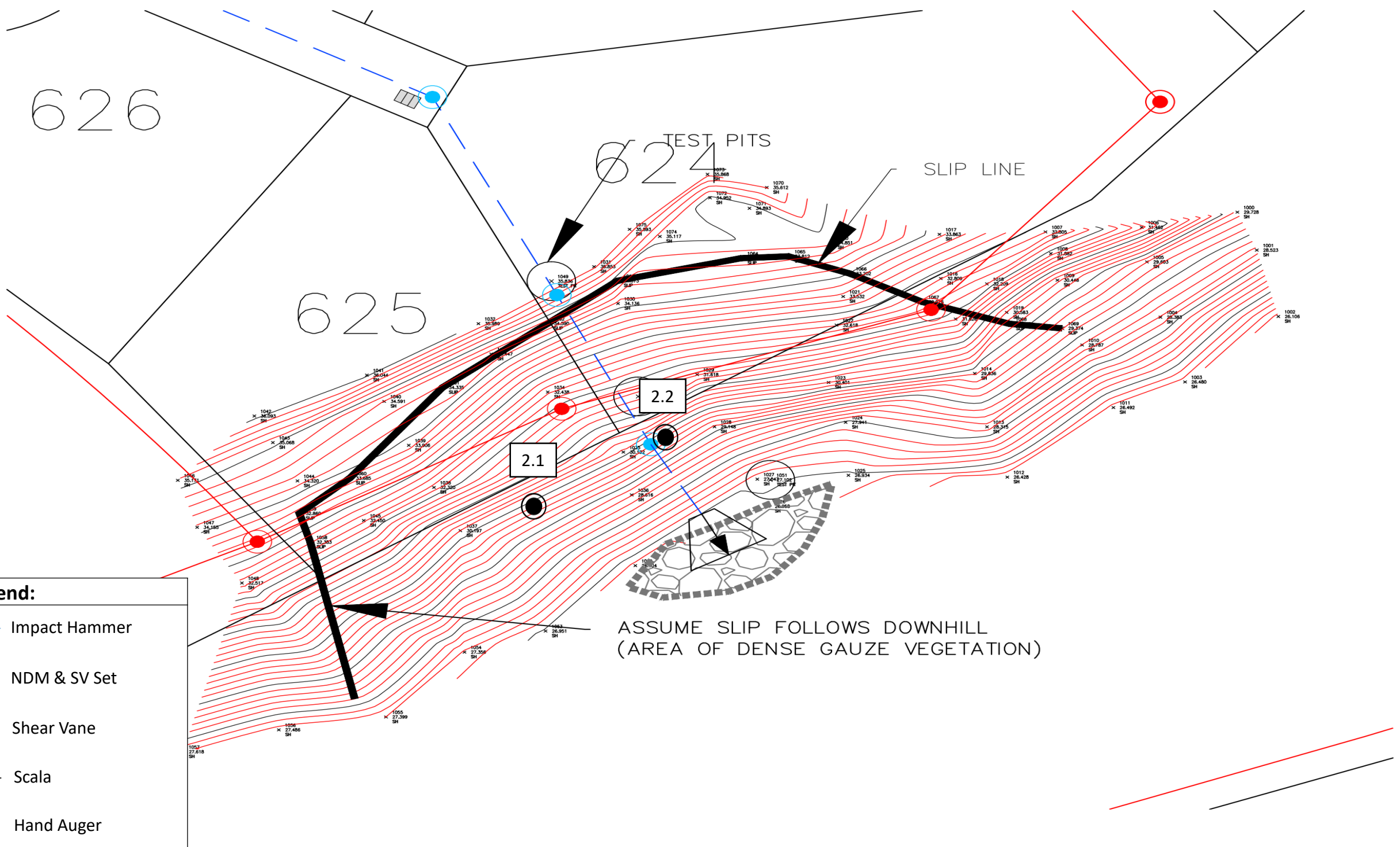
Legend:

-  Impact Hammer
-  NDM & SV Set
-  Shear Vane
-  Scala
-  Hand Auger

Test Location Plan

Site:	Slip Area - Hitchens Stage 3	Job Name:	Hitchens Stage 4	Drawn:	VIVE	Date:	01/2/19
Location:	Slip Area	Job No.:	1009213.0050.0.0/1	URN:	1	Date:	01/2/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1





Legend:

- Impact Hammer
- NDM & SV Set
- Shear Vane
- Scala
- Hand Auger

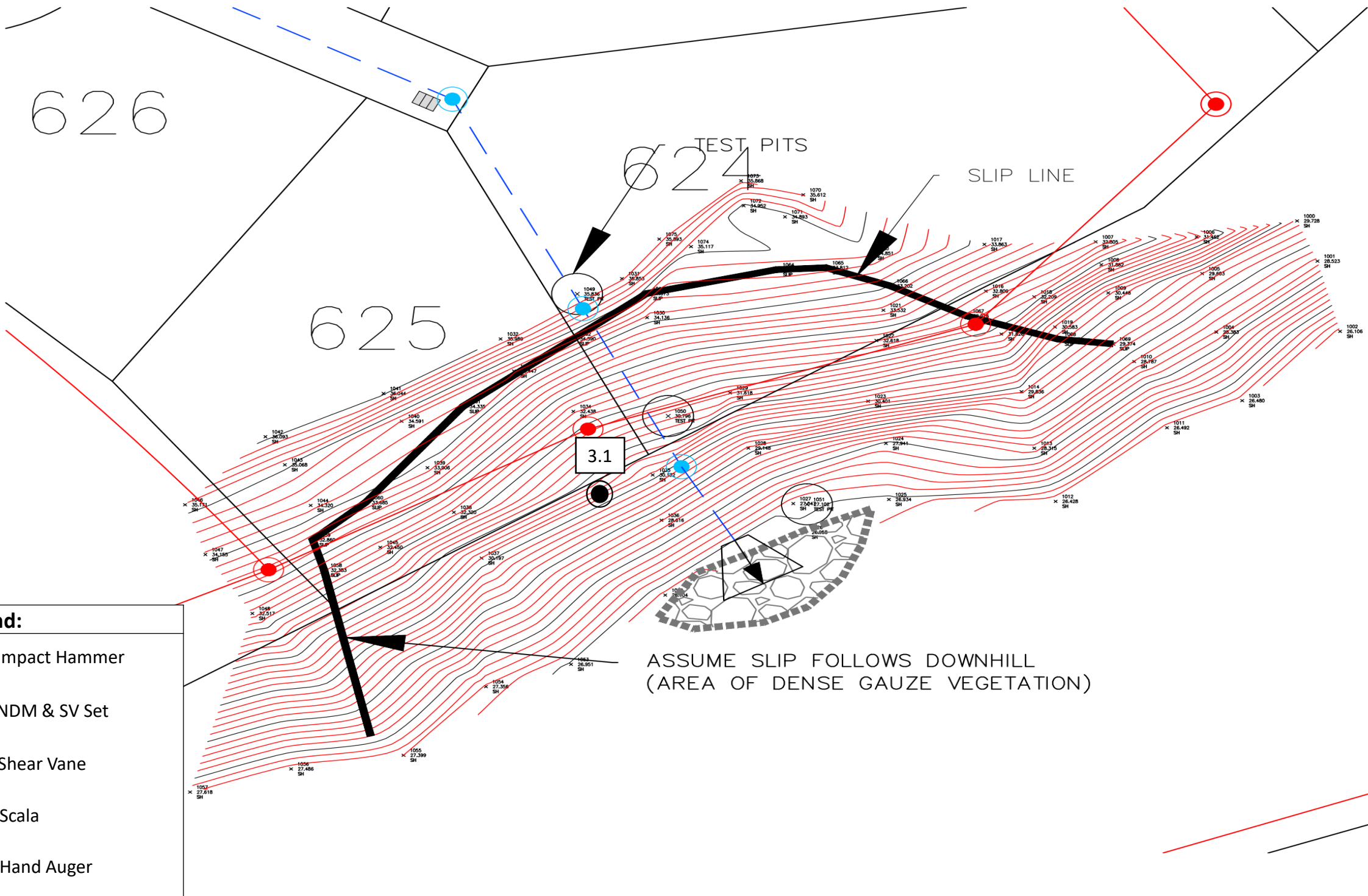
ASSUME SLIP FOLLOWS DOWNHILL
(AREA OF DENSE GAUZE VEGETATION)

Test Location Plan

Site:	Slip Area - Hitchens Stage 3	Job Name:	Hitchens Stage 4	Drawn:	VIVE	Date:	07/2/19
Location:	Slip Area	Job No.:	1009213.0050.0.0/1	URN:	2	Date:	07/2/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1




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Legend:

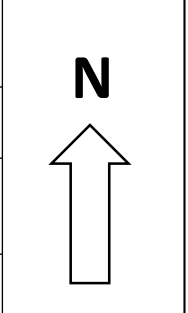
- Impact Hammer
- NDM & SV Set
- Shear Vane
- Scala
- Hand Auger

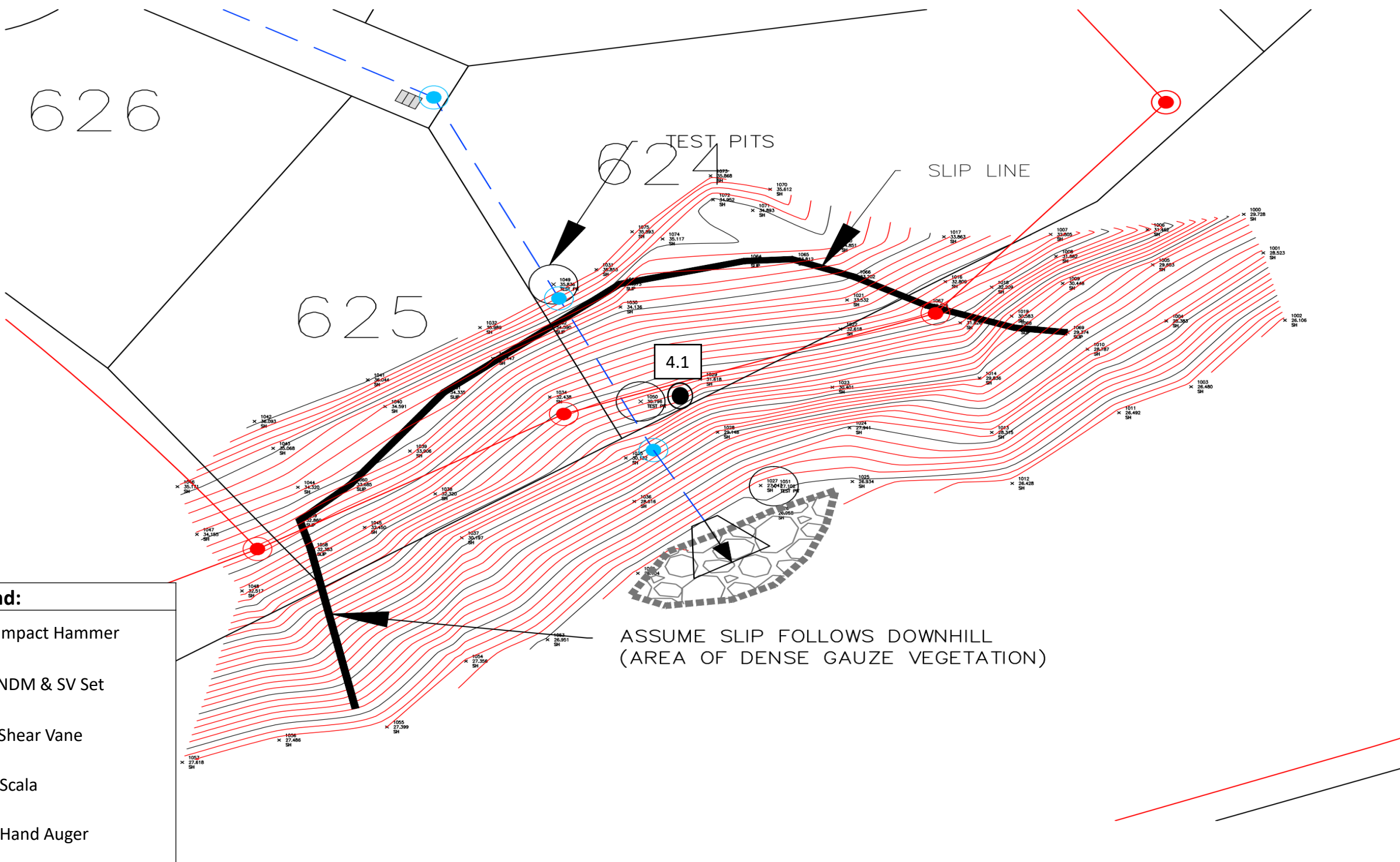
ASSUME SLIP FOLLOWS DOWNHILL
(AREA OF DENSE GAUZE VEGETATION)








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Test Location Plan							
Site:	Slip Area - Hitchens Stage 3	Job Name:	Hitchens Stage 4	Drawn:	VIVE	Date:	11/2/19
Location:	Slip Area	Job No.:	1009213.0050.0.0/1	URN:	3	Date:	11/2/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1





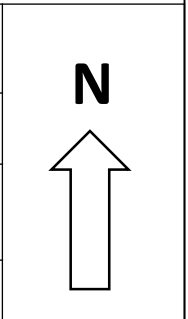
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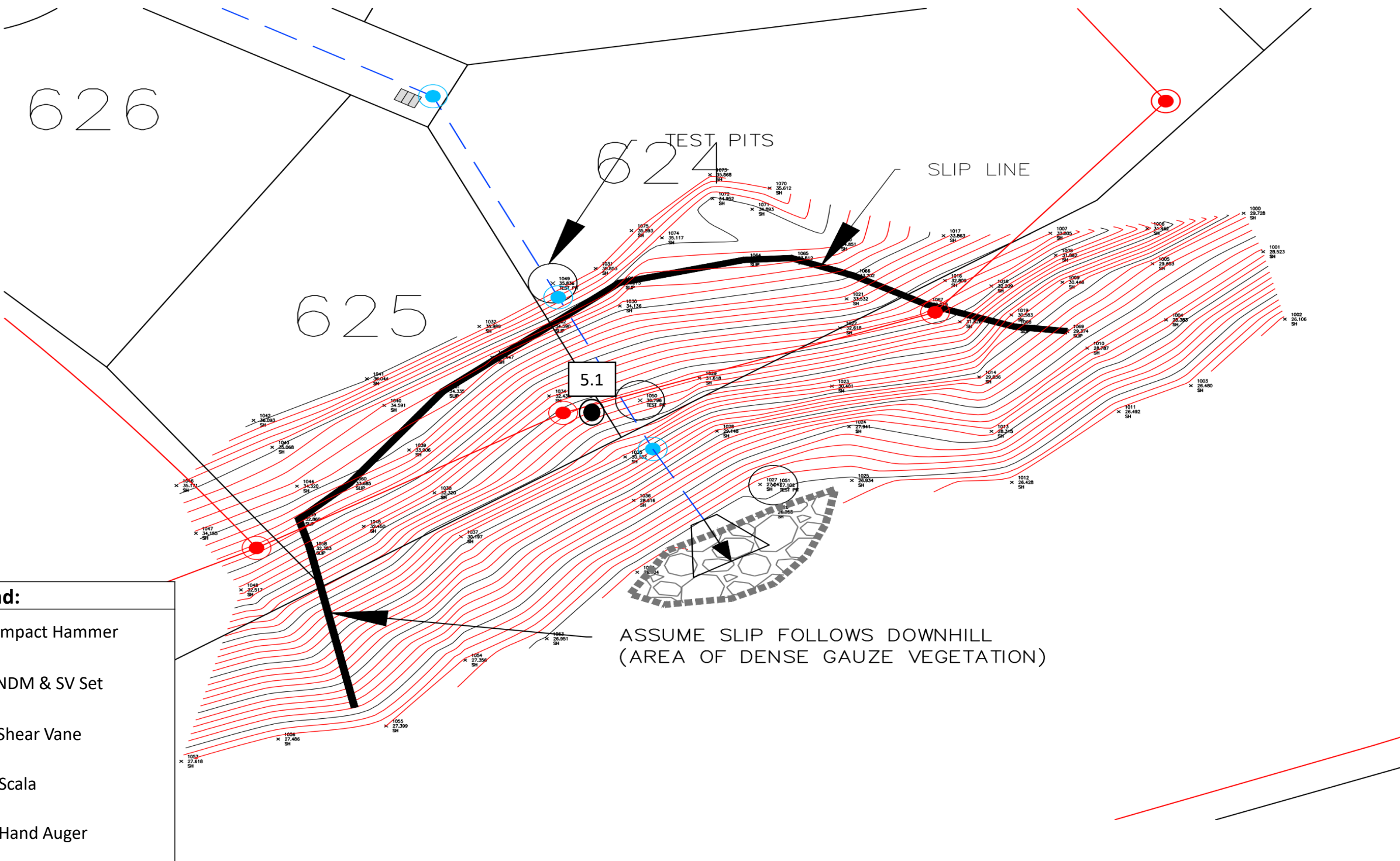
-  Impact Hammer
-  NDM & SV Set
-  Shear Vane
-  Scala
-  Hand Auger








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Test Location Plan							
Site:	Slip Area - Hitchens Stage 3	Job Name:	Hitchens Stage 4	Drawn:	JRA	Date:	13/2/19
Location:	Slip Area	Job No.:	1009213.0050.0.0/1	URN:	4	Date:	13/2/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1





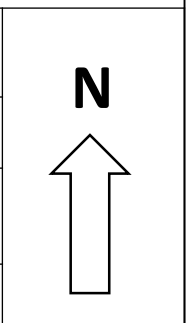
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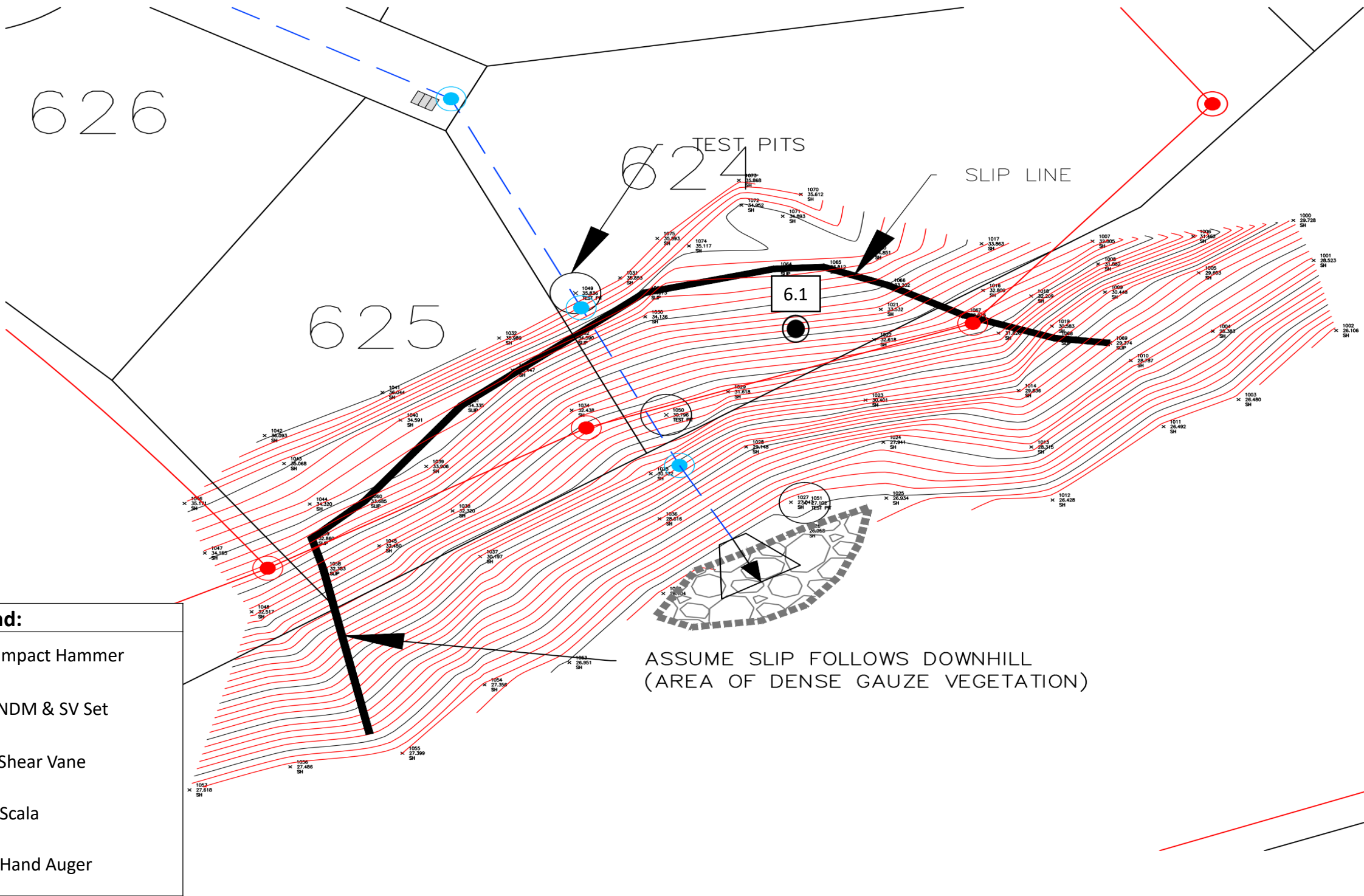
-  Impact Hammer
-  NDM & SV Set
-  Shear Vane
-  Scala
-  Hand Auger








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Test Location Plan							
Site:	Slip Area - Hitchens Stage 3	Job Name:	Hitchens Stage 4	Drawn:	VIVE	Date:	15/2/19
Location:	Slip Area	Job No.:	1009213.0050.0.0/1	URN:	5	Date:	15/2/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1



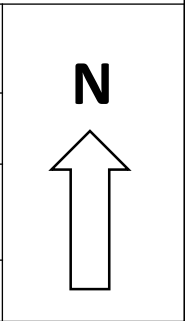


Legend:

-  Impact Hammer
-  NDM & SV Set
-  Shear Vane
-  Scala
-  Hand Auger

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Test Location Plan							
Site:	Slip Area - Hitchens Stage 3	Job Name:	Hitchens Stage 4	Drawn:	VIVE	Date:	20/2/19
Location:	Slip Area	Job No.:	1009213.0050.0.0/1	URN:	6	Date:	20/2/19
		Lab Ref:	- N/A	Scale:	Not to Scale	Rev.:	1





Our Ref: 1009521.1007/Rep1

Customer Ref: J00591

17 February 2020

Lander Geotechnical Consultants Limited
 Level 3/3 Osterley Way
 Manukau
 Auckland 2104

Attention: Chris Edwards

Dear Chris

Hitchen Stage 11,12,14 Pokeno

Laboratory Test Report

Samples from the above mentioned site have been tested as received 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 Consultants Limited, 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:

Authorised for Geotechnics by:




 Tylah Wardrop
 Laboratory Technician



 Paul Burton
 Project Director

Report checked by:



 Brendon Kingham
 Laboratory Coordinator
 Approved Signatory



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

17-Feb-20

t:\geotechnicsgroup\projects\1009521\1009521.1007\workingmaterial\20200217.hitchen stage 11,12,14 pokeno.tywa.docx



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Geotechnics Project Number 1009521.1007
QESTLab Work Order ID W20TG-0013
Customer Project ID J00113

Determination of Liquid & Plastic Limit, Plasticity Index - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

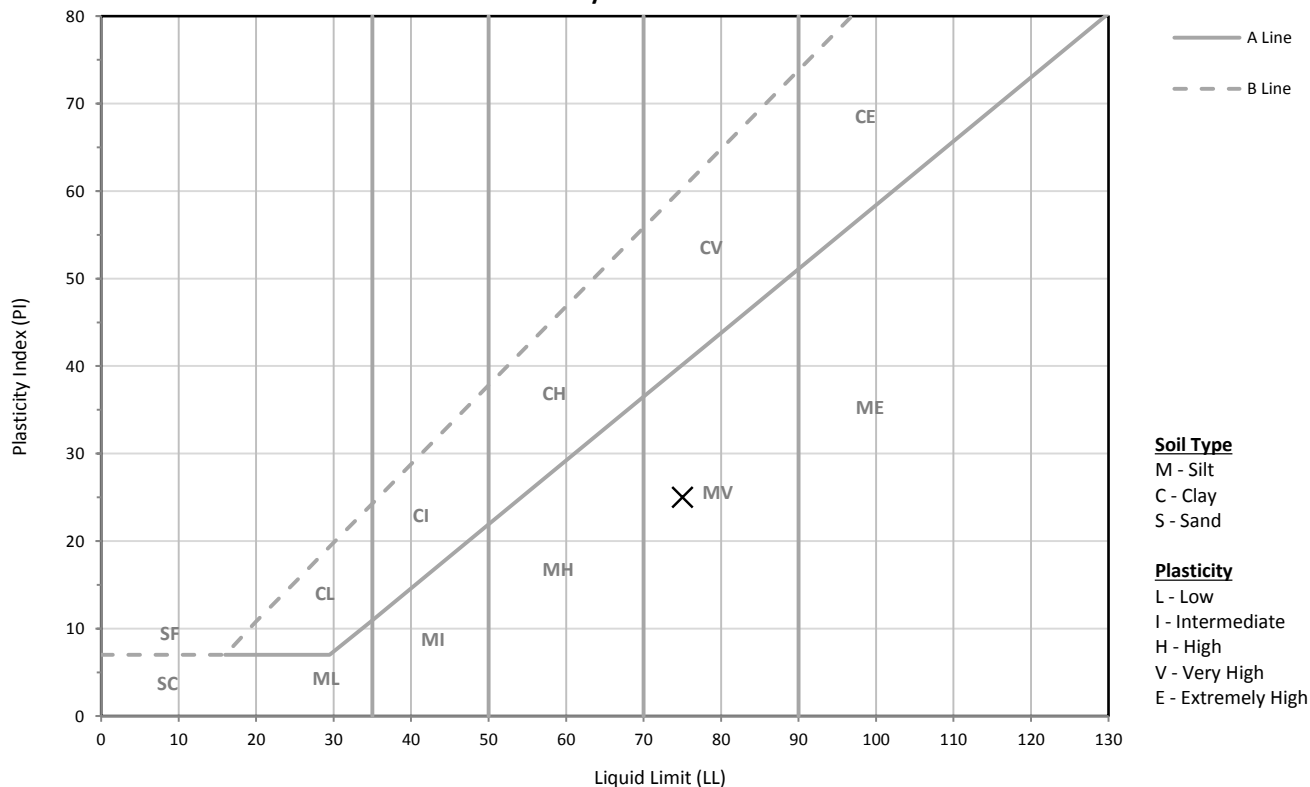
TEST DETAILS

LOCATION	Description	Hitchen Stage 11, 12 & 14, Pokeno		
	Data	N/A		
SAMPLE	Geotechnics ID	S20TG000030		
	Reference	LOT603	Top Depth	0.5m
	Sampled By	Others, Tested As Received	Bottom Depth	1.0m
	Description	SILT with some clay and some sand, trace rootlets; brown. Dry, very high plasticity.		
SPECIMEN	Reference	N/A	Depth	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit 75
Plastic Limit 50
Plasticity Index 25

Plasticity Chart - BS 5930:1999



Soil Type
 M - Silt
 C - Clay
 S - Sand

Plasticity
 L - Low
 I - Intermediate
 H - High
 V - Very High
 E - Extremely High

TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve. • This test result is IANZ accredited.

Approved Signatory Brendon Kingham
Date 17/02/2020



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Page 3 of 16
Geotechnics Project Number 1009521.1007
QESTLab Work Order ID W20TG-0013
Customer Project ID J00113

Determination of the Linear Shrinkage - NZS 4402:1986 Test 2.6

TEST DETAILS

LOCATION	Description	Hitchen Stage 11, 12 & 14, Pokeno		
	Data	N/A		
SAMPLE	Geotechnics ID	S20TG000030		
	Reference	LOT603	Top Depth	0.5m
	Sampled By	Others, Tested As Received	Bottom Depth	1.0m
	Description	SILT with some clay and some sand, trace rootlets; brown. Dry, very high plasticity.		
SPECIMEN	Reference			
	Description			

Linear Shrinkage **16%**

TEST REMARKS

- This test result is IANZ accredited.

Approved Signatory Brendon Kingham
Date 17/02/2020



GEOTECHNICS

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Report No: MAT:S20TG000030**Issue No: 1**

Material Test Report

Customer: Lander Geotechnical
Address: Level 3, 3 Osterley Way
 Manukau, 2104
Project: Hitchen Stage 11,12,14 Pokeno
Project No.: 1009521.1007
Customer Reference No.: J00113
Report Authorised By : Brendon Kingham

Approved By:
 Brendon Kingham
 (Geotechnical Technician)
 Date of Issue: 17/02/2020

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

Sample Details

Location Hitchen Stage 11, 12 & 14, Pokeno
Geotechnics ID S20TG000030
Sample Reference LOT603
Sample Description SILT with some clay and some sand, trace rootlets;
 brown. Dry, very high plasticity.
Sample Depth 0.5m
Bottom Depth 1.0m

Test Results

Description	Method	Result	Limits
Moisture Content [NZS 4402:1986 Test 2.1]			
Moisture Content (%)		35.6	
Date Tested		17/02/2020	

Comments

This test result is IANZ accredited.

If samples have been taken, and were not destroyed during testing, they will be retained for one month from the date of this report before being discarded.



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Geotechnics Project Number 1009521.1007
QESTLab Work Order ID W20TG-0013
Customer Project ID J00113

Determination of Liquid & Plastic Limit, Plasticity Index - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

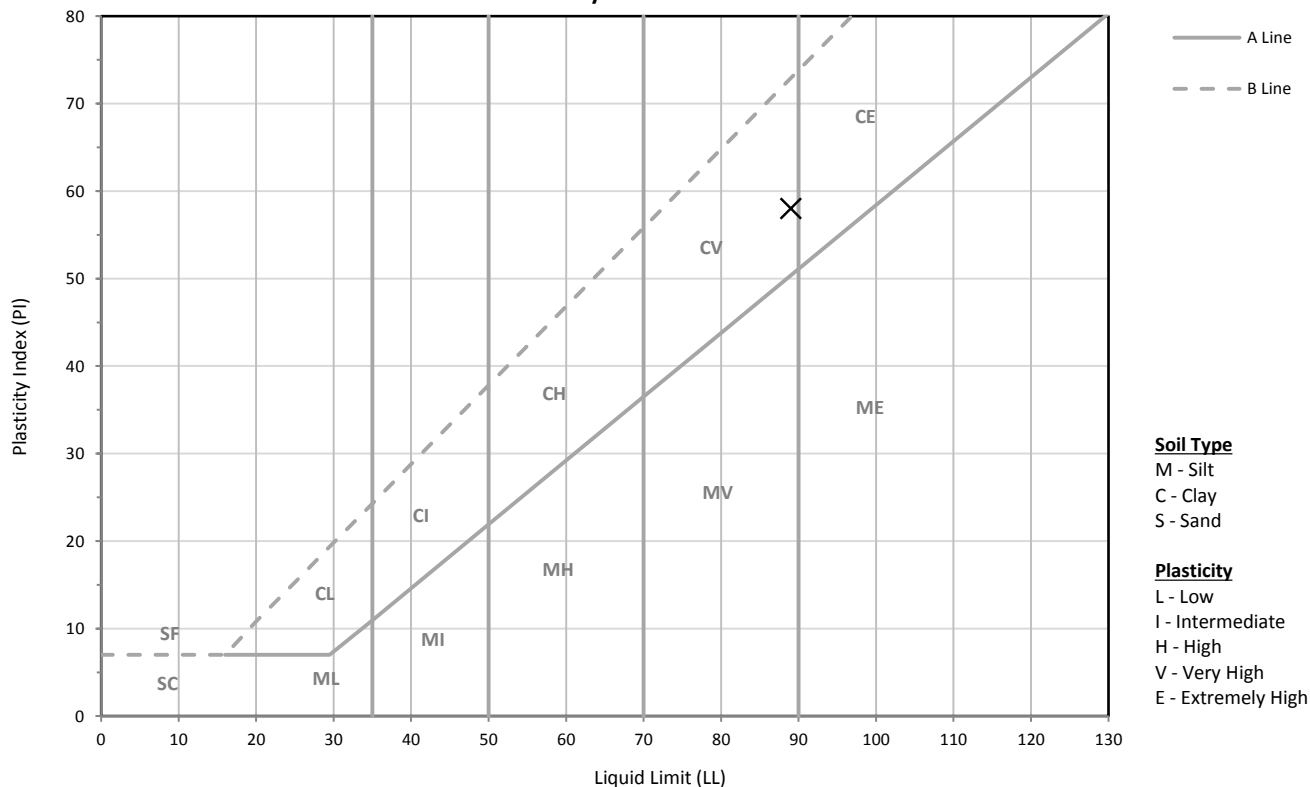
TEST DETAILS

LOCATION	Description	Hitchen Stage 11, 12 & 14, Pokeno		
	Data	N/A		
SAMPLE	Geotechnics ID	S20TG000031		
	Reference	LOT627	Top Depth	0.5m
	Sampled By	Others, Tested As Received	Bottom Depth	1.0m
	Description	Clayey SILT with some sand, trace rootlets and trace gravel; brown mixed pink. Moist, very high plasticity.		
SPECIMEN	Reference	N/A	Depth	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit 89
Plastic Limit 31
Plasticity Index 58

Plasticity Chart - BS 5930:1999



Soil Type
 M - Silt
 C - Clay
 S - Sand

Plasticity
 L - Low
 I - Intermediate
 H - High
 V - Very High
 E - Extremely High

TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve. • This test result is IANZ accredited.

Approved Signatory Brendon Kingham
Date 17/02/2020



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Geotechnics Project Number 1009521.1007
QESTLab Work Order ID W20TG-0013
Customer Project ID J00113

Determination of the Linear Shrinkage - NZS 4402:1986 Test 2.6

TEST DETAILS

LOCATION	Description	Hitchen Stage 11, 12 & 14, Pokeno		
	Data	N/A		
SAMPLE	Geotechnics ID	S20TG000031		
	Reference	LOT627	Top Depth	0.5m
	Sampled By	Others, Tested As Received	Bottom Depth	1.0m
	Description	Clayey SILT with some sand, trace rootlets and trace gravel; brown mixed pink. Moist, very high plasticity.		
SPECIMEN	Reference			
	Description	Depth		

Linear Shrinkage **21%**

TEST REMARKS

- This test result is IANZ accredited.

Approved Signatory Brendon Kingham
Date 17/02/2020



GEOTECHNICS

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Tauranga 3110
New Zealand

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Report No: MAT:S20TG000031**Issue No: 1**

Material Test Report

Customer: Lander Geotechnical
Address: Level 3, 3 Osterley Way
Manukau, 2104
Project: Hitchen Stage 11,12,14 Pokeno
Project No.: 1009521.1007
Customer Reference No.: J00113
Report Authorised By : Brendon Kingham

Approved By:
Brendon Kingham
(Geotechnical Technician)
Date of Issue: 17/02/2020

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Sample Details

Location Hitchen Stage 11, 12 & 14, Pokeno
Geotechnics ID S20TG000031
Sample Reference LOT627
Sample Description Clayey SILT with some sand, trace rootlets and trace gravel; brown mixed pink. Moist, very high plasticity.
Sample Depth 0.5m
Bottom Depth 1.0m

Test Results

Description	Method	Result	Limits
Moisture Content [NZS 4402:1986 Test 2.1]			
Moisture Content (%)		30.9	
Date Tested		3/02/2020	

Comments

This test result is IANZ accredited.

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Geotechnics Project Number 1009521.1007
QESTLab Work Order ID W20TG-0013
Customer Project ID J00113

Determination of Liquid & Plastic Limit, Plasticity Index - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

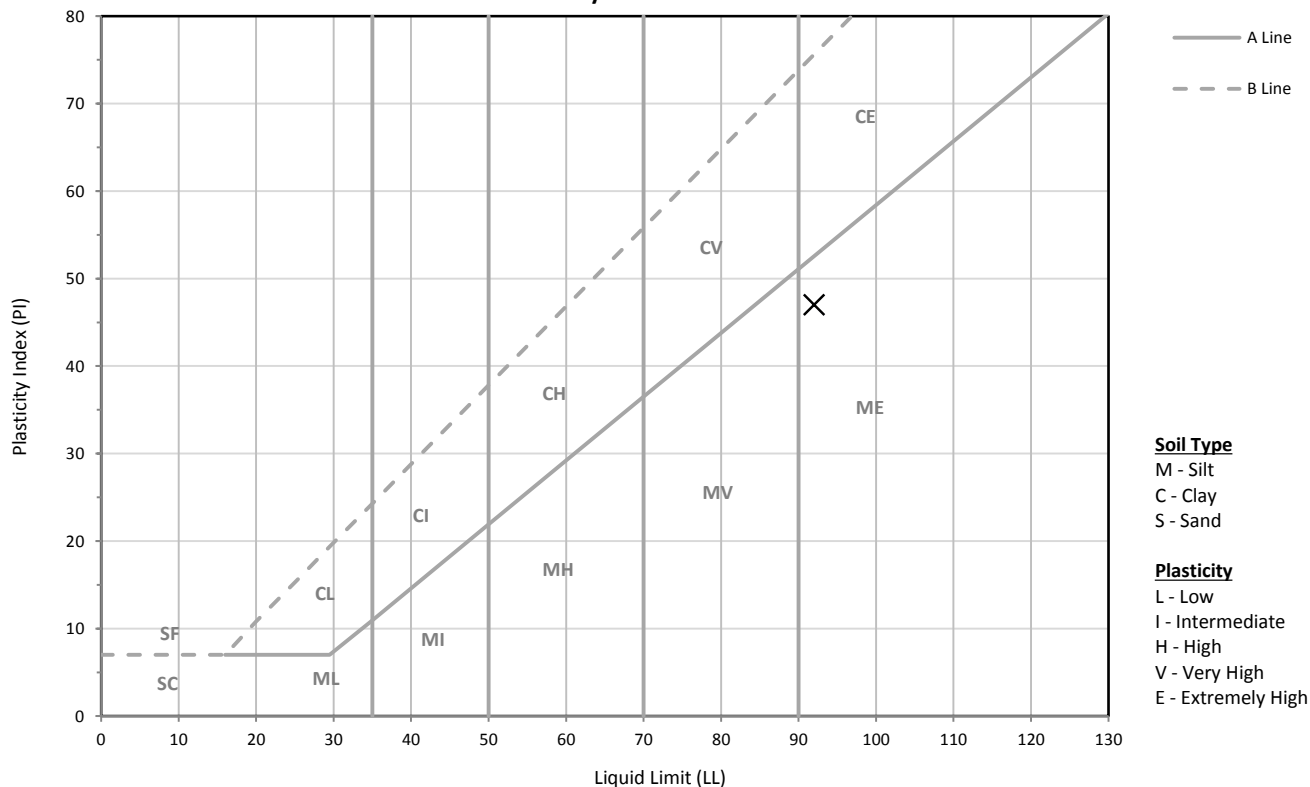
TEST DETAILS

LOCATION	Description	Hitchen Stage 11, 12 & 14, Pokeno		
	Data	N/A		
SAMPLE	Geotechnics ID	S20TG000032		
	Reference	LOT647	Top Depth	0.5m
	Sampled By	Others, Tested As Received	Bottom Depth	1.0m
	Description	Clayey SILT with some sand, trace gravel; light brown with orange brown mottling. Moist, extremely high plasticity.		
SPECIMEN	Reference	N/A	Depth	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit 92
Plastic Limit 45
Plasticity Index 47

Plasticity Chart - BS 5930:1999



TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve. • This test result is IANZ accredited.

Approved Signatory Brendon Kingham
Date 17/02/2020



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Geotechnics Project Number 1009521.1007
QESTLab Work Order ID W20TG-0013
Customer Project ID J00113

Determination of the Linear Shrinkage - NZS 4402:1986 Test 2.6

TEST DETAILS

LOCATION	Description	Hitchen Stage 11, 12 & 14, Pokeno		
	Data	N/A		
SAMPLE	Geotechnics ID	S20TG000032		
	Reference	LOT647	Top Depth	0.5m
	Sampled By	Others, Tested As Received	Bottom Depth	1.0m
	Description	Clayey SILT with some sand, trace gravel; light brown with orange brown mottling. Moist, extremely high plasticity.		
SPECIMEN	Reference			
	Description			

Linear Shrinkage **19%**

TEST REMARKS

- This test result is IANZ accredited.

Approved Signatory Brendon Kingham
Date 17/02/2020



GEOTECHNICS

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Report No: MAT:S20TG000032**Issue No: 1**

Material Test Report

Customer: Lander Geotechnical
Address: Level 3, 3 Osterley Way
Manukau, 2104
Project: Hitchen Stage 11,12,14 Pokeno
Project No.: 1009521.1007
Customer Reference No.: J00113
Report Authorised By : Brendon Kingham

Approved By:
Brendon Kingham
(Geotechnical Technician)
Date of Issue: 17/02/2020

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Sample Details

Location Hitchen Stage 11, 12 & 14, Pokeno
Geotechnics ID S20TG000032
Sample Reference LOT647
Sample Description Clayey SILT with some sand, trace gravel; light brown with orange brown mottling. Moist, extremely high plasticity.
Sample Depth 0.5m
Bottom Depth 1.0m

Test Results

Description	Method	Result	Limits
Moisture Content [NZS 4402:1986 Test 2.1]			
Moisture Content (%)		59.5	
Date Tested		3/02/2020	

Comments

This test result is IANZ accredited.

If samples have been taken, and were not destroyed during testing, they will be retained for one month from the date of this report before being discarded.



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Geotechnics Project Number 1009521.1007
QESTLab Work Order ID W20TG-0013
Customer Project ID J00113

Determination of Liquid & Plastic Limit, Plasticity Index - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

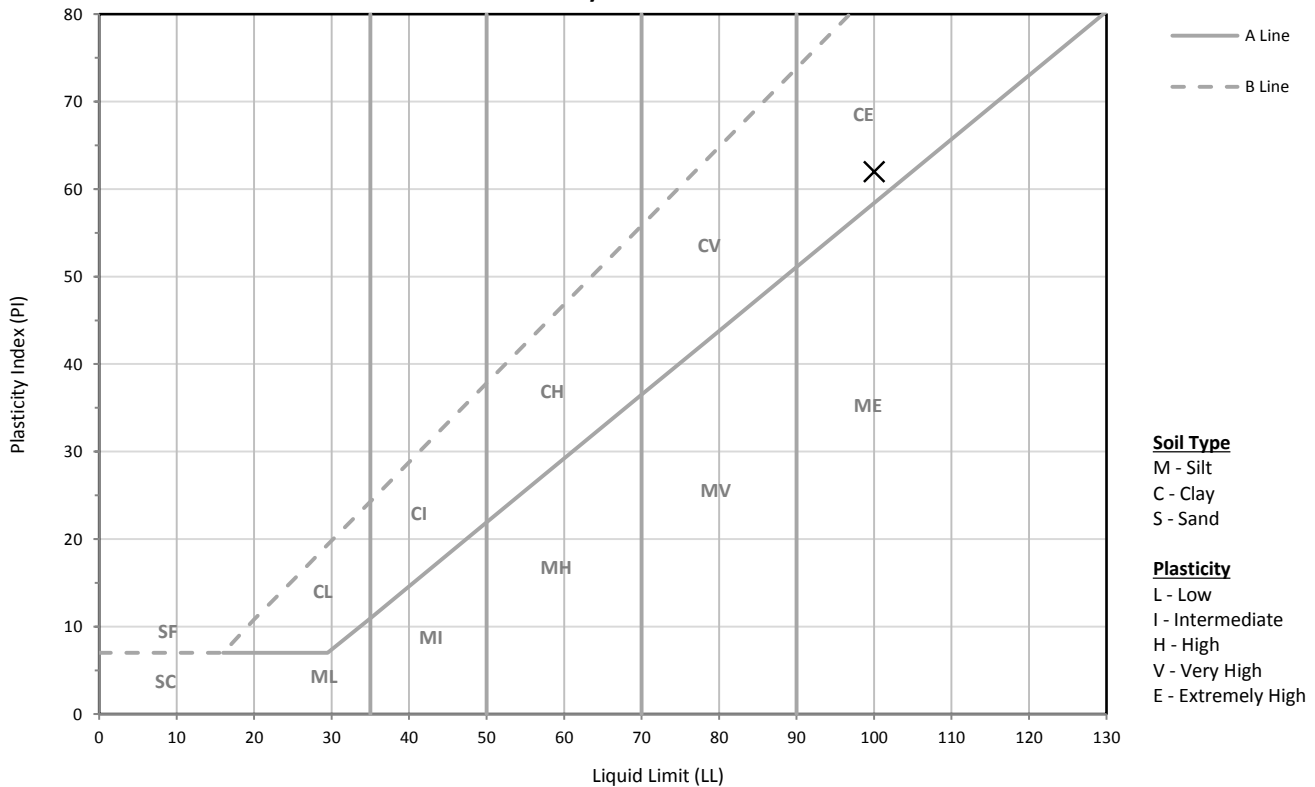
TEST DETAILS

LOCATION	Description	Hitchen Stage 11, 12 & 14, Pokeno		
	Data	N/A		
SAMPLE	Geotechnics ID	S20TG000033		
	Reference	LOT660	Top Depth	0.5m
	Sampled By	Others, Tested As Received	Bottom Depth	1.0m
	Description	SILT with some clay and some sand, trace gravel and trace rootlets; orange brown mixed lighty brown.Dry, extremely high plasticity.		
SPECIMEN	Reference	N/A	Depth	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit 100
Plastic Limit 38
Plasticity Index 62

Plasticity Chart - BS 5930:1999



Soil Type

M - Silt
 C - Clay
 S - Sand

Plasticity

L - Low
 I - Intermediate
 H - High
 V - Very High
 E - Extremely High

TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve. • This test result is IANZ accredited.

Approved Signatory Brendon Kingham

Date 17/02/2020



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Geotechnics Project Number 1009521.1007
QESTLab Work Order ID W20TG-0013
Customer Project ID J00113

Determination of the Linear Shrinkage - NZS 4402:1986 Test 2.6

TEST DETAILS

LOCATION	Description	Hitchen Stage 11, 12 & 14, Pokeno		
	Data	N/A		
SAMPLE	Geotechnics ID	S20TG000033		
	Reference	LOT660	Top Depth	0.5m
	Sampled By	Others, Tested As Received	Bottom Depth	1.0m
	Description	SILT with some clay and some sand, trace gravel and trace rootlets; orange brown mixed lighty brown. Dry, extremely high plasticity.		
SPECIMEN	Reference			
	Description			

Linear Shrinkage **24%**

TEST REMARKS

- This test result is IANZ accredited.

Approved Signatory Brendon Kingham
Date 17/02/2020



GEOTECHNICS

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Report No: MAT:S20TG000033**Issue No: 1**

Material Test Report

Customer: Lander Geotechnical
Address: Level 3, 3 Osterley Way
Manukau, 2104
Project: Hitchen Stage 11,12,14 Pokeno
Project No.: 1009521.1007
Customer Reference No.: J00113
Report Authorised By : Brendon Kingham

Approved By:
Brendon Kingham
(Geotechnical Technician)
Date of Issue: 17/02/2020

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

Sample Details

Location Hitchen Stage 11, 12 & 14, Pokeno
Geotechnics ID S20TG000033
Sample Reference LOT660
Sample Description SILT with some clay and some sand, trace gravel and trace rootlets;
orange brown mixed lighty brown. Dry, extremely high plasticity.
Sample Depth 0.5m
Bottom Depth 1.0m

Test Results

Description	Method	Result	Limits
Moisture Content [NZS 4402:1986 Test 2.1]			
Moisture Content (%)		37.6	
Date Tested		3/02/2020	

Comments

This test result is IANZ accredited.

If samples have been taken, and were not destroyed during testing, they will be retained for one month from the date of this report before being discarded.



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 Judea
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 New Zealand
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Geotechnics Project Number 1009521.1007
QESTLab Work Order ID W20TG-0013
Customer Project ID J00113

Determination of Liquid & Plastic Limit, Plasticity Index - NZS 4402: 1986 Tests 2.2 (4 Point), 2.3 & 2.4

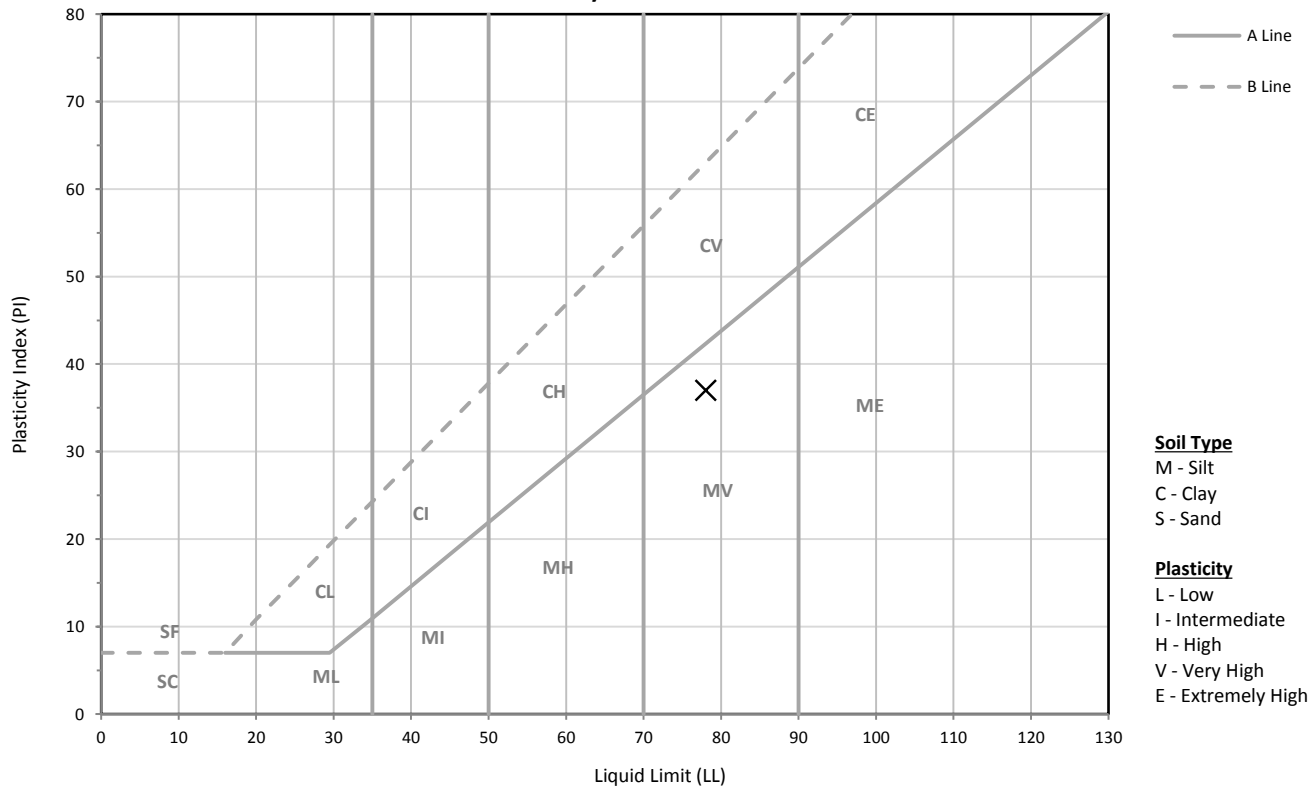
TEST DETAILS

LOCATION	Description	Hitchen Stage 11, 12 & 14, Pokeno		
	Data	N/A		
SAMPLE	Geotechnics ID	S20TG000034		
	Reference	LOT669	Top Depth	0.5m
	Sampled By	Others, Tested As Received	Bottom Depth	1.0m
	Description	SILT with some clay and some sand, trace rootlets; brown. Moist, very high plasticity.		
SPECIMEN	Reference	N/A	Depth	N/A
	Description	N/A		

TEST RESULTS

Liquid Limit 78
Plastic Limit 41
Plasticity Index 37

Plasticity Chart - BS 5930:1999



TEST REMARKS

• The material used for testing was natural, fraction passing a 425um sieve. • This test result is IANZ accredited.

Approved Signatory Brendon Kingham
Date 17/02/2020



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Geotechnics Project Number 1009521.1007
QESTLab Work Order ID W20TG-0013
Customer Project ID J00113

Determination of the Linear Shrinkage - NZS 4402:1986 Test 2.6

TEST DETAILS

LOCATION	Description	Hitchen Stage 11, 12 & 14, Pokeno		
	Data	N/A		
SAMPLE	Geotechnics ID	S20TG000034		
	Reference	LOT669	Top Depth	0.5m
	Sampled By	Others, Tested As Received	Bottom Depth	1.0m
	Description	SILT with some clay and some sand, trace rootlets; brown. Moist, very high plasticity.		
SPECIMEN	Reference	Depth		
	Description			

Linear Shrinkage **16%**

TEST REMARKS

- This test result is IANZ accredited.

Approved Signatory Brendon Kingham
Date 17/02/2020



GEOTECHNICS

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Sample Details

Location Hitchen Stage 11, 12 & 14, Pokeno
Geotechnics ID S20TG000034
Sample Reference LOT669
Sample Description SILT with some clay and some sand, trace rootlets;
brown. Moist, very high plasticity.
Sample Depth 0.5m
Bottom Depth 1.0m

Test Results

Description	Method	Result	Limits
Moisture Content [NZS 4402:1986 Test 2.1]			
Moisture Content (%)		44.0	
Date Tested		3/02/2020	

Comments

This test result is IANZ accredited.

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